Issue of *Identification of Options* in Context of Dam Planning and Management

FINAL Report to UNEP/DDP

Executive Summary

There have been a number of cases where decisions on the development and management of dams have not adhered to the emerging norms. Controversy about these cases led the World Bank and the World Conservation Union (IUCN) to initiate the World Commission on Dams (1998 – 2000), which undertook an unprecedented global consultation on large dams. In its final report, the Commission called for a new framework for decision making on water and energy development services. Under this framework, decisions on major dam projects should not be based solely on the technical merits of a proposed project. Decisions should also include a careful assessment of development needs, alternative options, and stakeholder perspectives.

The WCD recommended seven priorities in addressing dams and development. Comprehensive Assessment of Options is one of the seven priorities. COA comprises of needs analysis, identification of options and finally the screening of options. This assignment was aimed to identify, collect information and compile examples of relevant practices concerning the integration into policy/normative frameworks and implementation of Identification of Options in the context of dam planning and management.

The identification of Options as a separate subject is relatively new in the domain of public literature and debate. Much of the available literature and debate has surrounded the broader priority of comprehensive options assessment. In many documents and reports the identification of options is generally treated if not synonymously as COA.

Through secondary literature review and telephone interviews the Consultant developed a concept note to characterize the key issue of Identification of Options and derived some conclusions.

This report concludes the following about Identification of Options:

- That it occurs at different stages of the project life cycle from planning to extension or decommissioning
- That stakeholder involvement in the identification and screening of options is paramount in improving public acceptance of projects that are ultimately proposed for development.
- The identification of options can occur at the policy level about the different instruments in use, sectoral strategies and finally at project level on the
- There is very little information available in the public domain (internet) on the tools and frameworks in use in implementing the key issue of IO
- Impact on poverty reduction and environmental impacts are the common points of contention in the identification and selection of options

The assignment was approached on the basis of case studies from across the globe and covering the different levels of identification of options from policy, strategic/sectoral and the project level.

The case studies selected provided insights on the implementation of the key issue of Identification of Options at the various levels and stages of project life cycle. The policy level issues are covered in the case on EU Policy Options on Electricity Generation. The

case studies selected provided insights on the implementation of the key issue of Identification of Options at the various levels and stages of project life cycle. The policy level issues are covered in the case on EU Policy Options on Electricity Generation. The geographical elements are covered in the Community Based Planning for Water and Food Security in Zimbabwe and the Gouldburn Irrigation Options Case. The elements and frameworks for river basin level identification of options are addressed in the case studies on NELSAP Strategic Sectoral Environmental Assessment and the Olifants River Basin case studies. Sectoral elements are covered in the cases of Nepal Medium Hydropower Study, NELSAP Strategic Sectoral Environmental Assessment and to an extent Identification of Medium Scale Hydro Power Options in Uganda Case (Bujagali). Finally Project Level Options are covered in the British Columbia Water Use Plan Case, Tucurui Dam Case, Berg Water Project Case and the Identification of Medium Scale Hydro Power Options in Uganda Case (Bujagali).

In summary the following examples have been analysed:

PROJECT	*Investigation of Options*	*Stakeholder participation*	*Description of Options*	*Needs Assessment*
NELSAP Strategic Social Environmental Assessment	***Investigation of power development options for Nile Basin Countries***		***Description of both dam, and non-dam options for meeting energy needs***	
Community Based Planning – Gwanda			***Household Level water harvesting and soil conservation technologies***	***Community level matching of needs and options for meeting water and energy needs.***
Berg Water Project		***Stakeholders participation in the validation of preliminary identification of options***		
Olifants River Water Development Plan	***Identification of options for immediate needs and different stakeholders***			
Goulburn Irrigation Futures Options			***Dam and non-dam options to increasing agricultural production***	
Nepal Medium Hydro Study		***Stakeholder participation in identifying additional options and ranking criteria***		***Geographical balance of hydropower generation options***

EU Policy Measures for Renewable Energy	***Policy directives to identify and promote renewable energy options for new generation***			
British Columbia Water Use Planning Guidelines		***Stakeholder Participation in selection of dam operating regime***		
Ceara Integrated Water Project	***Staged development and selection of dam options for meeting water needs***			

In most of the cases it is evident that more information could have been derived from closer interviews with project promoters and other interested parties. This is due to the fact that there is limited literature available on the key issue with the bulk being around the broad subject of options assessment. There is limited amount of information available in the public domain mainly via the internet which severely constrained the analytical depth and subsequently the quality of the cases.

List of Acronyms

ADEN	African Development Education Network
AFFOREST	African Farmers Organic Research and Training
ANEEL	Agência Nacional de Energia Elétrica (Brazilian Electricity Regulatory Agency)
AREX	Department of Agricultural research and extension, Zimbabwe
BC	British Colombia
BNWPP	Bank Netherlands Water Partnership Program
BWP	Berg Water Project
CBP	Community-Based Planning
CCT	City of Cape Town
CFT	Core Facilitation Team
CMA	Cape Metropolitan Area
CMA	Catchment Management Authority
CMC	Cape Metropolitan Council
COGERH	Operational Water Agency in the State of Ceará, Brazil
DDP	Dams Development Project
DEAT	Department of Environment and Tourism
DFID	Department for International Development
DFO	Department of Fisheries and Oceans
DPI	Department of Primary Industries
DNR	Department of Natural Resources
DRC	Democratic Republic of Congo
DTT	District Training Team
DWAF	Department of Water Affairs and Forestry
EC	European Community
ECO	Environmental Control Officer
EEC	European Economic Community
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ENSAP	Eastern Nile Subsidiary Action Program
ESMAP	Energy Sector Management Assistance Programme
EU	European Union
FEEM	Fondazione Eni Enrico Mattei
FURNAS	Government-owned power utility
GBCMA	Goulburn Broken Catchment Management Authority
GLOF	Glacial Lake Outburst Flood
ICIMOD	International Centre for Integrated Mountain Development
IEA	International Energy Agency
IT	Intermediate Technology
ITDG	Intermediate Technology Development Group
ITQ	Individual Transferable Quota
IWRM	Integrated Water Resource Management
IWRP	Integrated Water Resource Planning
MCA	Multi-Criteria Analysis
MLGPWNH	Ministry of Local Government, Public Works and National Housing

MHSP	Medium Hydropower Study Process
NAP	National Action Plan
NBI	Nile Basin Initiative
NEA	Nepal Electricity Authority
NEL	Nile Equatorial Lakes
NELSAP	Nile Equatorial Lakes Subsidiary Action Program
NEMA	National Environment Management Act
NFFO	Non-Fossil Fuel Obligation
NGO	Non-Governmental Organisation
Nile-COM	Nile Equatorial Lakes Council of Ministers
NWRS	National Water Resources Strategy
ORWRDP	Olifants River Water Resources Development Project
PDF	Power Development Fund
PND	Planos Nacionais de Desenvolvimento (National Development Plans)
PROGERIRH	The Programa de Gerenciamento e Integração dos Recursos Hídricos
PROURB	Programa de Desenvolvimento Urbano e Gestão de Recursos Hídricos
RD & D	Research, Development and Demonstration
RES-E	Electricity from Renewable Energy Source
SAHRA	National Heritage Resources Act
SECTAM	Secretaria de Estado de Ciência e Tecnologia do Estado do Pará (The Pará State Science and Technology Bureau)
RDC	Rural District Council
PSC	Project Steering Committee
SEA	Sectoral Environmental Assessment
SRC	Stakeholder Reference Committee
SRH	State Secretariat for Water Resources
SSEA	Strategic/Sectoral, Social and Environmental Assessment
TCTA	Trans-Caledon Tunnel Authority
TMG	Table Mountain Group
UDI	Unilateral Declaration of Independence
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WCD	World Commission on Dams
WCWDM	Water Conservation and Water Demand Management
WCWS	Western Cape Water System
WMA	Water Management Area
WSDP	Municipal Water Service Development Plan
WUP	Water Use Plan
ZFU	Zimbabwe Farmers Union

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1. Characterisation of the Issue: Identification of Options

~~1.~~1.1 Background

The World Commission on Dams (WCD) has become a useful reference material for current thinking on water, food, hydropower and many other benefits. It marked the first comprehensive assessment of dam development[1] when it was acknowledged that dams have made an important and significant contribution to human development, and the benefits derived from them have been considerable. But it concludes and points out that dams have not performed as expected in the following areas:

- Power – more than half the hydropower dams reviewed generated less power than projected.
- Water supply – 70 percent did not reach targets
- Irrigation – almost half have under–performed
- Flood control – dams have increased human vulnerability to floods

Part of the shortcomings arose from planning processes where appraisals of large dams were confined primarily to technical parameters and to the narrow application of economic cost-benefit analyses that did not consider other options to dams, the report notes. By applying a set of core values, the Commission identified seven strategic priorities. The comprehensive assessment of options to dams was identified as one such priority. Decision to build a dam should emerge from a comprehensive and participatory assessment of the full range of policy, institutional, and technical options, that starts upstream in the planning process. Elements of a comprehensive options assessment process are the assessment of needs, **identification of options** and the screening of options. It is the identification of options that is the subject of this paper.

Identification of options includes the collation and validation of the full menu of possible alternatives to meet the expressed needs. These options include technological, policy and institutional response, such as demand-side and supply- side measures; structural and non-structural alternatives; and conventional and non-conventional options. Options may be categorised further based on whether they contribute to demand-side management (DSM), supply-side efficiency, alternative supply options including rehabilitation and upgrading of existing facilities and conventional supply options.

Decisions to proceed with construction of dams should be part of a much larger framework, as dams, particularly large ones, are often a considerable form of investment that affects many stakeholders. Prior to the construction of a dam, a process of strategic choice to construct a specific dam should be weighed against other options for the development of a sector or river basin owing to some of the following reasons:

- The need to ensure that decisions are sound and reflect the interests of all their citizens. Increasing emphasis on good governance, transparent and participatory decision making, which requires that stakeholders are both consulted and

1.Construction of dams accelerated from 1950 until the turn of the century when the global total of 45000 large dams were in place. But pressure on funding agents like the World Bank and doubts on social benefits necessitated some review.

empowered to participate in decisions that affect them and their need to consider potential benefits with potential losses are important considerations.

- The magnitude of the water development challenges means traditional supply strategies alone can no longer meet the demands of growing populations in many water-stressed countries and regions. New supply options are needed along with options that contribute to better management of existing assets reductions in water demand are also needed to compliment supplies.
- There is a greater range of technical options now than a few decades ago; options that may perform similar functions, or replace, or work in combination with dams can be put to use.
- Recent trends in financing of development initiatives have seen shifts towards different forms of funding that include public-private partnerships. This has imposed greater rigor on financial returns and thereby necessitated the need to find the most efficient investment options. More emphasis is also being placed on poverty alleviation in the global development agenda, making governments more accountable to their citizens' rights and interests.
- Greater concern over the social and environmental impacts of dams and their alternatives has entailed greater rigor in the assessment of options to meet developmental needs of communities and countries.

Taken together, these trends have broadened the objectives of decision making on public causes from narrowly defined technical and economic objectives to meeting complex human development needs and environmental sustainability.

1.2. Comprehensive Options Assessment

An options assessment is part of a decision-making process that works towards identifying the most appropriate options to satisfy defined needs. These processes are conducted at policy, strategic planning and project levels. Comprehensive options assessments:

- are driven by a needs assessment that reflects local, sub-national and national goals and is influenced by international commitments.
- are transparent; they are built on explicit assumptions and result in documented decisions.
- include the full range of alternatives relevant to the articulated need, such as demand-side and supply- side measures; structural and nonstructural alternatives; and conventional and non-conventional options.
- are participatory involving, among others, project-affected groups at local levels; and representatives of interest groups at the strategic planning and policy levels.
- recognize and address limitations of knowledge base and available resources.
- are iterative processes with time-bound outcomes designed to meet both short- and long-term needs.
- integrate consideration of environmental and social factors together with technical, economic and financial factors.

(UNEP-DDP, 2003)

1.2.1 Needs Assessment

Assessing the need (demand) for water and energy services in different sectors, and the relationship of these needs to wider development goals is an essential step in options assessment. The development goals and needs should be clearly set out and agreed by all stakeholders before proceeding to the identification of the options.

Generally, a study team would update or prepare the needs assessment, which is then reviewed by a multi-stakeholder advisory group, thus ensuring that stakeholders have input to this important phase of the assessment. The needs assessment should not only consist of demand forecasts, but also include required levels of access of different beneficiary groups to water or energy services, and in many cases the levels of service reliability. Needs are not defined simply in terms of growing demand, but also in terms of a society's development objectives. Consequently, the wider and cross sectoral impacts of these services should also be considered, such as education, agricultural production, health, equity, and other socioeconomic impacts.

Surveys are generally used to obtain raw data on the demands for various water and energy services. In rural settings, a community's development needs can be assessed relatively quickly using Participatory Rapid Appraisals (PRA). PRA uses a variety of participatory techniques (such as visualization) that solicit views and information from focal groups. NGOs, because of their closeness to communities and deep experience in the application of PRA tools and methodologies, are often engaged to facilitate these exercises. Outcomes of PRA exercises are qualitative statements of the development needs and priorities of local communities. PRAs would reveal whether the present level of irrigation, drinking water, or power service provision hampers the community's socioeconomic development and whether the communities are actively in favour of improving such services.

Service-oriented demand forecasts such as power demand forecasts or projections of municipal water demands vary from simple projections of past trends to data-intensive, disaggregated modelling exercises. Simple trend-based forecasts are not very robust or reliable for longer time frames. Modelling can improve the accuracy of forecasts and produce scenarios by incorporating assumptions about behavioural responses to changes in price, climate (such as dependence of water or electricity demand on temperature), or technology (such as effective leak detection techniques or energy efficient household appliances). The drawback is that such models are data intensive and that databases must be constantly updated. Irrigation water use forecasts rely strongly on assumptions about future cropping patterns, commodity prices, and on assumptions about conveyance efficiencies of irrigation systems.

Depending on the scope and boundaries of the exercise, the needs assessment phase may also identify priority short-term needs. This may lead to a decision by the relevant government authorities to identify fast track options to address those needs, while options to respond to mid-term or longer-range needs are evaluated.

1.2.2 Assembly of the Options Inventory

A wide diversity of options for meeting water and energy needs are available. It is realized that an infinite variety of options is never available and fundamental factors such as affordability, resource availability and scale of requirements define the possible options that need to be assessed. (IHA, 2004)

Some principles of relevant practice to follow when identifying options for a particular set of needs include:

- **Involving stakeholders in identifying the options** helps ensure that a diverse range of options is identified that represent development objectives and the needs assessments. The involvement of the stakeholders also makes the

deletion of infeasible options and the fast tracking of options that meet immediate needs less controversial.

- **Include options at all scales of intervention**. Depending on the type of exercise, options may include initiatives at household scale, community scale, as well as larger infrastructure developments. It may mean using options identified in earlier basin and community level planning work.
- **Include options from different time frames and properly recognize lead times**. To meet both immediate and future needs, the options inventory should include options that have different time frames. It also requires realistic assessments of the timeframe for implementation of supply projects and for the effects of demand side measures to occur.
- **Include supply-side efficiency options**. Improved management of existing assets can significantly reduce the need for new infrastructure while improving the quality and access to services at less cost than new infrastructure.
- **Include demand-side management options.** Reductions in demand for water and energy through pricing reforms; improvements in source-, transmission- and end- user efficiency; and educational programs can significantly reduce requirements for new supply infrastructure, or take pressure off supply development programs. Where a country has low levels of access to water and energy services, as in many parts of Africa, the benefits from demand management will be limited although they can still play a role alongside new supply development.
- **Include policy interventions and institutional arrangements.** Better focused policy and more efficient institutional arrangements can help facilitate development of new supply options, increase supply efficiencies, or better manage demand. These policy and institutional options can include cost recovery programs, new tariff structures, privatization, decentralization, and management transfer.
- **Address remaining social concerns from past projects**. Social and environmental problems from past projects can influence public attitudes toward new infrastructure. The WCD global review showed that, in many cases, promises of compensation and sharing of benefits from dams have not been kept. This is a complex subject that does not lend itself to global statements. However, addressing legacy issues may be a sensible option where it will enhance the acceptance by stakeholders of new developments.

1.2.3 Screening and Ranking of Options

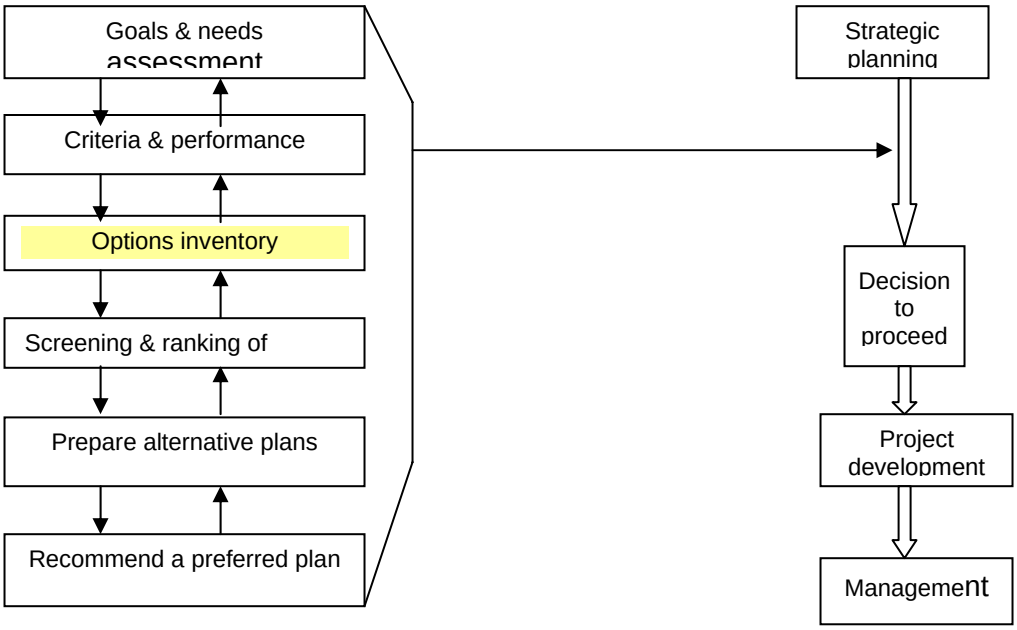
This phase typically consists of two steps: the rapid exclusion of unfavorable options (screening); and the valuing of the remaining options (ranking). The options are assessed against the criteria, so that options that contribute significantly to the needs and objectives set for the exercise are identified.

Where there are many options, there may be an initial stage where they are screened against coarse criteria and reduced to a more manageable number. This screening may include grouping similar options, as well as eliminating options that perform poorly against the screening criteria. For example, options that contradict provisions in national legislation can be excluded at this stage. In the case of the Nepal Medium Hydropower Screening and Ranking Project, compliance with the laws on conservation areas required eliminating potential hydropower sites from the project inventory if they were located in protected parks, conservation areas, and buffer zones. In irrigation

development, options that would extract water from transboundary rivers beyond quantities agreed in international treaties can be eliminated early.

An illustration of a structured approach drawn from a Word Bank study indicates the generic steps taken when performing a comprehensive options assessment. The process between goals / needs assessment is often an iterative one that typically results in an outcome of a preferred development plan. An appropriate sensitivity analysis or scenario analysis would also be provided to clearly show the range of circumstances where the recommendations are valid. Alternative plan(s) for significantly different scenarios could also be proposed. Similar steps may be used, but in a less extensive way, to assess within-project alternatives during the development and operational phases of a dam.

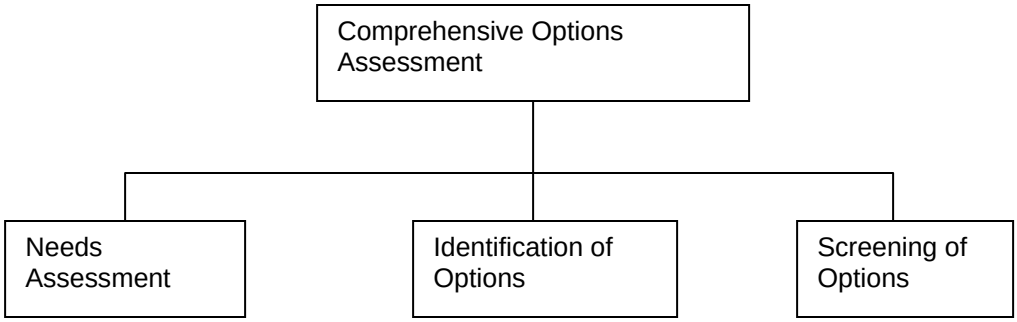
Figure 1. Typical steps of an options assessment process



To undertake comprehensive options assessments in the manner envisaged by the WCD, the planning processes must be dynamic, flexible and priority need to be given to the sustainability of what is already in place. Because of variations in natural resource endowment, both in time and space, a consensus may be quickly achieved without the performance of iterations. For instance, in an emergency drought situation, the need for domestic water supply may override all other needs stakeholders may propose. Very few no other options except the one that saves most lives in the quickest possible way will be considered viable.

1.3 Process Levels for Identification and Assessment of Options

The identification of options is an integral part of the process of comprehensive assessment of options as depicted below.



Despite its depiction as a separate element of the comprehensive options assessment framework, identification of options has hitherto been largely approached within the framework of options assessment rather than a stand alone process or event.

1.3.1 Levels of Options

As stated earlier, identification of options can take place at three levels i.e. the policy level, sectoral/strategic planning level and the project level.

1.3.1.1 Policy Level Options (policy review and development, reform of the legal and regulatory framework)

The policy framework and sector strategy of a country has increasingly become the focus of the debate over dams with the need for a comprehensive policy and regulatory framework that creates 'a level playing field' as the means to enable the full breadth of options to be fairly considered and assessed without being constrained by policy distortions or subsidies. However due to other national and geopolitical and social considerations such environmental sustainability, deliberate policy measures may be introduced to influence (promote or discourage) the adoption certain options in meeting water and energy needs. These could be in the form of environmental taxes, green electricity quotas.

To this end therefore policy-makers have to choose the instrument(s) or policy options that enable a country to meet its water and energy and broad strategic and development objectives. Such policy instruments and options contribute significantly in shaping the landscape in which water and energy use and generation options will be identified, adopted and implemented. As an example policy makers may require that they internalise the externalities[2] in the electricity production. For this they have to find a

[2] Externalities are defined as costs incurred by parties that are not engaged in any market transaction with the generator of the externality. An externality arises when the social or economic activities of one group of persons have an impact on another group and that impact is not fully accounted for by the first group. Thus, a power station that generates emissions of SO2 causing damage to building materials and human health is generating an externality

solution that gives the best outcome in terms of efficiency, cost minimisation, impact on the job market, security of supply, equity of the instrument, technological innovation, certainty of the level of the internalisation, and feasibility. The choice of the instrument will require some trade-offs among these criteria. The example on Policy Options for internalizing externalities in electricity production illustrates the framework (authorization and tendering procedure for additional electricity generation) in use in the European Union which influences the project choices for electricity generation.

The government is the key player and takes the lead and responsibility for identification of options at the policy level. Depending on the governance system, the process of identifying policy options is consultative with different stakeholders such as major end users, investors, industry/sector associations as well as consumer groups.

1.3.1.2 Strategic/Sectoral Level Options (master plans, basin plans, poverty reduction strategies, sector strategies, pre-feasibility)

There are different methods and techniques used in each sector to assemble options into a plan. In power sector planning exercises, system optimization and simulation models are typically used to prepare least-cost generation expansion plans for different scenarios. For example, a generation optimization model would show how the highest ranked generation options fit together (that is, which power generation options are selected, in what order, and in what timeframe) under different load forecast scenarios. The system models take into account the unique characteristic of each generation option, such as their suitability for base load, mid-range, and peak power generation, and ancillary benefits such as reactive power generation. In more complex planning exercises, a family of different expansion sequences can be produced for each scenario.

In the irrigation sector, farm household models help construct alternative farm configurations, which provide the required livelihood to the farming community. Plans can differ in the degree of dependence on irrigation, in the degree of specialization, and in the degree of support activities being undertaken, such as credit for farm modernization and input supply. Different farm household models may require different amounts of irrigation water supply and hence correspond with different infrastructure options.

Options for the management of water resources for various end uses can also be performed at the river basin level. This approach is premised on the concept of Integrated Water Resources Management (IWRM) and seeks to balance competing uses of finite water resources across sectors and users by recognizing the different uses and users but also the cross linkages between them.

The strategic/sectoral planning level identification of options is usually government led process. Sector stakeholders need to be actively consulted to add insights of local environment and projections of impacts especially where this is occurring at a basin level.

1.3.1.3 Project Level Options (feasibility, detailed planning, design, implementation and management phases)

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because the resulting impacts are not taken into account by the electricity generator when deciding to operate the power station.

For a set of identified needs, there are project options available that can adequately address these. The range of project options varies from increasing efficient use of available capacity to completely new infrastructure of either dam or non-dam options for supply water or energy. Efficiency improvement entails adopting new techniques and technology to use less resources without reducing the output. The key here is ensuring that identified options are derivatives of the expressed and verified needs of all stakeholders. It is quite rare to have a single intervention but rather a portfolio of interventions one reinforcing the other with each addressing specific needs and together contributing to different levels of local, regional and national development.

After a decision is taken to build a dam, decisions still need to be made about finalizing the physical components of the project, resettlement, local development issues related to the project, environmental and social mitigation, and management and monitoring activities.
Project Level options will include within project options which include optimization of capacity, different technical configurations to mitigate environment impacts and maximize benefits by addressing some of the developmental needs of locally affected communities.

Project level options identification is a process led by the promoter but with the government providing the guiding and enabling framework. Affected communities and service end users need to be widely consulted to tap local knowledge.

1.3.2 Stage in the Project Life Cycle

There are many decision points in the life of a dam or their alternatives in meeting the water and energy needs of people, where options have to be identified and assessed. Such options may include the extension of facilities (such as raising dams, increasing spillway capacities, adding outlets or power houses), introducing dam safety and emergency preparedness programs, and eventually making choices on life extension or decommissioning. Therefore, project- level options identification and assessment exercises can also be used to help make in-service decisions, as represented in Figure 2 below.

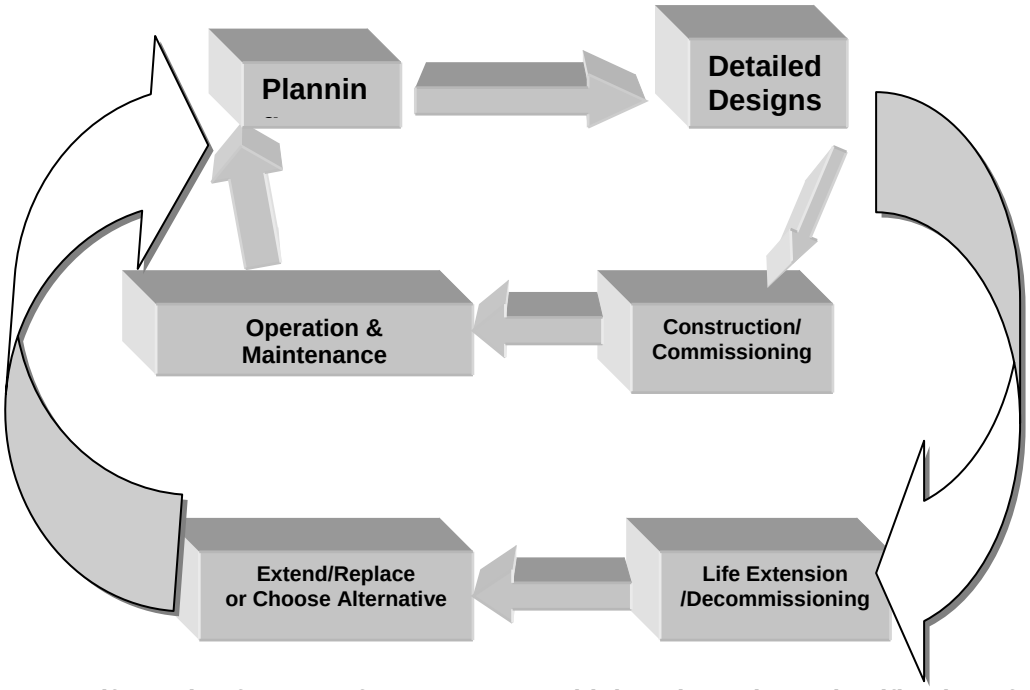

Figure 2: Life Cycle of Water Infrastructure – Multiple Points where Identification of Options and Assessment is carried out (Adapted from World Bank, 2004)

The triggers for identification of options exercises during the operational phase of dams are often regulatory but could also be a response to stakeholder influence especially affected communities and NGOs. Depending on the country and age of the dam, they might include:

- Re- licensing for owners and operators of dams (public or private)
- Introduction or changes in environment regulations, such as for environmental releases from existing dams where technically and economically feasible
- Regulatory requirements for periodic review of the management and operation of dams and their impacts
- Changes in economic regulation, such as restructuring of power markets that prompt changes in the operation of water and energy infrastructure (the case of the British Columbia's Water Use Planning Guidelines illustrates this)
- Changes in dam safety regulations.

1.4 Elements of the Identification and Assessment of Options

The identification of feasible options and their subsequent assessment are processes that are often involving. Many challenges and constraints arise from factors affecting societal choices, like natural resource endowments, technological capability, institutional capacity, finance, market conditions, cultural preferences, awareness and education. There are also obstacles that prevent more widespread adoption and use of certain options that need addressing. Obstacles may arise from market, policy, institutional, intellectual and regulatory factors; from capacity and resource constraints; the dominance of conventional approaches and interests in development planning; lack of awareness and experience with non-conventional alternatives; and inadequate access to capital and a lack of openness in the planning system. All can hinder or facilitate the identification and assessment of options.

A structured approach to identification and selection processes helps stakeholders to actively participate.

Current literature suggests that the process of identifying and assessing options is very much a learning exercise for the members of a group that may be leading the process. Often, there may be a need modify or improve criteria, revisit the importance of different criteria, or incorporate additional options. The important point is that all adjustments made within the process are carried out in a fair manner. The group leading the process should also ensure that:

- all options deemed relevant to stakeholders are included in the assessment.
- options are evaluated in a fair and transparent manner. Steps in options assessment should address aspects that stakeholders deem important, should be even handed and should be understood by all stakeholders
- reasons for exclusion or inclusion of options should be made clear.
- Social and environmental aspects are given the same significance as technical, economic, and financial factors in identifying options.
- economic, and financial factors in identifying options.

1.4.1 Investigation of Options

The range of options to be included in strategic planning for water and energy development is very wide. Each sector concerned with planning for water and energy development has its own set of options. Where planning takes place in a basin context the different sectors - power, irrigation, water supply, flood control, provide the options to be considered as illustrated below

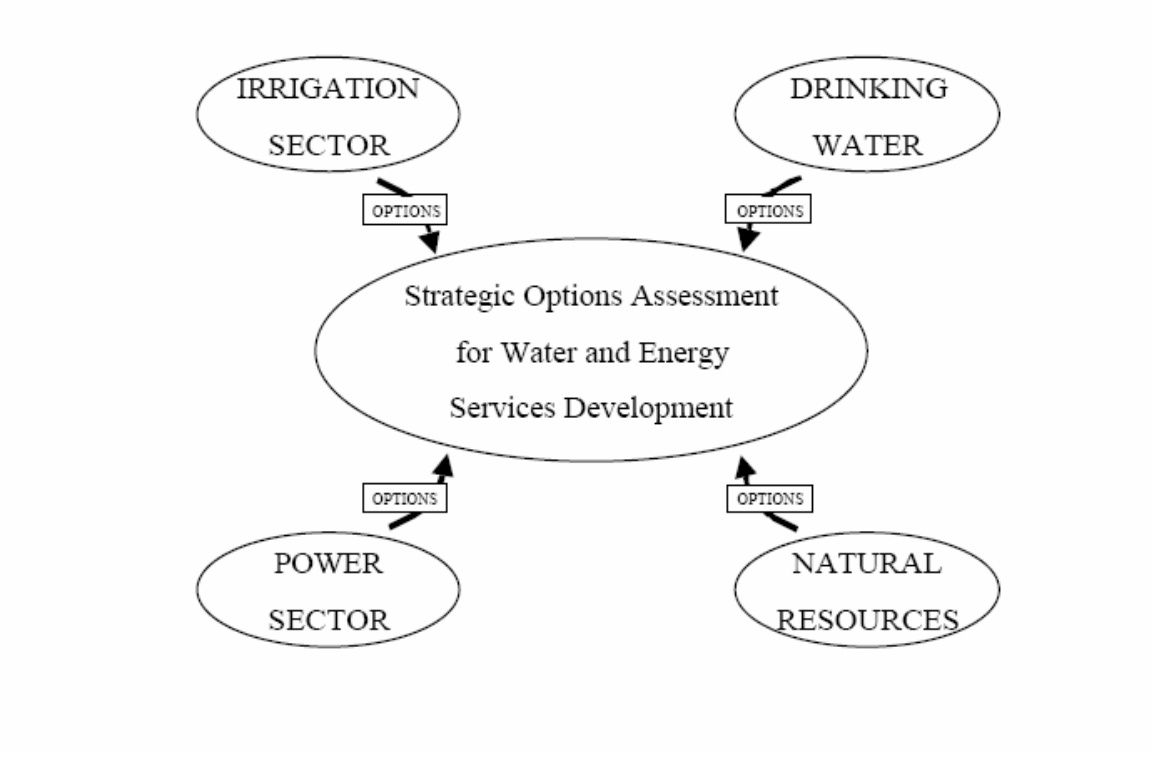

Figure 3: Sector Planning Informing Strategic Options Assessment in a Basin Context

Within each sector, the array of options can be placed along two axes; of structural versus non-structural options; and demand management versus supply development options. Within the structural options, further distinction can be made between options that address existing infrastructure and options that deal with new infrastructure. Supply options can comprise options those that:

- enhance local water supply through rain water harvesting, through small infield structures to encourage groundwater recharge, such as the contour and infiltration pits systems in Gwanda, Zimbabwe.
- increase power supply such as non conventional renewable energy supply options that include wind, solar, geothermal and fuel cell technologies.
-

Improving system efficiencies on the supply side can defer the need for new sources of supply by enhancing efficiencies, such as reducing leaks in agricultural and urban piped water reticulation to reduce losses or upgrading of control transmission and distribution technology in the power sector. Such supply side options can reduce water stress and power requirements. They can therefore be further categorised according to water use, such as in irrigation, energy or water supply.

Demand side options can also be structural or non structural. Policies, regulations, tariff measures are non-structural examples that can result in reduced demand in quantity of power or water used by consumers. Institutional practices that enhance efficiency of water and power use include education and awareness raising of consumers on water saving, adherence to technical standards and to existing legislation on control and water use for industrial and household equipment. Efficient end user technology such as electrical appliances, shifting to less water intensive crops, and recycling water are examples of structural options that improve efficiency or reduce demand.

The figure below illustrates the range of options available for a power sector intervention.

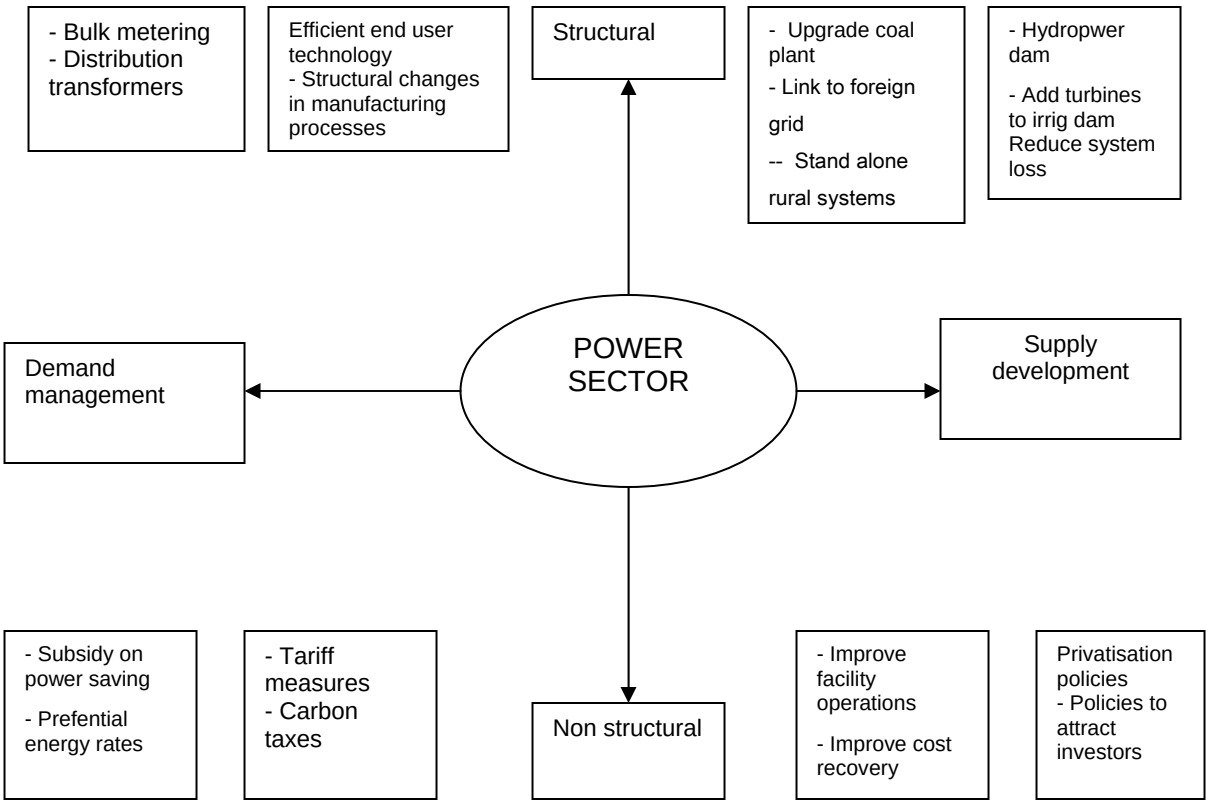

Figure 4: Power sector: an example of available options (Adapted from the World Bank, 2003)

Options also interact across sectors. An important part of this process is that dams are considered as part of a range of options and should be given the same weight as any of the other options. Hence, with interactions across sectors, a proposed dam might affect fishery, which leads to an option to safeguard fisheries or to assist fisherman to shift to aquaculture. Impacts on household properties and livelihoods lead to negotiations about resettlement and compensation. It is only through the active involvement of those affected by dams that all possible alternatives to dams are developed.

An increasingly popular variant of sectoral planning and identification of options is the Sectoral/Social and Environmental Assessment (SSEA). The SSEA incorporates environmental and social criteria in the selection of projects. The SSEA thus builds on traditional economic least-cost analysis by adding environmental and social criteria alongside the economic criteria. The SSEA is a prerequisite for IFC support to projects. The SSEA for the NELSAP programme Case Study 2 illustrates this.

1.4.2 Description of the Options

Options assessment is a component of planning approaches that assess all policy, institutional, management, and technical options before the decision is made to proceed with any set of programs or projects. Consequently, the assessment should be based on the respective merits of available options in the given context and involve full integration of social and environmental criteria into the set of technical, financial, and economic criteria.

Each of the options therefore has to be sufficiently described in terms of technical, economic, financial, institutional, environmental and social attributes.

Each option is different and it is not always possible to directly compare one alternative with another. It is nevertheless important that relevant comparisons are made in relation to the basic sustainability of a project. (IHA, 2004)

The description of options entails a certain level of preliminary investigation of the technical, social, economic, environmental and legal/regulatory aspects of the options. This is usually complicated by the disproportionate levels of information available across options.

1.4.3 Stake holder participation, identification and assessment of options

The identification and assessment of options should be open to all relevant stakeholders, starting from where needs are assessed through identifying the range of options available to meet needs. Participation of stakeholders is based on whether they could be affected by the outcomes of the planning exercise and on whether they are committed to contributing to it. Their involvement is not only a source of motivation to participants; it also imparts to the project the following characteristics:

- it gives the project legitimacy and contributes to good governance and acceptance of decisions. Legitimacy includes both good governance and acceptability of decisions; the process is also enhanced by the greater consensus that often arises from participatory decision-making rather than from narrow interests dominated by a few individuals.
- it reduces investment risk and makes the project more attractive to funding. By giving due consideration to alternatives and to the constructive involvement of stakeholders, beneficiaries of a project are more willing to pay for the services they receive. Investors and funding agents are also more reassured and are more likely to feel that safeguards on their investment policies will be met. This makes the project more attractive to funding.
-

To foster stakeholder involvement in these processes, information and resources need to be made available to stakeholders. As shown in the World Commission on Dams' analysis, past dam projects have not sufficiently considered all risks during the planning stage due to a variety of reasons that in some instances, include costs that arise from the long drawn out processes. Transparent and candid assessment of risks associated with major water resources interventions and the management of these risks were not common. As a consequence, many water related projects ended performing below expectations.

Yet studies indicate that investing up-front in stakeholder involvement and options assessment pays off in terms of reduced risks and uncertainties during project implementation (World Bank, 2003). The existence of a supportive environment helps to allow the participation of stakeholders in the identification and assessment of options. Such an enabling environment can be created through policies and legislation, by reorienting existing systems for planning, by providing relevant information and by building capacities that allow participants to understand processes taking place and their roles in decision-making.

Optimum benefits from planning processes can be achieved by using structured approaches for the identification and assessment of options and facilitate stakeholder involvement that starts with assessing needs upstream. There is now a wide consensus that plans for water and energy development are improved when options are systematically considered and when concerned parties are involved in planning exercises. (World Bank, 2003)

Delays in the start of construction activities tend to have a much smaller impact on the economic viability of a project than delays that occur after the bulk of investments have been made. There are several examples of projects that have experienced serious and extremely costly delays due to a failure to involve stakeholders in the project preparation and implementation process. A popular movement against the Sardar Saravor Dam (part of the Narmada Basin Development) in India led to fatalities and a court order that halted construction of the dam for five years. The interest on the half- finished dam and other project works, and lost power generation and irrigation benefits appear to exceed US$200 million per year or more than US$1 billion in aggregate. (World Bank, 2003)

Identification of options does not have a meaningful existence on its own except as a direct derivative of specific needs identified and agreed by stakeholders. In the author's opinion and analysis, much of the current project specific debates stems from a divergence on what are the priority needs for the country or the region and is the project the best alternative. Proposals and counter-proposals are made and inferences made about the interests of the government and project promoters where these are perceived to be different. Most commonly, different views are on the poverty impact of identified and subsequently selected options and its attendant environmental impacts.

Different views and positions arise from differing parameters used for alternatives during screening of options. The choice of discount rates, projected numbers of displaced people, environmental impacts are often the centre of contention as they are the basis of projected social, environmental and economic impacts. Overall, proponents need to demonstrate that their recommended option is sustainable and of net benefit to the community. To facilitate this, early engagement with relevant stakeholders on the comparative benefits of feasible options is recommended. (IHA, 2004)

1.5 State of the Practice in Frameworks and Implementation

The process of identification of options in particular and the comprehensive assessment of options are not fully integrated in national legal and regulatory frameworks. There are few examples of specific provisions in these frameworks to promote and enforce the due process as recommended by the WCD. Bringing the identification and assessment of options "upstream" in the planning process depends on the circumstances in each country. One common starting point is to introduce Strategic Environmental Assessments (SEAs) with appropriate stakeholder involvement. SEAs generally provide a broad assessment of priorities and identify the critical issues likely to surface in subsequent steps of the planning procedure. Where SEAs generally concentrate on the physical environment and sustainable resource use, Social Assessments have a similar role but assess social issues, particularly issues of equity. The hybrid Strategic and Social Environment Assessment is now more commonly required as a prerequisite for IFC funding.

A range of tools such as the EIA process, Integrated Development Planning and Country Strategy Papers have generally been used as frameworks through which the

identification and assessment of dams and their options have been conducted. The EIA process however suffers from the limitation that it only kicks in when a project option has already been selected thereby curtailing the chances of an impartial identification and assessment of alternatives. The inclination at this stage is more towards justifying the selected option than to compare it comprehensively without bias to other alternatives. The adoption and inclusion of a compulsory EIA for projects above a certain scale in the majority of national environmental laws and regulatory frameworks offers opportunity to push for a comprehensive assessment of options earlier as a requirement under bye laws or regulations.

Legislation that requires the involvement of stakeholders can be a powerful way of legitimizing their role in the eyes of decision makers. They gain “rights” of involvement. The Government of Bangladesh has preceded investments for the improvement of water management with the production of guidelines for public participation in water resources management. In South Africa, the Water Services Act (108-1997) and National Water Act (1998) require participatory planning and public consultation as input to all major water management decisions at local, provincial, and national levels.

The International Energy Agency (IEA) has produced generic recommendations on how governments might incorporate the assessment of options in national power sector policies and regulatory frameworks.

Following extensive political and civil society dialogue on decentralized water management, government officials in the state of Bahia in northeastern Brazil divided the state into 13 "Water Management Regions" (Regioes Administrativas da Agua) corresponding to its major watersheds. Instead of case-by-case approaches, Water Resources Management (WRM) Plans at the river basin level were prepared to identify investment projects and nonstructural policy measures in a more systematic manner. A new Water Resources Directorate (Superintendencia de Recursos Hidricos, SRH) was created and made responsible for water resources planning and management, options assessments (including technical studies, inventory, and cadastre of water users), hydrologic and meteorological monitoring, a hydrologic database, and baseline studies of the major watersheds. Basin and user institutions were created to participate in the development of plans, identification of options, and water management policies. The Bahia State Water Resources Management Project emerged from a request for World Bank support to help implement the new basin plans.

The multi-purpose Ponto Novo Reservoir was identified as a key infrastructure project in the Water Resource Management Plan for the Itapicuru River basin (World Bank, 2002).

The IHA believes that broad energy option assessment should be the responsibility of national and/or regional governments as part of their energy development strategy. Governments and, where applicable, project proponents should apply sustainability criteria when comparing project alternatives in order to focus on options that maximise environmental, social and economic benefits and, conversely, eliminate unacceptable alternatives early in the planning process(IHA, 2004).

The efficiency of market mechanisms in selecting the optimum options is still contested. The UNEP DDP Workshop on Options Assessment came to the conclusion that even in developed countries the market still had imperfections that

The different cases cited above point to different institutional, regulatory and legal frameworks that have produced positive results and serve as relevant practice.

1.6 Conclusions

The author makes the following conclusions based on the project cases and available literature:

- The process of identification of options and the broader comprehensive options assessment is vital to the implementation and viability of the best option in a given context. Information about the need for and structure of the process is vital in ensuring transparency of the process which will enhance the legitimacy and buy in of the final outcome. This will translate into low project risk. Incorporation of these provisions into the regulatory and legislative frameworks therefore would be essential to provide guidance and enhance predictability in the process of IO and COA.
- Large scale commercial oriented projects receive more attention and detailed investigation compared to small scale decentralized developmental type options. This disparity in levels of interest leads to information asymmetry when comparing the two with more known about the more detailed (large scale) options and very little about the other. This bias is evident in the NELSAP in which projects with a capacity below 10MW were immediately screened off.
- The description of each option is the most contentious and the source of most controversies. The extent of displacement of people, the discount rate, the unit cost of energy or water supplied, the total project budget and the amount of energy or water availed are some of the fundamental parameters for which differences among stakeholders are common and persistent. The development of guidelines and clear processes for validating each of these is essential in the process of identification of options and subsequently screening of options.
- Policies and the regulatory frameworks in each context are key in shaping which options get identified and promoted. Levies, taxes, credits, preferential tariffs, targeted grants are all types of instruments that are used by governments to promote the identification and selection of some type of options over others. Currently these are inclined towards promoting environmentally friendly options for meeting water and energy needs. The EU Directive on Electricity Generation is one example described in this study.
- The available technical and human resource capacity in a country of region is a key determinant to the type of options identified. Due to historical practices in meeting water and energy needs and different natural resource endowment, differential skills exist across options.
- Multilateral conditionalities and safeguards have been effective in deepening the process of IO. The Inspection Panel for Bujagali helped undertake more detailed alternative generation options.
- The EIA process although done in retrospect is a useful starting point in enforcing a detailed process of COA through legal and regulatory instruments.

1.7 Overall Conclusion

Based on the diverse factors and approaches to undertaking the process of IO the author could not find a single project or normative framework that addressed the whole spectrum of issues comprehensively. However, elements of relevant practice and legal provisions were identified in the South African Water Act as illustrated in the EU

Directive on Electricity Generation, Berg Water Project and the Olifants River Water Resources Development Plan Case studies.
Given the broad and diverse nature of issues to be tackled when considering dams and their alternatives for meeting water and energy needs such as supply side efficiency, demand side management, environmental sustainability, least cost etc, it is difficult in the author's conclusion to have a broad enough framework that caters for all cases. However there is scope for broad cross sectoral framework that sets minimum requirements for stakeholder participation, consideration of supply side and demand side options and the conformance to environmental standards. This can then be backed up by regulations or guidelines for each of the sectors and subsectors. The case of the Britisih Columbia Water Use Planning Guidelines provides a useful example in this respect.

1.8 Recommendations

In the author's analysis the following are the broad recommendations on how to improve the incorporation of IO in frameworks:

- that public resources will need to be devoted to options assessments at planning levels within and across each sector.
- The comprehensive options assessment process needs to be explicitly placed in legal and regulatory frameworks. The development of guidelines e.g. Water Use Planning Guidelines is a useful starting point with the medium term objective to progress to formal regulatory and legal embedding and enforcement.
- Donor and financing conditions and safeguards could be used to encourage both governments and private developers as an international and external framework to promote a detailed process of identification and assessment of options.

1.9 Approach to the Study

Owing to complexity, long drawn, iterative nature and lack of established practices on assessment of options that meet requirements of many stakeholders, this assignment draws examples from cases. Through cases, the current status and thinking on IO was illustrated by examples from national and international experiences. Examples from cases illustrate feasible options in relation to dams and other alternatives and examine the issues along the project life cycle as well at the different levels of policy, strategic planning and project levels.

Examples selected illustrate varying levels of complexity of identifying needs, screening of alternative water, energy, food options that places them at similar levels of importance with dams.

Cases presented reflect variations in approaches and processes of identifying and assessing options under varying conditions of:

- policy and regulatory frameworks
- resources such as land, water and diverse ecosystems.
- population densities or concentrations / region or river basin
- project scale, ranging from small to large water related projects.

Varying combinations of the physical and socio economic environments generate different potential outcomes from semi-arid regions in Zimbabwe to high rainfall hydro potential in Nepal. Effort was made to balance across the continents to get a fair spread of geographical and socio-economic and political contexts.

Over 25 cases were pursued to differing degrees of detail and screened to a final list of twelve examples for which there was reasonable level of data to illustrate specific key elements or relevant practice. The screening criteria were:

- cases reflecting a key element of relevant practice in IO
- a sufficient level of data about the framework and project example available
- stage and level of option identification from policy interventions, strategic and project level cases as well those that had interesting issues in planning, implementation and extension or alteration of operating regime.

Information was collected through internet searches and targeted emails to project promoters or regulatory agencies. Most of the information available in the public domain(internet) was mainly for promotional purposes or projects that were subject of conflict and controversy. In addition there are a few institutions which detailed project information such as the World Bank available on the internet. The DDP and WCD knowledge bases were also browsed for information and helped to provide another source of information.

Project proponents, government departments also helped to provide source documents. A general trend was the absence of information or a documentation of the process of the key issue of IO in most of the cases.

The most difficult element to address in the terms of reference was the judgement of stakeholder views. In a few cases details were documented of the numbers and response of key stakeholders to the process. It was difficult to cross check and reconcile what were often divergent views on the same issues on the different cases under consideration. Some of the stakeholder views were based on internet news articles which the consultants found difficult to substantiate to be able to consider them as legitimate and factual.

Overall the process could be improved by an allocation of more time as well as allowing for project visits and interviews with major stakeholders. This could be considered as a progression of this work with fewer examples.

Key Issue of IO addressed	Framework	Identification of Options Level	Life Cycle Stage	Case
Options on Integrated Water Management	Ceara State Water Resources Act	Regional/River Basin	Planning and Implementation	Ceara
Identification of least cost electricity generation options	National Hydropower Masterplan; East Africa Hydro Power Masterplan; NELSAP	Sectoral	Planning	Bujagali
Stakeholder participation in identification of options	Zimbabwe, Rural Districts Council Act (1998);	Regional/geographical	Strategic Planning and Implementation	Community based planning for water and food security in Zimbabwe
	South Africa, Water Act (1997), National Environment Management Act (1997)	Project	Implementation	Berg Water Project
Needs based planning		Sectoral	Implementation	Goulburn Broken
Selection of operating regime for hydroelectricity facility		Project level	Operation	British Columbia Water Use Plan
Policy options	EU Directives 2003/54/EC and 2003/55/EC On The Internal Market In Electricity And Natural Gas	Policy	All stages	EU Policy Options for Electricity Generation
Selection of medium scale hydropower options	NELSAP	Sectoral	Strategic Planning	NELSAP SSEA
Selection and ranking of medium hydropower options		Sectoral	Strategic planning	Nepal Medium Hydropower Study

1.10 References

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Keith Frausto; Developing Irrigation Options for Small Farmers, Institute Development Enterprises,

Victor Isidro; Dam Construction And Development In The Philippines,

Saskia Bourgeois, Thomas Kocher & Peter Schelander; Zambezi River Basin: A case study; ETH Seminar; Science and Politics of International Freshwater Management 2003/04, November 2003

Selection of Examples

A. Assessment of Power Development Options in the Nile Equatorial lakes Region

B. The British Columbia Water Use Guidelines

C. Medium Hydropower Project in Nepal

D. Golburn Broken Region Catchment: Scenario Planning for Future Irrigation, Victoria, Australia

E. Ceara Integrated Water Resource Management Project, Brazil

F. Berg Water Project

G. Olifants River Water Resources Development Project

H. Community based Planning for Local Water and Food security in Zimbabwe

I. EU Policies for Electricity generation

J. Identification of Power Development Options in Uganda

A. ASSESSMENT OF POWER DEVELOPMENT OPTIONS IN THE NILE EQUATORIAL LAKES REGION

Identification of the Example

Key issue addressed
Strategic social and environmental assessment of power development options
Assessment of power needs
Identification of power development options
Screening of options
Multi-criteria assessment

Integration
Nile Equatorial Lakes Subsidiary Action Program

Implementation
Strategic/Sectoral, Social and Environmental Assessment of Power Development Options in the Nile Equatorial Lakes Region (Burundi, Democratic Republic of Congo, Egypt, Kenya, Rwanda, Sudan, Tanzania, and Uganda)

Stage regarding the project life cycle
Strategic planning: needs assessment and selection of electricity production options

Description of the Framework

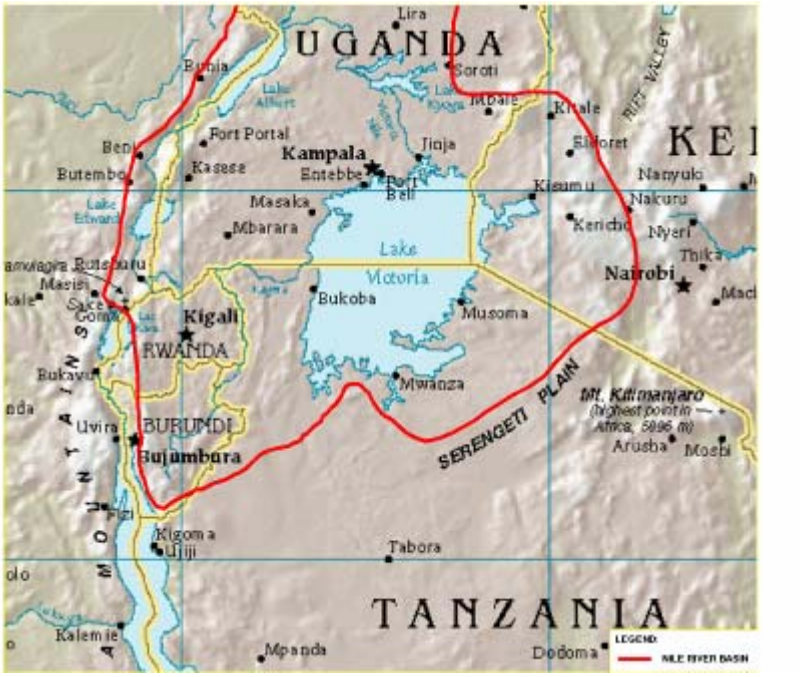
Institutional set up
Recognizing that cooperative development holds the greatest prospect of bringing mutual benefits in the region, the Nile riparian countries took a historic step in the establishment of the Nile Basin Initiative (NBI). Formally launched in February 1999 by the Council of Ministers of Water Affairs of the Nile Basin States, the Initiative includes all Nile countries and provides for an agreed basin-wide framework to fight poverty and promote socio-economic development in the ten Nile countries: Burundi, Rwanda, Uganda, Tanzania, Kenya, Sudan, Eritrea, the Democratic Republic of Congo (DRC), Ethiopia and Egypt. The Initiative is guided by a Shared Vision "to achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin water resources."

Under the NBI framework, two subsidiary action programs have been established: The Nile Equatorial Lakes Subsidiary Action Program (NELSAP) and the Eastern Nile Subsidiary Action Program (ENSAP). ENSAP includes Egypt, Ethiopia, and Sudan. The primary objectives of ENSAP are to: ensure efficient water management and optimal use of resources through equitable utilization and causing no significant harm; ensure cooperation and joint action between the Eastern Nile countries seeking win-win gains, target poverty eradication and promote economic integration, and; ensure that ENSAP results in a move from planning to action. ENSAP projects focus on integrated water resources management, flood management, power generation and interconnection, irrigation and drainage and watershed management. NELSAP includes Burundi, DRC, Egypt, Kenya, Rwanda, Sudan, Tanzania, and Uganda and targets investments in power

development, transmission interconnection and trade, water resources management, management of lakes and fisheries, agricultural development, and water hyacinth control.

The following map illustrates the location of the Nile Basin near Victoria Lake.

Nile River Basin at Lake Victoria



Source: Nile Basin Initiative et Al., 2005

Policy/Normative Framework

NELSAP Power Development Program

The water resources of the Nile Equatorial Lakes (NEL) region are composed of one of the world's greatest complex of lakes, wetlands and rivers. These water resources are central to the survival and livelihood of local populations and the sustenance of the region's unique
natural ecosystems. There is great potential for these resources to underpin strong economic growth in the region.

The region has traditionally been characterized by economies dependent on rain-fed agriculture and subsistence farming, low industrialization, poor development of infrastructures and high population growth and poverty. The population of the eight region countries was estimated in 2004 to be in the order of 268 million. Two of these countries (Rwanda and Burundi) are among the five poorest countries in the world. The population's average access rate to electricity in the NEL region (excluding Egypt) is about five to 10%.

Under the NELSAP program, the NEL riparian countries have specified the need for more power and a more efficient means of sharing power among the NEL region countries. This need is reflected in the short-term and long-term objectives of the NELSAP Power Development and Trade Sub-Program. The long-term objectives of this sub-program are:

- *to promote regional economic development and improved quality of life through provision of ample power supply at reasonable prices;*
- *to increase regional power supply in the NEL region by improving export and import capabilities between NEL member countries; and*
- *to improve reliability of power supply and the quality of power delivered through interconnecting the currently isolated networks of each country.*

The immediate objectives are to augment the supply of power to the grids of the region and to provide decision makers with guidance on the development process required to achieve the long-term objectives in the most efficient, economical and environmentally sustainable way.

NELSAP power projects focus on hydropower development and interconnections between NEL countries. No specific normative framework deal with the identification of options.

Besides the international umbrella provided by the NBI and NELSAP, the national legislations of the NEL riparian countries concerning water, energy resources management and environment also constitute an overarching framework.

Organisational set up

The Nile Equatorial Lakes Council of Ministers (Nile-COM) serves as the highest decision-making body of the NBI. Chairmanship of the Nile-COM is rotated annually. The Nile-COM is supported by a Nile Technical Advisory Committee, which is composed of two senior officials from each member country. The NBI maintains a Secretariat located in Entebbe, Uganda. The Secretariat began operations in June 1999.

Implementation history of the norm

Following a dialogue between the NEL countries and the World Bank, the need for a comprehensive strategic regional assessment of different power options was formulated for the NEL region building on the ranking study of hydropower options identified by NELSAP. The approach to undertake a broad based power options analysis including issues covering Strategic/Sectoral, Social and Environmental Assessment (SSEA) was agreed at the NEL Power Experts Retreat that took place in May 2002 in Kisumu, Kenya. The objective of this assessment is two-fold:

- First of all, it will serve as an instrument to prepare the World Bank and other investors for possible requests to support the NELSAP power development program.
- Secondly, it will assist the NEL riparian countries in their selection of power supply options (including interconnections) by contributing to informed and transparent decision-making before major funds to investigate individual options are committed.

Description of the Example

Project description

This SSEA of Power Development Options was split into two components: a first phase covering Burundi, Rwanda and Western Tanzania and a second phase to follow that adds the remainder of Tanzania, Kenya, Uganda and the eastern provinces of the Democratic Republic of Congo. Both assessments covered the following issues:

- current situation in the sub-region;
- a review of energy policies and legal and administrative frameworks as they apply to the promotion of power development options;
- an assessment of the power needs;
- the identification and screening of power development options;
- a comparative analysis and ranking of power development options that were retained after the screening;
- the development of portfolios of power options;
- an overview of cumulative impacts on the sub-region of the development of such portfolios;
- the definition of mitigation measures that can be applied to reduce the social ad environmental impacts of these portfolios.

The assessment was guided by a Project Steering Committee composed of representatives from the World Bank, the Canadian International Development Agency, NELSAP Coordinating Unit, power experts and NELSAP Technical Advisory Committee members from Burundi, DRC, Kenya, Rwanda, Tanzania and Uganda, observers from Sudan and Egypt.

The decision to carry out the assessment was taken in May 2002. The first stage was completed in March 2005 and the second stage was completed in November 2005.

Implementation Process

Stakeholder consultation process

Stakeholder consultation is an integral part of the SSEA of power development options in the NEL region. The overall objective of the stakeholder consultation program was to incorporate stakeholder viewpoints into each step of the SSEA.

The stakeholder consultation program constituted a regional “pulse-taking” of the different issues at hand. Because of the regional scope of the SSEA, such a “pulse-taking” exercise was more appropriate than an in-depth public consultation seeking to take into account the input of all of the stakeholders concerned by each power option. The strategy of a regional pulse-taking required that national and regional stakeholder representatives from Burundi, eastern DRC, Kenya, Rwanda, Tanzania and Uganda be:

- relatively limited in numbers;
- required to speak for large numbers of people at national or regional levels;

- selected in order to cover to the widest extent possible the spectrum of issues involved in the study; and
- selected in order to reflect the concerns of national and regional governments, civil society organizations, and academia.

It was decided from the onset that the stakeholder consultation process would be structured around two regional stakeholder 2-day workshops for each of Phase I and Phase II of the SSEA. The workshops would be held in the sub-region and would involve seven representatives from each of the countries concerned (Burundi, Rwanda and Tanzania in Phase I and DRC, Kenya and Uganda added for Phase II). Each country representation included two representatives from the power sector selected from the Project Steering Committee as well as five governmental and non-governmental representatives of civil society. Such a number represented a trade-off between a search for a wide representation of cross-sectoral interests and perspectives and the need for a group that was reasonably small to enable fruitful exchanges and discussions.

In order to guide the selection of national and regional stakeholder representatives invited to participate in the stakeholder consultation process, a regional stakeholder analysis was carried out in the six countries of the NEL region. Potential workshop participants were identified by the Consultant so as to cover all of the issues reflected in the decision criteria. Five candidates from each country were subsequently selected by the Project Steering Committee. They included representatives from environmental and socio-economic NGOs, international NGOs and faith-based organizations, academic institutions and relevant ministries and agencies.

The regional communication strategy adopted in the context of the project had to take into account the multinational nature of issues involved as well as the poor state of power and telecommunications infrastructure and low literacy levels in the NEL region. Given the hurdles to overcome, it was considered that public information bulletins (in English and in French) could serve as vehicles to make the issues involved easier to grasp by non-experts and that the availability of such bulletins at project workshops and on the project Web site would enable interested parties to access project-related information.

Assessment of needs

In the year 2002 (the latest year for which data were available when the study was carried out), the supply-demand balance was estimated as follows:

Country	Capacity (MW)	Demand (MW)	Year or amount of Deficit
Burundi	37.2	30	2004
Eastern DRC	40	50	10 MW
Kenya	1121	800	2005-07
Rwanda	28.7	30	2004
Tanzania	785	500	2005-07
Uganda	327	280	2005

Source: Nile Basin Initiative et Al., 2005

During the study, an estimate was made of the power needs of the region at the end of the period of analysis (2020). This analysis suggested that the needs would rise to about 4700 MW or almost double the installed capacity of 2400 MW in 2004. This estimate was based on a scenario of extrapolation of the current economic growth. Taking into account the level of uncertainty, the range of the forecast was considered to vary from a low of 3400 MW to a high of 6000 MW.
A very high growth scenario, called "transformation" scenario was also considered in which an estimate was produced of how much power would be required to transform the region from one of severe poverty to one that would be comparatively comfortable. This scenario resulted in a demand in 2020 of about 10,500 MW.

Identification of options
As the SSEA is a regional study, it was implicit that the process should be based on energy demands and supply options for the interconnected systems. However, information has also been provided on some off-grid options such as solar power PV, mini/micro hydropower, wind energy conversion systems and diesel. Indicative costs and potential applications for these options provide useful contexts for assessing costs and performance of on-grid options that are the target of the assessment. The potential for demand-side management to reduce new generation requirements was also noted.

The scope of the power identification component covered the following:
Compilation of basic information on previously identified new hydroelectric sites, including generation capacity, capital cost and, very importantly, the level of preparation and project status that defines the earliest possible on-power dates.
Identification of generic and specific thermal alternatives, including diesel engines, gas fired engines, combined cycle, oil and coal fired steam plants. Thermal options included some specific projects at the planning stage.
Evaluating the status of each candidate new power option, estimating the probable lead time for the implementation of the project.
Preparing a long list of candidate projects that potentially could be economic and implemented within the time horizon of the study.

A total of 8719 MW of power development options were identified through a meticulous data search and validation process, which included:
For Burundi, Rwanda, and western Tanzania: assessment and updates of previous studies.
For eastern DRC: information from previous reports.
For the East African Community consisting of Kenya, Tanzania, and Uganda: the East African Power Master Plan and assessment of information from previous reports.

For options such as demand side management, solar, biomass, natural gas coastal thermal also evaluated from a regional perspective; data from files, internet, etc.

Of the 8719 MW identified, 6494 MW were hydro, 2195 MW were thermal and geothermal and wind accounted for 30 MW.

Not all of the identified options were attractive; a technical screening was carried out to focus on realistic regional options. Four screening criteria, which were suggested by the stakeholders and approved by the Project Steering Committee (PSC), were applied. These criteria were:
Availability of data (pre-feasibility level or better).
Tolerable socio-economic or environmental risks after mitigation, in compliance with national laws, international conventions or applicable amendment conditions.
Unit cost below a specified threshold value.
Size of project: ≥ 10 MW for Rwanda, Burundi and Eastern DRC and ≥ 30 MW for the EAC countries; the 10 MW criterion reflects the minimum size that could have some impact on power supply for a neighbouring country and thus reflects the regional nature of the study; the 30 MW criterion is applied to the larger generating countries and is the minimum value used in master plan studies in Kenya and Uganda.

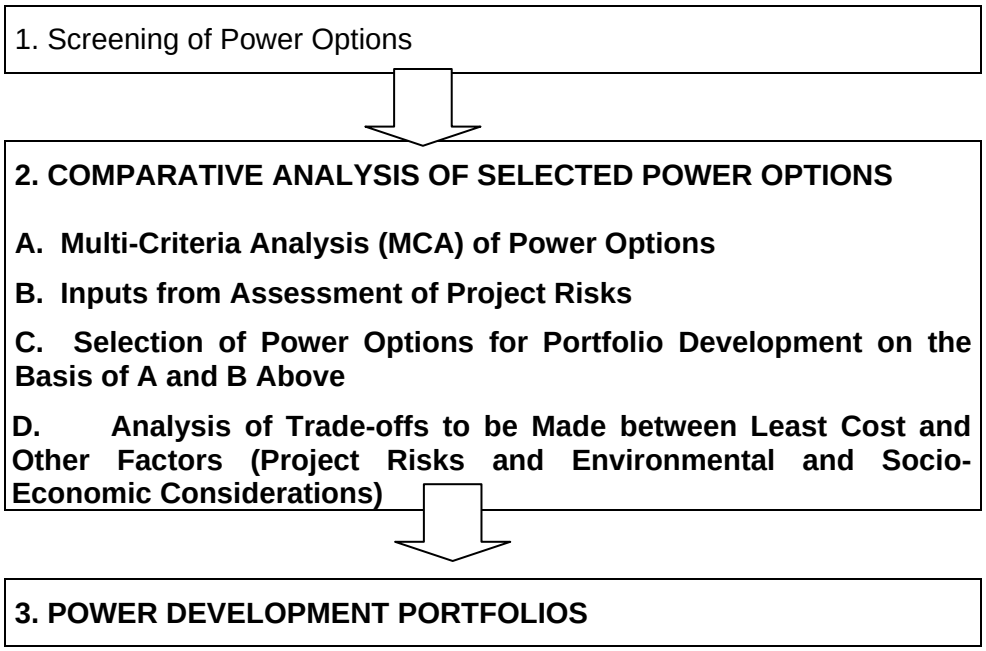
The application of these criteria resulted in the elimination of 2489 MW for the following reasons:
Lack of data: 520 MW
Unacceptably high environmental and social impacts even after mitigation measures: 1017 MW
Excessive unit cost of firm energy: 922 MW and
Options too small: 30 MW

This left 6230 MW made up as follows:
Hydro: 4005 MW
Geothermal: 455 MW
Natural gas (Songo Songo and imports): 740 MW
Coal fired thermal (Mchuchuma and imports): 700 MW
Lake Kivu Methane Gas: 120 MW
Oil fired committed diesel and gas turbines: 180 MW
Wind: 30 MW

The only non-hydro options that were not retained were:
demand-side management, evaluated as being not applicable to the current planning process as no utilities in the region are implementing any such plans at this time;
solar power which is not economic as an on-grid application.

Comparison of options
The application of the screening criteria to the long list of identified options reduced the number of hydroelectric candidates from 61 to 21. The objective of the comparative analysis of power options was to compare the retained options on the basis of economic, environmental, socio-economic and project risks points of view. The overall process is presented below.

Methodological Process for Selection of Power Options



The power development options are first compared on the basis of a Multi-Criteria Analysis (MCA). Each option is scored against each criterion on the basis of qualitative and quantitative indicators. Percentage points are associated with each criterion as an indication of their relative importance (the sum of the weights must add to 100). The final value score of each option is obtained as a weighted average of the scores for the individual criteria.
The list of criteria retained for the MCA, as well as the weighting indicating their relative importance within a category (shown in brackets), are presented below.

- Economic: Unit cost of firm energy (100%)
- Socio-economic: Resettlement (15%), rural electrification (35%), downstream impacts (15%), and land issues (35%)
- Environmental: Resource depletion (25%), greenhouse gas emissions (10%), air pollutants (10%), land use (25%), waste disposal (5%) and downstream impacts (25%)

During the review of power development options several risks were identified:

- Risks of opposition from external groups (including resettlement, and risks to natural habitats and to public health)
- Risks related to institutional and legal frameworks (including the risks of those options straddling two countries or located in national parks)
- Risks in the use of resources
- Gestation period in delivering benefits
- Risks of sedimentation
- Hydrological risk

- Financial risk

Although these risks are, in general, non-quantifiable, a process similar to the multi-criteria analysis was used to assess the overall level of risk of each power development option. Because many of the criteria used non-quantifiable indicators, it was not appropriate to assign weights to each criterion.

All options have impacts on social and physical environment and the comparative analysis attempted to indicate the most severe for each option. In selecting any option, therefore, trade offs are necessary. The results of this analysis were to place each development option into one of two groups: best evaluated options and other options. The group of best evaluated options amounted to 2832 MW and included:

- 1307 MW of hydropower options: Bujagali, Kabu 16, Kakono, Karuma, Ruhudji, Rumakali, Rusumo Falls, Ruzizi III, and Mutonga.
- 1525 MW of non-hydro options: all geothermal, all gas from Songo Songo, Lake Kivu methane and wind.

The other options had impacts considered more severe than the best evaluated and amounted to 3398 MW and included 2698 MW of hydro options and 700 MW of non-hydro options (all fossil fuelled thermal).

Outcomes and results: definition of development strategies and key findings

It was first established that there are sufficient identified new generation resources in the region to meet the projected median load forecast until 2020; however, all of the best evaluated options would need to be used. The net requirements would increase from 3240 MW to about 5000 MW under the high growth scenario and to about 10,000 MW under the transformation growth scenario. Three alternative strategies have been developed, each with its core concept.

- Focus on the use of the best evaluated options regardless of technology, location or cost: this strategy would use up all of the best evaluated options plus 560 MW of other options.
- Technological diversification: reduce reliance on hydro projects with the attendant risks of power shortages during drought periods: this would require some 650 MW of less well evaluated options at the expense of the best evaluated options (replacement of some hydro with geothermal and thermal).
- Geographical diversification: this strategy is intended to reduce the reliance of any country upon its neighbours for power: this would require some 770 MW of less well evaluated options at the expense of the best evaluated options.

The study was able to arrive at a strong set of recommendations. The analyses recommended the development of the following options as soon as possible as they had been adequately studied to be confident of the estimated costs and benefits:

- Bujagali (200 MW + 50 MW, Uganda)
- Rusumo Falls (61.5 MW, Rwanda, Tanzania, Burundi)
- Kabu 16 (20 MW, Burundi)
- Lake Kivu gas (initially 30 MW, Rwanda)

In addition, studies should be completed on Ruzizi III (82 MW, Rwanda, and DRC), Ruhudji (358 MW, Tanzania), Karuma (200 MW, Uganda), geothermal sites (various sites and sizes in Kenya) and wind (30 MW, Generic) in order to be able to meet the load as it developed. They also recommended the development of a backbone of transmission lines to strengthen the interconnections between the six countries.

The cumulative impacts of these installations on the social and physical environments of the region were examined as part of the work. The main conclusions of those impact studies were:

- Virtually no impact (flow regime, evaporation, etc.) on Victoria Nile downstream of Lake Albert.
- Wetlands and habitats affected at several sites.
- Some portfolios involve options located in national parks or affect forest reserves.
- Some portfolios involve significant resettlement.
- Thermal options result in emissions (low level in global terms but can affect global warming and health in local populations).

Assessment of outcomes by involved stakeholders

As described above, two regional 2-day workshops were held for each of the two phases of the SSEA. A number of participants responded to the request to complete evaluation forms at the end of the stakeholder's workshops. The responses showed considerable degree of satisfaction regarding the venue selected for the workshops, the quality of the reports and supporting materials, time allowed for the review of reports and supporting materials before and during the workshop, the active role given to participants in planning of the SSEA, and, in particular, the openness of discussions and time given to participants to express their points of view.

Discussions at the workshops were held in an open and constructive manner. Stakeholder representatives from all six countries expressed the urgent need for power in the NEL region including the need for rural electrification as a means to alleviate widespread poverty. In this respect, they reaffirmed the need to promote a regional framework for sharing benefits which in turn could help countries implement rural electrification programs that have a long time only existed on paper. The key contributions by the stakeholder representatives included:

- Reviewing and adjusting the power needs assessment for the sub-region: this led to a fourth, very high scenario called the "transformation" scenario in addition to the low growth, base case and high growth scenarios.
- Reviewing and adjusting the identification of power options and the criteria selected for the screening of power options. In particular, this led to the inclusion of five additional power options in eastern DRC and four additional power options each in Kenya, Tanzania and Uganda.
- Reviewing and adjusting the categories of evaluation criteria, the selection of criteria within each category and the corresponding indicators used for the comparison and ranking of selected power options. In particular, this led to the identification of some new criteria and indicators and to the removal of criteria that could not be assessed

on the basis of a ratio scale in the Multi-Criteria analysis and their inclusion in a separate assessment of project risks.

- Assigning weights to each of the criteria for the purpose of comparing and ranking the selected power options.
- Providing guidance in the development of strategies for the region and proposing a set of alternative strategies to allow for the development of investment portfolios to reflect each strategy.

Overall Conclusions

Important lessons can be drawn from the experience of the SSEA project for the Nile basin, as it is one of the first of such programs. The most significant areas that will affect the value and validity of the SSEA outcome include:

Identification and selection of stakeholder representatives and effectiveness of the consultation process: environmental and social stakeholder representatives who participated in the SSEA brought relevant local expertise to power planning discussions during the regional consultation workshops. However, they expressed a need for wider involvement of regional stakeholders in the SSEA process, ideally through additional public information and consultation workshops held in each of the concerned countries or sub regions. They pointed out that it was essential that sufficient time and materials were provided for briefings and discussions with other concerned stakeholders, and that proper mechanisms be provided for obtaining feedback from stakeholders. It was also considered important that agreed upon decisions in consultation workshops were not revisited, unless underlying information had changed.

Quality of the new power options data base, including environmental/social aspects: it is necessary to treat some quite preliminary studies from up to 30 years ago with the same level of confidence as recent detailed evaluations. One key issue is the lack of a common understanding of what different levels of preparation should entail. Environmental and social information is usually very limited in the older studies, and tend to be very project specific in all but the most recent reports on larger projects. Unless the pool of candidate options is restricted, expectations on the quality of information from reports should be lowered.

Decisions taken on how screening is done: it is important that stringent criteria be applied to limit the detailed analyses to realistic and potentially viable options

Selection and application of the multi-criteria analysis and risk analysis methodology: the availability and reliability or data used as indicators has to be clearly understood. Equally the selection of weighting factors to reflect real importance is critical. Data for some indicators is so limited that these should be evaluated in the risk component.

Cumulative impacts and mitigation measures: the analysis of cumulative impacts and mitigation measures should be based on information from project EIAs. Consequently, either the SSEA evaluation should be limited to projects with modern feasibility studies, or pre-feasibility studies with preliminary EIA information, or the SSEA should be limited to scoping of issues and identifying mitigation measures that would have to be included in project implementation planning. Including cost allowances for mitigation does provide a measure of equality for evaluation, however it does nothing to define the conditions under which development may be acceptable.

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B. THE BRITISH COLUMBIA WATER USE PLAN GUIDELINES

Identification of the Example

Key issue addressed
Identification of alternatives for hydroelectric facilities
Screening and selection of an operating regime for a hydroelectric facility

Integration
1996 British Columbia Water Act
1998 British Columbia Water Use Plan Guidelines

Implementation
Clowhom hydroelectric facility, British Columbia, Canada

- Commissioned in 1958
- Capacity: 33 MW
- Average energy production: 120 GWh
- Project developer: BC Hydro

Stage regarding the project life cycle
Operation

Description of the Framework[3]

Institutional set up
British Columbia enjoys a rich endowment of high-quality water resources. In recent years, declining or endangered fish stocks have emerged as a pressing issue, along with concerns about aquatic habitat and, consequently, water management. The relationship between fish and power generation at hydroelectric facilities has received considerable consideration. Environmental and other interest groups have been calling for greater protection of fish resources. For the most part, federal and provincial governments are now taking stronger stance on the management of fish habitat, particularly at power facilities around the province. The fish and aquatic habitat issues epitomize evolving public priorities with respect to water resource management. At the same time, the public has become more concerned about flood control, recreational and other implications of regulating water.

In November 1996, the Ministers of Employment and Investment and Environment, Lands and Parks announced the creation of a water use planning process meant to revisit provincial water management in light of changing public values and environmental needs. These guidelines set out the steps and components of a new process to better manage British Columbia's water. The development of water use plans (WUPs) for

[3] Most of the information in this Section is extracted from the Water Use Plan Guidelines (Province of British Columbia, 1998)

power and other water control facilities[4] are carried out as part of the licensing procedure defined in Part 2 of the British Columbia *Water Act*.

Water control facilities are also subject to the 1985 federal *Fisheries Act* which governs the protection of fish and fish habitat in Canada. The Act empowers the Department of Fisheries and Oceans (DFO) to set requirements for minimum water flows, the construction of fish-ways, fish guards or screens, pollution prevention, fish habitat protection and other matters. DFO's *Policy for the Management of Fish Habitat* identifies a long-term policy objective of achieving an overall net gain in the productive capacity of fish habitat. The water use planning process provides a mechanism for achieving the net gain policy objective at individual facilities throughout British Columbia.

Water use plans are prepared through a collaborative effort involving the existing or prospective licensee, government agencies, First Nations, other key interested parties and the general public. Draft plans are submitted to the Comptroller of Water Rights for regulatory review and approval. As much as possible, the goal of the water use planning process is to achieve consensus on a set of operating rules for each facilities that satisfies the full range of water use interests at stake, while respecting legislative and other boundaries.

Specific Policy/Normative Framework

Water Use Plan Guidelines

A WUP is a technical document that, once reviewed by provincial and federal agencies and First Nations, and accepted by the provincial Comptroller of Water Rights, defines how water control facilities will be operated. The purpose of water use planning is to understand public values and develop a preferred operating strategy for a facility using a multi-stakeholder consultative process. The following steps describe the process for initiating, developing, approving, monitoring and reviewing a water use plan:

Step 1: Initiate a water use planning process for the particular facility. The Comptroller of Water Rights (the "Comptroller") may require a WUP as a condition of a new water license, as part of a review of an existing license or in response to a perceived water use conflict. The licensee may request a water use planning process, e.g., where facility operation is to be changed beyond the terms and conditions of existing licenses. Other interested parties may make a request for a plan, for consideration by the Comptroller. Once the water use planning process has been initiated, a public announcement will be issued.

Step2: Scope the water use issues and interests. The licensee or proponent will meet with regulatory agencies, First Nations, local governments and key interested parties to:

identify issues and interests associated with water management;

review and summarize available information on water use impacts;

identify gaps in information and the need for further studies to develop a WUP; and

explore appropriate approaches to consultation.

Step 3: Determine the consultative process to be followed and initiate it. The licensee/proponent, in consultation with the Comptroller, will set up a process involving government agencies, First Nations, key interested parties and the general public in plan

[4] Works are defined in the Water Act and include facilities for "diverting, storing, measuring, conserving, conveying, retarding, confining or using water" and "producing, measuring, transmitting or using electricity."

development. WUP consultations will be advisory, providing information and facility operation proposals for use in the Comptroller's decision-making (Step 10).

Step 4: Conform the issues and interests in terms of specific water use objectives. Participants in the consultative process (including the licensee/proponents) will define specific water use objectives, along with quantitative and/or descriptive measures for assessing their achievement. Every WUP must consider fish and aquatic habitat protection, flood control, beneficial use of the water (e.g. power generation) and First Nations issues; other issues, such as recreation and navigation, may also be taken into account, depending on the facility.

Step 5: Gather additional information on the impacts of water flows on each objective. Technical studies will be conducted and information from other sources gathered and analyzed to build on the results of Step 2. The draft WUP should document remaining "data gaps" and a research program to fill them.

Step 6: Create operating alternatives for regulating water use to meet different interests. The participants in the water use planning process will define a diverse set of alternative operating regimes to compare the impacts on water use objectives.

Step 7: Assess the trade-offs between operating alternatives in terms of the objectives. Information on water use impacts from Step 5 will be used to frame discussions about choices and trade-offs among conflicting water uses by participants (including the licensee/proponent) in the consultative process. Analytical tools, such as multi-attribute trade-off analysis, can assist the trade-off assessment. The impact of uncertainty on the ranking of alternatives must be demonstrated.

Step 8: *Determine and document the areas of consensus and disagreement*. Consensus on an operating alternative for the facility is a goal, but not a requirement of the WUP consultative process. A report signed off by the participants and made public will describe the consultative process and its results. The consultation report will fully document areas of agreement and contention and, in the case of non-consensus, disagreements and reasons for them.

Step 9: Prepare a draft WUP and submit it to Comptroller for regulatory review. The licensee/proponent will draft a concise technical document detailing the operating parameters to meet a proposed operating regime. If consensus is achieved, the signatory page may be added indicating agreement by the licensee/proponent and other participants. If no consensus is achieved, the licensee/proponent will select a proposed operating regime.

Step 10: *Review the draft plan and issue a provincial decision*. The Comptroller will refer the draft plan for review and comment, along with notice of any license amendments or application for a license, to affected and other interested parties as required under the *Water Act*. When sufficient information has been obtained, the Comptroller will make the appropriate licensing decisions and approve the plan.

Step 11: Review the authorized WUP and issue a federal decision. DFO will review the authorized plan and provide advice and authorizations, as appropriate.

Step 12: Monitor compliance with the authorized WUP. The plan will specify monitoring programs and reports for preparation by the licensee to enable provincial and federal regulatory authorities to assess compliance with the authorized WUP.

Step 13: Review the plan on a periodic and ongoing basis. The WUP should specify a scheduled review period and "triggering" issues that will be particular to the facility and its water use impacts.

Organisational set up

The Comptroller of Water Rights and the unit in charge of water use planning are part of the Ministry of Environment of British Columbia.

Implementation history of the norm
In 1998, the Government of British Columbia, under the *Water Act*, requested that BC Hydro undertake a water use planning process to review the operating conditions of BC Hydro power generation facilities. A WUP is to be produced for each of BC Hydro's 30 hydroelectric facilities in 25 watersheds. Water licenses issued for each facility are then to be amended to reflect the recommendations made in the WUP. In 2005, 24 out 30 WUPs have been completed. The WUPs for BC Hydro's largest dams, including the 2730 MW Bennet/Shrum station in the Peace River Basin have not yet been completed. The entire WUP process is expected to cost the Province of British Columbia CAN$ 25 million (Ryder, 2005).

Description of the Example[5]

Project description
The Clowhom hydroelectric facility was commissioned in 1958 and is located on the Sunshine Coast in south western British Columbia, approximately 300 metres from the head of Salmon inlet. The Clowhom reservoir receives water from a 382 km^2 drainage basin that is subject to large short-term fluctuations in inflows. The reservoir covers 800 hectares at full pool and has an operating range between elevations of 42 and 53.84 metres. The concrete gravity dam is 402 metres long at the crest and 21 metres high. The Clowhom generating station has a capacity of 33 MW and an average energy production of 12 GWh. Typically, the facility runs around the clock during the snowmelt period and fall storms. During the remainder of the year it is operated as a peaking plant.

Implementation
The water use planning process for BC Hydro's Clowhom Project was initiated in May 2002 and completed in May 2003.

The Consultative Committee included representatives from BC Hydro, BC Ministry of Water, Lands and Air Protection, Clowhom Lodge, District of Sechelt, Fisheries and Oceans Canada, Interfor (Sechelt Divisions), Reservoir cabin owners, Sechelt First Nation, Sunshine Coast Regional District and Sunshine Coast Rod and Gun Club. The Consultative Committee held three two-day meetings between September 2002 and May 2003 to work through the steps outlined in the WUP Guidelines. The Fish and Wildlife Technical Subcommittee also met during that period to support the work of the Consultative Committee.

The Committee established a set of 18 objectives to structure and guide the decision-making. These objectives were associated with the following issues: Fish, Power Generation, Recreation, Spills, Heritage and Culture and Wildlife. The Committee then established performance measures for all objectives (except for Heritage and Culture and Wildlife due to a lack of data).

Operating alternatives were then developed to satisfy the various interests and objectives of the Consultative Committee members, and trade-offs between interests

[5] Most of this Section is extracted from Consultative Committee Report on the Clowhom Water Use Plan.

were made in an attempt to find the best balance. This was an iterative process, as the Consultative Committee evaluated alternatives and then developed new alternatives by refining, combining and modifying existing alternatives to better meet and balance competing objectives. In the later stages of the process, the Consultative Committee considered a final set of six alternatives. After thorough discussion of the trade-offs involved, they chose the following consensus operating alternative:
Normal maximum elevation: 53.34 metres.
Normal minimum operating elevation: 49.0 metres. The reservoir will only be operated lower than 49.0 metres for special maintenance deep drawdowns, emergency and dam safety requirements.
The Consultative Committee identified a strong preference for drawdowns to occur in March to minimize impacts on fish and recreation activities.
Maximum diversion rate for the Clowhom Reservoir: 100 m^3/s.
Notification protocol: all organizations represented at the WUP Consultative Committee and the Comptroller of Water Rights will be notified of: 1) all special maintenance deep drawdown events, and 2) drawdown events for annual maintenance when the event is scheduled to occur at any time other than March.

Recommendations of the Consultative Committee also included a monitoring program and a 20-year period review period for the Clowhom WUP.

Outcomes and results

The Clowhom WUP Consultative Committee came to consensus agreement on a package of recommendations that is expected to achieve net benefits (or be neutral) for all interests, as detailed below:
Fish: Conditions for the fish resources are expected to be better by improving the littoral zone productivity and by reducing spill frequency and magnitude.
Power generation: The proposed operating conditions are expected to provide an increase in generation while reducing spill frequency and magnitude.
Recreation: Access to reservoir should be improved. The reduced reservoir fluctuation should also improve conditions on the reservoir for recreation and aesthetics. Improvements in the fishery should also provide some spin-offs benefits for recreation.
Flood control; the expected frequency of spills is being reduced slightly.
Heritage and Culture: The monitoring program includes archaeological surveys.
Wildlife: The effect of the proposed operation is uncertain for wildlife and wildlife habitat. The monitoring program should provide information to determine any effect.
First Nations: BC Hydro's Clowhom hydroelectric facility lies within the claimed traditional territory of the Sechelt First nation. Implementing the Clowhom WUP should reduce impacts to any First nation archaeological resources in Clowhom Reservoir drawdown zone, provide the opportunity to collect information on traditional use, improve conditions for fish in the Clowhom Reservoir and adjacent area and improve the safety and reliability of access to Clowhom Reservoir.

The conditions proposed in the WUP for the operation of the project reflect the March 2003 recommendations of the WUP consultative committee. In April 2005, the Clowhom WUP was accepted by the Comptroller of Water Rights and implemented in April 2005. The Monitoring Programs Terms of Reference prepared by BC Hydro were accepted by the Comptroller of Water Rights in October 2005. Four monitoring programs will be carried out:
Monitor of adequate wildlife in wetlands affected by dam operations

Role of littoral zone in governing Clowhom reservoir productive capacity
Validation of the effective littoral zone performance measure
Archaeological sites monitoring.

As stated in the Clowhom WUP, a comprehensive report of the monitoring programs will be issued after 10 years. The Clowhom WUP will be reviewed from the date (7April 2005) of approval of the Plan by the Comptroller.

Assessment of outcomes by involved stakeholders

The consultative process itself provided a forum for sharing information, promoting understanding of various affected interests and perspectives, exploring alternative ways to operate the facility, evaluating impacts in a structured way and making clear choices about trade-offs between interests using both technical/scientific information and participants' values. The above recommendations of the Consultative Committee thus reflect the viewpoints of involved stakeholders.

The Watershed Watch Salmon Society (Quadra Planning Consultants et Al., 2004), after evaluating seven WUPs concluded that the water use planning process has improved the knowledge base and better defined flow requirements for fish conservation in BC Hydro facilities. Recommended flow alternatives have been positive for fish conservation. However it also pointed out a number of limitations, particularly the following ones concerning the stakeholder consultation process:

Some participants felt that it would be more efficient to complete the technical analysis in advance of the stakeholder consultations so that there would have been more clarity about what is known and unknown before the public discussion begins.

There was no mechanism within the water use planning process to address the historical "footprint" impacts of hydroelectric development which in many cases overwhelm the operational impacts.

There was no commitment to providing First Nations with the resources to adequately and consistently participate in the technical aspects of the fisheries assessments and therefore they depended upon government technical staff to represent fish conservation concerns and interests.

Water use planning is largely a BC Hydro process for engaging stakeholders in the review and updating of its operating licenses, rather than a more public process by the regulator of determining long-term allocation and management of water within watersheds.

Overall Conclusions

The British Columbia Water Use Guidelines provide a structured consultative planning process involving all stakeholders to find a better balance between competing water uses. The water use plans prepared by BC Hydro demonstrate that:

The planning process effectively allows for stakeholders to identify and explore the implications of a range of facility operating alternatives relating to water use objectives. Most of the WUPs resulted in a consensus among stakeholders. Where no consensus was reached on a single operating alternative, active monitoring and adaptive management was initiated to test alternative flow regimes (Ryder, 2005).

Water use planning helped develop a better expertise with respect to water use management with more precisely defined flow regimes in terms of target flows, timing

and ramping rate specifications. Monitoring programs will further consolidate this expertise.
Public participation on the operating regime of hydroelectric facilities is now part of current practice at BC Hydro.

Even in countries that already have consultative processes for water use planning, the British Columbia WUP guidelines can be used as a reference for defining a detailed planning process that provides for systematic consensus building. In addition, since this process is linked to a licensing procedure, water users have a better assurance to have a say in the operating regime of the facility. However, the implementation of such guidelines in countries with high population densities would likely be much more complex.

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C. MEDIUM HYDROPOWER STUDY PROJECT IN NEPAL

Identification of the Example

Key issue addressed
Options assessment: screening and ranking of medium scale hydropower projects

Integration
1992 Nepal Hydropower Policy

Implementation
- Sectoral Environmental Assessment (SEA), Nepal Power Sector: Hydropower Subsector Screening, 1996-1997
- SEA Process Manager: Nepal Electricity Authority (NEA)

Stage regarding the project life cycle
Strategic planning: screening and ranking of hydropower options

Description of the Framework

Institutional framework
In 1951, the Nepalese monarch ended the century-old system of rule by hereditary premiers and instituted a cabinet system of government. Reforms in 1990 established a multiparty democracy within the framework of a constitutional monarchy. A Maoist insurgency, launched in 1996, gained traction and threatened to bring down the regime, especially after a negotiated cease-fire between the Maoists and government forces broke down in August 2003. In February 2005, the king dissolved the government, declared a state of emergency, imprisoned party leaders and assumed power. The king's government subsequently released party leaders and officially ended the state of emergency in May 2005, but the monarch retained absolute power until April 2006. After nearly three months of mass protests organized by the seven-party opposition and the Maoists, the king allowed parliament to reconvene on 28 April 2006.

Nepal's population of just over 24 million (in 2003) is divided in equal proportion between the flat plains of the Terai in the south of the country, which border India, and the foothills and mountains of the high Himalayan range in the north, which border the high Tibet plateau. The country has one of the lowest per capita incomes and rate of commercial energy use in South Asia. Disparity in access to electricity is stark: over 90% of the urban population is connected, in contrast to an estimated 30% in rural areas.

With many steep rivers fed by a combination of snowmelt, winter rains and torrential monsoon rains, Nepal has a vast hydropower potential of approximately 40,000 MW of economically feasible hydropower potential. Less than 1.5% has been developed (about 600 MW). Electricity fulfils only 1% of the energy need in Nepal. The bulk of energy consumption is dominated by fuel wood (68%), agricultural waste (15%), animal dung (8%) and imported fossil fuel (8%) (IPPAN, 2006).

Policy/Normative Framework

1992 Hydropower Development Policy

In 1992, Nepal adopted a national hydropower development policy with the following four objectives. First, to supply electricity by exploiting the high potential of water resources. Second, to enhance hydropower to meet industrial needs. Third, to promote national and foreign private sector investment in hydropower development. Fourth, to conserve the environment by supplying clean hydropower (SEA Drafting Group, 1997).

These objectives were to be achieved by the following ten strategies: 1) to undertake a variety of sizes and types of hydropower projects; 2) to emphasize rural electrification; 3) to emphasize hydroelectricity in the transport sector to reduce petroleum use; 4) to use indigenous human resources as well as foreign investment and technology in hydropower; 5) to export hydropower in excess of national demand; 6) to promote hydropower to minimize fuel wood and conserve forests; 7) to diversify use of electricity; 8) to control losses; and 10) to provide electricity at practical tariffs.

The development of the hydropower potential is thus a key government objective. The aim is to develop indigenous hydropower to meet growing commercial energy needs, support the modernization and diversification of the economy and generate earnings from power exports as a major source of national income.

During the early 1990s, a comprehensive legal and regulatory framework was put in place, including detailed environmental assessment guidelines. The main project pursued was Arun III which was to be the first at the upper end of a cascade series of hydropower dams on the Arun River basin in eastern Nepal. However, following increasing controversy, the World Bank withdrew its support from the project in 1995. The Government of Nepal adopted an alternative strategy for power sector development. One objective was to establish the Power Development Fund (PDF) to supplement private and other public financing available for the development of Nepal's power sector to meet the domestic demand for electricity and to export power where possible. The initial PDF focus was on financing of hydropower projects in the 10 to 300 MW range.

Sectoral Environmental Assessment

As a result of the above policy orientations, a sectoral environmental assessment (SEA) was carried out in 1996-1997. The primary reasons for using SEA are the following (SEA Drafting Group, 1997):

The first reason is to incorporate environmental and social criteria in the selection of electricity supply options and projects. The SEA thus builds on traditional economic least-cost analysis by adding environmental and social criteria alongside the economic criteria.

Second, encouraging private sector participation in power development is one means to alleviate the heavy burden on the Government budget for financing all physical infrastructure development. Private developers want to reduce risks as well as up-front planning and preparation costs. SEA helps reduce such risks and makes investments more attractive to private developers by undertaking much of the expensive project selection costs.

Third, broad stakeholder participation and consensus building approach helps to ensure broad public endorsement and avoid costly delays on all projects whether implemented by the public or private sector.

Fourth, to a certain extent, SEA assists in project optimization and feasibility design, including environmental and social mitigation measures.

The SEA analyzed power demand in Nepal in the context of the overall national energy situation. It then provided a generic assessment of alternatives to meet power demand, including electricity production options and conservation and demand management options. The SEA confirmed broad consensus that medium-scale hydropower offered the best way forward to meet the expanding grid supply needs.

The SEA thus included the Medium Hydropower Study Process (MHSP) screening and ranking exercise which focused on developing a quality pipeline of medium scale hydropower projects in the 10 to 300 MW range for domestic grid supply. An inventory of 138 alternative hydropower sites across Nepal was assembled in consultation with stakeholders. A well-structured process using multi-criteria techniques was then employed to select seven of these projects to advance to full feasibility and EIA study, as further described below.

Organisational set up

The Nepal Electricity Authority (NEA) was the agency responsible for the management of SEA process. An inter-agency Steering committee was set up including representation at senior level of eight ministries with responsibilities with water and power, environment, social, and regional development and roads programs, and the National planning Commission. A multi-disciplinary team worked on behalf of the Steering Group under the supervision of the process manager. The team consisted of seconded professionals from NEA (planning, engineering and environment departments), from other government departments and from the private sector. International consultants were responsible for technical quality of the study team's work, to introduce new tools and methods and to provide on-the-job training.

Description of the Example

The MHSP exercise included first a nation-wide inventory of hydropower sites in the 10 to 300 MW range. Then a three-stage process was adopted consisting of screening, coarse ranking and fine ranking. These steps are summarized in Table 1 on the next page. They are further described below[6].

Table 1: Steps in the MHSP Exercise

	Options Inventory	***Screening***	***Coarse Ranking***	***Fine Ranking***
Site Selection	Expanded the initial inventory of 60 sites to 138 sites	Eliminated 94 sites from the 138 to base ranking on 44 sites	Coarse ranked 44 sites and selected 22 for fine ranking	Fine ranked 22 sites and selected 7 projects to proceed to full feasibility/EIA study

[6] Most of the information in this Section is extracted from ESMAP and Bank-Netherlands Water Partnership Program (July 2003).

Stakeholder Involvement	Stakeholders defined criteria and adding sites proposed by stakeholders	Multi-criteria screening Stakeholders reviewed sites and results	Multi-criteria analysis framework Stakeholders involved in developing criteria and criteria weights, project scoring method and reviewing ranking results presented in a series of preference matrix for all scales of options

Source: ESMAP and Bank-Netherlands Water Partnership Program (July 2003).

Inventory of hydropower projects

Prior to the start of the MHSP exercise, NEA had assembled an inventory of 60 potential sites across the country. Once this list was published, there was an immediate call from the stakeholder community to include more site options. This was for three main reasons: to increase the regional spread of sites; to expand the number of sites in the 50-100 MW range, a scale considered most attractive for private financing and within the capacity of domestic engineers to provide engineering services; and to include more sites with storage and daily peaking capacity to better match Nepal's power system requirements. In response, the Study Team expanded the inventory using basin studies that had been prepared by government agencies, NEA and various donors and from mapping exercises. Sites identified directly by stakeholders were also included (i.e. submissions received from industry, NGOs and community and local government interests). When the extended deadline for submissions on options to include was reached, there were 138 optional sites. Agreement was reached to exclude irrigation and multipurpose projects, while focusing primarily on power projects.

Screening

Screening criteria formulated by the Study team in consultation with stakeholders and NEA management were discussed and approved by the Steering Group. These criteria were published before being applied and stakeholder comment was invited. The Study Team did not engage local communities at the screening stage. This was a deliberate strategy so as not to create unfulfilled expectations or anxieties in the communities around the 138 sites included in the exercise, which could lead to speculation on land and changes in price. The screening criteria reflected:

- congruence with regional development policies;
- construction road;
- transmissions access;
- hydrology and cost;
- watershed conditions;
- World Bank and national safeguard policies on social and environmental aspects;
- indices such as persons resettled and land take /MW, biodiversity impacts;
- current level of study.

After debating of the screening criteria results, the Steering group authorized 44 sites to proceed to coarse ranking. The list of 44 sites was published in national and regional newspapers and the screening report was sent directly to key stakeholders, inviting comments in a fixed timeframe.

Coarse ranking

At coarse ranking, reconnaissance site visits were undertaken by members of the Study Team. This was to verify and bring the technical information on engineering, environment and social aspects on each site to a consistent level. At this time, community leaders at the 44 sites were engaged to elicit their views about development of a hydropower scheme in their area and community members participated in socio-economic baseline surveys. The surveys revealed that local development impacts were most often seen as positive. Many sites involved limited resettlement. Local people generally regarded the project, particularly the access road, as a major development opportunity. Coarse ranking of sites was based on multi-criteria analysis using a composite technical/economic criterion and a composite environmental/social criterion, as summarized in Tables 2 and 3.

Table 2: Coarse Ranking Composite Technical/Economic Criterion

Criteria	**Scoring System**		**Weighting**
Economic Supply Cost (75%)	Discounted cost/Discounted energy (in US¢/kWh), inclusive of civil, E&M, transmission, road access, environmental mitigation and cost contingencies		*75%*
System Fit for Medium-Term Supply (25%)	*Project size*	*Installed capacity in three size ranges reflecting what is needed in the "project basket" for system planning*	3%
	Firm Energy Contribution	*Ratio of firm energy to average energy production from the project*	*10%*
	Flexibility of dispatch	*Storage and ability to dispatch at peak or seasonally*	*7%*
	Regional Location	*Regional supply-demand balance*	*5%*
			100%

Source: Imran, Mudassar and Tjaarda P. Storm van Leeuwen (2006)

Table 3: Coarse Ranking Composite Environmental/Social Criterion

Criteria	***Scoring System***		**Weighting**	
			Run-of-River Project	*Storage Project*
Physical Environment	*Land take*	*Amount of land required for the project facilities, reservoir and access roads*	*17%*	*14%*
	Watershed conditions	*ICIMOD classification of watersheds in Nepal*	*17%*	*14%*
	Downstream impacts	Potential of adverse downstream impacts	-	*14%*
Biological Environment	*Biodiversity Impact*	*Potential for the project to adversely impact sensitive biological areas*	*14%*	*14%*
	Aquatic System Impact	*Length of river stretch and aquatic habitat adversely affected*	*14%*	*14%*
Socio-Cultural Environment	*Number of project-affected people*	*Estimated number of persons directly or indirectly affected by the project in terms of relocation or other disturbance*	*27%*	*33%*
	Cultural Sensitivity	*Potential for adverse socio-cultural impacts*	*8%*	*7%*
			100%	*100%*

Source: Imran, Mudassar and Tjaarda P. Storm van Leeuwen (2006)

Based on the coarse ranking, the Steering Group approved 22 sites to proceed to fine ranking. The list of projects proceeding to fine ranking was then published in national and regional media and sent to regional NGO and local government offices, also inviting their comments.

Fine ranking

At fine ranking, the Study Team mobilized for further site visits and surveys. The data collected was sufficient to enable the Study Team to prepare reconnaissance level project layouts with standardized methods for design, quantities and unit rates and to prepare environmental and social impact assessment that were in effect rapid appraisals and initial EIA scoping exercises.

In parallel, meetings and workshops were held with national level civil society and professional groups to refine the fine screening criteria and weights. Additional criteria such as project risk criteria were introduced. The composite technical/economic criterion and the composite environmental/social criterion used at the fine screening stage are summarized in Tables 4 and 5.

Table 4: Fine Ranking Composite Technical/Economic Criterion

Criteria	***Scoring System***		***Weighting***
Economic Supply Cost	Discounted cost/Discounted energy (in US¢/kWh), inclusive of civil, E&M, transmission, road access, environmental mitigation and cost contingencies		65%
Project Risk	Schedule Risk	Length and difficulty of road, bridges and transmission connection to the grid	3.1%
	Glacial Lake Outburst Flood (GLOF) Risk	Type and number of (GLOF) hazard lakes	2.3%
	Sediment Risk	Degree of sediment related issues	2.3%
	Hydrological Risk	Availability of a gauging station and the length of records	2.3%
System Fit for Medium-Term Supply	Project size	Installed capacity in 3 size ranges reflecting what is needed in the "project basket" for system planning	3%
	Firm Energy Contribution	Ratio of firm to average energy production from the project	10%
	Flexibility of Dispatch	Ability of project to dispatch at peak or seasonally	7%
	Regional location	Regional supply-demand balance	5%
			100%

Source: Imran, Mudassar and Tjaarda P. Storm van Leeuwen (2006)

Table 5: Fine Ranking Composite Environmental/Social Criterion

Qualitative Environmental and Social Criteria	**Physical Environment Weight (%)**	**Biological Environment Weight (%)**	**Social Environment Weight (%)**
Project Site/Selection	8	*8*	*10*
Construction Phase Impacts	*8*	*8*	*10*
Operation Phase Impacts (Long-term)	*6*	*6*	*10*
Enhancement Factors	*8*	*8*	*10*
Column Total	*30*	*30*	*40*

Source: Imran, Mudassar and Tjaarda P. Storm van Leeuwen (2006)

On the basis of the above criteria, the fine ranking was completed and new preference matrices were prepared. The Steering Group reviewed the fine screening analysis and preliminary recommendations were made for seven projects and three reserve projects. A public consultation meeting was then held to present and discuss the fine screening analysis and preliminary recommendations. Full media coverage was provided. Informed by the results of the public consultation, the Steering Group recommended a final selection of the following seven projects:

Table 6: Projects selected as a Result of the Fine Screening Process

Name of Project	***Capacity (MW)***	***Type of Project***
Budhi Ganga	22	Run of River
Rahughat Khola	24	Run of River
Liku Khola	34	Run of River
Kabali-A	35	Run of River
Tamur	72	Run of River
Upper Karnali	240	Peaking Run of River
Dudh Koshi-1	143	Storage

Outcomes

The MHSP screening and ranking exercise has served as input to the formulation of the Power System Master Plan for NEA. In addition, the exercise has provided the initial projects for consideration under the PDF. Feasibility and EIA studies have been completed for the Rahughat Khola and Kabali-A Projects and can be used as a basis for competitive solicitation to private power developers (World Bank, 2003).

The exercise also contributed to building the capacity of Nepal engineering and professional community in all disciplines to better position them to participate as partners in future private or public development projects.

Assessment of outcomes by involved stakeholders

As described in Table 1, stakeholders have been actively involved at each step of the MHSP exercise: hydropower projects identified directly by stakeholders were included in the options inventory; stakeholders reviewed the results of the screening stage; they were involved in developing criteria and criteria weights as well as the project scoring method; they also reviewed the ranking results. It seems that the results of the MHSP reflect to a large degree the consensus of involved stakeholders. However, no information could be found on the points of view of each stakeholder.

Overall Conclusions

The ESMAP and Bank-Netherlands Water Partnership Program Report (July 2003) presented the lessons that can be drawn from the Nepal MHSP screening and ranking exercise as follows.

One major lesson was that time and resources for participatory processes can be seriously underestimated. Once stakeholders become involved, the concerns they raise and their requests for more information or analysis have to be met. Sufficient time and notice is also needed for people to digest new information, for representatives to consult their constituencies and for people to form opinions. Otherwise, the legitimacy and the benefits of meaningful participation can be compromised.

The MHSP screening and ranking exercise was originally envisaged as a 3-month exercise. It took close to 14 months. The decision to allocate additional budget and time was made possible by the demonstration of the active interest the process generated among the stakeholders and the commitment of stakeholders (including decision actors) to strive for consensus on the outcome.

Other lessons included:

Involving stakeholders enriches the number and quality of options.

Using a multi-disciplinary team in a neutral setting should be considered for more complex options assessment processes. In the case of the MHSP screening and ranking exercise, the Study Team was able to respond to stakeholder needs as the process evolved and as stakeholders gained confidence that the process was not dominated by single interests.

National safeguard policies (and those of the World Bank) can be moved upstream in the planning process. Options that clearly violate safeguards can be eliminated at an early stage.

Decision-makers are better informed of the degree of consensus and acceptance of projects than otherwise and are in a better position to take decisions.

Specific steps must be taken to ensure that the databases, spreadsheets and other tools developed in the options assessment processes are maintained. Toward this aim, seconded staff from the agencies responsible for power development and licensing were included as key members of the Study Team.

Finally, the screening approach that Nepal adopted provides a successful example of moving options assessment upstream in sector decision processes, thereby lifting options debate out of project-specific approval processes.

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D. GOULBURN BROKEN REGION CATCHMENT: SCENARIO PLANNING FOR FUTURE IRRIGATION VICTORIA, AUSTRALIA

Identification of the Example

Key issue addressed
Needs based planning of existing water and environmental systems

Integration
Strategic planning: Goulburn Broken, Broken – Murray River Basin, Victoria, Australia guided by Intergovernmental Agreement on Water quality and salinity of 2001.

Implementation
National Action Plan Agreement between the Commonwealth of Australia and the State government of Victoria for the Implementation of the Intergovernmental Action for the improvement of Salinity and Water Quality.

Stage regarding the project life cycle
Implementation 2003 to 2007

Description of Framework

The Goulburn Broken Catchment of Victoria, Australia, is home to 200 000 people. It is located in northern Victoria and stretches from just north of Melbourne in the south to Murray River in the north. The Murray River has its mouth near the city of Adelaide in South Australia. The Goulburn and Broken rivers Catchment drain an area that of 24 000 km^2 . With 280 000ha under irrigation, the region is regarded as the Food Bowl of Australia. But as one of the oldest gravity irrigation systems in the country, it needed substantial renewal of its ageing infrastructure.

The upper catchment is also an attraction to the nearby population of Melbourne (3.4 million people) who come for recreational purposes. The influx of tourists each year however has caused serious environmental problems for the area, which need to be addressed. Many of these problems are related to water issues; salinity associated with irrigation, declining quantity and quality, rising water tables in the catchment meant that the region had to develop a sound plan to meet the interests of many stakeholders and strategically position itself for future sustainable use.

Institutional Set up
A cooperative and collaborative approach to natural resource management program was developed in the Goulburn Broken Catchment, a major catchment of the Murray Darling Basin, Australia. Through a combination of basin Partnership Programs and, Operational Initiatives a project involving communities along the river basin was undertaken. Stakeholders concerned with the health (environmental sustainability) of a catchment they lived participated in a basin wide strategic planning to formulate appropriate strategies of solving land and water use problems. The project is being implemented in line with the following institutional frame:
The project is being implemented by Goulburn Broken Catchment Management Authority (GBCMA), an institution that was established in 2001 through an Intergovernmental agreement between the central government and the state government of Victoria. The agreement is to run until 2007.

Catchment Management Authorities (CMA's) are regional corporate bodies established under the Catchment and Land Protection Act 1994 and the Water Act 1989 of Victoria and are led by a Boards whose members are appointed by the Victorian Minister for Environment and Conservation

The GBMA's mandate is to develop and oversee the implementation of a Regional Catchment Strategy in the Murray Darling Basin in line with the National Action Plan (NAP) for Salinity and Water Quality. The NAP was formed in November 2000 by the country's state governments with objectives that include the improvement of water quality and securing reliable allocations for human uses, industry and the environment.

The NAP has a national focus of tackling water and salinity problems in the country's worst affected regions such as the Goulburn Broken Catchment. Land and water degradation has adversely affected biodiversity and livelihoods. NAP urges a regional approach in which local communities actively take part in solving regional, basin wide problems. It is with this background that the project was formulated.

Futures Project of the Goulburn Broken catchment

Following dialogue and consultation between the different stakeholders an Irrigation Futures Project of the Goulburn Broken catchment was established. A location map illustrates the project area.

Fig1. Map of the Goulburn Broken catchment, Victoria, Australia

The project was formed with the following objectives:
to assist key stakeholders to develop a shared vision on the future of irrigation in the Goulburn Broken catchment, and to identify scenarios of major constraints and opportunities and of regional response options.
Understand the social, economic and environmental consequences of various scenarios through impact assessment based on an integration of the best available knowledge.
Facilitate key stakeholders to build consensus on preferred regional options for future irrigation, and recommend regional follow-up actions.
Develop a methodology that can be applied elsewhere in Australia for sustainable irrigation planning at a catchment scale.

The project implementer, Goulburn Broken CMA works in partnership with all tiers of state and national of government, landholders (current and traditional), universities and research organisations, and other authorities and agencies involved with water and environmental issues to create innovative and practical solutions to land, water and biodiversity issues.

Members of the Goulburn Broken CMA Board of Directors are drawn from within the region. Under the direction of the Board, the Goulburn Broken CMA articulates the views of local communities by working with Committees that comprise community members with local knowledge and wide experience in areas such as agriculture, food processing, salinity, waterway and floodplain management and biodiversity. These Committees are responsible for setting priorities in the region. Funding for the project is largely from the state and central government.

Implementation Committees drive the works programs to ensure the activities of the Goulburn Broken CMA reflect the views of local communities. The Committees comprise community members with wide knowledge and are responsible for setting priorities in the region. These committees act as a valuable link between the community and the CMA Board and staff. A River Health and Water Quality Committee and individual Waterway Working Groups for each of the implementation areas also draw on the skills and networks of community members.

Description of the Framework
The project takes an integrated approach to natural resource management rather than an isolated approach to land and water resources. This facilitates a Catchment-wide scale of outcomes designed to achieve multiple benefits.

In addressing needs of many stakeholders, an integrated approach of basin wide water and environmental issues, the project acknowledged complexity and uncertainty at the onset. To handle such challenges in the development of strategic plans for the catchment, the project adopted a scenario planning approach where individuals, groups and organisations of the catchment acknowledge that their transactional environment is part of the operating environment. The region is a significant player, influencing the outcomes as much as being influenced by other players and factors of the external environment. Although there is an acknowledgement that there are limits to how they can influence the external factors, the ability to face new challenges improves if the following conditions are met:

An acknowledgement of community values and aspiration.
An assessment of the region's characteristics, including its capability to change.
An assessment of the current and future operating environment.

A region needs to fit well with its operating environment if its aspirations are to be achieved. Good regional planning aims to develop strategies that will usefully guide the behaviour of the players in the region to achieve a good fit

The development of strategic plans therefore involved scenario planning that projects the current status under different conditions. Based on the scenarios that are developed by stakeholders, appropriate strategic options were subsequently developed.

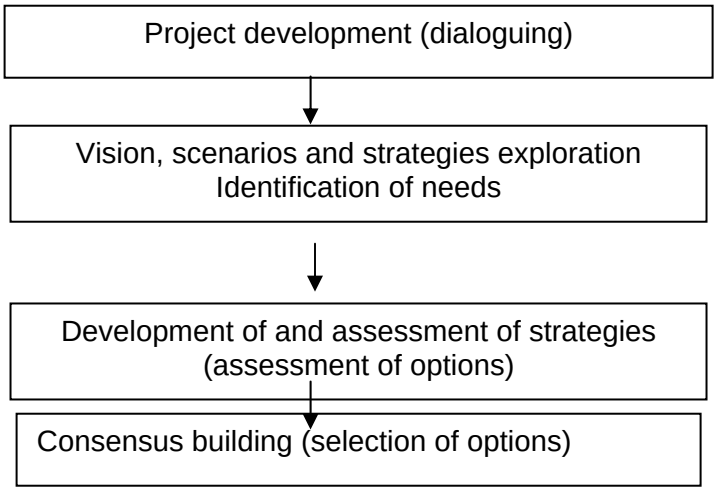
Scenario planning explicitly acknowledges ambiguity and uncertainty in a given strategic question. By creating a set of scenarios that are plausible, coherent pictures of alternative futures were formulated. Such scenarios proved to be a powerful tool of testing the robustness of strategies as well as for generating new strategic options. Scenario planning also provided a useful platform of making stakeholders understand their environment better.

Stakeholder consultation and participation

The project considered stakeholder participation as critical to the success of regional planning. It broadened the "scientific" view of systems, utilised local knowledge, took into account stakeholder values and increased the ownership of planning outputs. It also increased an additional benefit of capacity building. The strategic planning for the Goulburn Broken irrigation futures therefore revolved around stakeholder participation at all stages of:

Project development
Exploration of vision, scenarios and strategies
Further development of and assessment of strategies
Consensus building

The methodological approach is illustrated below



The responsibility of performing specific tasks and monitoring the implementation of the project was given to Committees. The Governance Committee was responsible for formulating project implementation plans while the Stakeholder Reference Committee (SRC) was responsible for ensuring the participation of stakeholders and the Scenario Analysis Committee (later renamed the Technical Working Group) was responsible for reviewing workshop outcomes. Since project inception, the SRC met on 7 occasions during 2004 to perform the following functions:

Provide guidance on processes for wider stakeholder participation
Consolidate input (ideas, feedback etc) from wider stakeholders.
Provide strategic advice on the general make-up of participants in the Forum Workshops and to prioritise and rank the scenarios and options to be examined further by the Scenario Assessment Panel.
Make recommendations on preferred regional response options, based

on stakeholder views.
Make recommendations on any additional follow-up actions, which may assist agencies and groups in their subsequent implementation of these preferred response options.
Generate confidence in the project (its processes and outputs) within the stakeholder and wider community.

To cater for input from groups that were not well-represented in the Forum Workshop processes, the project team also planned special engagement activities. These were targeted at women and ethnic communities, the Indigenous community, and young people. Finally, the project sought to engage with the wider community through newspaper articles and community network newsletters.

Identification of needs and options

These processes were combined through conducting of a series of Irrigation Futures Forum workshops that were held at 6 major centres throughout the region during 2004. A total of 9 workshops were conducted. During the workshops, participants were drawn from primary producers and industry, from institutional groups who manage land, water and the environment as well as from environmental groups whose focus is protection of natural resources. A total of 120 participants were tasked with:

Listing and relating major events and changes that had occurred in the last 30 years in the region.
Identifying some of the external and internal drivers for these changes.
Considering the current strengths and weaknesses of the region.
Describing what the region would look like in 30 years if it were “thriving”.

The participants then constructed a total of 26 “external scenarios”. These are stories of plausible contextual environments in the next 30 years. In response to these external scenarios, participants generated ideas that would relate to their needs. The scenarios formed the basis of options for the future.

The large amount of material from the Forums was consolidated and synthesised through the project Stakeholder Reference Committee (SRC). Functions of SRC were to prioritise and rank scenarios and options to be assessed and examined further by the Scenario Assessment Panel. The panel would make recommendations on the preferred regional response options based on stakeholder views. Outputs from this stage of the project were:
A set of aspirations for the future of irrigated agriculture in the region.
Four external scenarios.
A list of regional strengths and weaknesses.
A suite of regional strategies to guide future regional actions.
These stages comprised project milestones that would be evaluated before implementing activities of the next stage.

Assessment of options

This constituted stage 3 where the development and assessment of regional strategies and future action options is to be done through constructing “response scenarios”. These are stories of regional players’ responses to the four external scenarios, in interaction with outside players in the transactional environments. A stakeholder Technical Working

Group was formed to work with the project team to complete this task. The Group had two teams; Intuitive Team and Analytical Team, working in sequence to construct the response scenarios. Drawing from these response scenarios, strategic positioning analysis were conducted to understand:
The societal/customer value that the region creates.
The nature of the competitive advantage exploited by the region.
The region's distinctive competencies, which, in their mutually reinforcing interaction, create competitive advantage.
The threats to the region causing its distinctive competencies to depreciate.
New business opportunities and capability options to maintain and increase the region's competitive advantage.

Assessment of options required identifying and understanding consequences of the options. It also required identifying the preferred and non-preferred options given the consequences. The region's catchment's competencies at a given time may depreciate over time due to:
Changes in the contextual environment (eg. customer values, free trade, climate change).
Re-positioning of players outside the region in the transactional environment (eg. international and national competitors, government water policy and resource allocation).
Changes in internal affairs (eg. land and water uses, salinity, irrigation infrastructure).

Through the strategic positioning analysis an appreciation of how regional players may position themselves and how they may create regional synergies to give them and the region the edge over competitors emerged. A process of identifying internal drivers of change processes, strengths and weaknesses, threats and opportunities within the region formed a basis of generating options.

Selection of options
This final stage that is currently in progress envisages working with some of the key regional players and other stakeholders to incorporate project outputs into their strategic plans. This is in recognition that, despite the large number of people involved in the project and the active communication program throughout the project period, different players have different processes and needs. The project seeks to understand these processes and needs, and to find effective ways for decision makers to own and use the project outputs. The project plans introduced the following approach:

Outcomes
Outcomes on aspirations

During the first stage of the process, participants identified the following aspirations:
Farmers needed to be innovative enough to respond to international markets, to produce a greater diversity of crops at higher yields and at higher values of water use efficiency.
The community needs to value its farmers and its food production processes.
Water managers need to work on an integrated water system form source to plant.
Irrigation need to be better linked to land use capability
Participants wanted to achieve an accountable balance between social, economic and environmental aspects of development.
As part of the scoping process, participants also listed their 4 top community values as illustrated

Value	Prosperity including profitability	Relationships including cooperation	Justice including fairness	Integrity	Security
%	15	11	11	9	7

In summary, participants aspired to having a balanced social, economic and environmental outcome, and to having active community participation in future decision making processes.

Outcomes on external scenarios

Four external scenarios synthesised to represent a range of plausible contextual environments in the context of social, economic, political technological, and ecological developments in the next 30 years are:

Moving on scenario is where modified genetically modified (GM) crop varieties resistant to fire blight are introduced. Other GM plants are also allowed soon after. Water delivery systems are privatised with significant investment in infrastructure and services. The phasing-in of the free trade agreements with the US and ASEAN results in both export opportunities and strong competition. There is an increased demand for high quality "bush" niche products.

New frontiers scenario occurs when communication, technological developments, demographic and attitudinal changes trigger a shift from urban to rural more eco-friendly rural areas. At the same time declines in agricultural output occur in response to policy shifts and acceptance of synthetic food products. At the same time, drawing of water from the catchment declines as low energy, solar-powered meet requirements of cities currently supplied by the catchment.

Pendulum scenario would occur when there are swings in water supply and economic fortunes due to climate change. Food prices would fluctuate and respond to the rising economic influence of multinational corporations and China. Demand for food rises

Drying up scenario would take hold when the combination of war on terror, recession and drought will result in a decline in water for irrigation and food production

Regional strategic options

At the end of the 2nd stage, and as a response to these scenarios, participants recommended 29 strategic actions that were grouped under

- Building social capability.
- Building land, water and environmental capability.
- Building agricultural industry capability.

The strategies are about creating the right conditions for entrepreneurship and innovation to flourish, and at the same time protecting and enhancing environmental and community well being as indicated in their aspirations. For example, the strategies recommended that the region:

- Develop a sound plan for water pricing and associated services to ensure the viability of irrigation delivery services and ability of irrigation enterprises to adapt to changes, and to balance short term and long term needs.
- Investigate options for structural change in agricultural businesses, for example, corporate dairy farms jointly owned by several families.

The strategies are also about building the region's adaptive capabilities to continually monitor, learn, innovate and make adaptive changes to manage future uncertainties, so that the region will embrace opportunities and challenges when they arise. For example, the strategies recommend that the region

- Continually rejuvenate memberships and processes of community groups and community involvement in organisations.
- Value the ability of irrigation infrastructure to adapt to future changes in land and water uses, and adopt flexible technologies and management processes where appropriate.
- Value and support diversity in agricultural enterprises, farming systems and products in the region.

The strategies emphasise the importance of active participation of the community in decision making to effectively utilise local knowledge and take into account a diversity of views, so that decisions will be robust and owned by the community. They also recommend effective communication and alignment among organisations, community leaders and the community.

Summary and conclusions

The project identified four stages of project development; vision, scenario and options; development and assessment of regional options, and lastly, building consensus. Outputs identified from completed stages (up to stage 2) are:

- A set of community values and options for the future of irrigation development in the Goulburn Broken catchment
- A set of scenarios describing plausible positions of factors that influence irrigation in the catchment over which the catchment has no control. These are opportunities or threats that the catchment may face in future.
- A set of assets describing the resources within the catchment and the condition they are. These represent current strengths and weaknesses within the catchment.
- A set of regional response options describing factors within the control of the catchment that will respond to challenges and opportunities presented by the catchment.

These outputs laid a foundation for the 3rd phase of the project where the project plans to use a deliberative multi criteria evaluation process. This is a process that retains stakeholder participation through use of a "citizen's jury that will be constituted to assess the impact of the identified strategies on the outcome of the project.

Lessons learnt

Participation of stakeholders is key to the success of applying this framework of identifying and assessing options. However, there may be some disadvantage of attrition on the part of some of the stakeholders due to a variety of reasons such as fatigue, new interests, and change in personnel or leaving the region. In addition, a futures project extending for 4 years must allow for, and adapt to, substantial changes in key parameters, drivers, assumptions and other dynamic factors over the life of the project. Through such changes, an internal or external situation can convert an internal factor into an external one or vice versa. Thus any changes in situations have to be continuously incorporated in the framework; a process that limits application in socio economic environments where information is not readily and rapidly available.

Discussions with representatives of the regional Indigenous communities indicated that while there is a willingness to be involved in the planning and management of land and water resources in the region, there are some significant challenges to be overcome. There are protocols to be established in terms of who can speak for each of the several groups in the region and on their behalf at country level. There is also a lack of capacity within the Indigenous community to contribute to; other than the definition of high level, aspirational goals for land and water management (clean water, more fish etc). That capacity needs to be developed if effective participation is to be achieved. Unfortunately, such capacity building lies outside the scope and the resources of this project. As a result, the project team has initiated calls to a number of authorities to address this issue.

Project implementers noted that foresight exercises are as good as the accuracy and relevance of information used to develop the scenarios, it is not a panacea to the identification and selection of the "right" options in all cases. It is also not a solution to future problems. What was important to stakeholders was that it offered a useful means of making decisions by reducing uncertainties to a form where tools for strategic planning can be applied. It also gave an opportunity for stakeholders to learn and better understand their environment.

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E. THE CEARA INTEGRATED WATER RESOURCE MANAGEMENT PROJECT, BRAZIL

Identification of example

Key issue addressed
Options on integrated water management

Integration
National river basins water management strategies and operations

Implementation
River basin planning: balancing supply and demand options

Stage regarding the project life cycle
Project planning and implementation at river basin level

Description of the Framework

Context
The state of Ceará in North East Brazil is characterised by low and variable rainfall, high evapotranspiration and a fragile ecosystem of shallow soils and scrubland vegetation. The state is part of the "drought polygon" of north east Brazil (Fig 1) that is prone to recurrent droughts that have historically caused devastation to the population. Nearly 40% of the population of 7 million, the majority of whom are considered poor, is engaged in agriculture and are vulnerable to such droughts. Prior to the 1990's, construction of dams was considered to be a major strategy of augmenting water supplies. As a result of this policy, a total of 7227[7] dams with a total maximum storage capacity of over 11 billion cubic meters were registered with the sate government by 1992. Despite the investments in storage, the demand for water remained largely unmet due to physical constraints that include losses from evaporation, leakages from the inter basin transfer system and lack of connectivity between urban and irrigation demands. As a result, many reservoirs remained empty at critical moments of water demand.

[7] Kemper, 1996 cited by Young

Fig. 1 Map of Brazil illustrating location of Ceara state in the north east

Institutional set up

Brazil is a federal nation where states have formulated their own laws on issues such as the establishment of water agencies, committees, norms, information systems, water tariffs, permits, etc. Dams constructed with federal funds, had their operational management structures handed over to individual states in the 1990s. Elements of institutional structures applying to the framework are:

- Ceará became one of the first states in the northeast to pass its own State Water Resources Act and to create a State Secretariat for Water Resources (SRH) in 1987.
- The state of Ceará instituted a multi-tiered system for the planning, development and management of water resources handed over by the federal government.
- The state also instituted state and basin water committees whose goal was to promote participatory decisions on water allocation
- The functions of water are facilitated by the operational water agency (COGERH) and by the secretariat for water resources (SRH).
- COGERH has the ultimate responsibility for operating the water system. Agricultural, municipal and industrial users, as well as political and social groups are represented in the committees.

SRH drafted new policies and long-range plans to reform the legal, institutional and physical frameworks for water management. Key strategic challenges that faced the new institution were:

- to rationalize water allocation and to put in place capacity to manage water demand in the urban and irrigation sectors
- to identify new infrastructure for the improvement of bulk water storage, management and distribution.
- to develop greater flexibility to manage water supplies on an inter-basin level, including improving the integrated management of existing facilities for both seasonal and multi-annual storage
- introduce environmental criteria in infrastructure management

During the same time, there was a strategic shift towards the development of integrated management of a network of dams and reservoirs linked through inter basin transfers and the adoption of more decentralised governance that encouraged improved community participation, professional public administration and the development of policies that fostered economic growth. Buoyed by decentralization policies, funding from institutions such as the World Bank and supported by reform initiatives introduced through the PROURB Project (Programa de Desenvolvimento Urbano e Gestão de Recursos Hídricos), it became possible to:

- construct small and medium storage dams for the supply of water to rural and urban communities and towns
- to register all existing water users by river basin as a first step toward control of water use, issue water use rights, put in place water rights enforcement capacity
- introduce bulk water tariffs and demand-side management programs.

Interventions therefore took a balanced approach towards supply side and demand side options.

Description of example

Project Description

The Ceara Integrated Water Resource management Project was intended to:

- increase a sustainable water supply for multiple uses, and improve the efficiency of the State of Ceara's integrated water resources management system and thus decrease the vulnerability of poor populations to cyclical drought.
- It was intended to promote soil and vegetation management in tributary watersheds, to enhance water conservation, in turn, improve on protecting the fragile environment.

Following earlier intervention with support from the World Bank, further support continued (PROGERIRH) as part of the State's water reforms and long-range plan through The Programa de Gerenciamento e Integração dos Recursos Hídricos: 1998-2006 (PROGERIRH) project. It essentially enlarged on the scope of PROURB. A Pilot Project to consolidate and take stock of progress of earlier work began in 1997. The programme spelt out the following purposes:

- harmonization of environmental policies with water management policies, and adoption of more efficient water use and management technologies.
- Upgrading and rehabilitating existing infrastructure (water conveyance structures and dams) to improve safety, supply efficiency and permit more flexible operation.
- Providing support for education and information programs for the public and training of water users in efficient water use
- Enhancing natural resource hydro-meteorological databases to improve on water user capacities in environmental monitoring.
- Training of water users in efficient water use capacities through the improvement of timely flow of information to managers and basin committees.

Key activities of the project are indicated in an activity schedule below in Table 1:

Period	Schedule of activities
1987	SRH - State Water Resources Secretariat established
1988-1991	1991 Development of (PLANERH)
1992	Publication of the new water policy (SIGERH).
1993	Formation of multi-stakeholder river basin committees and water user organizations
1997-2002	PROGERIRH Pilot Project and Regional Environment Assessment
1998-2006	PROGERIRH - Components expanding on (PROURB)
	Rehabilitation of existing hydraulic infrastructures
	Water Management Strengthening (policy, institutional, non-structural measures
	Increase in the State's network of strategic reservoirs, and
	Integration of river basins (management of interbasin transfers
	Watershed management in selected micro basins and coastal groundwater management.

The schedule of activities outlined required the participation of stakeholders as discussed below.

Key elements of the strategic frame related to demand and supply options through:

- Rationalizing water allocations and improve efficiency in delivery
- Putting in place capacity to manage water demand in urban and irrigation sectors;
- Developing greater flexibility to manage water supplies on an inter-basin level, including improving the integrated management of existing facilities for both seasonal and multi-annual storage.
- Identifying new infrastructure to improve bulk water storage and supply management.
- Introducing environmental criteria in infrastructure management and inter-basin.

Support from the World Bank and decentralization policies assisted in seeing implementation of outlined objectives.

Implementation

Stake holder participation

Involvement started in the late 1980's and improved progressively until 1997 when PROGERIRH started. At each successive cycle of Planning stage, stakeholder involvement improved; starting with limited interaction of regional and sate agents. Over time, Water user groups and basin committees were gradually introduced as they became functional. Initial emphasis in the participation process lay in groups competing for physical investment opportunities in their areas. This emphasis shifted when more participation from non-government stakeholders in decision-making processes for the design and construction phases of reservoir projects and in establishing the policies to manage inter-basin transfers became more mature.

Gradually, stake holders have become more involved in all stages of assessing options, implementing investment opportunities as well as operating water distribution systems of inter basin transfers.

Assessment of options

The first systematic assessment of reservoir options started in 1987 when a portfolio of 40 new storage reservoirs was identified with the assistance of Ceará Water Resources State Plan. Although state and municipal agents were involved in the planning process, their role was not as direct as in previous years. The proposed reservoirs in the PLANERH portfolio were put through two processes of evaluation and prioritization before they became eligible for World Bank financing under PROURB and PROGERIRPLANERH. Outcomes of this exercise were announced in 1992.

Initially four dams at an advanced state of preparation (design and EIA) were evaluated and accepted under PROURB. The remainder was evaluated in a three-stage screening and ranking process. The first two stages have an eliminatory character and the third having a ranking objective. The process was open in the sense that enlargement of the original PLANERH portfolio was permitted. This occurred when regions submitted new proposals for the inclusion of dams in the State Plan, while the ranking was taking place.

This resulted in a list of 32 dams eligible for financing under the PROURB. Results are summarized in Table 2 below.

Phases	Character	Purpose	Reservoirs assessed	Reservoirs accepted
1	Eliminatory	Eliminatory Environment Impacts	32 (Excluded 3)	29
2	Eliminatory	Water demand priority	29 (Excluded 3, added 8)	34
3	Ranking	Multi criteria matrix	34 (excluded 2)	32

The results announced in 1996 were subject to project specific evaluations and EIAs. These were eventually ranked and based on the ranking prepared and subsequent project-level evaluation and public consultation, as part of the EIAs, 14 storage dams were constructed under PROURB. There were budget constraints. As a result, the highest ranked dams were first to be constructed.

Assessments were also made at a regional level through PROGERIRH, a pilot multi-disciplinary consulting project tasked with studying environmental studies that started in 1997. This was a Regional Environment Assessment (REA) performed to consider cumulative social and environmental impact of reservoirs in a basin context and to refine the environmental and social selection criteria for the operation of existing and new reservoirs the State wanted to develop up to 20 more. The process started with screening and ranking process to choose a further 12 reservoir options. Building on the PROURB exercise, new parameters were defined and assigned weights on the basis recommendations from the advisory unit. Each reservoir was then scored against each parameter, receiving a grade varying from zero (the lowest classification – i.e. highest cost or most adverse impact) to five (the highest grade). The weighted average of those grades defined the overall rank of that dam. Five key ranking parameters used were:

- technical aspects - reflecting factors such as the role of the reservoir in the integrated system, and specific engineering features of each dam site and hydrological efficiency.
- environmental aspects - bringing in criteria from the Cumulative Environment Impact Study prepared by SHR
- political aspects - giving priority to areas in conformity to the state economic development plans
- social aspects - reflecting the degree of social hardship due to water deficit and the resettlement involved in each project
- economic aspects: bringing in factors used in the benefit-cost evaluation of each project, such as reflecting the assessed benefits, total cost of the project, comparative cost per unit of water supplied, operation costs, and the relative degree of uncertainty of the cost estimates

<u>Selection of options</u>

The process outlined resulted in an updated portfolio of 29 reservoirs. Of this total, 12 units with the highest ranks were selected for detailed project-specific study for possible financing under PROGERIRH.

At the same time, a parallel process selected an inter basin project for further assessment as it was considered to be a priority. A ranking matrix procedure was then used to evaluate five different schemes for integration to water demand in one of the state's regions. With the rehabilitation of eight projects already advanced, consideration was given on how the new projects would integrate with projects being rehabilitated in improving inter-basin transfer flexibility and local service delivery.

Implementation enforcement and monitoring

COGERH, a bulk water company at the state level had a significant role in the implementation of the project. After construction it plays the role of water agency for all state river basins. The organisation of were initially organised at reservoir level followed by the basin level. It is at basin level where, agreements are reached on water allocation for minimum flows, industrial withdrawals and effluent dilution, during the monthly meetings of the commissions, between water supply utilities, power sector companies and industrial sector. It is these structures that are able to solve most of the local disputes without going to court and therefore play a key role in the management of these structures.

Outcomes

The participation of stakeholders raised concerns about the potential environmental effects and impacts of drainage and sewage effluents flowing into rivers, conversion of rivers with intermittent flows to perennial flows. Discussions included the size and timing of releases during normal flood periods and the effect they would have on existing estuarine dynamics and marsh ecosystems that had already adapted to intermittent flow regimes and floods. Representatives of coastal settlements expressed concern about the lack of knowledge of the possible adverse impacts on coastal fisheries. Although not all concerns could be addressed, the process of dialogue through River Basin Committees helped to strengthen their functions as they visited planned construction sites and sought opinions from experts; processes that helped in involving stakeholders in taking part in decision making and make them better understand and manage infrastructure to increase utilisation efficiency.

The process gave government officials and stakeholders a learning opportunity in which each of the parties was able to appreciate decision – making processes and expectations of each stakeholder. It also gave users an opportunity to grow in confidence as regards operating the increasingly complex inter basin transfers. Understanding benefits of river basin integration and social and environmental impacts of inter-basin transfers would bring about new sets of conflicts that needed resolving at local levels. It has been reported that 80%[8] of these conflicts are resolved at river basin level rather than in court, strengthening the value of river basin committees

- New methodologies of evaluating options can be institutionalized in public organizations, different segments of society in which a more open debate of the inter-basin transfers offered opportunities to meet interests of different interest groups far more likely to increase efficiencies.
- Information and data bases created by the process offered platforms upon which future assessments can be built. It also provided a reference point that can be

[8] Porto, 1998; cited by Tortojada

used in future to assess and evaluate performance of a given project once it has become operational.

- A buying in process in which stakeholders played a role was initiated. This is a crucial part of the process that not only builds institutional memory; it also helped to mobilize stakeholders into taking part in a given set of opportunities.

Broader Lessons

In Ceara State over 24 reservoir projects were built under the PROURB and PROGERIRH projects. Part of a relatively easier implementation phase lay in having a well-defined set of options that were defined by a process that lowered controversy. The decision making process is made less complex. The existence of a policy framework, a work plan with an inventory of 40 projects; and a systematic process to identify and screen the options helped the process. The case also illustrates that an enabling environment, in this case, of a decentralized decision making promotes effective participation when compared centralized control that prevailed prior to the 1990's in Brazil. The case also illustrates that the assessment of options is very much a learning process where an incremental understanding of relevant issues can be made over a period of time.

Context is important when selecting new options to add to an integrated system already in place. Criteria that indicate how each particular option would operate in the system have to be evaluated to understand its contribution and interaction with the total. The understanding of these criteria (e.g. integrated and optimized operation and cumulative impacts that take into account environment, social and physical performance) is rapidly evolving. Just as environment and social criteria have been introduced at the project-level, they need to be introduced at the system level for selection and management of options. Particular attention must be paid to update these criteria in each successive cycle of planning.

It is also important to note that identification and assessment of options is often a long drawn out process that is iterative may take time. Changes often take place during the process. Important lessons to draw from this are that criteria used in the process have to be continuously reviewed. It is possible to turn down an option in initial phases of assessment but may turn out to be attractive a few years or months in the process as a result of changes in certain conditions. This dynamic process has to be continually updated.

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Looking upstream to the Berg River
The arrow indicates where the dam will be

F. BERG WATER PROJECT WESTERN CAPE TOWN SOUTH AFRICA

Identification of Example

Key issue addressed
Assessment of options and water demand management

Integration
National urban and agricultural water supply and environmental management project

Implementation
Strategic/Sectoral, Social and Environmental Assessment of urban and agricultural water supply.

Stage regarding the project life cycle
Project level implementation phase; construction of dam, water intake and delivery structures in progress; impoundment expected June 2007 and water delivery expected end of 2007.

Description of Framework

Institutional Framework
The Western Cape of South Africa is a water-scarce region characterised by low summer rainfall that require storage to supply urban consumers of Cape Town and agricultural users of surrounding environs with water during the dry summer months. Droughts are common; the worst droughts are reported to have occurred in the 1930's and the early 1970's. These occurrences were both in excess of 1:200 year droughts. If similar occurrences were to be realised, planners considered the region to be at a greater risk of water stress due to the rising population.

The current water supply of City of Cape Town (CCT) and surrounding municipalities is from five large storage dams augmented by a number of smaller dams and groundwater from two aquifers. The combined water sources constitute the Western Cape Water System (WCWS). Water is also transferred into the Berg Water Management Area (Berg WMA) from rivers located in the adjacent Breede WMA area through a River tunnel system. The city of Cape Town consumes 70% of this water and the balance is consumed by the agricultural (irrigation) sector, as well as by other urban / industrial users in the lower Berg River. In average rainfall conditions, total annual yield[9] that can be realized from the three sources (of existing dams, aquifers and inter-basin transfer) falls far too short from projected unrestrained needs[10]. During the 1990's, bulk demand growth, at 3–4 percent per annum, was in step with demographic growth. By the 1999 / 2000 season when demand exceeded supply by 8%, it was clear strategies to address the shortfall had to be formulated.

[9] 364 million m^3 under average rainfall conditions
[10] Needs projected to be 507 – 912 million m^3 by 2020

The responsibility of formulating appropriate plans forms part of the Department of Water Affairs and Forestry (DWAF) portfolio. The department subsequently classified the Western Cape as one of the first major urban regions in the country where demand for water exceed the total potential yield. Ways to augment supplies needed development, and at the same time, ways to save need to be found. The case illustrates how a local authority, government and other stake holders can make informed decisions that help to meet long term water needs.

Policy and normative framework

DWAF initiated a study, subsequently referred to the Western Cape System Analysis (WCSA), between 1989 and 1995 to assess current and future water needs of the Western Cape. Following the study and a dialogue with urban and agricultural users, various schemes were proposed and guided by the following considerations:

- Legislation (Water Services Act 108-1997) that required that alternatives to dams be prioritized before the construction of new dams.
- New legislation that governed water management policies and practices in South Africa. In particular the National Water Act (1998) introduced legal requirements that enforced among other things, environmental reserves for the sustenance of riparian communities.
- New legislation introduced in the water resources and environment management fields also required, or reinforced, participatory planning and public consultation as an input to all major water management decisions at local, provincial and national levels.
- A commitment to water demand management and integrated water supply management initiatives by DWAF. Users were required to introduce appropriate conservation measures of their water resources. The Water Services Act also stipulated that where possible, water development projects should be funded by the users.

DWAF is a stakeholder in articulating needs of various stakeholders. It is also plays a key role of interacting with other government departments in all stages of the project cycle that include assessment of options as well implementing and operating projects.

History of the norm

The 1997 Water Services Act and the introduction of the National Water Act in 1998 made Skuifraam dam a first major test of the new legislation in the Western Cape Province. The new process of participatory planning and consultation also triggered debate on water management policy that called for a new approach to demand and supply management. Before accepting CTC's proposal for construction of Skuifraam dam, the government made it conditional that CTC;

- Revise demand projections;
- Demonstrate commitment of local authorities to demand management; and
- Improve information on demand management potential as well as the budgetary support for programs.

In compliance to these requirements, CTC, subsequently referred to as the Cape Metropolitan Council (CMC) issued a policy statement in 1997 that committed it

"*to develop and manage, in a participatory manner, the implementation of a socially beneficial, technically feasible, economically effective and ecologically sustainable water*

demand management strategy, which will reduce the (DWAF 1994) projected water demand in greater Cape Town by 20% (or more), by the year 2010"

In February 1998, the CMC followed this by establishing a Water Demand Management Section that introduced initiatives to reduce the demand for water in the Cape Metropolitan Area. A twelve-point strategy was prepared and accepted by the CMC Water & Waste Committee in November 1998**,** together with an accompanying programme for implementation that included examining alternative sources of water supply and mending leakages to improve supply side efficiency. These efforts saved up to 5% of the metropolitan's water supply

Towards the end of 1999 the former CMC also identified the need to adopt an integrated water resource planning approach to manage the future water demand in the Cape Metropolitan Area (CMA). To achieve this objective, the CMC appointed specialists who performed an Integrated Water Resource Planning (IWRP) Study. The aim of the IWRP Study was to investigate at pre-feasibility level, various water demand management initiatives along with water supply augmentation schemes. One outcome of the study was the adoption of an Integrated Water Demand Management Strategy where a parallel approach of augmenting supplies was to be balanced with appropriate demand management interventions. These measures were strengthened during the 1999 / 2000 season when drought forced city authorities to impose restrictions on water use.

Table 1 below summarises key events that relate the implementation of the project. .

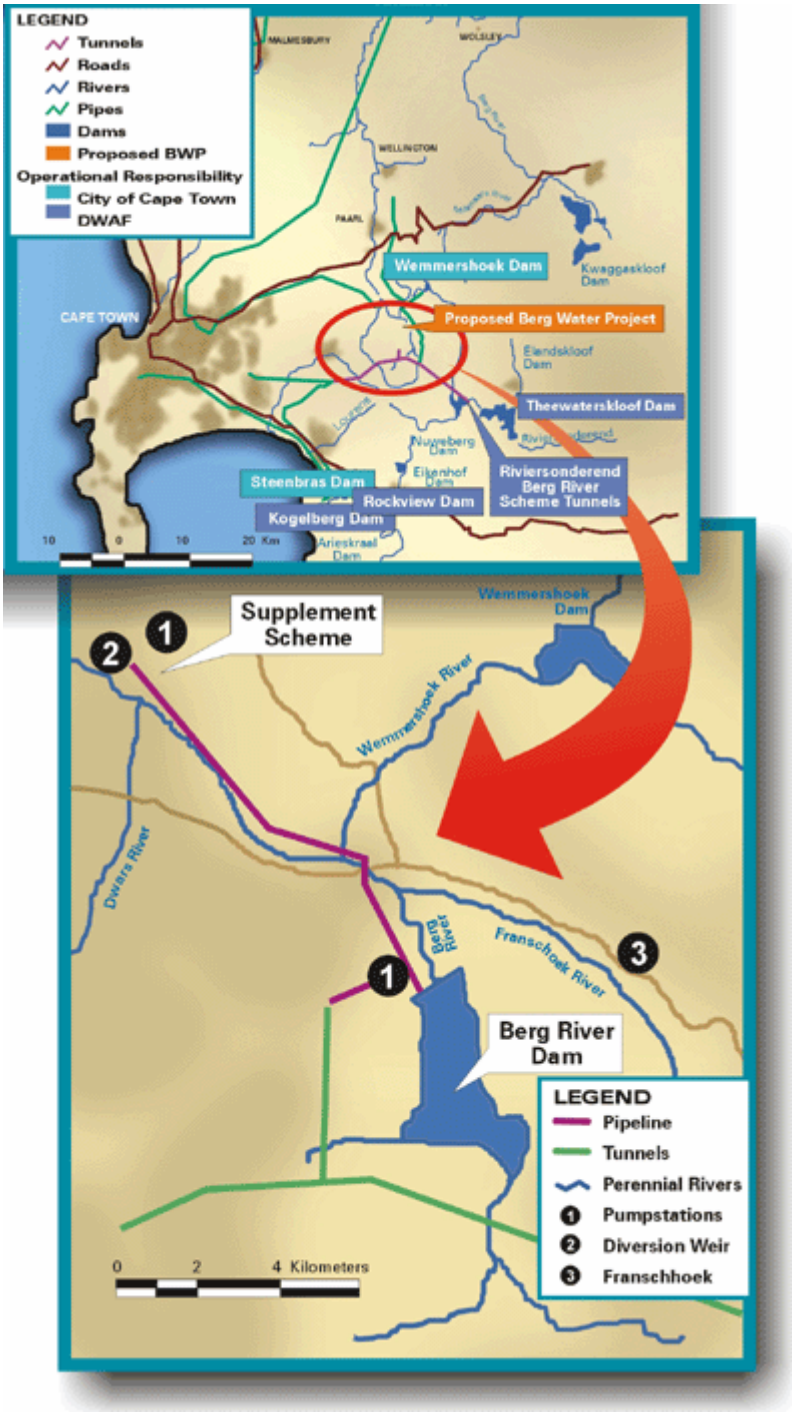
1989-1995	Western Cape System Analysis: Study of current and future water needs, available resources and augmentation options by DWAF.
1995-1996	DWAF public consultation on options. Task team short-listed BWP (and water demand management for further study). Draft EIA report presented for public comment. (Goudini Conference, April, 1996)
1997	Water Services Act (108), CTC policy statement on water
1994	National Water Act, National Environment Management Act
1998	Dam recommended for approval by CMC, endorsed by DWAF. Minister defers decision until CCT water authorities show progress in managing water demand.
1999	Drought and restrictions introduced in water use; initiation of accelerated DSM program by CTC.
Dec 1999	CTC undertook an Integrated Water Resource Planning (IWRP) study
1998–2001	Options studies and public debate on options in 3 parallel processes (Municipal WSPD, Berg WMA Planning, and EIA of the Skuifraam Dam).
Sept 2001	Approval in principle of the Berg Dam by the minister.
May 2002	Cabinet decision to proceed with Berg Project.
2007	Scheduled commissioning of the BWP and dam.

The decision to implement the project was made after meeting requirements specified by the government. These measures were also in line with recommendations by the World Commission on Dams Report of 2000.

Description of example

Scope of project

In 1998, CTC supported building the Skuifraam Dam to augment storage on the system by a further 18% and sought the approval of the national government. The project located 70 km from Cape Town (as illustrated below)



comprises a 70m high dam with a gross capacity of 126.4 million m^3. The dam is situated on the farm Skuifraam, about 6 kilometres outside Franschhoek, and a pumping scheme about 9 kilometres away. The project involves the erection of a dam wall on the Berg River and a supplementary scheme downstream of the confluence of another river. The supplementary scheme includes pump stations and 9km of pipelines to transfer water from the abstraction works in the Berg River to the dam and into the Western Cape water system.

Implementation

The immediate objective of the project was to increase the water supply of the Cape Town area. The project was to be implemented with a long-term objective of reducing demand of the Cape Town Metropolitan Area. As per required by legislation, Skuifraam dam development required inclusion of water demand management options before the project could be built. Data and information on the water supply and demand balance and also related environmental issues needed to be compiled to enable stakeholder consultation. During implementation, information on progress and on social and environmental impact would also have to be disseminated to all stakeholders. The implementation process comprised the following institutions and processes:

- Trans-Caledon Tunnel Authority (TCTA), a specialized liability management body for bulk water supply is the project implementer. It is a public entity that was created in 1986 by a Government Notice. It raised capital equivalent to Rand 1.4 billion from the private sector to finance implementation of the project. The TCTA Board consists of nine members appointed by the Minister of Water Affairs and Forestry to whom they are ultimately responsible.
- The participation of stakeholders, such as City of Cape Town and DWAF, in the implementation of the project, is accommodated through membership on the Technical Committee, a Board sub-committee.
- As stipulated by the National Water Policy (1997), water development projects should be funded by the users where possible. In line with this, water users in the City of Cape Town will repay this economically viable scheme through a Berg Water Charge to be added to the tariff charged by DWAF on water supplied from the Western Cape Water Supply System. TCTA will receive the Berg Water Charge from DWAF to cover the costs of and repay the loans obtained to fund the implementation of the BWP. Cape Town's water tariff increases of 6 and 7.5% for the 2004/05 and 2005 / 06 financial years respectively factored in loan repayments of the project.
- In April 2003, TCTA entered into an Implementation and Income Agreement with DWAF, who, in turn, entered into a Supply and Payment Agreement with the City of Cape Town. Primarily, these two parallel agreements will govern the implementation and funding of the BWP. The Project will be operated and maintained by DWAF on completion of construction, as part of the Western Cape Water System.
- During the construction process the following guidelines and procedures are monitored and adhered to:
    - On site water quality monitoring to avoid changes in water quality downstream of construction site and performing an environmental audit. A TCTA report of August 2005 indicated that no adverse environmental impacts had been experienced in the catchment since construction started.
    - Instituting a social monitoring programme to determine / rectify any social changes that may be brought by implementation process on social groups.
    - TCTA is obliged to disseminate project information and proactively engage with stakeholders who include businesses (such as the agricultural and tourism sector), local authorities (local and downstream municipalities), project authorities (i.e. Department of Water Affairs and

Forestry and City of Cape Town), decision making authorities (i.e. Department of Environmental Affairs and Tourism and the provincial Department of Environmental Affairs and Development Planning) and all interested and affected parties.

Stake holder participation

After the initial studies by DWAF, presentation of the feasibility study marked the first attempt within South Africa to include the full range of stakeholders in decisions affecting water supply and demand. The process involved over 1100 people and organizations. In December 1995 a meeting had been held to introduce the exercise, as well as the Skuifraam Dam feasibility study and Integrated Environmental Management process to the public. The evaluation study also involved initial contact meetings (including capacity building workshops), five sub-regional public workshops and culminated in a two and a half day conference at Goudini with over 100 stakeholders' representatives, in April 1996. At the conference, guiding principles and criteria to evaluate the options to reconcile demand and supply were developed.

At the same conference, stakeholder representatives elected members to a task group that was given the responsibility to short list the options based on the guiding principles and comparative criteria. The task group was given this responsibility by The Minister of Water Affairs and Forestry. Subsequently the task group commissioned some further work and appointed experts to assist them. The process was concluded in November 1996 when a short list of schemes for further study, with a view to implementation, was agreed upon and recommended to the Minister. Among this list was the Skuifraam Dam and Skuifraam Supplement scheme.

Options Identified

Information and analysis on options was exchanged between the three parallel processes that examined ways to meet immediate and future water services needs. Many of the same parties were involved in each process. The CCT set about evaluating options for water service provision as part of its municipal plan (WSPD), which, under the new Water Services Act, each Municipality was required to develop. Parallel evaluations of water supply and management alternatives for the wider Berg WMA were undertaken in national DWAF-led processes, and the EIA of the Skuifraam Dam followed steps for within-project options assessment prescribed in the 1989 Environmental Conservation Act and the new 1998 National Environment Management Act (NEMA).

Municipal Water Service Development Plan (WSDP) options

These were demand side options. As prescribed in legislation, each WSDP had to incorporate new water demand projections, identify infrastructure requirements, provide a water balance, and review the environmental management issues associated with current and future water service provision. While it introduced an initial set of conservation measures and restrictions to address the immediate water shortage, the CCT commissioned an Integrated Water Resource Planning Study in December 1999. Its purpose was to evaluate the principle demand management and supply alternatives for the Council area in the medium and longer term. The study recommended three "packages" of options, in addition to the Skuifraam dam:

- Pressure control, removal of automatic flushing urinals, user education, tariffs metering, credit control, and leakage repair[11].

[11] By the beginning of the implementation of the project, the city was able to save 30 ML / day

- Private boreholes (for irrigation users), water efficient fittings, and grey water recycling.
- Voëlvlei Augmentation Scheme and the Table Mountain Group Aquifer pilot study.

Based on the studies, CCT's water demand management policy and strategy was projected to reduce overall demand for water by 20 percent by the year 2010. Various committees of locally elected officials, expert working group meetings, consultations with interest groups, and public hearings discussing the separate studies were part of the WSDP process. In these engagements, pressure from stakeholders arguing in favor of non-dam options helped to ensure that the scope of options assessment studies stayed broad, and reflected what the Water Services Act had envisaged. Proponents of non-dam options felt the CMC needed to look more closely at the experience of other (smaller) local authorities and emulate their approach, such as the small seaside holiday town of Hermanus where a 12-point water demand management program had achieved 30 percent reductions in peak water demands. They advocated intensified and accelerated water recycling programs, introducing by-laws on grey water reuse and recycling of the City's treated sewage water (at that time pumped out to sea). Other stakeholders advocated for a series of drought management measures with staged restrictions on water use that reflected the severity of the drought.

Berg Project Supply options

These were led by DWAF and considered alternative supply options for the Berg WMA in the context of overall demand-supply balances and inter-basin water transfers between the WMAs. Supply options assessed included the possibility of deep groundwater supply from the Table Mountain Group (TMG) aquifers, further transfer of water into the Berg WMA from the Breede River, and desalination of seawater. The study team also considered increasing storage capacity by raising the height of the five existing dams. The criteria used for evaluation of options for supply augmentation broadly included economic, environment, social factors, as well as risk and reliability factors. The DWAF studies also took into account the new requirement to provide ecological reserves from existing and potential surface water regulations. These studies were prepared in collaborative processes with public review, as set out in the new guidelines for public consultation guidelines. The Skuifraam Dam emerged as the preferred supply scheme to meet the Berg WMA requirements, in combination with water conservation and water demand management.

EIA Alternatives

Within-project alternatives for the Skuifraam Dam were assessed in the EIA process, involving issues such as the design and siting of major structures, construction schedules, and environmental mitigation, management, and monitoring provisions. Environmental stakeholders were concerned about the impacts on downstream wetlands and downstream coastal fisheries, so the EIA evaluated in stream flow requirements (IFR) downstream of the proposed dam site. Provisions were made in the design of the dam to provide for both low-flow and flood releases in normal, wet and dry years.

The framework and mechanisms for stakeholder involvement reflected the legislation and regulations governing each of the three options evaluations. For example, the Water Services Act required the WSPD to be taken through a full public participation process, with the public, stakeholders, and water services authorities/providers given an opportunity to comment at each step in the plan formulation. DWAF responded to

provisions in the National Water Act (1998), which required stakeholder involvement in the Berg WMA analysis as well as an extensive public participation process in connection with the National Water Resource Strategy.

Outcomes of the process

Stakeholders opposed to the Skuifraam Dam argued that against a dam option on grounds of costs and damage to the environment. Instead they proposed alternative options of water recovery and recycling measures that could be mobilized to provide new supply for immediate and future needs. They also argued that the demand management measures introduced by the CTC were not aggressive, were limited in scope, pointing to achievements of smaller water-stressed municipalities in the region that had mounted programs to reduce peak water demands. Further, they argued that building the Skuifraam Dam would not change the inequities of water use prevalent in the Western Cape, while paying for it would impose high water charges on low-income consumers. Environmentalist also opposed it on grounds that the EIA showed that changing flow regimes would affect downstream wetlands and coastal fisheries

The debate spurred media interest and greater public awareness. Cape Town responded to stakeholders concerns by adopting a more aggressive demand management program and achieved greater (short term) water security. While the legislation required options assessment and prioritization of demand management, it did not specify the level of effort. The explicit political support for demand management and the debate this prompted on the actual measures and their effectiveness resulted in more resources being directed by the Water Authorities to demand management, water recycling, and non-conventional supply options.

Although approval to proceed with the Berg Water project in principle had been given in 2001, work could not proceed until all the preconditions had been made. The agreement between the project implementer, Trans Caledonia Tunnel Authority and DWAF to proceed with the project in April 2003 addressed some of the concerns raised by stakeholders. Apart from targets to reduce consumption by 20% by year 2010, Cape Town also specified measures to seek greater public acceptance such as through incentives. For instance, domestic consumers will not be charged for the first 6 m^3 of water supplied and 4.2 m^3 of sewage treated per month, after which they are billed according to a steeply rising incremental tariff rate to encourage saving water and to encourage public acceptance of tariff rates. Provision of 6 m^3 from free basic water assists in alleviating poverty and, together with the affordable tariff increases, ensures that the poor are able to afford the cost of water for basic human consumption needs.

Lessons learnt

The case illustrates that where there is acute shortage of water, there is a greater acknowledgement and awareness of the need. While longer-term options are pursued, immediate needs for water services can be met by a mixture of voluntary conservation measures and restrictions. The case study also demonstrates that, in this situation, while demand management could meet immediate needs, new sources of water supply would eventually be needed. It also illustrates that informed leadership able to accommodate diverse views about a project such as that provided by DWAF in the study is a contributing factor to meeting set project objectives.

Other broader lessons include:

- A participatory approach and comprehensive options assessment does not alter the need to make choices that may be unpopular among specific interest groups. However, the decision makers are better informed about the views of different stakeholders and are able to make decisions that are more defensible.
- Involvement (and pressure) from civil society and non-government stakeholders helped to expand the range of options evaluated. Civil society should be seen by traditional water resource management interests as a source of new ideas, approaches, and information - not as an impediment to solutions.
- Legislative and regulatory provisions requiring that alternatives be prioritized before new dams can be approved were a catalyst for the options exercise to occur. They provided an enabling environment and a foundation for political support to implement demand management measures that helped meet immediate needs. The legislation also helped move options assessment "upstream" in the planning process and institutionalize this practice on a regular basis.
- Trials can reduce the uncertainty over the impact of demand management measures in the short and longer term. Early and serious efforts in demand-side management can reduce disruptions to water supply and help avoid the worst conflicts.
- Water from the Berg project is expected to flow to Cape Town at the end of 2007; 18 years after the project was first mooted. It is imperative that future water-resource planning starts at an early stage, as the lead-time to implement can be long.

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G. OLIFANTS RIVER WATER RESOURCES DEVELOPMENT PROJECT (ORWRDP) SOUTH AFRICA

Identification of the Example

Key issue addressed
Assessment of options and water development

Integration
Agricultural, urban, mining water supply and environmental management project

Implementation
Strategic/Sectoral, Social and Environmental Assessment of urban and agricultural water supply.

Stage regarding the project life cycle
Project planning; construction of dam expected in 2006 and delivery f water in 2009,

Description of Framework

Institutional Framework
As part of its mandate to assess national water requirements and in preparation of the National Water Resources Strategy (NWRS), The Department of Water Affairs and Forestry (DWAF), South Africa did an assessment of water requirements for main water sector users in the Olifants Catchment for the period of 2002 to 2020 and beyond. The Olifants catchment straddles 2 provinces of Mpumalanga and Limpopo. The main river draining the catchment, Olifants has its sources to the south, east of Johannesburg and flows in a northerly direction and eventually curves in an easterly direction to become a tributary of the Limpopo river.

Most surface runoff originates from the higher rainfall southern and mountainous areas where annual values average about 800mm. This declines to 500mm further north. With large dams already in place in the south, boreholes and basin transfers into the catchment augment water supplies to these northern parts of the catchment for irrigation, power generation and rural water use. Economic activity is highly diverse and ranges from mining, to irrigation, dry land and subsistence agriculture and eco-tourism. Population projections indicated limited growth, if any increase in the rural areas beyond 2025. Growth was expected `to be centred around on the main industrial and mining towns of Witbank, Middelburg and Phalaborwa, (Fig. 1) as well as at new mining developments foreseen along the eastern limb of the catchment. Water requirements for power generation in the upper Olifants sub-area are also expected to increase. Studies by DWAF (2002) indicated that demand for water in these catchments would, in the near future, be much higher than the water available from current resources.

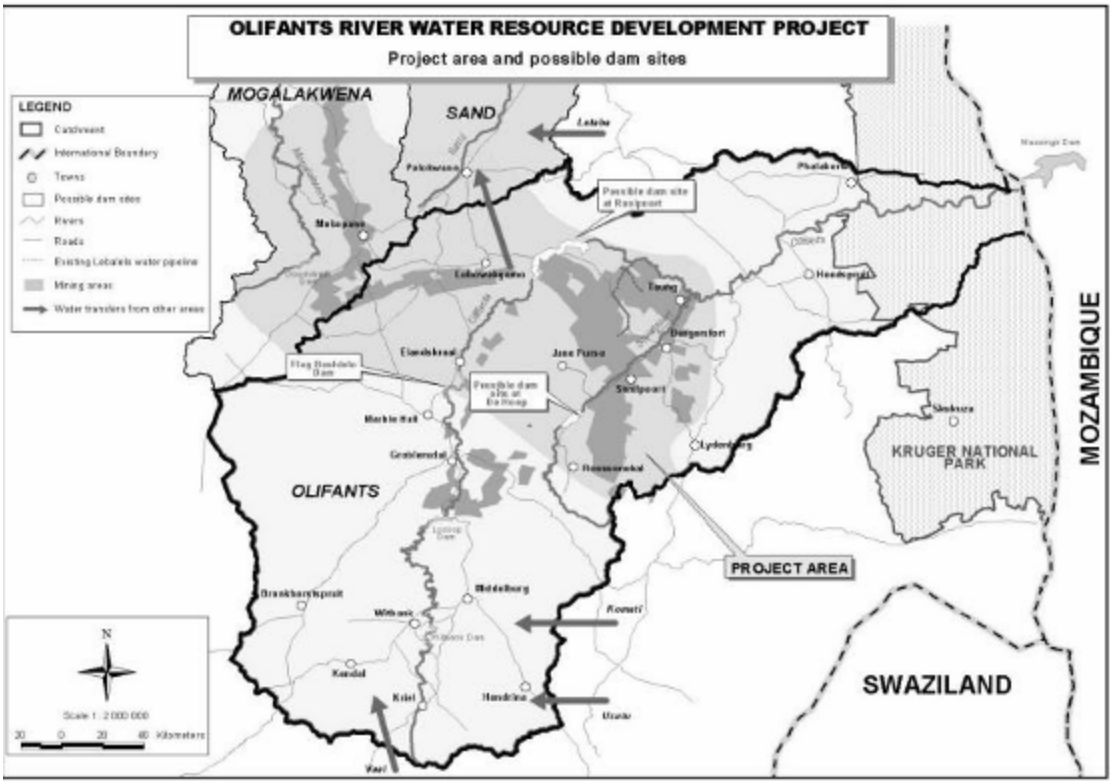

Figure 1: The Olifants River Water Resources Development Project area

The responsibility for water development options fell with DWAF. In reviewing the options, the country's legislative framework provided an opportunity for the involvement of all stakeholders. The Department of Environment and Tourism (DEAT) is responsible for assessing if selected options are in line with environmental legislation

Policy and normative framework

Following these studies on alternatives for the supply of water, a dialogue with stakeholders from agriculture, mining, urban areas, various schemes were proposed and guided by the following considerations:

- Legislation (Water Services Act 108-1997) which required that alternatives to dams be prioritized before the construction of new dams.
- Legislation such as the National Water Act (Act 36 of 1998) that provides legal requirements of enforcing among other things, environmental reserves for the sustenance of riparian communities.
- New legislation introduced in the water resources and environment management fields that also required and reinforced, participatory planning and public consultation as an input to all major water management decisions at local, provincial and national levels.
- Conducting an Environmental Impact Assessment (EIA) on any project option in fulfillment of requirements of the Environment Conservation Act (Act 73 of 1989), the National Environmental Management Act (Act 107 of 1998), the National Heritage Resources Act (Act 25 of 1999), the Minerals and Petroleum Resources Development Act (Act 28 of 2002). These regulations are intended to mitigate

any environmental, archeological / social and economic impacts that may arise from the implementation of a water development project.

Stakeholders were invited by DWAF to make comments on options of increasing water supplies in the project area. Participants were notified of dates upon which a meeting to discuss these project options were to be conducted. Further meetings were to be conducted on the impact of these options. The impact assessment was a screening exercise that comprised four phases of:

- Scoping.
- Impact Assessment.
- Environmental Impact Report (integrated report of findings)
- Decision-making.

These four main phases are underpinned and supported by other sub-phases of:

- screening, pre-application consultation with the environmental Authorities.
- preparation and submission of an application for authorisation to undertake listed activities.
- the preparation and submission of a Plan of Study for Scoping, followed by a Scoping Report and, thereafter, by a Plan of Study for Impact Assessment.

The Impact Assessment was circulated and discussed in the public domain after which final reports were submitted to the environmental Authorities for consideration and decision-making. Should the proposed project be authorised by the Department of Environmental Affairs and Tourism (DEAT), in close collaboration with other relevant government institutions such as the Mpumalanga Department of Agriculture and Land Administration, the Limpopo Department of Finance and Economic Development, an Environmental Management Plan (EMP) was to be prepared. The purpose of the EMP is to transfer the mitigation measures as stipulated in the Record of Decision into measurable actions that will be implemented by the development proponent, viz. the Department of Water Affairs and Forestry and / its implementing agent (as may be decided by the Minister of the Department of Water Affairs and Forestry). This will be inclusive of monitoring programmes for construction and operation. These are the key institutions that played a role in the assessment process of the Olifants River Water Resources Development Project (ORWRDP).

Organisational set up

Olifants Water Resources Development Project (OWRDP) was formulated to address water needs of numerous stakeholders. The decision to proceed with the project was based on findings and reports from different government and non-government authorities. Implementation and monitoring of a project relies on the interaction of some of the following issues and institutions:

- A favourable EIA report
- The proposed development came as a result of the need to provide previously disadvantaged communities with potable water and with the need to facilitate economic development

- The EIA assessment made complied with regulations, information provided was considered adequate, no flaws were recorded and mitigation measures outlined, if complied with, negative effects on the environment will be reduced
- Mitigation measures proposed in the environmental impact report are appropriate and practical for implementation

Approval was also based on conditions that:

- DWAF establishes an Environmental Monitoring Committee (EMC) whose representatives are drawn from affected residents, community leaders, non governmental organisations and ward councillors. The EMC is chaired by an independent person they appoint, it monitors compliance of conditions specified in the approval to proceed with the project, meets quarterly, reports and makes recommendations to the director general of Department of Environment & Tourism DEAT - a different dept). The EMC shall be disbanded at a time to be determined by DEAT
- DWF appoints an Environmental Control Officer (ECO) who monitors compliance with stipulated regulations, compiles monthly audits, & provides secretariat service (of convening meetings, preparing agendas, making minutes) to the EMC and controls
- DWF establishes a suite of Environmental Management Plans (EMP) for the ORWRDP for mitigating environmental effects. Activities and reports produced are related to the stages of implementation that comprise:
  - Pre-construction EMP
  - National Bulk distribution infrastructure
  - Operational EMP
- DWAF shall initiate an investigation into the conservation of an equivalent area to replace Plant Endemism lost due to the construction of the dam and its impoundment area.

There should also be compliance with other regulations such as those specified in terms of section 36 of the National Heritage Resources Act (SAHRA), 1999 that relate to scientific and archaeological values of national importance –e.g. the relocation of any graves and the need to accommodate wishes of next of kin. DWAF should also verify with the Department of Mining and Energy to verify if there are no active, old prospecting and mining activities in and around the project area

The Record of Decision should be made available to all stakeholders who may need to lodge an appeal within the specified period. There are also measures of handling non-compliance, which may result in withdrawal of the permit and the enforcement of penalties that include criminal charges.

Implementation history of the norm

DWAF had implemented this framework of assessing options in other parts of the country; Pongolo Water Development and Western Cape Water Development (Berg) Projects are typical examples. In the Berg River Water Development Project, implementation took longer than the current project. Key chronological events of implementing this project are:

- In 2002, DWAF performs a study of the water requirements of the project area. The department identifies the construction of a 70m high dam at De Hoop as a viable option. Other infrastructure linked to the operation of the dam were pipelines and pump station that would deliver water to users in the catchment. The department also propose institutional measures of managing demand intended to reduce consumption and to increase efficiency=y in water use.
- From January to March 2004, DWAF in compliance with the (Water Services Act 108-1997) and the National Water Act (1998), together with the Limpopo and Mpumalanga Provincial governments, made consultation with a broad range of stakeholders who studied and took part in the screening of options.
- In April 2004, an assessment of options was completed and recommendations were presented to the minister for approval.
- In May 2004, the minister approved the recommendations on selected options and presented them for cabinet approval.
- On June 9, 2004, a provisional approval of the selected option was granted by cabinet; approval was provisional on conditions of meeting terms of the Environment Conservation Act (Act 73 of 1989) which, among other things stipulates that an Environmental Impact Assessment (EIA) with full public consultation should be conducted before project implementation. The EIA evaluates potential impacts of the proposed options, and recommends measures to reduce or avoid negative impacts, and to enhance the benefits.
- On 15 October, 2004, meeting to discuss outcomes of a scooping exercise conducted between June and October was conducted.
- In November 2005, authorization to proceed with the construction phase was granted. The lead authority for EIA, National Department of Environmental Affairs and Tourism made the final decision on whether the proposed project may go ahead or not, and under what conditions. In fulfilling this responsibility, DEAT collaborated closely with DWAF, the provincial Department of Agriculture and Land Administration and the Department of Finance and Economic Development.

The two government departments of DWAF and DEAT collaborate their work so as to ensure adherence to a variety of regulations before and during project selection and during implementation of the project. Following final approval, DWAF then issues and disseminates a Record of Decision to stakeholders who are given an opportunity to appeal against the decision within a period of 30 days. A fundamental element of IWRM is the implementation of water conservation and water demand management (WCDM) principles and practices that must be adhered to. Experiences by DWAF in implementing this framework suggest that it is an important part of the framework of selecting options. Although its effectiveness varies with situations, the general trend is it has an impact on reducing demand. In some of Cape Town's suburbs, mending leaks in the pipeline system made water savings of up to 70%. In Hermanus, South Africa, implementation of a comprehensive and integrated WCDM plan that included measures such as social awareness, catchment management, retrofitting and tariff structuring, resulted in a 16% reduction in water consumption. Implementation of measures that consider the involvement of stakeholders in utilization is important at selection of options as well as at the operational phase of a project.

Description of example

Scope of project

The main objective of the project was to determine the most suitable options of providing water to meet current and future water needs of all sectors within the middle parts of the Olifants catchment, as well as parts of the Mogalakwena/Sand catchments. Key elements of the project were the identification of needs of the area through use of development models; a high and a low water use model. Water requirements under both scenarios indicated that demand was beginning to outstrip the available water. Options to supply and conserve were therefore developed to meet requirement.

Identified options were subsequently presented to stakeholders for screening the most likely projects to be considered for the next phase of analysis and scoping. An EIA was subsequently performed to assess and mitigate any environmental impact of a selected project.

Stakeholder participation

Consultation of stakeholders began with soliciting comments on options that had been selected by DWAF on the basis of identified needs, technical, socio-economic, financial and environmental considerations. Stakeholders were involved at the second stage when they attended a meeting in April 2004 to review the options that had been presented by DWAF. Stakeholders were subsequently involved in the remainder of project activities.

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Stakeholders also participated by receiving regular feedbacks and being notified on dates of meetings in advance. There were also meetings with groups of people affected by the project such as those in the dam basin, those along pipeline routes and landowners who were in one way or another affected by the project. This dialogue was intended incorporate their views in the project.

Identification of options

In its studies of 2002, DWAF had identified various water resource development and management options for technical, financial, environmental and social feasibility; the most feasible being options that deliver the most water for the least cost, and those that would keep environmental and social impacts to a minimum. In accordance with the National Water Resource Strategy (NWRS), supply options that made more water available through dams on both the Olifants and Mogalakwena/Sand Catchments, water transfers and ground water development had to be considered in conjunction with demand management options of treated effluent and re-allocation of water from irrigation to domestic and urban use. In all cases, the water use of and availability of water in adjoining water management areas were also taken into consideration.

The meeting reviewed the following options:

i. A possibility of dams in the catchment, one at Rooipoort on the Olifants River and one at De Hoop on the Steelpoort River. The 2 potential dam sites were compared using agreed criteria. De Hoop dam site scored higher on technical criteria of yield, lower costs and low environmental impact costs. The second site was rejected on higher social costs of flooding a larger area – grazing agricultural land, graves, homesteads (313 vs. 9), schools, rural enterprises and livelihoods. Thus the later required affected more

stakeholders in a variety of ways and was therefore rejected as a viable option.

ii. A bulk water distribution system from the existing and possible dams to the demand centres of the different user groups including integration with existing supply infrastructure, was investigated and considered to be costly due to investments of pipeline systems that transmitted water over long distances.

iii. Treatment and reuse of effluent was also considered as an option. Participants expressed reservations on impact on water quality standards. The option was considered to be more suitable to the mining sector where quality was likely to have a less adverse effect. The possibilities of recharging the water table, as is the current practice in near by catchments was accepted as viable option.

iv. Water transfer into the catchment was considered to be costly on grounds of distances that required pipelines further away from the catchment. The option was considered as one of the least attractive in the short term.

v. The potential for reallocating irrigation water (currently using 60% of the water) to mining was investigated but found to be unattractive because of potential negative impacts on food production and on the local economy. The option was left open for mining companies to make individual arrangements of leasing water from farms that were currently underutilising their water allocations.

vi. The option of ground water development was considered suitable for small-scale local use such as in irrigating small plots of less than 1 ha. There was fear that extensive development without adequate knowledge of the aquifers may lead to overexploitation and recovery could be jeopardised. Use of surface water resources was considered a better option.

Outcome of process

Investigations during the Screening showed that a combination of raising of a smaller near by dam wall by 5 metres and construction of a dam at the farm De Hoop, combined with localised, small-scale use of groundwater and use of effluent by the mining industry, would result in the project area meeting its water needs over time.

But many stakeholders pointed out during screening that new resources should not be developed if water is not being used efficiently. Studies during screening showed that whereas some water conservation is still possible, this option would not nearly meet the requirement of 120 million m^3 per year of water in the project area. The mining industry already practiced high water use efficiency and the savings potential in rural areas is very small. In the urban areas, previous initiatives and an additional 10% saving / year was potentially possible. Water conservation and demand management, combined with water recycling and re-use, particularly in the irrigation and all sectors will nevertheless be promoted. The aim is to maximize use of available water

Final recommendations arising from the assessment of the configuration of options for making more water available in the Olifants, Mogalakwena and Sand catchments as part of the Olifants River Water Resources Development Project were:

- **Infrastructure components** that proceeded to the next stage of the Environmental Impact Assessment (EIA) in accordance with the Environment Conservation Act that consisted of construction of a dam at the farm De Hoop, 35

km south of Steelpoort on the Steelpoort River in the Mpumalanga Province. The dam would be associated with other structures of pipelines with capacity for future expansion, pump stations for irrigation and purification works for urban water supplies.

- **Non Institutional** components that would be covered in a series of studies and investigations, already commenced by DWAF comprising water saving combined with water recycling and re-use, provision of a recommendation to relevant local authorities to develop groundwater resources, where quality and sustainability are assured, provision for the requirements of the Reserve as well as institutional, social and economic and various other investigations were to be implemented.
- **Institutional arrangements** where it was agreed that DWAF would be the owner of the project, with overall responsibility. The new dam will form part of the Olifants River system together with the existing water resources infrastructure, managed by the Department. Water distribution would be assigned to Lapelle Northern Water, a regional water body that would be responsible for bulk water distribution to main water users; the mining industry as well as to other users such as the local municipalities and rural service centers.
- **Financing option** would be centred on DWAF's policy of funding commercially viable projects off budget. Since approximately 50% of the project will serve the mining sector and 10% will serve mining-related urban development, funding is likely to come from this sector. The balance was likely to be funded by the public sector through Trans Caledon Tunnel Authority (TCTA), a government body responsible for such development projects.

These recommendations, compiled by a task group that included stakeholders were presented to the government in March 2004. The minister accepted the recommendations, subject to meeting National Environment Management Act requirements on mitigating negative impact that may arise from the dam.

Scoping of options

The purpose of the scoping exercise was to identify people issues and environmental considerations that were to be addressed during the EIA. During the scoping exercise, some of the issues and questions raised by participants were:

- Can project developers indicate what the water is needed for?
- Can a project of such magnitude be stopped on grounds of negative EIA given the stage of planning that has taken place?
- Have all options to build a dam been considered and have all issues of people's concern and environmental considerations been taken into account?
- What is the asset value of a dammed river versus a free flowing river participants asked the

Not all contributions were negative. There were also instances where the stakeholders commented DWAF for the work they were doing for them. They expressed satisfaction and appreciated efforts of involving them on issues that affect their livelihoods.

<u>Outcomes</u>

The EIA reported that from a technical perspective, discipline-specific specialists had carefully studied issues and associated impacts. Furthermore, results were peer reviewed by independent external reviewers. From a public participation perspective, the report concluded that stakeholders had been afforded numerous opportunities to participate in the EIA. The report also notes that through communications, meetings and issues raised through the public domain, participation brought about valuable contributions to the project. On the basis of these findings, adoption of a plan that meet legal requirements such as the creation of Reserve DEAT approved the project involving construction of a dam at De Hoop farm. The consultation process also had an impact of mitigating the negative effects on the environment. Stakeholders pointed out that breeding patterns of fish might be affected by downstream releases. To reduce such an impact, dam designers had to incorporate multi level intakes that allowed the mixing of waters during releases.

Approximately half of the comments made during the public participation process were on issues related to water supplies. The project took the needs of the people as regards domestic water and employment by ensuring that the project supplies water to both sectors. The mining sector created employment opportunities. It is also utilizes a large proportion of the water. For this reason, it was agreed that the phased construction of raising the smaller existing dam would augment water supplies earlier than the main dam that is expected to come on stream in 2011. The mining sector would also fund this early part of construction. Women groups in rural areas had expressed the desire for the dam as it reduced the drudgery of collecting water, purchased at high prices, from long distances. The decision to proceed with the project required a consideration of the views of many stakeholders and in line with legal, policy and strategic issues.

As a result of the participation process, stakeholders became more informed. It became easier to form a Catchment Management Authority for Olifants River. Stake holders started off with pilot system which they could understand better before construction of the dam, expected to commence in 2006.

Owing to questions raised during the EIA exercise, on values of water as a national asset, there was a reassessment on the option of water trading and reallocation from one sector to another. The exercise concluded that neither trading nor reallocation would reduce water demand or increase efficiency of utilization. Thus from a national asset point of view, greater value was to be realized from conserving water, first, than from building a dam. A compulsory licensing arrangement, a system that promotes improvements in efficiency, was seen as a promising option particularly in irrigation where water use efficiency, at 55 – 80% is generally is considered low in comparison to other sectors.

Considering the above, had more water conservation and demand management measures been in place for a number of years already, it might not have been necessary to consider infrastructure development this early, project proposers noted.. The need to construct a dam may have been deferred. However, given the long lead time for potential water saving and, similarly, the long lead time for dam planning, construction and filling, delaying the proposed De Hoop Dam was considered a risky option given positive economic outcomes arising from the proposed investment (dam) and secondary developments (mines). A decision to proceed with construction of the dam was made.

Lessons learnt

The case illustrates the importance of a participatory approach in the assessment of options. As can be seen from the chronology of decisions made by government departments, decision makers are better informed about processes, are able to consider views of different stakeholders and make decisions that can be defended.

The case illustrates that where there is acute shortage of water, there is a greater acknowledgement and awareness of the need. While longer-term options are pursued, a mixture of voluntary conservation measures and restrictions can meet immediate needs for water services. The case study also demonstrates that, in this situation, while demand management could meet immediate needs, new sources of water supply would eventually be needed. It also illustrates that informed leadership able to accommodate diverse views about a project such as that provided by DWAF in the study is a contributing factor to meeting set project objectives.

The case also illustrates that while water conservation and WDM are proven cases in the urban context, this is not yet the case in the agricultural/rural context. Thus many stakeholders raise points that indicate that full implementation of these policies still requires much work, particularly on bulk water users such as the irrigation sector.

Other broader lessons include:

The case illustrates that a comprehensive assessment of options as outlined in the WCD report may not be possible in all situations. Differences in natural resource endowment, capacity, existing policy, legislative frameworks, socio economic considerations all influence processes of identifying needs and options, assessing options as well as selecting the options. Where the need for water is strong, the process of assessing options can become a focused assessment of options within a project.

Comments by stakeholders during the scoping exercise such as “is there any way such a large project can be stopped now and are there any other options identified” suggest concurrence with the South Africa’s Multi Stakeholder on Report on Applying the WCD issues. It notes that while DWAF has developed Generic Guidelines on Public Participation, the tone, principles and advice that the Guidelines convey is located more at the consultative end of the public participation spectrum, rather than at the higher level of public impact in decision-making required by the WCD. The DWAF Guidelines are also not based on recognising rights and assessing risks as envisaged by the WCD Guideline. The Guidelines place almost no accountability on how government deals with the participation outcomes. In a way, the case illustrates the difficulties of getting good cases that are close to what is proposed by WCD Guidelines.

While the policy and legislative frame has gone some way towards participation, a fundamental challenge in applying comprehensive options assessment early in the process remains. Once a dam has been considered to be important, stakeholders may not have options to change the selected option. The option of not building a dam in countries prone droughts is still a difficult issue to articulate. The challenge in South Africa is to consider options early enough in the national planning process to decide on whether a water resource development is needed or not.

The study also points out that the NWRS lists 19 dams to be developed within a 10 to 20 year time frame without indicating that the list was derived from a comprehensive options assessment, or indicating that options to dams would be further investigated in the future. This creates the impression that DWAF is already committed to building these dams, rather than evaluating the needs and investigating alternative options later. A comprehensive assessment of options is still very much a learning process.

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H. COMMUNITY BASED PLANNING FOR LOCAL WATER AND FOOD SECURITY IN ZIMBABWE

Key Issue Addressed
Community driven needs analysis and identification of options for water services and food security

Integration
Rural District Councils Act (1988)
Traditional Leaders Act (2000)

Implementation
Community Based Planning for Chimanimani and Gwanda District in Zimbabwe by ITDG (now Practical Action) 2000-2005, funded by DFID through Khanya, a development practice organization based in South Africa.

Stage regarding life cycle
District planning and implementation

Description of the Framework

Systems for participation and local government Zimbabwe has a long history of autocratic national and local political systems, including the kingdoms and chieftainships of pre-colonial times, the colonial and Unilateral Declaration of Independence (UDI) regimes, and the *de facto* one-party state system of the 1980s. From 1980 to 1988 the system of rural local government comprised the poorly resourced District Councils in the Communal Areas (formerly known as tribal trust lands) administered in terms of the District Councils Act (1980) and richer Rural Councils in the commercial farming areas, administered in terms of the Rural Councils Act, 1966. In 1984, the Prime Minister's Directive was issued to establish planning structures from village level to national level to ensure a more participatory and bottom-up approach to development planning. This was one giant step towards the decentralisation process taken by the government. In 1988, the Rural District Councils Act resulted in the amalgamation of Rural Councils and District Councils in 1993. Some of the key legislative changes after this include the conferring of statutory planning powers to Rural District Councils through Statutory Instrument 175 of 1999 and in 2000 the Traditional Leaders Act, which sought to strengthen the role of traditional leaders over local planning and development issues.

Legislative/Policy Framework

The Traditional Leaders Act (2000) gave the chiefs, headmen, and village heads the powers to co-ordinate development, allocate land as agents of the Rural District Council, manage natural resources, preserve and maintain family life, culture, health and education, keep population records, try a range of crimes, and collect all levies and taxes

payable to the council. This act gives traditional leaders a wide range of powers in the planning system. It is however, still debated whether the Act will manage to link traditional leadership to the democratically elected rural district council structures in a manner that will remove rivalry, tensions, and conflicts in the planning process.
Planning in Zimbabwe is usually initiated at national or district level, to achieve national or district objectives, and is often linked to particular sectors or types of project. However, due to recent resource limitations, central government agencies, including local authorities, have not been initiating planning processes. Following the Traditional Leaders Act(2000) in 2000 there has been a shift from local authority-driven planning to a planning process driven by traditional structures.

Organizational/Institutional Structure

The Institutional structure that supports decentralized planning in Zimbabwe is provided for in the Rural District Councils Act(2000). The smallest planning unit is the Village Development Committee (VIDCO) where immediate needs for families and the village are raised and options to meet them identified. The VIDCO then links to the next level, the Ward Development Committee (WADCO) which is chaired by an elected councilor for the area and the chairpersons and secretaries of all VIDCOs in the ward. The WADCO is responsible for developing and submitting the ward development plan on an annual basis. The ward development plan which ranks the ward's priorities and suggested project actions is presented to the Rural District Development Committee (RDDC) which is chaired by the District Administrator and includes heads of government departments in the district, other stakeholders co-opted on the basis of expertise and contribution such as NGOs. The RDDC is provided in the Rural District Councils Act (2000). The roles of the different committees is summarized in Table 1 below.

Table 1: Structure of government in Zimbabwe

Level	Approx population	Structure	Role
Province	1-1.3 million	Provincial Development Council (political) and Provincial Development Committee (technical)	Consolidation of district plans and providing a link for local government to central government.
Local Authority	300, 000-500, 000	Rural District Council and Rural District Development Committee	Planning and development authority at local level. The Rural District Development Committee provides technical support to the Council and is chaired by the District Administrator who is national government's representative at local level.
Ward	6, 000 – 8, 000	Ward Assembly and Ward Development Committee	Unit of planning which coordinates village plans and links them with local government planning processes. The Ward Development Committee provides technical support to the Ward Assembly and is chaired by a Councillor who sits on the Rural District Council.
Village	600-1,000	Village Assembly and Village Development Committee	The Village Assembly is the point where plans are generated and are chaired by the Village Head. The Village Development Committee

			provides technical support to plans at village level through an elected Chairperson.

Description of the Example

Project description

The Community Based Planning (CBP) project evolved from engagement and reflection between government, NGOs, and development practitioners, with interaction with Khanya, the South African organization facilitating the CBP project. There was a common observation that despite heavy investment of resources and time at district and community level, three key concerns were evident:

• People's participation in determining their future and developing their own areas was far from satisfactory. People were still not exercising their basic rights and lacked the freedom to organize themselves to improve their livelihoods.
• Communication lines between communities and rural district councils and other support institutions remained relatively closed. Lack of open dialogue tended to limit opportunities for promoting accountability and transparency.
• Planning at district level remained dominated by top-down strategies and RDCs lacked clearly developed mechanisms for responding to community priorities. CBP was seen as an opportunity for addressing some of these emerging concerns, and there was consensus to use existing knowledge and experiences to pilot a more effective approach to community-based planning in Zimbabwe, linking it with resource allocation systems.

Identification of Options

The process of community based planning linked the needs analysis and the identification of solutions or options to address these. The table below shows the options identified through this process with regards to water and food security in Gwanda District.

CHALLENGE/NEEDS	PRIORITY STRATEGY/ STRATEGIC OPTIONS	COMMUNITY FOCUS/PROJECT OPTIONS TO BE IMPLEMENTED	EXTERNAL SUPPORT
1. Unreliable rainfall/ Need reliable water supply	Infield water harvesting	-Identify and test low cost harvesting technologies such as contour ridges, infiltration pits - Promote learning by forming water harvester groups and linking with local 'farmer innovators' -	-Technical advice on use of A- -Frame -Provide a basket of water harvesting technology options -Database on farmer innovations accessible and shared in the district
2. Weak institutional and organisational arrangements in the ward/ Need for strong and dynamic institutions in the community	Strengthen local drivers and its leadership through training for transformation.	-Local organisations (drivers) that need strengthening - Zimbabwe Farmers Union (ZFU), - Traditional leaders - Natural resource committees - Village & farmer field school co-ordinators - Training workshop on importance of planning and self-organisation -Exposure visits	-Workshops on institutional strengthening & self-organisation -Exposure to organised wards -Build a strong bond between extension staff and the local leaders -Support local ward leadership meetings -Build a vibrant network of farmer innovators. -Build a shared vision among the local leadership -Link the grassroots institutions to higher level institutions so that they are recognised.

3. Soil loss and environmental degradation	Strengthen natural resource restoration, utilisation and conservation	-Change resource conserving practices including open access areas -Change operational procedures of local institutions especially natural resources committees -Promote water harvesting for environmental purposes in grazing areas - Promote education and awareness on natural resource management legislation.	-Environmental awareness raising including the Environment- Poverty cycle. -Demonstration workshop on water harvesting for underground recharge -Support the ward in marking the environment day. -Exposure to see sustainable way of harvesting mopane worms. -Financial support to rehabilitate degraded areas particularly open access areas. -Exposure to natural resources legislation -Information gathering on natural resource management is disseminated to stakeholders. -Harmonisation of institutional by-laws
4. Few community irrigation initiatives	Water source development at household level	-Identification of households with the potential of developing own water source -Upgrading and protection of family wells -Development of micro-irrigation schemes/ kitchen gardens at household level. -Initiate water conservation technologies.	-Material support with appropriate micro-irrigation technologies -Strengthen extension support and linkage with the micro-irrigation groups.

5. Role of women in agriculture and natural resource management not recognised	Strengthen participation of women rural farmers in decision-making and natural resource management.	-Feedback and adoption of initiatives from the ADEN-UNESCO women rural farmers workshop. -Identify and practise methods and techniques that improve agricultural productivity -Build and strengthen women's social movements at local level. -Documentation of own experience in the ward (booklets, photos, role plays, dramas) -Improve women solidarity at ward level. - Increase the number of women in decision making positions	-Mobilise resources to support women initiatives. -Strengthen women rural farmers network nationally. -Promote linkages with UNESCO, ADEN and AFFOREST on production of booklets. -Facilitate exposure on techniques and methods that improve agricultural productivity. -Strengthen women farmers group in the ward. -Support documentation of women rural farmers -Workshop on knowledge sharing on "From just basic needs to human rights". -Establish a database of available natural resources and share it with other development actors in the district (Forestry Commission, DNR, AREX , RDC)
6. Limited access to markets and agro-processing technologies	Value addition to agricultural and natural resource products from the ward	-Identify and promote the use of household level agro processing technologies - Promote information sharing on agro technologies that are relevant to the ward.	-Linkage with the ITDG business shop. -Exposure to the ITDG business shop -Initiate a scheme that enables the ward to easily access technologies at ITDG business shops. -Identify marketing opportunities for the products produced and link with the ward. -Support training of technology users in the ward.

Source: Adapted from D. Gumbo, (ITDG (Practical Action) 2002)

A number of possible benefits were identified, notably:
• creating opportunities for promoting community empowerment and ownership in the development process;
• developing a reliable method for obtaining realistic, integrated, and focused plans from ward level;
• increasing potential for integrating ward and local authority level plans;
• helping to identify additional sources of revenue for implementing local plans;
• creating opportunities for capacity-building for institutions operating at sub-district level;
• bringing transparency to the selection and prioritization of projects at all levels; and,
• creating opportunities for improved accountability during project and programme implementation.

In 2001 a review of experiences was conducted in Zimbabwe using participatory planning (Conyers, 2001) and a national workshop held to discuss the emerging findings, funded by the four-country CBP project. A decision was taken to pilot CBP in the Gwanda and Chimanimani districts. A core steering group was formed including the Ministry of Local Government, Public Works and National Housing (MLGPWNH), IT Southern Africa, Chimanimani RDC, Gwanda RDC, and Development in Practice (a consultant organisation focusing on local governance and community empowerment in Southern Africa) to monitor the implementation and knowledge-sharing process. The team met regularly with implementation teams on the ground. The implementation team consisted of multi-sectoral teams who underwent rigorous training in community- based planning building on their own experiences. District Training Teams (DTTs) were established and trained to support the planning from district level, and Core Facilitation Teams (CFTs) were established at ward level, which included the Councillor, Technical extension staff, Ward Coordinator, and a respected person from each ward. Sharing results at district level involved electing community representatives, who later provided feedback to the broader community. A national workshop in 2003 shared the emerging results with stakeholders at both national and district level who were convinced of the need to roll out CBP in other parts of Zimbabwe. The steering group was then formalized as a national steering committee to spearhead the process.

The CBP system in Zimbabwe was process-based and involved:

- adaptation of four-countries CBP training manual;
- training district training teams;
- training core CBP facilitators.
- CBP manual trial runs and review
- actual ward planning
- community documentation of plans
- integration of ward plans at RDC level
- community feedback meetings
- district training team review meetings
- budget allocations and ploughing back of development levies
- knowledge sharing and information dissemination workshops

Table 2 summarises the methodological approach used in Gwanda District, Zimbabwe.

Table 2: CBP approach in Gwanda District	
Element	**Adaptation in Zimbabwe**
Planning unit	Ward
Methodology	Five – day planning session facilitated by a core team chosen by the community. Emphasis of the methodology was more on developing a shared vision rather than dwelling on problems and constraints.
Facilitation of ward plans	By ward staff, part of Core Facilitation Team (CFT).
Training	An intensive ten-day training of District Training Team members by experts followed by three-day training sessions of the ward core facilitation teams by the DTT.
Financing the planning process	Rural District Councils and participating NGOs including transfer of funds from the CBP project managed by Khanya.
Funding the plans	Use of 50% of the levy paid by each ward in Gwanda
Linkage to district plans	Ward plans are used as a basis for preparing district annual plans and budgets.
Implementation of the ward plans	Implementation occurs at two levels: first, the interest groups are responsible for implementing the relevant sections of the plan. Secondly, the support agencies, including the RDC, implement the rest of the plan with community participation.
Monitoring of implementation at ward level	An internal monitoring system has been developed in conjunction with the monitoring of council budgets on a quarterly basis. In practice, monitoring is initiated at ward level and then followed up by a similar exercise at district level – the impact of this monitoring system is still being evaluated.

Innovations in the use of participatory methodologies

Some of the innovations, which were introduced in Zimbabwe in the application of the CBP approach, included:

- Setting up a local and trusted Core Facilitation Team (CFT), which inspired a lot of confidence in fellow community members and unlocked their full participation.
- The creative involvement of respected leaders such as chiefs and councillors as facilitators;
- The establishment of the DTT, with periodic review and knowledge sharing meetings;
- The use of 50% of the levy paid by each ward in Gwanda proved to be a key innovation in sustaining community participation and financial contribution;

Outcomes

After the CBP process and the identification of household level water harvesting techniques the following have been the results

- 5455 households now have implemented infield water and soil conservation techniques
- Household food production has increased by at least 30% for 80% of the target households
- As a result of this process the Ministry of Local Government has now adopted community based planning and empowerment as one of the key pillars of the decentralization strategy in Zimbabwe.

Assessment of Outcomes by Stakeholders

- CBP was applied in a manner that allowed divergent groups to build consensus and visions for the ward. The strength of the approach was seen when it was

accepted in new resettlement areas and convinced groups such as the war veterans who had previously seen themselves as a superior groups in any community

- Practical Action gauges stakeholder feedback through stories of change and attached is a story of change from Gwanda.
- The process has been replicated in 4 new districts since completion by 6 NGOs and negotiations for roll-out support are on-going with 5 other NGOs involved in implementing a variety of community based projects.
- The rapid improvement in the quality of district planning as a result of CBP has also led to demands for support by all the 7 Rural District Councils in Matabeleland South Province.

Conclusions

The community based planning process was a bottom up approach meant to build on local resources and capacities. The following conclusions were inferred from the case:

- The identification of options for water and food security were driven by the community's appreciation of their local conditions, resources and capabilities.
- The case illustrates the seamless coordination and link between sectors and the upstream activity/process of needs assessment.
- Poverty alleviation was a central consideration and priority
- The process followed provided a seamless link between needs/ challenges, **identification of options** to address them and selection of project actions. This could be the reason for the high rate of uptake and implementation of selected project actions.
- Environmental considerations were well considered in determining the project actions to be undertaken.
- Unlike in the case of one centralized solutions, the CBP process allowed for the development of several decentralized, household level options at different levels from actual infrastructure to training and awareness raising and community level environmental conservation measures.

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Appendices

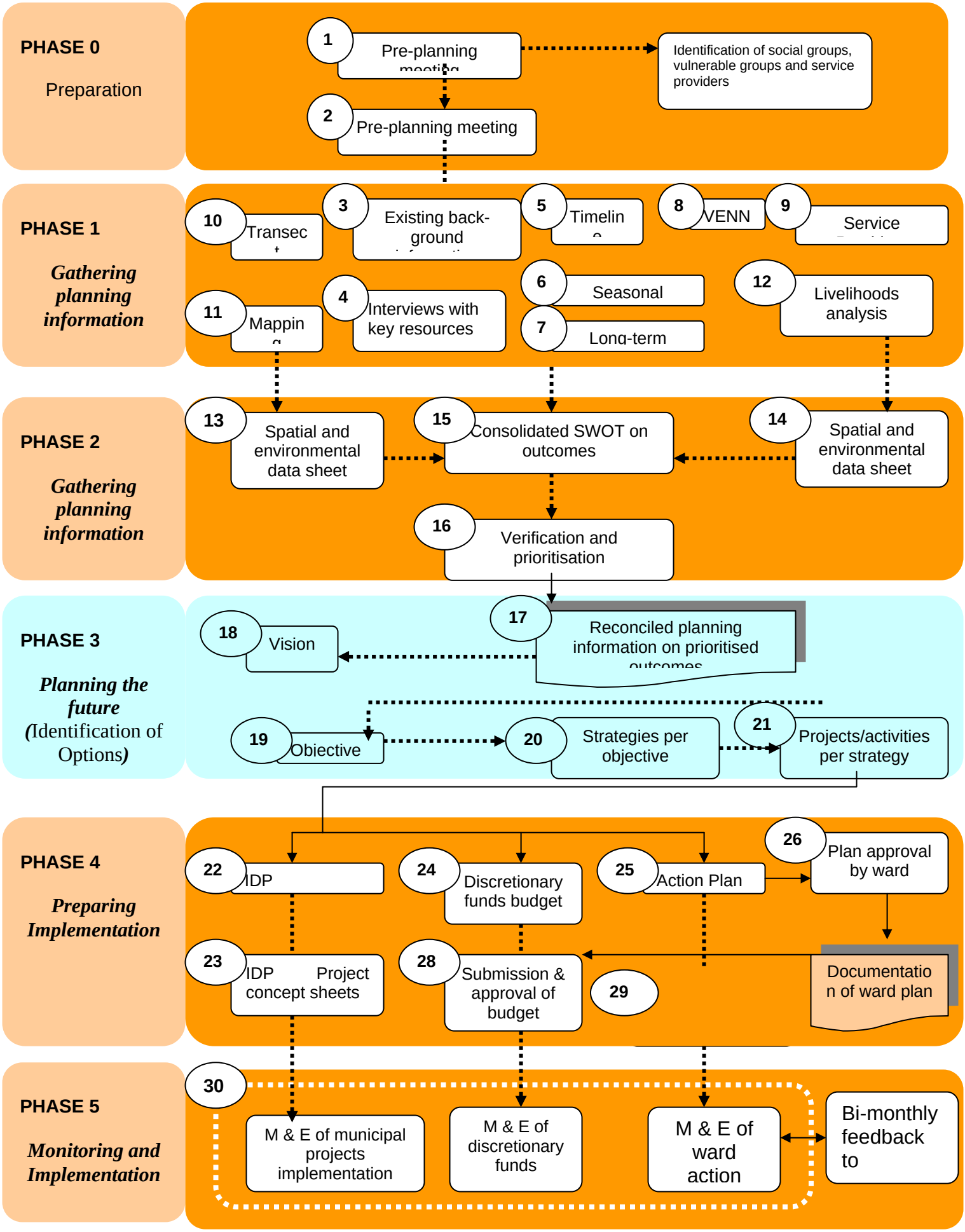
Steps in Community Based Planning Process

This section includes facilitation notes for each of the planning sessions detailed in the CBP planning schedule. These sessions are called events and include:

Event		Page
Phase 0: Preparation		
1.	Preplanning community meeting	
2.	Community launch meeting	
Phase 1: Gathering planning information		
3.	Analysis of existing background information	
4.	Interviews with key resource people in the community	
5.	Timeline –analysing community trends and dynamics	
6.	Analysing seasonal trends	
7.	Analysing long-term trends	
8.	Venn – analysing services and providers	
9.	Service provider interviews	
10.	Transect (optional)	
11.	Mapping spatial/geographical issues	
12.	Livelihoods analysis	
Phase 2: Consolidating planning information		
13.	Consolidation of Spatial and Environmental Data	
14.	SWOT of Social Groups	
15.	Consolidated SWOT against outcomes	
16.	Verification and prioritisation	
Phase 3: Planning the future		
17.	Reconciliation of prioritised outcomes	
18.	Visioning	
19.	Developing objectives	
20.	Developing strategies	
21.	Developing projects and activities	
Phase 4: Preparing implementation		
22.	Developing proposals for submission to IDP	
23.	Developing IDP project concept sheets	
24.	Developing discretionary funds budget	
25.	Developing a ward action plan	
26.	Approval of plan by ward	
27.	Documentation of ward plan	
28.	Submission and approval of budget	
29.	Feedback to community before implementation	
Phase 5: Monitoring and implementation		
30.	M&E	
31.	Two –monthly feedback to community	

The notes for each tool give detailed instructions of how to carry out the exercise, as well as examples of how the information should be presented for use in the plan

Figure: CBP Roadmap



I. EU POLICIES FOR ELECTRICITY GENERATION

Key issue addressed

Identification of Options
Identification of policy options for the internalisation of external costs of electricity generation

Integration
European Commission White Paper on Renewable Energy (COM (1997)599)

*Council Decision 1999/21/EC, Green Paper of 29 November 2000 "*Towards a European strategy for the security of energy supply*," Decision No 1230/2003/EC*

Various Member States' Energy Policies and Strategies

Implementation
Various countries at different stages see Tables 1 and 2

Stage regarding the project life cycle
Policy: identification of policy options

Description of the Framework

Context
The European Union is a union of twenty-five independent states based on the European Communities and founded to enhance political, economic and social co-operation.

The Directorate of Transport and Energy is responsible for broad energy and transport policy and monitoring in the Union.

The European Union is increasingly dependent on energy imported from third countries. Its member states import 50% of their energy requirements. This external dependence has economic, social, ecological and physical risks for the EU. Energy imports represent 6% of total imports, which means in geopolitical terms that 45% of oil imports come from the Middle East and 40% of natural gas comes from Russia. This weakness has been clearly recently highlighted by the strong increase in oil prices.
The EU has frequently acknowledged that energy and transport play a large part in climate change, since they are the leading sources of greenhouse gas emissions; this is why energy policy is particularly important in the European Union's sustainable development strategy. In the Commission's White Paper on renewable energy (COM (1997) 599) an indicative objective specifies that EU governments must double their share of renewable energy supplies from the present 6% to 12% of gross inland energy consumption by 2010.
Another goal to be reached by year 2010 is to raise the part of new and renewable energies in electricity production from 14 to 22%.

The EU therefore wishes to reduce its dependence from foreign energy sources and improve its security of supply by promoting other energy sources and cutting demand for energy. Consequently, it is putting the accent, above all, on improving energy efficiency

and promoting renewable energy sources and on internalizing the external costs of electricity production.

Policy and Legislation

The European Union has acknowledged the importance of the external costs in the production of electricity and has required that measures be undertaken to take these costs into account. The recent Community guidelines on state aid for environmental protection explicitly foresee that EU member states may grant operating aid, calculated on the basis of the external costs avoided, to new plants producing renewable energy (European Commission, 2003).

The recommendations regarding the external costs of electricity production fall within a broader European policy for energy that aims at (European Commission Communication, 23 April 1997)[12]

- *(i) ensuring the security of the energy supply through managing the growing external dependence of the Union in this sector;*
- *(ii) facilitating closer integration of the Community energy markets, so as to improve the competitiveness of European industry, without in any way neglecting the safety, quality and durability of energy equipment, or public service objectives;*
- *(iii) implementing an energy policy compatible with sustainable development objectives, particularly through more rational use of energy and the development of renewable sources;*
- *(iv) promoting research and technological development in the energy sector;*
- *(v) liberalizing energy markets in which monopoly market structures are to be replaced by competitive markets (Directive 96/92/EC).*

The **Electricity directive 2003/55/EC** is the key European legislation to establish the Internal Market of Electricity. The directive had to be implemented by the Member States by 1 July 2004. **Notes for implementation** of the Electricity and Gas directives clarify how in practise the directives should be implemented.

The **Regulation on cross-border trade in electricity 1228/2003/EEC** sets rules for transmission of electricity between Member States. The regulation entered into force 1 July 2004. It is directly applicable Community law.

The **Directive 2005/89/EC** of the European Parliament and of the Council of 18 January 2006 concerns measures to safeguard security of electricity supply and infrastructure investment. The directive has to be implemented by the Member States by 24 February 2008.

The Electricity directive and the Regulation on cross-border trade are based on a **proposal** made in March 2001 to revise the **old Electricity Directive 96/92/EC**, adopted in 1996.

The following are the key points raised for the Electricity Directive

[12] *These goals have been stressed in several occasions: Council Decision 1999/21/EC, Green Paper of 29 November 2000 "Towards a European strategy for the security of energy supply," Decision No 1230/2003/EC*

Security of supply in electricity is a public good and on the basis of Article 3,3 of the Directive Member States have to guarantee universal service at least for household consumers.

The Electricity Directive gives the European Union and the Member States enough instruments to ensure that security of electricity supply at reasonable prices can be achieved. This paper describes the options are open to Member States, if exceptional circumstances warrant intervention in the market. This paper also gives suggestions as to which of these options would be the least distortive of competition and the internal market. This is important in the light of the fact that any measures taken are justified by their public service character and would therefore have to be able to pass the test applicable to public service obligations.

Relevant points from the Directive:

(Recital 21)
Nearly all Member States have chosen to ensure competition in the electricity generation market through a transparent authorisation procedure. However, Member States should ensure the possibility to contribute to security of supply through the launching of a tendering procedure or an equivalent procedure in the event that sufficient electricity generation capacity is not built on the basis of the authorisation procedure.

Member States should have the possibility, in the interests of environmental protection and the promotion of infant new technologies, of tendering for new capacity on the basis of published criteria. New capacity includes inter alia renewables and combined heat and power (CHP).

Protection of public goods

(Article3,2)
*Having full regard to the relevant provisions of the Treaty, in particular Article 86 thereof, Member States **may impose** on undertakings operating in the **electricity secto**r, in the general economic interest, **public service obligation**s which may relate to security, including security of supply, regularity, quality and price of supplies and **environmental protection**, including energy efficiency and **climate protection**. Such obligations shall be clearly defined, transparent, non-discriminatory and verifiable. In relation to security of supply, energy efficiency/demand-side management and for the fulfilment of environmental goals, as referred to in this paragraph, Member States may introduce the implementation of long-term planning, taking into account the possibility of third parties seeking access to the system.*

The range of policy options available under this framework is provided in the two tables below.

Table 1: A taxonomy of policy instruments to internalize externalities

Liability insurance	Entities using hazardous substances are required to take out liability insurance which ensures provisional compensation to victims of accidents without the need for a court hearing or proof of individual fault on the part of the entity
Location subsidies	A payment given to an entity for choosing to locate on a particular site.
Natural resource damage liability	Financial obligations for cleanup costs and preventive measures when an entity causes damage, injury or loss of natural resources.
Pollution charges	Charges to be paid on discharges into the environment, based in principles on the quantity and/or quality of pollutants.
Product taxes/subsidies	A positive charge on products that are polluting in the manufacturing or consumption phase or for which a disposal system has been organized; a negative charge on environmental friendly products
Resource use taxes	A levy placed on the use of a natural resource
Road toll	A fee paid for some liberty to pass a certain segment of a road link. This is one of the instruments commonly used to reduce road congestion.
Royalties	A payment made for the use of property such as a natural resource. The amount is usually a percentage of revenues obtained for its use.
Soft loans	Loans with interest rates below market rates
Tax differentiation	A positive charge levied on a polluting product and a negative charge, or subsidy, on a cleaner alternative. This instrument is used to promote consumption of products that are environmentally safe.
Tradable catch quota	Transferable property rights allocated to fishers in the form of a right to harvest any amount up to the limit equal to the quota over the course of a specified fishing period; Also called "Individual transferable quota" (ITQ) in fisheries management
Tradable emission permits	Tradable emissions permits are used in an environmental regulatory scheme where the sources of the pollutant to be regulated (most often an air pollutant) are given permits to release a specified number of tons of the pollutant. The government issues only a limited number of permits consistent with the desired level of emissions. The owners of the permits may keep them and release the pollutants, or reduce their emissions and sell the permits. The fact that the permits have value as an item to be sold gives the owner an incentive to reduce their emissions
Tradable land permits	An economic policy instrument under which rights to exploit land can be exchanged through either a free or controlled permit market.
Traditional management regimes	The traditional management regime is the existing state of management (eg. of a resource); or status quo. For instance, the traditional management regimes in open ocean fisheries are: "Open access regime" where property rights are non-exclusive.
Use right (licenses/concessions)	Any grant of rights, land or property by a government, local authority, corporation or individual
User charge -	Fee collected from only those persons who use a particular service, as compared to one collected from the public in general
Water right	A legal right to use surface water. This may be a right wherein a property owner is entitled to use of water which touches his/her property or may be an appropriative right granted by the government.
Voluntary agreements	Commitments made by individual companies or by trade and industry as a result of negotiations with public authorities.

Organizational/Institutional Set Up

The Directorate of Transport and Energy is overall responsible for enforcing the provisions of the EU Directive among member states. Nationally the various Energy Ministries through their respective regulatory agencies are responsible for the promotion, monitoring and enforcing the chosen national policies which are in line or subservient to the EU directive.

The Directive also provides for this in article 4

(4) *Member States shall ensure the monitoring of security of supply issues. Where Member States consider it appropriate they may delegate this task to the regulatory authorities referred to in Article 23(1). This monitoring shall, in particular, cover the supply/demand balance on the national market, the level of expected future demand and envisaged additional capacity being planned or under construction, and the quality and level of maintenance of the networks, as well as measures to cover peak demand and to deal with shortfalls of one or more suppliers. The competent authorities shall publish every two years, by 31 July at the latest, a report outlining the findings resulting from the monitoring of these issues, as well as any measures taken or envisaged to address them and shall forward this report to the Commission forthwith.*

'Tendering' for new capacity

(Article 7,1) Member States shall ensure the possibility, in the interests of security of supply, of providing for new capacity or energy efficiency/demand-side management measures through a tendering procedure or any procedure equivalent in terms of transparency and non-discrimination, on the basis of published criteria. These procedures can, however, only be launched if on the basis of the authorisation procedure the generating capacity being built or the energy efficiency/demand-side management measures being taken are not sufficient to ensure security of supply.

Implementation History of the Norm

This target has been formulated in the Directive 2001/77/EC1 on the promotion of electricity produced from renewable energy sources in the internal electricity market, which has also set differentiated targets for each Member State.

Under the Directive, Member States have set up individual RES-E (electricity from renewable energy source) targets. They are free to choose their preferred support mechanism in order to achieve the targets and/or are allowed to continue to do so for a transitional period of at least seven years after a new EU-wide regulatory framework would be adopted. Article 4 of the Directive states that, *not later than 27 October 2005, the Commission shall present a well documented report on experience gained with the application and coexistence of the different mechanisms used in Member States.*

There are currently in the EU a range of different support systems operational that can be broadly classified into four groups: feed-in tariffs, green certificates, tendering systems and tax incentives.
Feed-in tariffs exist in most of the Member States. These systems are characterized by a specific price, normally set for a period of around several years, that must be paid by

electricity companies, usually distributors, to domestic producers of green electricity. The additional costs of these schemes are paid by suppliers in proportion to their sales volume and are passed through to the power consumers by way of a premium on the kWh end-user price. These schemes have the advantages of investment security, the possibility of fine tuning and the promotion of mid- and long-term technologies. A variant of the feed-in tariff scheme is the fixed-premium mechanism currently implemented in Denmark and partially in Spain. Under this system, the government sets a fixed premium or an environmental bonus, paid above the normal or spot electricity price to RES-E generators.

Under the **green certificate** system, currently existing in SE, UK, IT, BE and PL, RES-E is sold at conventional power-market prices. In order to finance the additional cost of producing green electricity, and to ensure that the desired green electricity is generated, all consumers (or in some countries producers) are obliged to purchase a certain number of green certificates from RES-E producers according to a fixed percentage, or quota, of their total electricity consumption/production. Penalty payments for non-compliance are transferred either to a renewables research, development and demonstration (RD&D) fund or to the general government budget.

Since producers/consumers wish to buy these certificates as cheaply as possible, a secondary market of certificates develops where RES-E producers compete with one another to sell green certificates. Therefore, green certificates are market-based instruments, which have the theoretical potential, if functioning well, of ensuring best value for investment. These systems could work well in a single European market and have in theory a lower risk of over-funding. However, green certificates may pose a higher risk for investors and long-term, currently high cost technologies are not easily developed under such schemes. These systems present higher administrative costs.

Pure **tendering** procedures existed in two Member States (IE and FR). However, France has recently changed its system to a feed-in tariff combined with tendering system in some cases and Ireland has just announced a similar move. Under a tendering procedure, the state places a series of tenders for the supply of RES-E, which is then supplied on a contract basis at the price resulting from the tender. The additional costs generated by the purchase of RES-E are passed on to the endconsumer of electricity through a specific levy. While tendering systems theoretically make optimum use of market forces, they have a stop-and-go nature not conductive to stable conditions. This type of scheme also involves the risk that low bids may
result in projects not being implemented.

Systems based only on **tax incentives** are applied in Malta and Finland. In most cases (e.g. Cyprus, UK and the Czech Republic), however, this instrument is used as an additional policy tool.
The above categorisation into four groups is a fairly simple presentation of the situation. There are several systems that have mixed elements, especially in combination with tax incentives.

Since the directive came into effect in 2003, the following table shows the current status of its implementation.

Table 1: Overview of the main policies for renewable electricity in EU-15

Country	Main electricity support schemes	Comments
Austria	Feed-in tariffs (now terminated) combined with regional investment incentives.	Feed-in tariffs have been guaranteed for 13 years. The instrument was only effective for new installations with permission until December 2004. The active period of the system has not been extended nor has the instrument been replaced by an alternative one.
Belgium	Quota obligation system / TGC[27] combined with minimum prices for electricity from RES.	The Federal government has set minimum prices for electricity from RES. Flanders and Wallonia have introduced a quota obligation system (based on TGCs) with the obligation on electricity suppliers. In Brussels no support scheme has been implemented yet. Wind offshore is supported at federal level.
Denmark	Premium feed-in tariffs (environmental adder) and tender schemes for wind offshore.	Settlement prices are valid for 10 years. The tariff level is generally rather low compared to the previously high feed-in tariffs.
Finland	Energy tax exemption combined with investment incentives.	Tax refund and investment incentives of up to 40% for wind, and up to 30% for electricity generation from other RES.
France	Feed-in tariffs.	For power plants < 12 MW feed-in tariffs are guaranteed for 15 years or 20 years (hydro and PV). For power plants > 12 MW a tendering scheme is in place.
Germany	Feed-in tariffs.	Feed-in tariffs are guaranteed for 20 years (Renewable Energy Act). Furthermore soft loans and tax incentives are available.
Greece	Feed-in tariffs combined with investment incentives.	Feed-in tariffs are guaranteed for 10 years. Investment incentives up to 40%.
Ireland	Tendering scheme. It has been announced that the tendering scheme will be replaced by a feed-in tariff scheme.	Tendering schemes with technology bands and price caps. Also tax incentives for investment in electricity from RES.
Italy	Quota obligation system / TGC. Anew feed-in tariff system for photovoltaic valid since 5th August 2005.	Obligation (based on TGCs) on electricity suppliers. Certificates are only issued for new RES-E capacity during the first eight years of operation.
Luxembourg	Feed-in tariffs.	Feed-in tariffs guaranteed for 10 years (for PV for 20 years). Investment incentives also available.
Netherlands	Feed-in tariffs.	Feed-in tariffs guaranteed for 10 years. Fiscal incentives for investment in RES are available. The energy tax exemption on electricity from RES ended on 1 January 2005.
Portugal	Feed-in tariffs combined with investment incentives.	Investment incentives up to 40%.
Spain	Feed-in tariffs.	Electricity producers can choose between a fixed feed-in tariff or a premium on top of the conventional electricity price, both are available over the entire lifetime of a RES power plant. Soft loans, tax incentives and regional investment incentives are available.
Sweden	Quota obligation system / TGC.	Obligation (based on TGCs) on electricity consumers. For wind energy, investment incentives and a small environmental bonus are available.
UK	Quota obligation system / TGC.	Obligation (based on TGCs) on electricity suppliers. Electricity companies which do not comply with the obligation have to pay a buy-out penalty. A tax exemption for electricity generated from RES is available (Levy Exemption Certificates which give exemption from the Climate Change Levy).

Table 2: Overview of the main policies for renewable electricity in EU-10

Country	Main electricity support schemes	Comments
Cyprus	Grant scheme for the promotion of RES (since February 2004) financed through an electricity consumption tax of 0.22 E/kWh (since Aug. 2003).	Promotion scheme is fixed only for a 3-year period.
Czech Republic	Feed-in tariffs (since 2002), supported by investment grants Revision and improvement of the tariffs in February 2005.	Relatively high feed-in tariffs with 15-year guaranteed support. Producer can choose between a fixed feed-in tariff or a premium tariff (green bonus). For biomass cogeneration, only the green bonus applies..
Estonia	Feed-in tariff system with purchase obligation.	Feed-in tariffs paid for up to 7 years for biomass and hydro and up to 12 years for wind and other technologies. All support schemes are scheduled to end in 2015. Together with relatively low feed-in tariffs this makes renewable investments very difficult.
Hungary	Feed-in tariff (since January 2003) combined with purchase obligation and tenders for grants.	Medium tariffs (6 to 6.8 ct/kWh) but no differentiation among technologies. Actions to support RES are not coordinated, and political support varies. All this results in high investment risks and low penetration.
Latvia	Quota obligation system (since 2002) combined with feed-in tariffs.	Frequent policy changes and the short duration of guaranteed feed-in tariffs result in high investment uncertainty. The high feed-in tariff scheme for wind and small hydropower plants (less than 2 MW) was phased out in January 2003.
Lithuania	Relatively high feed-in tariffs combined with a purchase obligation. In addition good conditions for grid connections and investment programmes.	Closure of the Ignalina nuclear plant will strongly affect electricity prices and thus the competitive position of renewables as well as renewable support. Investment programmes limited to companies registered in Lithuania.
Malta	Low VAT rate for solar.	Very little attention to RES-E so far.
Poland	Green power purchase obligation with targets specified until 2010. In addition renewables are exempted from the (small) excise tax.	No penalties defined and lack of target enforcement.
Slovak Republic	Programme supporting RES and energy efficiency, including feed-in tariffs and tax incentives.	Very little support for renewables. The main support programme runs from 2000, but there is no certainty as to the time frame or tariffs. The low support, lack of funding and lack of longer-term certainty make investors very reluctant.
Slovenia	Feed-in system combined with long-term guaranteed contracts, CO_2 taxation and public funds for environmental investments.	None.

Bulgaria	Combination of feed-in tariffs, tax incentives and purchase obligation.	Relatively low levels of incentive make penetration of renewables especially difficult as the current commodity prices for electricity are still relatively low. A green certificate system to support renewable electricity developments has been proposed. Bulgaria recently agreed upon an indicative target for renewable electricity, which is expected to provide a good incentive for further promotion of renewable support schemes.
Romania	Subsidy fund (since 2000), feed-in tariffs.	Normal feed-in tariff modest, but high tariff for autonomous small wind systems (up to 110-130 €/MWh). Romania recently agreed upon an indicative target for renewable electricity, which is expected to provide a good incentive for further promotion of renewable support schemes.

Assessment of framework[13]

Wind energy

The green certificate systems present currently a significantly higher support level than the feed-in tariffs. This could be explained by the higher risk premium demanded by investors, the administrative costs as well as a still immature green certificate market. The question is how the price level will develop at the medium and long term.

The analyses show that, in a quarter of the Member States, support is too low for any takeoff. Another quarter provides enough support but still obtain mediocre results. This can be explained by the existence of grid and administrative barriers.

Biomass forestry

In nearly half of European countries, the support for biomass forestry it insufficient to develop this high-potential sector further. In many regions incentives would be needed, targeted at forest harvesting, to increase the wood-flow from EU forests to all users, thus preventing possible distortions in the market for wood residues.

Biogas sector

Six countries have an effectiveness higher than the EU average, four of them with feed-in tariffs (Denmark, Germany, Greece, Luxemburg) and two of them with green certificates (United Kingdom, Italy).

Nearly 70% of the EU countries do not provide give enough support for the development of this technology.

Other renewable energy sources

The small hydropower sector shows large variations in both supports and generation costs.

The development of this renewable technology is considerably influenced by the existence of barriers.

Solar photovoltaic energy is currently actively promoted in Germany (world leader), Netherlands, Spain, Luxemburg and Austria.

[13] Information on this has been largely drawn from "***COMMUNICATION FROM THE COMMISSION : The support of electricity from renewable energy sources*** *{SEC(2005) 1571}*

Description of the Example – MAXIMA Coordination Action

MAXIMA Coordination Action, a project funded by the European Commission, whose aim is to involve policy-makers and stakeholders in the debate on the external costs of electricity production.
The example describes the application of conjoint choice analysis in selecting policy instruments for internalizing externalities in the production of electricity.

This is a project funded by the European Commison but the application of the tool was undertaken by Fondazione Eni Enrico Mattei (*www.feeem.it*) .

Implementation of the key issue

As part of the project work FEEM detailed the policy instruments used to internalize externalities by governments and the rationale for them.
The project identified through a set of questionnaire and literature review the use of Conjoint choice analysis for policy options for the internalization of externalities in electricity production. The example illustrates the impact of different policy options on the identification and uptake of renewable energy technologies in meeting the electricity requirements in EU member states.
The following are the outcomes of the process followed.

Policy instruments to internalize externalities

Term	Definition
Technology-based command and control	The regulator specifies the methods and equipment that firms must use to meet the target.
Performance-based command and control	The regulator sets an overall target for each firm, or plant, and gives firms some discretion in how to meet the standard.
Accelerated depreciation	Any method of cost recovery of a fixed asset that is faster than charging an equal amount each period during the useful life of the asset after allowing for a salvage value. Traditional rationale supports higher maintenance and repair costs in later years. These costs are offset in the early years by the higher depreciation expense, resulting in a level effect on earnings throughout the useful life of the asset. Sometimes accelerated depreciation is used as a tax shelter because of large up-front write-offs with no reduction of cash flow.
Access fee	The fee charged for entrance to a protected area or biological reserve (e.g., national parks)
Administrative fee	Fees paid to authorities for such services as monitoring and enforcement of environmental regulations.
Deposit refund system	Involve a refundable charge which gives the user an incentive to return articles or materials.
Environmental funds	Programs which make available loans to finance environmental protection and resource conservation measures through public or private sector banks
Environmental performance bond	A deposit that polluters and violators of environmental standards must pay to a certain environmental fund. These bonds are aimed at providing a financial incentive to industry to adhere to environmental requirements.
Export taxes/subsidies	Any form of government levy or payment/benefit that is given to an exporter or producer contingent upon the export of goods.
Grants	Non-repayable forms of financial assistance
Import tariffs/subsidies	Fixed monetary tax/subsidy per physical unit of the good imported
Input taxes/subsidies	A levy or payment on an intermediary good used in the production of a final output
Investment tax credits	A government tax provision for reduction of tax liability as an incentive to encourage investment in a specific financial transaction. One such incentive for the small business is the reduction of tax liability when the business purchases new equipment.
Land reclamation bond	A binding agreement to make the land capable of more intensive use by changing its general character, as by drainage of excessively wet land; irrigation of arid or semiarid land; or recovery of submerged land from seas, lakes and rivers.
Land title	A register or survey of land, containing information on the surface of properties, tenants' names, commencing with the earliest owners through successive ownership and partitions.
Land use taxes	A program authorized by the state and adopted by localities at their option in which qualifying agricultural forest or open space land is taxed at its use value for its current use rather than its market value for possible development
Legal liability	The polluter or resource user is required by law to pay any damages to those affected. Damaged parties collect settlements through litigation and the court system.

Policy instruments to internalize externalities in the electricity market

Technology-based command and control
The regulator specifies the methods and equipment that firms must use to meet the target. This policy does not stimulate firms to increase research efforts towards new technologies because the latter are provided by the government. The positive element is that information on the best technology (provided by the regulator) is spread in the economy and all firms have access to it.

Performance-based command and control
The regulator sets an overall target for each firm, or plant, and gives firms some discretion in how to meet the standard. Technology forcing standards demand a performance (energy consumption level, emission level) that is not feasible with the existing technology.
The requirements induce firms to invest in developing innovative technologies. As an example, this instrument is applied in California to stimulate the development and introduction of zero emission cars.

Carbon Tax
Several EU member states have applied taxes on CO2 emissions with the double purpose of collecting revenues and try to influence the behaviour of the economic agents. The objective of a carbon tax is to internalise the external cost of CO2-pollution into the price of fossil fuels (Hanley et al., 1997). However, some practical difficulties are to be expected. First, the determination of the externality and therefore of the tax value is difficult.
Second, tax neutrality shall be achieved, by compensating decreases somewhere else in the economy. Third, a pollution tax is not specific, i.e. its revenues are not allocated to any special purpose but go to the general State budget. Fourth, there would be significant variation in timing and size of the carbon taxes among countries and regions, given that the marginal cost of abating CO2 emissions substantially differs across countries and over time. Fifth, the autonomous (i.e. non-price-induced) energy efficiency improvement, the possibilities for fuel substitution, and the availability of backstop technologies are essential elements in determining the evolution of the tax rate over time. Finally, the tax is part of the electricity price. The consumer, who is supposed to change his or her behaviour, will not be aware of it in a transparent way (Kunsch et al, 2004).

Finally it is worth noting that if a tax is designed to fully internalize the external costs of electricity production, taxing the damaging fuels and technologies will result in a substantial increase of energy prices. For example, if the external cost of producing electricity from coal were to be factored into electricity bills, between 2 and 8 Euro cents per kWh would have to be added to the current price (this is true for the majority of the EU Member States). Politically, such increases would be impossible; hence full internalisation may never be achieved through a tax, or it may only be achieved over a very long period. Carbon taxes have been introduced in the UK, Denmark, the Netherlands, Germany, Italy, Slovenia, Sweden, Norway, and Finland. The introduction of carbon taxes has not always been successful.

For example, Italy imposed a carbon tax in 1999 that was due to start at a relatively low level, and then to build over five years. However, during the late 1990s, Italy was

required to meet several macroeconomic constraints, in order to be allowed to join the Euro currency at launch. One constraint was on the annual inflation rate.
The carbon tax was suspended by Italy in order to reduce inflation. This suspension proved temporary, and the tax was re-instated. However, in late 2002 the Italian government notified its intention to repeal the carbon tax.
Other differences among EU Countries exist. For example, while Sweden is one of few countries that included coal in its carbon tax, major countries such as Germany are still subsidising coal production (Metroeconomica Limited, 2003).
In the present study we prefer not to stress the use of taxes as an instrument for the internalization of external costs of electricity production. The previous experience with the carbon tax has shown that some countries are not willing to increase or implement the use of a carbon tax adequate to the internalization of externalities.
Moreover, the European Commission has highlighted that the use of subsidies, which has been stressed in the community guidelines on state aid for renewable energies, should be a preferred instrument to deal with externalities.

Emissions permits
Each permit represents a fixed quantity of allowed CO2-emissions, typically 1 metric ton per permit (IEA, 2001). The number of permits in hands represents the total permitted emission quantity; a penalty is applied in case the actual emissions are in excess of this quantity.
Permits may be traded. Buyers will be those operators or countries, which lack permits for their emission needs (their marginal costs of reduction are high). Sellers will be those operators or countries, which have permits in excess (their marginal costs are low).
The emissions trading scheme for greenhouse gases is currently being introduced by the EU in order to achieve the Kyoto targets of emissions reductions. In the present report we want to keep distinct the EU Kyoto target that aims at reducing the emissions of greenhouse gases by 8% in 2008 compared to the 1990 emissions level and the broader goal of externalities internalization in the electricity market. We will therefore not emphasize the use of emissions trading as an option to internalize externality costs created by the emissions of the greenhouse gases, CO2, CH4, N2O, N and S. However, emissions permits might be considered as a policy tool for the external costs in the electricity market generated by other pollutants, such as SO2 and NOx.

The allocation of permits among industries has been the subject of a debate. Permits could be allocated to companies on the basis of their historical output of emissions (grandfathering) or they could be auctioned. The usual argument to support grandfathering is that while inefficient, is it provides greater political control over the distributional effects of regulation (Stavins 1997).
On the other hand, Cramton and Kerr (2002) argue that an auction is preferred to grandfathering because it reduces tax distortions and the need for politically contentious arguments over the allocation of rents, provides more flexibility in distribution of costs and greater incentives for technological innovation. An important difference between permits that are auctioned by the government and permits that are issued for free is that with free permits the polluter pays only the abatement cost, but with auctioned permits the polluter must also pay the remaining damage at the new emission level, as pointed out by Desaigues and Rabl (2001). The difference in cost to the polluter is very large: a factor of three or more as can be seen from the results of Rabl et al. (2004).

Subsidies

The same environmental goal reached by taxing the most damaging fuels and technologies can be reached by subsidizing greener technologies and renewable energies. Since taxation on a EU level is very difficult to achieve, the Commission has opted to encourage the second solution. In February 2001, it published the Community guidelines on state aid for environmental protection, which explicitly foresee that "Member States may grant operating aid to new plants producing renewable energy that will be calculated on the basis of the external costs avoided."

At any rate, the amount of the aid thus granted to the renewable energy producer must not exceed 5 Euro cents per kWh. More details of limits to subsidies under EU law are discussed below.
Subsidies range from tax credits given to companies that produce green electricity, or low-interest loans for the purchase of renewable energy equipment, to sales tax exemptions for the cost of renewable energy equipment.

Subsidies: Feed-in tariffs
The feed-in tariff scheme involves an obligation on the part of electric utilities to purchase the electricity produced by renewable energy producers in their service area at a tariff determined by the public authorities and guaranteed for a specified period of time (generally about 15 years).
The feed-in tariff system operates as a subsidy allocated to producers of renewable electricity. It works in the same way as a pollution tax does for firms that pollute: producers of green electricity are encouraged to exploit all available generating sites until the marginal cost of producing green electricity equalises the proposed feed-in tariff price Pin. The amount generated then corresponds to Qout2, representing an increase in renewable energy of Qout2 - Qout1 depends on the position of the marginal cost curve (Figure 3). The cost of subsidising producers of renewable energy is covered either through cross-subsidies among all electricity consumers (Spain, Italy) or simply by those customers of the utility obliged to buy green electricity (Germany)[14]or by the taxpayer, or a combination of both systems (Denmark).5 Calling simply on customers of local companies to finance green power generation is considered unfair and mechanisms are therefore often adopted to share the burden more equitably (Menanteau et al., 2003).

Subsidies: Competitive bidding processes
In the case of competitive bidding processes, the regulator defines a reserved market for a given amount of renewable energy and organises a competition between renewable

[14] *According to the old German Electricity Feed-In Law it was the utility who had the exclusive right to serve in the area where the renewable energy power plant was erected that was obliged to purchase the renewable energy produced. This led to a situation where utilities and their customers in northern Germany with the majority of wind power installations under the Law had to pay a considerable higher share of the costs than the southern companies and their customers. The introduction of amount caps tried to solve this problem: if the green electricity fed-in exceeded 10% of the total sales of the utility, the obligation for the specific utility to purchase the green electricity would end. However, this solution threatened the further deployment of wind energy in certain areas and addressed the unbalanced burden insufficiently. The Renewable Energy Act of 2000 solves this problem in a different way by requiring electricity supplier to have the same share of green electricity in its fuel mix. Thus, not only the costs but also the benefits in form of the generated electricity are shared equally among all electricity suppliers, thus electricity customers (see SEPCO website: www.ises.org/sepco/). In Germany, the new tariffs for wind energy are 0.091 Euros/kWh during 5 years, after which the rate decreases depending on the site; in Denmark, the tariff is fixed at 85% of the domestic tariff supplemented by the reimbursement of the carbon tax.*

producers to allocate this amount. Electric utilities are then obliged to purchase the electricity from the selected power producers.
Competition focuses on the price per kWh proposed during the bidding process. Proposals are classified in increasing order of cost until the amount to be contracted is reached. Each of the renewable energy generators selected is awarded a long term contract to supply electricity at the pay-as-bid price. The marginal cost Pout is the price paid for the last project selected which enables the quantity Qin to be reached (Figure 4). The price in this case is determined by the position of the marginal cost curve. The implicit subsidies attributed to each generator correspond to the difference between the bid price and the wholesale market price.
The competitive bidding procedure enables the marginal production costs of all the producers to be identified (ex post.) The overall cost of reaching the target is then given by the area situated under the marginal cost curve.
Competitive bidding systems have been used in the United Kingdom under the
Non-Fossil Fuel Obligation (NFFO) set up in 1991 and which concerned different renewable energy technologies. Similar schemes existed in France with the Eole 2005 programme set up in 1996 to promote wind energy.
A difference between competitive bidding and feed-in tariffs is that the exact amount of renewable electricity covered by the bids is known a priori in the competitive bidding system. On the other hand, since the precise shape of the cost curve is not known (ex ante), the marginal cost and the overall cost of reaching the target cannot be determined.
Finally, the extra cost is financed in much the same way as in the previous case. It is either added to electricity bills in the form of a special levy (England), or the cost is covered through cross-subsidisation among all electricity consumers (France).

Subsidies: Green renewable certificates
Green certificates have been introduced by several governments to support the development of renewable energies (IEA, 2001; Odgaard, 2000; van den Berg and van Biert, 1998). The regulator imposes a quota as a percentage of the total electricity production, which has to come from those renewable sources. Wholesalers, distributors or retailers of electricity are liable to respect the quota. To give them more flexibility and compensate for missing green kWh, they can purchase green certificates from the green electricity producers. The price of green certificates will be close to the difference in price between renewable electricity and classical electricity. The additional revenues for the producers will compensate them for this difference in price. Distributors, which do not achieve the quota imposed by the regulator, will have to pay penalties. No certificates can be produced without actual electricity production (Kunsch et al, 2004).

The flexibility of this instrument allows the regulator to induce the demand for green certificates by transferring the national target for renewable energy to either the consumers or the distribution companies[15]. Consumers or distributors will be required to prove that they consume at least the specified amount of renewable energy.
There are also some practical difficulties, however. First, the start up of the green certificate market is difficult in countries with small initial renewable capacities. Second,

[15] *This obligation could also be imposed on the supplier. In Italy every supplier of energy, except renewable energy producers or importers, are required to ensure that 2% of the energy that is put on the grid is renewable energy. This can be done by installing renewable energy capacity or buying certificates (Nielsen and Jeppesen, 2003).*

although the renewable quota is respected, or even exceeded, the emission-reduction objective might not be achieved. Renewable electricity could be used mainly to compensate the increase in demand and not to substitute “dirtier” emission sources. However, this is an issue that would remain with any similar subsidy or with a carbon tax. Green renewable certificates have been recently introduced in Italy, Denmark, Belgium (the Flanders region), Germany and the UK in the EU.

Voluntary agreements in the electricity market
Voluntary agreements in the energy market involve commitments by the industry to decrease the level of emissions in exchange, for example, of a training programme for energy-efficient purchasing and an audit provided by the authority.
Voluntary agreements are the results of co-operation and negotiation between two partners, an authority and an industry, and are intended to be followed by some form of contract. From the voluntary basis of cooperation there also follows a variation in content between agreements aimed to fulfil the same purpose. Failures in fulfillment cannot be brought to court. Handling failures thus have to be dealt with by partners in a way agreed upon.

It is often argued that voluntary approaches do not result in significant effects on the environment. Voluntary commitments may hide a low ambition of the objective itself: in a voluntary agreement firms may have declared an easy target to reach. Critics argue that voluntary approaches only contain a pollution program which follows a natural trend, a business as usual trend. As technology evolves and improves, it “automatically” increases the efficiency with which natural resources are used, and therefore reduces the emissions per unit of resource used.

A second concern with voluntary agreements is that once an agreement has been signed, the initial pressure may dissipate and firms may have the opportunity not to comply with their commitments. Even though voluntary agreements have been initiated in association with a regulatory threat, most have not included a monitoring and sanction for non-compliance mechanisms. Another criticism that has recently emerged is that voluntary measures are often suspected to promote collusive practices between participating firms. The potential danger of industry collusion is greater when the voluntary approach concerns a contracted sector where a relatively small number of firms dominates the market (Carraro and Lévêque, 1999).

These limitations imply that agreements can never replace legislated regulations or other more conventional policy instruments.

The appropriate contexts for using environmental agreements indicate that they are best suited to industries with well-organised management that has a good understanding of the environmental problem in question (Lindén and Carlsson- Kanyama, 2002). Past experience with voluntary agreements in the energy market has shown that they can play a useful role. However, this requires proper preparation and negotiation of demanding targets as well as a combination with substantial incentives for compliance by other policy instruments. Moreover, regular monitoring and evaluation have to be explicitly utilized for policy learning. By this, effective agreement schemes impose significant institutional demands, i.e. implementation costs. Moreover, a sound preparation of voluntary agreements takes time, so that they are not necessarily a suitable means for accelerating the energy policy process (Krarup and Ramesohl, 2000).

In Switzerland, voluntary agreements are an integral part of the federal law to reduce CO2 emissions which was passed in 1999. Voluntary agreements in the energy market have been applied also in Sweden, France, Denmark and the Netherlands.

Green Electricity Purchasers

The main advantage of renewable energies over conventional energy generation is that they contribute to the preservation of public goods, namely clean air and climate stability. Because of the non-excludable and non-rival characteristics of these public goods, however, private actors are not prepared to invest in something which everyone can acquire free of charge. In such conditions, the diffusion of renewable energies cannot be assured spontaneously by the market (Menanteau et al., 2003), unless it is cost effective. This has been the position of economists for a long time, but there is now some evidence that certain groups may, in fact, buy some goods that are more expensive, because they have some public good benefits. The arrangements under a liberalised electricity market which enables consumers who want to pay for this environmental good to purchase green electricity directly from a supplier, is one response to this demand. This solution, already tested in a number of countries (Germany, United States, Netherlands, etc.), can provide insight into the preferences of consumers and their willingness to pay for renewables. Although green electricity seems to attract a small and increasing number of supporters in certain countries, most consumers are not prepared to pay a higher price for a public good which everyone will be able to benefit from; the problem of free-riding remains a very real one (Batley et al., 2001; Wiser and Pickle, 1997; Mirabel et al., 2001). Experience has shown that the proportion of green electricity purchasers is low, around 2–3%, except in cases where there are strong incentives in the form of tax exemptions for electricity consumers (Jegen and Wustenhagen, 2001). In the Netherlands in 2001, 8% of consumers opted to buy green electricity, but with a tax incentive of 0.06 euros/kWh. This percentage may, however, be increased by information campaigns, education, formation and training can help to increase the acceptance of renewable energies. Additionally, special support programmes can provide grants or low-interest loans for investments in renewable plants for own use of electricity, which can be used voluntarily by beneficiaries (Espey, 2001).

Generation Disclosure Rules

“Disclosure” typically refers to the requirement that utilities provide their customers with additional information about the energy they are supplying. This information often includes fuel mix percentages and emissions statistics. Fuel mix information, for example, can be presented as a pie chart on customers’ monthly bills.

“Certification” is a related issue which refers to the assessment of green power offerings to assure that they are indeed utilizing the type and amount of renewable energy as advertised.

Both disclosure and certification are designed to help consumers make informed decisions about the energy and supplier they choose. Indeed, disclosure is often thought of as a good policy to help educate customers about electricity and thereby to prepare markets in advance of retail competition.

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J. IDENTIFICATION OF POWER DEVELOPMENT OPTIONS IN UGANDA

Key Issue Addressed

Identification of Options
Stakeholder Involvement in identification and selection of medium sized hydropower option

Integration
Ministry of Energy and Minerals - Hydropower Development Master Plan (1997)
Uganda Energy Policy, 2002
Nile Equatorial Lakes Subsidiary Action Programme (NELSAP)

Implementation
Strategic/Sectoral, Bujagali Hydropower Project, Uganda, 2001, AES Nile Private Limited.

Stage regarding the project lifecycle
Strategic and Project Planning: options identification and selection of electricity generation and within project options

Description of the Framework

The Context
Uganda is a landlocked country lying astride the equator, located west of Kenya, more than 800 kilometers from the Indian Ocean. The total area of the country is about 241,000 square kilometers, including some 44,000 square kilometers of inland water. Its population is 22.3 million with a per capita income of about US$300 (2000). Uganda has implemented broad-ranging policy reforms over the past decade and its macroeconomic performance has been impressive, with growth averaging close to 7 percent per year. Rapid economic growth has contributed to increasing standards of living of the poor. The Government's strategy to reduce poverty goes further. Since 1997, public expenditures have been overhauled to focus specifically on improving education, health, water and rural infrastructure for all Ugandans, in particular the poor. A key to success of the public finance reforms has been the removal of subsidies to inefficient parastatal entities so as to generate additional budget resources for essential social services.

Private sector development in Uganda is central to sustaining economic growth. Uganda's deregulation and privatization programs have thus far concentrated on manufacturing, but in recognition of the importance of infrastructure in enabling economic growth, the Government is now turning to the private sector to support infrastructure in general and the power sector in particular. This is appropriate, since only some 3 percent of Uganda's population has access to electric power, and it is important to expand access to power supplies in order to broaden the base of economic growth. Moreover, the poor quality and reliability of power supplies in Uganda are consistently cited by investors as binding constraints to private investment. Private sector firms reported in a 1998 investor survey that in recent

years they were without power supply for an average of 89 days per year. Before the 80MW capacity increase at Owen Falls Extension came on stream in July 2000, there were significant annual economic losses that resulted from power shortages.
Uganda's special advantage is considerable hydropower potential, primarily from the Victoria Nile, to meet its medium- to long-term energy requirements. In these circumstances, the Government's strategy to develop the power sector aims to:
(a) remove power supply constraints hindering economic growth and meet the increasing demand for electricity over the medium term;
(b) develop the country's significant hydropower potential;
(c) support private investment in the power sector;
(d) expand energy access to the rural population; and
(e) potentially increase export of electricity to Kenya, Tanzania and other countries in East Africa.

As early as 1994, the Government of Uganda signed a Memorandum of Understanding (MOU) with a private sector sponsor, AES to develop the Bujagali Hydropower site, and subsequently signed additional MOUs with other sponsors to develop the Kalagala and Karuma hydropower sites on the Victoria Nile.

The Government of Uganda carried out the *Hydropower Development Master Plan* (completed by Rust Kennedy and Donkin in November 1997) with funding from the African Development Fund (ADF). The plan identified and established the least-cost generation plan for Uganda, and helped form the technical basis to underpin international financial support for significant hydropower investment.

The proposed Bujagali Hydropower Project was identified in the Master Plan as the next least-cost option after Owen Falls Extension.

In September 2002 a new Energy Policy document was approved and building on the Hydropower Master Plan and earlier investment negotiations between the GoU, World Bank and AESNP built the identified power generation options into the policy framework for Uganda. The policy identifies the following issues as key to be addressed:

- An inadequate and inefficient power supply system, arising from stunted generation capacity growth, a poor transmission and distribution infrastructure and poor utility commercial practices, has been prevalent. The sub-sector badly needs large investments and prudent utility practices
- Energy development and environmental damage are intricately related. The policy recognizes the need to mitigate both the physical and social environmental impacts created by energy development, especially hydropower.
- UETCL has export contract obligations to neighbouring countries as follows: Kenya (30 MW), Tanzania (9 MW) and Rwanda (5 MW). However, the 30 MW to Kenya is supplied only during off-peak hours and only 9 MW and 5 MW exports go to Tanzania and Rwanda respectively. However, arrangements have been finalised for Uganda to export firm capacity of 50 MW to Kenya from 2006 after the commissioning of the Bujagali Project.

To address these, the following objectives and strategies were proposed:

Objective 1 - ***To establish the availability, potential and demand of the various energy resources in the country***

To meet this objective, Government shall:

- Prepare a database on all the available energy resources and energy consumption patterns in order to:
    - (i) have a long term perspective of the options for demand/supply matching; and
    - (ii) package information on potential projects for investment.
    - (iii) Build the necessary local capacity to acquire the required data and assess and evaluate the resources.

Objective 3 - ***To improve energy governance and administration***

In order for the energy sector to operate efficiently and play its role in the socio-economic development of the country, Government will strengthen and streamline energy sector administration and governance.

To achieve the above objective government shall:

- clarify the roles and functions of the various institutions involved in the energy sector increasing the role of the private sector and other NGO's and communities;
- create a transparent legal and regulatory framework for the sector;
- build capacity at the national and local levels for better formulation and implementation of energy policies and programmes;

ANNEX 1: Short and Medium (0 – 10 Years) Term Policy Priorities

PRIORITY POLICY ACTION	STRATEGIC INTERVENTION	REQUIRED FINANCIAL RESOURCES	FUNDS ALREADY COMMITTED	SOURCE OF FUNDING	TIMING	OTHER COMMENTS
1) INCREASE POWER GENERATION	1) COMPLETE THE OWEN FALLS EXTENSION PROJECT (KIIRA POWER PLANT)	US$ 84 MILLION	US$ 84 MILLION	• INTERNATIONAL DEVELOPMENT ASSOCIATION (IDA) • NORAD/NDF • GOU	2002 – 2004	PUBLIC SECTOR INVESTMENT
	2) CONSTRUCT TWO HYDROELECTRIC POWER PLANTS	US$ 950 MILLION	US$ 350 MILLION	• SPONSORS' EQUITY AND LOANS • GOU: US$ 30 MILLION	2002 – 2008	PRIVATE SECTOR INVESTMENT WITH GOVERNMENT SUPPORT
2) DIVERSIFY POWER GENERATION SOURCES TO ENSURE SECURITY OF SUPPLY	1) DEVELOP SELECTED RENEWABLE ENERGY PROJECTS e.g. KAKIRA SUGAR CO-GENERATION, SMALL AND MINI-HYDROS	US$ 117 MILLION	US$ 25.4 MILLION	• PRIVATE EQUITY, GRANTS AND LOANS. • GOU: US$ 3.5 MILLION	2002 - 2012	GOU SUPPORT REQUIRED
3) INCREASE ACCESS TO MODERN ENERGY IN RURAL AREAS	1) IMPLEMENT THE RURAL ELECTRIFICATION PROGRAMME BY GRID EXTENSION, DEVELOPMENT OF ISOLATED GRIDS AND DISSEMINATION OF SOLAR PHOTOVOLTAIC SYSTEMS	US$ 322 MILLION	US$ 35.87 MILLION	• IDA, GEF, BILATERAL DONORS • GOU: US$ 22 MILLION	2002 – 2012	MAINLY PUBLIC SECTOR PROJECTS WITH A GROWING PRIVATE CONTRIBUTION
4) INCREASE OPERATIONAL EFFICIENCY IN THE UTILITY COMPANIES AND CONNECT MORE CUSTOMERS TO THE GRID	1) CONCESSION OUT UEB GENERATION, DISTRIBUTION BUSINESS AND INVEST IN THE REFURBISHMENT OF THE DISTRIBUTION NETWORK	US$ 84 MILLION	0	PRIVATE SECTOR CONCESSION HOLDER EQUITY AND LOANS	2002 – 2007	REQUIRES GOVERNMENT SUPPORT TO MANAGE CERTAIN RISKS
	2) EXPAND THE TRANSMISSION NETWORK	US$ 100 MILLION	0	GOU UETC LTD DONOR FUNDS	2002 - 2007	PUBLIC INVESTMENT WITH CONCESSIONAL FINANCES

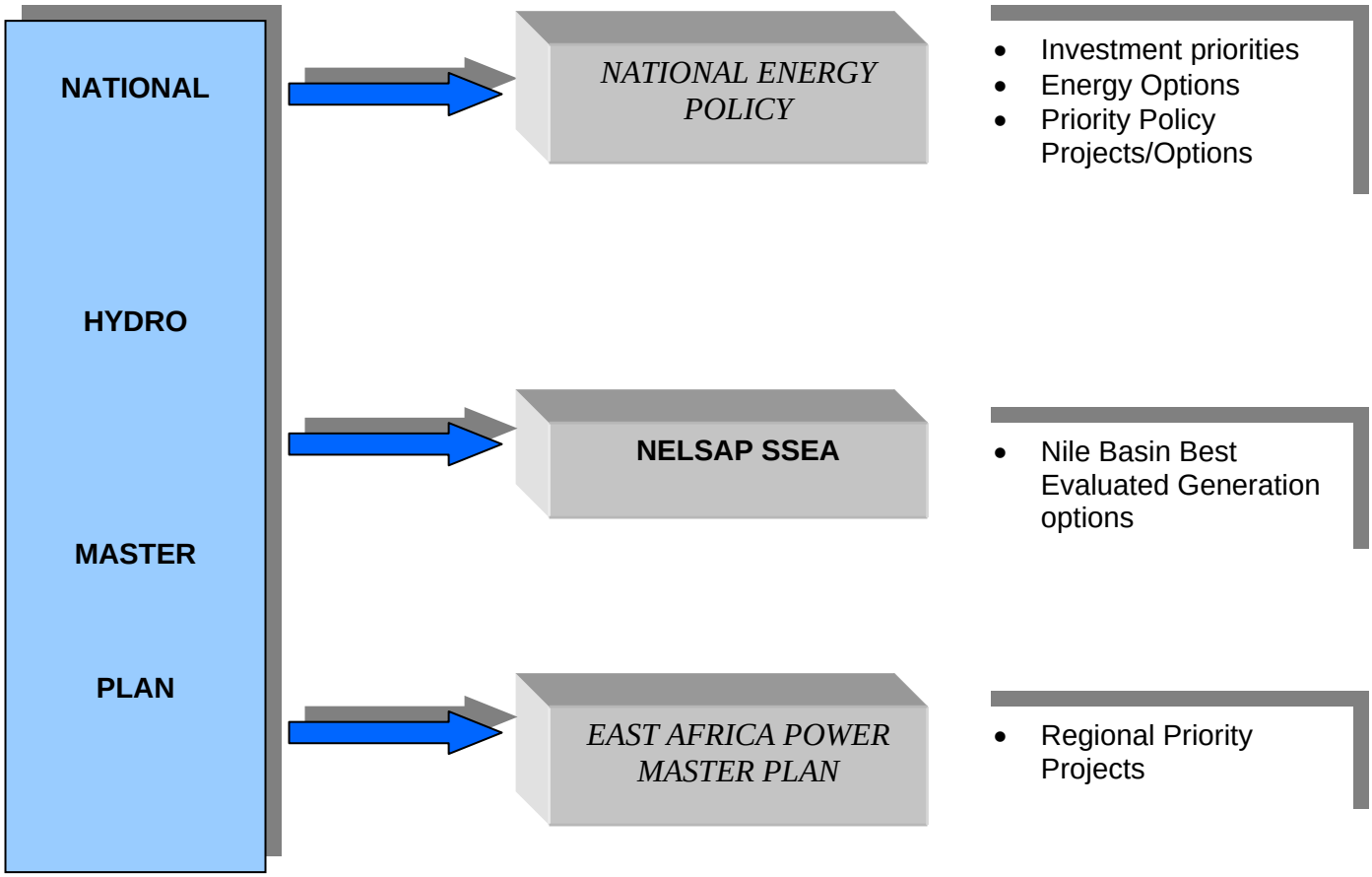
The Nile Basin Initiative (NBI) provides for an agreed basin-wide framework to fight poverty and promote socio-economic development in the ten Nile countries: Burundi, Rwanda, Uganda, Tanzania, Kenya, Sudan, Eritrea, the Democratic Republic of Congo (DRC), Ethiopia and Egypt. Under the NBI framework, two subsidiary action programs have been established: The Nile Equatorial Lakes Subsidiary Action Program (NELSAP) and the Eastern Nile Subsidiary Action Program (ENSAP).

NELSAP includes Burundi, DRC, Egypt, Kenya, Rwanda, Sudan, Tanzania, and Uganda and targets investments in power development, transmission interconnection and trade, water resources management, management of lakes and fisheries, agricultural development, and water hyacinth control.

NELSAP Power Development and Trade Sub-Program. The long-term objectives of this sub-program are:

- to promote regional economic development and improved quality of life through provision of ample power supply at reasonable prices;
- to increase regional power supply in the NEL region by improving export and import capabilities between NEL member countries; and
- to improve reliability of power supply and the quality of power delivered through interconnecting the currently isolated networks of each country.

The immediate objectives are to augment the supply of power to the grids of the region and to provide decision makers with guidance on the development process required to achieve the long-term objectives in the most efficient, economical and environmentally sustainable way.


NATIONAL
HYDRO
MASTER
PLAN
NATIONAL ENERGY POLICY
NELSAP SSEA
EAST AFRICA POWER MASTER PLAN
Investment priorities
Energy Options
Priority Policy Projects/Options
Nile Basin Best Evaluated Generation options
Regional Priority Projects

Implementation History of the Norm

National Norm

The Government of Uganda considers development of the Bujagali site a logical next step in a series of cascade projects on the Victoria Nile River and a key opportunity to introduce private investment in the sector. After Bujagali, installed generation capacity on the Victoria Nile would rise to 550 MW, including 180 MW from the existing Owen Falls Dam (now called the Nalubaale), and 80 MW from the first-phase of the Owen Falls Extension Power Station (Kiira), where 2 units were commissioned in 2000 and a third 40 MW unit in 2001. The Hydropower Development Master Plan (1997) prepared by the Uganda Electricity Board (UEB) envisages an additional two 40 MW units at Kiira.

Regional Norm

Following a dialogue between the NEL countries and the World Bank, the need for a comprehensive strategic regional assessment of different power options was formulated for the NEL region building on the ranking study of hydropower options identified by NELSAP. The approach to undertake a broad based power options analysis including issues covering Strategic/Sectoral, Social and Environmental Assessment (SSEA) was agreed at the NEL Power Experts Retreat that took place in May 2002 in Kisumu, Kenya. The objective of this assessment is two-fold:

- First of all, it will serve as an instrument to prepare the World Bank and other investors for possible requests to support the NELSAP power development program.
- Secondly, it will assist the NEL riparian countries in their selection of power supply options (including interconnections) by contributing to informed and transparent decision-making before major funds to investigate individual options are committed.

The SSEA provided final results and recommendations on how the region could fulfill its power development options. The results of this analysis were to place each development option into one of two groups: best evaluated options and other options. The group of best evaluated options amounted to 2832 MW and included:

- 1307 MW of hydropower options: Bujagali, Kabu 16, Kakono, Karuma, Ruhudji, Rumakali, Rusumo Falls, Ruzizi III, and Mutonga.
- 1525 MW of non-hydro options: all geothermal, all gas from Songo Songo, Lake Kivu methane and wind.

Description of the Example

Scope of Work

In the mid 1990s, GOU invited independent power producers to express interest in Uganda's power development program. AES Corporation (AES) of the United States emerged as the main interested party. GOU entered into negotiations with AES to develop the Bujagali site as a BOOT project. Based on the agreements that were reached, a privately owned and operated project company—AES Nile Power Ltd. (AESNP)—was created as a subsidiary of AES. It would be wholly responsible for the Bujagali development costs at its own risk, whether the project proceeded or not. On commissioning of the facility, AESNP would sell the power output to the Uganda Electricity Transmission Company Limited (UETC) under a 30-year Power Purchase Agreement (PPA). The facility would be owned and operated by AESNP for 30 years

before transfer to GOU. The transmission facilities would be constructed by AESNP and transferred to UEB on their completion.

Stakeholder Consultation and Contribution

Prior to Cabinet approval of the PPA, national debate and international NGO campaigns put a number of divergent opinions on the table for power development in Uganda. Some parties advocated higher spending on rural electrification based on decentralized renewable energy systems, either as an alternative or to complement the investment in Bujagali. Others argued for the development of geothermal power for grid supply. Others questioned the basic rationale of the project, its economic viability, national affordability and impact on tariff levels, as well as the allocation of project risk and environment impacts. For example, some contended the 30-year PPA did not account for possible changes in river flows from climate change.

At the international level, debate over these issues intensified when the World Bank Group began to consider the request from Uganda to support the project following the Cabinet decision. The debate was considered in the decision taken by the Board. The proposed project was subsequently subject to an Inspection Panel Review that made a number of findings relevant to options assessments[16].

IFC/IDA provided financial support to UEB/GOU to engage international and local consultants and involve national and international stakeholders in the subsequent studies that informed the project appraisal.

Informing Strategic Decisions

The decision to develop the Bujagali project was taken by the GOU in the context of its national development strategy and power sector plan. At the time of EIA submission in Uganda, AESNP had carried out 240 consultations with over 7,000 local residents from affected areas, including 49 consultations with 103 representatives of Ugandan cultural institutions; 130 items conveyed via local radio, television, and print media; 235 meetings held with local government representatives; 110 meetings with representatives of the Government of Uganda; 128 meetings with stakeholders; and 87 meetings with environmental and nongovernmental organizations. The debate in Parliament and subsequent Cabinet decision was thus well-informed by open public debate and extensive media coverage, and by formal public consultations during the facilities EIA review.

IFC/IDA facilitated meetings with international stakeholders on the additional studies—the Generation Alternatives Study and Victoria Nile Strategic Impact Study—that were used to inform its project appraisal. IFC/IDA also helped to ensure that the various international constituencies and networks had timely access to information, including the new suite of EIA studies released in 2001. Beyond this, the IFC/IDA, GOU, and AESNP engaged in meetings throughout the process and took steps to improve two way communications with the international constituencies.

For example:

[16] In the Panel's view, a wider range of load forecasts would have enabled a more robust examination of the risks andrewards associated with the Bujagali Project with respect to both hydrology and timing. More information could have been provided to support the contention that the current data were too uncertain and/or the delays were too long for thegeothermal alternative to be a realistic candidate. While a qualitative comparative analysis was undertaken of all the options in the facilities EIAs, a quantified analysis would have provided more certainty, even though not required by OP/BP 4.01 on Environmental Assessment.

- IFC and AESNP established websites where project documents and analysis could be accessed; similarly many NGOs established sections on their websites providing their views on the studies and the project overall.
- GOU supported a public forum for the Panel of Experts in Uganda in March 2000.
- AESNP hosted an open forum at the Bank offices in Washington in June 2000 following the Panel of Experts Forum in Uganda.

Primary topics of discussion were the World Bank's power sector support for Uganda and the basis for justifying the project.

- IFC/IDA sponsored a second Forum at the World Bank offices in 2001 within two months after the second suite of project EIA studies were submitted to NEMA and IFC/IDA.

Informing Within-Project Decisions

The framework established for decision making on within-project alternatives for the Bujagali project included the following mechanisms and groups:

- A Steering Committee to promote open discussion of joint decisions required by AESNP and GOU. Project affected groups and local NGOs were represented on the committee.
- A Multi-Disciplinary Project Team staffed mainly by Ugandan professionals with access to national and international specialists in various physical, natural, and social science disciplines.
- An Independent Panel of Experts consisting of international and national experts whose reports were made public and presented in a public consultation meeting.
- An Independent NGO Witness acceptable to the stakeholders (paid for by AESNP) to oversee the full process of interaction with the project-affected communities and households.
- External Auditors to verify the compliance with agreements reached among AESPN, communities, and individual households.
- Within the EIAs and social action programs, different techniques were used to provide two-way communications to identify, modify, and select alternatives. Here, regular community meetings, home meetings, surveys, and focus group meetings were employed. Other mechanisms included:
    - Community liaison officers to proactively work with the community to explain the alternatives, their rights and entitlements, and to facilitate local input on alternatives
    - Use of community subcommittees to debate wider community concerns, and collectively identify additional measures, how they would be implemented, and cost and benefit sharing arrangements within the community
    - Site visits such as taking project-affected people to visit the Owen Falls dams and meet with affected communities in those areas to learn from their experience
    - Special assistance for the elderly, poor, and vulnerable members of the community to participate in meetings and eventually in accessing benefits.
    - Measures adopted to provide transparent negotiations on resettlement and compensation included:
        - A census and database—with all socioeconomic data, valuations of property and assets etc.— that was accessible to all

stakeholders and provided a basis for settling claims and negotiations
- Property survey and valuation where elders and village leaders signed off on the plots' limits and counts, together with the affected person and the AESNP representatives
- Independent legal counsel (paid for by AESNP) made available to all affected households to advise on their rights, regulations, and compensation and resettlement matters.

A three-stage dispute settlement mechanism was used to resolve matters as early as possible. The steps included :
(1) resolving disputes through mediation and customary rules;
(2) amicable settlement under the auspices of a legal counsel, witness NGO and AESNP;
(3) failing resolution of the dispute in the previous steps, a court appeal under the Constitution and Land Tribunals jurisdiction.

AESNP also invested in a pro-active communication strategy to provide objective information and to make the case for the project. These efforts included publishing regular newsletters; having a site information office and visitor centers at Jinja and Kampala; placing feature articles with radio stations, newspapers, and electronic media; disseminating up-to-date website-based information; and ensuring key information and reports were available to all government and non-government organizations in Uganda.

Assessment of Needs

During the 1990s, the Government of Uganda (GOU) successfully introduced economic liberalization policies that resulted in macroeconomic growth of close to 7 percent annually, with comparable growth in electricity demand. While overall economic growth was impressive, investments in power and other infrastructure did not keep pace. According to a private investment survey in 1998, inadequate and unreliable grid power supply was rapidly emerging as the main impediment to private investment (domestic and international) in the economy and sustained economic growth.

At the same time, only 3 percent of Ugandan households had an electricity connection. Moreover, development in rural areas was lagging well behind that of urban areas. Less than 1 percent of rural households had electricity services, and rural communities lacked basic infrastructure for productive rural enterprises. Rural electrification now forms an integral part of the wider rural transformation and poverty alleviation strategy of the GOU. The national rural electrification program comprises a combination of conventional grid extensions, decentralized community scale mini-grids, and stand-alone systems. This is supported by the Energy for Rural Transformation Project, a World Bank project approved in 2001 that supports the first phase of the Energy for Rural transformation Program.
GOU's power development strategy was formalized in the 1999 Electricity Act. The policy is to improve power services in the short-term and position for future power development through restructuring and commercializing power sector institutions, mobilizing private sector expertise, and encouraging foreign and domestic private investment in the electricity industry.

Identification of Options

A set of least-cost analyses, begun in 1995 and continuing through 2000, have confirmed that the Owen Falls Extension and proposed Bujagali Hydropower Project are the first and second power generation expansion options in Uganda's least-cost generation plan to meet the country's electricity demand.

During the 1990s, Uganda prepared a number of options evaluations as part of its ongoing power and energy sector planning for both grid supply and rural electrification. Apart from hydropower and conventional thermal (based on imported fuels), non-conventional options for grid supply and rural electrification were evaluated in these studies. Non-conventional options included generation from geothermal, biomass, wind, and solar. Cogeneration and connection of captive generation units to the grid (back-up diesels used in industry) were also evaluated as potential grid supply options.

The studies found that each option (or group of small-scale options) offered potential as part of the broader supply mix in different circumstances and over different timeframes. For example, the 1999 ESMAP study indicated that decentralized renewable systems could contribute as much as 70 MW to rural electrification by 2010, depending on assumptions about external financing and local capacity development.

Supply-side efficiency measures, particularly improvements to Uganda's overloaded distribution infrastructure in urban areas, could provide the equivalent of 30 MW on the existing grid. Geothermal was seen as a potentially promising option to complement hydro-based grid supply in the future (there was possibly more than 450MW of unexplored potential in the western rift valley).[17]

The assessments broadly pointed to medium- and large-scale hydroelectric development as the most practical and economically viable strategy for grid supply in the short- to medium-term. Information from these assessments was updated and additional studies were undertaken as input to decision making on Bujagali. All stakeholders welcomed the options assessment as a critical input to the debate on Bujagali. Some stakeholders nevertheless criticized findings for not being sufficiently robust or independent. Conclusions were challenged on specific points. For example, international NGOs criticized the development timeframe of 10 years for geothermal options as too pessimistic (as compared to 4 to 5 years for Bujagali).

Studies of alternative locations for hydropower were also undertaken both as input to the GOU decision in 1999 and for the project appraisal in 2001. Initially, UEB updated comparative studies of alternative dam sites in its 1997 Hydropower Development Master Plan (1997) and assessed potential compliance of developments at each site with the World Bank's safeguard policies. Bujagali emerged as economically attractive and one of the least environmentally damaging sites. As input to the appraisal, the IFC/IDA sponsored three additional studies to assist the hydropower options assessment: the Generation Alternatives Study, the Victoria Nile Strategic Impact Study, and the Economic Review.

Comparison of Options

[17] ESMAP recommended a program for accelerated exploration of indicated geothermal resources as follow up to the 1992 Geothermal Exploration I Project previously funded by donors (UNDP, the OPEC Fund, and the Governments of Iceland) and Uganda.

The proposed site for the Bujagali project is on Dumbbell Island, 8 kilometers downstream of the existing Nalubaala Dam near the town of Jinja, where the Victoria Nile divides into two channels. The total project cost is estimated at US$582 million. The major physical components are a 30-meter dam with a small reservoir and associate spillway and outlet works, a 250 MW power station, and about 100 kilometers of transmission lines with sub-stations. The impoundment would flood 80 hectares and displace 101 households (714 individuals). Another 1,000 families would be affected by transmission facilities.

Decision making for the Bujagali project was informed by options assessments carried out at both strategic and project levels. The UEB and the Ministry of Energy and Mineral Development (MEMD), acting on behalf of government, were responsible for the power planning and options studies leading to selection of Bujagali as a preferred project in 1999.

AESNP was responsible for the within-project alternatives assessments and the associated stakeholder involvement. It acts under Ugandan laws and the regulatory oversight of the GOU, with IFC/IDA advising all parties on compliance with the World Bank's safeguard policies.

Strategic Options Assessments–Development Alternatives for Providing Electricity Services and Alternative Sites for Hydropower

The Generation Alternatives Study (May 2000) reviewed the previous options assessments for grid and decentralized rural supply, and reevaluated the six main hydropower sites on the Victoria Nile. This analysis supported the conclusion that hydropower was the most viable option for grid supply. Bujagali was economically attractive and ranked third out of the six hydro sites in terms of capital costs per MW, excluding environmental and social impacts. It was the preferred project after accounting for its lower social and environmental impacts and its ability to generate 250 MW of power. The study confirmed the conclusions reached in the analysis of alternatives undertaken in the 1999 EIA that geothermal was not attractive as the next grid supply increment. This was due to uncertain information on the quality of the geothermal resource, and the need to install gas turbines or diesel generation and import fuels for up to 10 years while a full geothermal exploration, drilling, and plant commissioning program was mounted.

A workshop was held with national stakeholders—including representatives from central government, local government, national and local NGOs, development agencies and hydropower developers, and representatives of communities directly affected by Bujagali—on the preliminary findings of the generation alternatives study. While indicating support for the project, stakeholders requested more information on the cumulative environmental impacts, given the planned concentration of hydro development on the Victoria Nile River.

In response, a second study, the Victoria Nile Strategic Impact Study (2000), was commissioned. The analysis was then reviewed in a workshop in Kampala with the same stakeholder group. This exercise also aimed to elicit views on the environmental and social criteria appropriate for future developments in the post-Bujagali period. Here the concept of "offset" emerged, where the loss of Bujagali Falls would be offset by protection of a similar cultural and environmentally sensitive area at another location on

the river. The eventual outcome was an agreement between IDA and GOU to preserve the Kalagala Falls in perpetuity (one of the six alternative sites).

The third study, the Economic Review (2001), provided internal analysis required for the appraisal. The analysis confirmed that the Bujagali project was the least cost option as the next grid supply increment under various scenarios for future power demand growth and hydrology.[18]

Within-Project Alternatives—Assessment of Alternatives for Facilities, Operations, and Social and Environmental Management Activities

AESNP began the engineering and EIA assessments of the Bujagali site in 1997-98, after signature of the initial agreements and following procedures set out by the National Environment Management Authority (NEMA). In early 1999, AESPN submitted EIAs for the hydro facilities and transmission facilities to NEMA. The hydropower facility EIA was approved in 1999 after public consultations. Over the next two years, AESNP revised the two EIA reports based on comments received from IFC/IDA and incorporated feedback from local government and affected communities in ongoing interactions. Seven new EIA documents were resubmitted to NEMA and IFC/IDA in March 2001.
The EIA scoping initially identified priority issues that were important to stakeholders, including:

- Compensation and involuntary resettlement of affected people at the project site and transmission routes
- Effects on cultural properties, including shrines and spirits associated with the Falls;
- Effects on fish and local fisheries in the Nile River and affected tributaries
- Effects on tourism and ecotourism, including whitewater rafting
- Implications for local and regional development.

Initially, five alternative project configurations identified in earlier studies were considered for a dam near Dumbbell Island. Two additional configurations were added that aimed to avoid the inundation of Bujagali Falls. Technical and economic criteria to decide among the site location alternatives included the cost and time-scale of the Stage 1 diversion, the total project cost, the overall duration of the construction program and the installed capacity. Environmental criteria included permanent loss of land through inundation and permanent works; temporary occupation of land for construction purposes; displacement of the local population; potential inundation of sites of cultural significance; and the relative impacts on tourism and recreation activities.

Alternative strategies for filling the dam and operating hydraulic facilities such as spillways and bottom outlets for different hydrology conditions and operating events were also evaluated. Options to decommission the facility after 30 years—when the project was to be handed over to the government—were also presented. All these data

[18] While the findings of the Economic Review (2001) were made available, the entire study was not publicly released because of property right issues over documents held by the Bank but owned by, or jointly with, other parties.

were presented in the alternatives analysis section of the Facility EIA, which was subject to public review.

Similarly, four alternative transmission corridors from Bujagali to a new Kampala-area substation north of the city were evaluated. Criteria were published in advance, and a 2-stage process was used:
(1) selecting the preferred corridor; and
(2) optimizing the routing (within a 1-kilometer width) based on environmental, social, and technical criteria. AESPN and its consultants worked closely with local governments and villages along the alignment to choose the best alignment. The recommended alignment was then presented in the alternative analysis section of the Transmission EIA for public debate and government consideration.

After the baseline studies, the social and environment mitigation and management alternatives were identified and evaluated interactively with the affected stakeholders groups. The selected alternatives and the agreements reached between AESPN and communities were identified in the environmental management and monitoring programs and social action programs. These included the Resettlement and Community Development Action Plan (CDAP) for the hydropower facility and the Resettlement Action Plan (RAP) for the transmission facilities.

What Benefits and Value-Added Was Derived from Involving Stakeholders in Option and Within-Project Alternative Assessments?

Broadly, the outcomes provide evidence of successful interaction with stakeholders. The project design and the proposed construction and operation arrangements are well matched to community development needs.

There are various indications of the degree of public support that influenced the government decision to develop the project. Public support was expressed at the Jinja public hearing convened by NEMA in 1999 –contingent on the resettlement and compensation package being implemented in the manner proposed. Independent polls undertaken by Ugandan media at the time of the Cabinet's approval of the PPA broadly concluded that while there was some opposition in Uganda, the majority of directly and indirectly affected stakeholders supported the project. A market research firm was retained by AESPN to poll attitudes of 64 NGOs in Uganda and record responses. This poll suggested that the large majority of the NGO organizations (48 out of 50) that responded to interviews either supported or strongly supported the project. Notwithstanding the support for the project expressed by local and national NGOs, several international NGOs remain firmly opposed to the project.

Overall Conclusions

The Bujagali project offers a number of lessons on involving stakeholders in both sector-level options assessments and project-level alternatives assessments.

- To have credibility, power options need to be evaluated against a wide range of demand forecasts. When excluding specific options that are important to different stakeholder groups, it is important to clearly state the reasons.
- Cumulative impact assessments (as undertaken in Sector Environmental Assessments) are important when evaluating dam options as part of a cascade sequence.

- Options assessments are welcome by all stakeholders as an input to public policy decisions if there is open discussion and review of the findings. In the Bujagali exercise, all issues and position were put on the table for an open stakeholder debate. Decision makers ended up being better informed.
- Follow-up to the issues that stakeholders raise in debates is important to maintain trust and credibility. Concerns about options have to be taken seriously and studied, and the results brought back for discussion.
- Full consensus in strategic choices about large-scale infrastructure (high risk/high reward) is elusive and often impossible where there is polarized debate. While a structured process for options assessment and stakeholder involvement helps to build consensus, it will not guarantee a consensus. In this case, some international environmental NGOs did not agree to the decision reached by the Uganda Government and World Bank Board—despite the high level of public support the project enjoyed in Uganda. Despite this disagreement, the views of all stakeholders influenced the priorities for future work.
- Stakeholders, even those likely to be negatively affected by a project, are more likely to constructively engage in decision making on within-project alternatives if involved through appropriate mechanisms. Affected stakeholders engage most actively when the process is open and understandable; when practical choices are offered (particularly on resettlement, compensation, and restoration issues); where there are formal agreements; and where conflict resolution mechanisms are clearly set out and agreed to in advance. Providing access to legal advice and witness NGOs helps ensure fairness, transparency, and confidence in the process.
- The Bujagali Power Project typifies the extent to which political support behind specific options will propel some options ahead of others. As early as 1994 the GoU had already signed an MoU with AES for the development of Bujagali.
- The case also illustrates that the more the level of detail available on an option the more likely it will continue to be considered seriously for implementation. The Bujagali Power Project features extensively in all plans and strategies development after the initial feasibility studies of the mid nineties and the outcome of the Hydropower Development Masterplan (1997).
- This case also illustrates the iterative nature of the process of Identification of Options. At each stage the promoters or supporters will require different levels and type of detail for an option to be considered as an option. The Hydropower masterplan identified options on the basis of least cost and this was adequate for the government to prioritise its strategies. The IFC/IDA on involvement required a detailed study to study other alternatives. Subsequently an *Assessment of Generation Alternatives – Uganda* (Acres International), was completed in May 2000. The main objective of the study was to provide an assessment of the alternative electric generating projects in Uganda on the basis of environmental, social, cost and technical considerations. The study focused on hydropower projects on the Victoria Nile, although generation alternatives to hydropower were also addressed. Using stakeholder consultations, criteria were developed to evaluate alternative hydropower projects. Three projects were identified as possible least-cost alternatives: Bujagali, Kalagala, and Karuma. This study addressed the cumulative impacts associated with these three projects. The study concluded that the proposed Bujagali Hydropower Project is the least-cost generation alternative.

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Ministry of Energy and Minerals Annual Report 2001

Ministry of Energy and Minerals Annual Report 2004

www.irn.org

APPENDIX 1

DATABASE OF REFERENCES : IDENTIFICATION OF OPTIONS

Key issue: Identification of Options

Element/Mechanism[19]	*Location*	1.1.1.1 Normative Framework		1.1.1.2 Implementation	
	Country	Legislation/Policy/Guidelines	*1.1.1.3 References* *1.1.1.4 For Framework[20]*	Relevant Dam Plan/Projects[21]	*1.1.1.5 References* *1.1.1.6 For Dam Plan/ Projects[2]*
Stakeholder Participation Stakeholder involvement in assessment of options and informed government decision in making water needs.	South Africa	Environmental Conservation Act (1989) Water Services Act (108-1997) National Water Act (1998) National Environment Management Act (NEMA 1998).	www.dwaf.gov.za www.dwaf.pwv.gov.za/Documents/Legislature/wsa97.PDF www.environment.gov.za/PolLeg/Legislation/2004Jun23/Bio%20Bill%202004_1.pdf www.environment.gov.za/PolLeg/WhitePapers/Biodiversity/Contents.htm www.dwaf.gov.za/Documents/Legislature/NWAamend_finaldoc.pdf	Skuifraam dam / Berg Water Project	Trans Caledonia Tunnel Authority: http://www.tcta.co.za/ project/ Cape Town Metropolitan Area http://www.capetown.gov.za/press/Newpress http://www.engineeringnews.co.za
Needs Assessment	South Africa	Environmental Conservation Act (1989) Water Services Act (108-1997) National Water Act (1998) National Environment Management Act (NEMA 1998).	www.dwaf.gov.za www.dwaf.pwv.gov.za/Documents/Legislature/wsa97.PDF www.environment.gov.za/PolLeg/Legislation/2004Jun23/Bio%20Bill%202004_1.pdf www.environment.gov.za/PolLeg/Whit	Olifants River Water Development Plan Project	DWAF Directorate (March 2005): Options Analysis, Olifants river water resources Development Project (ORWRDP) Results of the screening assessment

[19] Those identified in the characterisation of the issue and referred to in section 2 of the examples template
[20] Minimum information required: author, year, title, publisher and website
[21] Please attach a location map of the project in country

			ePapers/Biodiversity/Contents.htm www.dwaf.gov.za/Documents/Legislature/NWAamend_finaldoc.pdf		
Needs Assessment Planning needs and management of existing water and environmental resources	Victoria, Australia	**Victoria State Catchment and Land Protection Act 1994** **Victoria State Water Act 1989.**	**Implementation of the Intergovernmental Agreement on a National Action Plan for Salinity and Water Quality Agreement between the Commonwealth of Australia and the State of Victoria** .	Action Plan for Salinity and Water Quality	National Action Plan: http://www.napswq.gov.au The Goulburn Broken Catchment Management Authority www.gbcma.vic.gov.au
Description of Options River basin transfer	Brazil	**Water ResourcesAct**	**Cecilia Tortajada. Institutions for Integrated River Basin Management in Latin America. Third World Centre for Water Management, Avenida Manantial Oriente 27, Los Clubes, Atizapan, Estado de Mexico, 62958, Mexico; and Royal Institute of Technology, Sweden** World Bank 1999. Report No. 19873-BR. Project appraisal document on proposed loan to the state of Ceara, brazil for Ceara integrated water resource management project (PRODERIRH). Environmentally and socially sustainable development sector management unit UNEP DDP Issue based Workshop # 1, Comprehensive Assessment	Cear Water Development Project	http://www.europeanecolecon.org/frontiers http://www-wds.worldbank.org/servlet/WDSContentServer

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