

Executive Summary: Planning Approaches

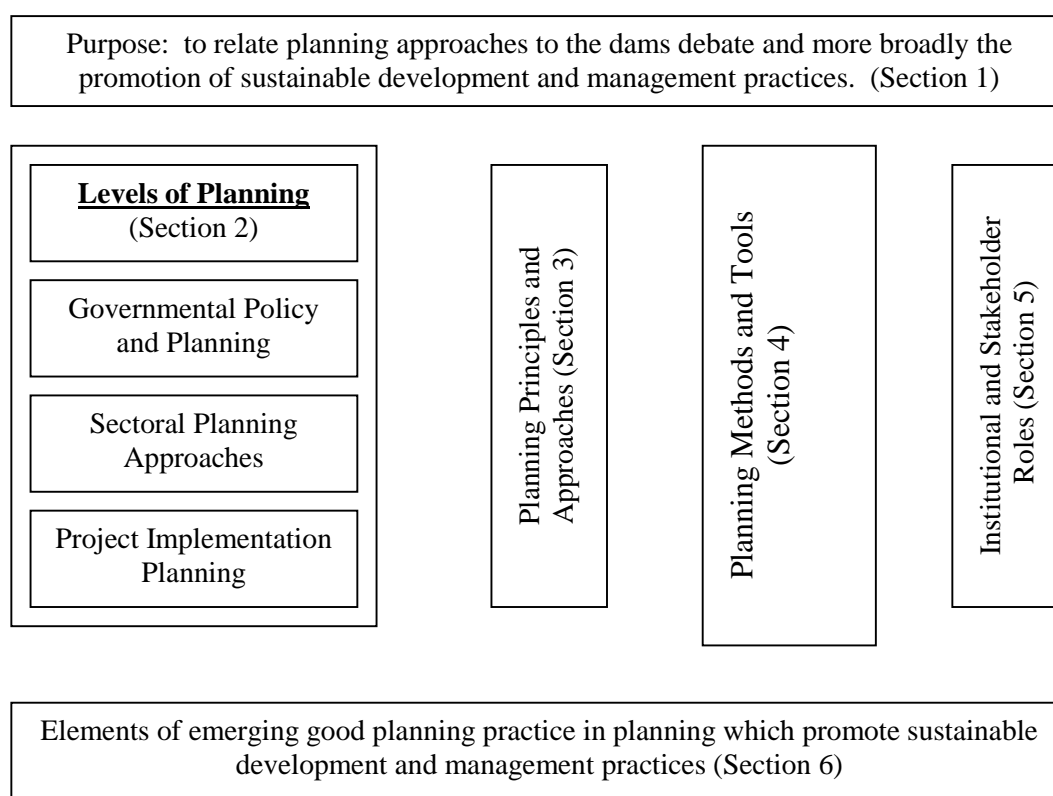
ES-1. Introduction

This paper draws on the planning sections of the other 16 thematic reviews and on a survey of planning issues conducted for this review, noted in the annex. This review also captures the perspectives provided in the various papers, reports and other submissions sent to the WCD on water and energy resource planning issues. This thematic review will be finalised after comments are received on the circulation draft. Practical illustrations of the application of the planning approaches and methods suggested here will be incorporated in the final version of the paper as examples of emerging good practice.

Planning approaches for water and energy resource development vary significantly in scope, detail and orientation across different systems of governance and political economy. Moreover, planning activities that are associated with large dams and alternative methods of providing water and energy services typically cross many traditional sectoral boundaries. This is due to the multi-purpose nature of the services and the wide range of direct and indirect impacts. Moreover, because many river basins are shared between countries, water resources planning may also involve two or more countries as upper or lower riparian states.

The framework and aims of this review paper are noted in Figure ES-1 below.

Figure ES-1: Planning Approaches Thematic Review – Framework and Aims



Given the large diversity in planning systems and approaches, a central challenge for this review was to move beyond purely sector-based planning considerations (e.g., looking at the unique or separate planning approaches and methods such as for irrigation, power, water supply, flood management, navigation, fisheries, recreation services, etc.) toward exploring integrated approaches for planning and decision-making, potentially relevant to the resolution of conflicts arising in the dams debate.

Considering the scale, variety and large cost of water and energy resource development, the inescapable need to provide these services for all segments of society and the current nature of the controversies surrounding dam-related planning and decision-making, preliminary observations and conclusions emerging from the review of planning approaches include the following:

- Planning has traditionally been conducted at national (provincial or state), sectoral and project levels. Two other levels for planning, which are becoming increasingly important today, are: (1) emerging planning initiatives at the community level that are supported by NGOs and civil society (mainly in the developing country rural situation); and (2) emerging planning initiatives at the regional level, involving one or more countries in a region sharing river resources or entering into regional power pool agreements which may rely on co-ordination of national power planning and river management.
- Where large dams are being considered as options in water and energy resource development, greater emphasis must be placed on the front-end planning stages where options assessment and initial project identification is made. This is perhaps the single most important issue in planning identified by stakeholders to the WCD process. It will help reduce conflicts and risks and avoid placing premature political momentum behind specific large projects as well as other options too early in the planning and decision-making process, particularly when there are many choices open to society.
 - ◆ Generic as well as more comprehensive options assessments are needed at the front end of the planning cycle. Often options assessments are either superficial and limited in scope. Planners need to clearly demonstrate that options have been given serious consideration at an early stage in the planning process.
 - ◆ Political levels are increasingly demanding full and comprehensive options assessments from planners in order to respond to growing public awareness and pressure in this regard.
 - ◆ Generally, more comprehensive and reliable information is needed for sector level planning, particularly relating to the baseline conditions for large-scale water and energy resource projects (e.g. socio-economic, cultural, environmental, engineering, and other conditions) before individual projects are advanced to more detailed project-level study.
 - ◆ However, the number and diversity of options also is an important consideration. Too many options make the process difficult to manage. Thus, streamlining the process for options assessment is important. Various approaches for screening and ranking options in sequential steps with more progressive detail are available and have been demonstrated.
- Integrated resource planning (IRP) frameworks, despite their limitations, are among the most effective approaches for sector-level planning which provide the means to address many issues raised in the dams debate. There is no single approach to IRP and the process is adapted to different circumstances and countries. Nevertheless, there are common elements to IRP processes.
 - ◆ Demand and Supply: IRP approaches place the consideration of supply and demand options on an equal footing at an early stage in the planning process, without predetermining outcomes.
 - ◆ Existing Facilities and Services: IRP approaches look carefully at the adequacy of existing facilities and quality of services and consider improvements in existing services as an option.

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- ◆ Options: IRP processes consider options at all levels and stages in the planning process including policy options, individual project options, and alternative plans consisting of a mix of options.
 - ◆ Externalities: IRP allows for the transparent inclusion and analysis of externalities (non-price factors), which are increasingly important to all segments of society and, hence, to political decision-makers.
 - ◆ Participation: IRP entails open and participatory processes. It presupposes that appropriately wide diverse sets of stakeholders are identified or self-identified, that poorly financed stakeholders obtain the means to support effective participation in planning processes, that analytical studies are made as accessible as possible to stakeholder participants, and that participation commences during the early stages of planning, when planning objectives are set forth, continues during key intermediate stages, and is not relegated to a penultimate consultation phase.
- There are *local*, *national*, and *multi-national* applications for IRP processes which are helpful to addressing issues in the dams debate and of wider practical value in market economy settings and in planned or transitional economies.
- ◆ IRP processes have local, national and multi-country variants and applications. Adoption of IRP processes at the local level or community level (where there is local demand for participation in planning and decision making) has the potential to empower and provide legitimacy for community based planning efforts. At the national level, IRP approaches provide the opportunity to integrate sector-based planning activities for water and energy services and reduce fragmentation in sectoral planning. At the regional (multi-country) level, IRP process and their variations can provide a working framework for co-operation to share and optimise water resource development and harmonise large investment decisions in a manner that shares or reduces risks.
 - ◆ Co-ordination of IRP processes that occur within nations is essential, and within the scope of individual national governments. Co-ordination of national and multi-nation regional IRP processes requires political support among countries and may be expected to emerge in steps over time as conditions for regional economic co-operation evolve.
 - ◆ Applications in different market frameworks: Increasingly in market economies policy and resource portfolio approaches are replacing sector-planning exercises. Public policies are translated into regulatory policies and the markets compete in making financial allocations. IRP has an application in setting regulatory policies and provides a transparent and participatory basis for arriving at policies. IRP processes in such applications also help to derive policy responses to issues prominent in the public and political agenda that markets cannot fully accommodate or capture in the short term. By contrast, where resource sectors are not deregulated, as is the case in many developing countries, IRP may continue to involve direct selection of the resource option portfolio. And when large dams are possible options, IRP for option selection tends to be needed in all countries.
- Multi-criteria planning or decision analysis (MCA) tools are available to integrate the informational and analytical inputs to planning while providing a methodology for weighing and trading off issues within an overall IRP framework.
- ◆ MCA tools have uses at all key stages of the planning cycle including identification of planning objectives, characterisation and comparison of individual options, and selection of preferred plans which include specific projects.

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- ◆ Participation and transparency goals can be facilitated and operationalised through multi-criteria processes, while political levels ultimately responsible for decisions can be better informed at each step.
 - ◆ MCA can also be used subsequently at the project planning level and further along the project cycle (e.g., operations, renovation / upgrading and re-licensing phases; or periodically when economic, environment or other regulation changes are introduced which require a change in operations affecting water use allocations and where tradeoffs may be involved).
- More attention needs to be placed on the river basin as a basic unit of planning for water and energy resource projects.
- ◆ The river basin unit or variations thereof is well suited to planning services such as irrigation, water supply, flood management, and river navigation. The basin or sub-basin provides a framework for integrating sectoral-based planning activities commonly concerned with the consumptive and non-consumptive use of water, accounting for land-water resource interactions and environment, social and cultural impacts. This unit is particularly important in developing countries with large river-based populations.
 - ◆ Power sector planning is less limited in geographic extent and except for the hydropower option is not river focused. In the IRP context, hydropower options may be identified in the course of integrated water resource planning (IWRP) activities focussed on river basins and aim to identify hydropower generation options, which may then be picked up by integrated electric resource planning (IERP) processes for the power sector.
 - ◆ IWRP planning based on the river basin unit also provides means to reconcile community initiated planning processes with traditional sectoral planning processes. The latter tend to be top down and focused on meeting urban/industrial needs with water resources shared by rural communities. Reconciling these perspectives is particularly important in places where a high proportion of the population lives in rural areas. In sum, the river basin is an appropriate basis for planning consumptive and non-consumptive uses of water in consideration of the full range of physical, socio-economic, cultural, and ecological implications of alternative strategies and options.
- As a general rule with IRP approaches, efficiency improvements in the supply of water and energy services from existing facilities should be considered a priority, or at least complementary to consideration of new projects when planning identifies the need to expand services.
- ◆ Among the supply side options, there is often substantial potential for upgrading the efficiency of the existing water and energy service delivery systems (e.g. water distribution irrigation canals or electrical transmission facilities).
 - ◆ There is also the potential for technical and operational efficiency improvements to existing facilities (e.g. dams, power station or diversion works).

A general conclusion is that planning processes must seek to identify and promote options which improve water and energy services in an equitable and economically efficient manner, while managing and reducing risks. Risks to be managed include political, social, engineering, environmental, legal, financial and economic. Risk minimisation is important from many perspectives. In general, the overall financing costs of projects which rely partly or wholly on private sector financing sources may be reduced where risks are perceived to be lower. In most settings, reducing the risk of public rejection of a large infrastructure project can lead to lower cost of capital (i.e. lower interest rates on loans) or improved access to financing. Moreover, if lower cost options are identified than would otherwise be possible in weak or constrained planning processes, additional

savings accrue. Such economic savings alone may more than cover additional costs needed for more rigorous and participatory options assessment and planning.

IRP processes are not new. Operationalising IRP planning processes presents many well-known challenges including data requirements and the need for sharing of information and political support. In the context of the dams debate the underlying need and rationale for pursuing IRP is enhanced. In developing countries with limited financial resources, planning efforts are underfunded at present. Thus, steps to improve IRP planning, options assessment and stakeholder participation create additional financial challenges. In this context, developing countries and financial service providers will need to seek opportunities to develop mechanisms to cover the higher up-front costs of improved planning, and then recapture the expense from subsequent savings.

Moreover, if more emphasis is placed on selecting projects that emerge from integrated and multi-criteria planning and decision-making processes, traditional sources of financial support will need to become less tied to specific projects at early stages of planning and more sectoral in nature. For instance, sector-lending programmes of the major multilateral financing agencies would need to recognise the increased cost of planning and stakeholder participation processes. Project financing would be redesigned to support projects emerging from such processes. Similarly, the point where governments invite entry of the private sector into the planning and project development process would more logically be after the basic clearance of the projects in the initial options assessment stage. This can have substantial practical advantages to the private sector as well as government in terms of risk reduction and promoting efficient use of scarce financial resources overall.

Finally, it is important to note that institutional roles in planning may rapidly change as governments undertake economic liberalisation and regulatory reforms. It is thus important in many jurisdictions to create or alter legal and regulatory provisions to support planning reforms.

ES- 2. Issues and Context

Water and energy resource development usually combines large investments and many distributed smaller investments. Individual supply projects vary considerably in scale and costs as well as their extent of public, community and private sector involvement, and the intended beneficiaries; that is whether the investments are intended to meet rural, local or urban/industrial needs. In human terms, water and energy services and the very nature of the projects selected to provide the services have far reaching impacts on the lives and livelihood of large segments of society due to the essential nature of energy and water in daily life.

One broadly agreed upon perspective is that past planning and decision-making around large dams has been largely top-down, driven by governments, investors, or donors and focused on national-scale priorities. It is certainly recognised that in past planning, attention to environmental and social consequences has been ancillary, not integral. Planning has focussed on the “supply” side, substantially omitting full consideration of the demand-side measures. Similarly, large-scale infrastructure investments in water and energy resources have accounted for a large portion of investment capacity and external debt of many countries, with limited analysis of the distribution of benefits within society.

2.1 Issues

The sixteen other WCD thematic papers that are sector based explore some of the social, environmental, economic, and institutional aspects of the large dams debate in more detail. The issues are not repeated here, though to a large extent all the issues converge at the planning level. Planning and decision-making processes inevitably involve making trade-offs among conflicting needs.

Regarding planning, there is an apparent shared ground among many parties to the dams debate that:

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- water and energy resources planning processes ultimately support political decision making on development paths and on specific supply and demand management options;
 - water and energy resources planning must be based on the fullest possible range of information about the economic and non-economic costs and benefits of alternative approaches, projects, and investments;
 - there must be transparency of planning and openness of decision making processes; and
 - interests of all legitimate stakeholders must be taken into account in all stages of the planning, building, and operating water and energy resource systems.

While the dams debate exhibits many areas of broad agreement, there are differing perceptions and emphases over such matters as:

- how planning inputs are used in and shape decision-making;
- the extent to which national legislation and embodied policies for water and energy resource development shape, are translated and practically reflected in planning processes and outcomes;
- the extent to which all dams and non-dam options are addressed in the early stages of planning before political momentum develops around particular options;
- the form, level, and scope of stakeholder participation in planning and decision-making;
- the ability of existing planning approaches to balance and reconcile top down sectoral driven approaches, typically intended to satisfy urban/industrial development needs, with bottom up planning approaches, typically more focused on the more basic subsistence needs of poorer rural populations; and the implied conflict over resource use; and
- the extent to which external donors, financing and other considerations influence planning processes and decision-making outcomes in developing countries which rely heavily on external finance with conditionality.

In the developing country context, there are concerns that international financial institutions play a large role in the planning and decision making in their countries and on the degree of direct accountability in such relationships. Similarly, in the changing political and economic reform context, rural populations feel they should have a greater stake or role in the planning and selection of options if they are to pay for water and energy services from projects developed on their behalf by government.

2.2 Systems of Governance

It is well recognised that planning systems in different countries reflect and are influenced by a range of country-specific factors and conditions. Among these are:

- ◆ the political economy and constitutional framework;
- ◆ the size of the country and its water and energy resource endowment;
- ◆ the capacity of local institutions;
- ◆ the division of authority among central, provincial and local levels of government; demographics particularly the urban/rural population ratio; national income levels;
- ◆ the maturity of commercial markets and associated legal systems; and
- ◆ the degree of participation of civil society in resource-related decision-making.

Similarly, there are great differences in how the sector and project level planning responsibilities are allocated among institutions and co-ordinated.

Planning itself is a major part of the investment decision-making process for water and energy resource development in both centrally planned economies and in regulated market economies. In planned economies, governments tend to take a more active role at all levels of planning, including the national, sectoral and project levels. Rather elaborate national and sectoral planning processes

support the political process, where resource allocation decisions are typically made for the sector as a whole and for specific projects. Moreover, planning processes involving large water infrastructure investments are often influenced by considerations of the possible source of project financing.

Planning processes in market economies are highly varied. Political processes and regulators empowered by governments establish the rules under which markets operate. Markets take decisions concerning the types of new projects to develop or the existing projects to expand, modify or abandon, all subject to licensing and other environmental approval or public review requirements established by regulatory oversight. This paradigm fits many countries' power sectors, where there is a trend towards deregulation and open markets. However, in many market economies other water-related services — such as irrigation, water supply, and navigation — have been more in the realm of public investment. In these sectors, governments may take a more active role or lead in planning and investment.

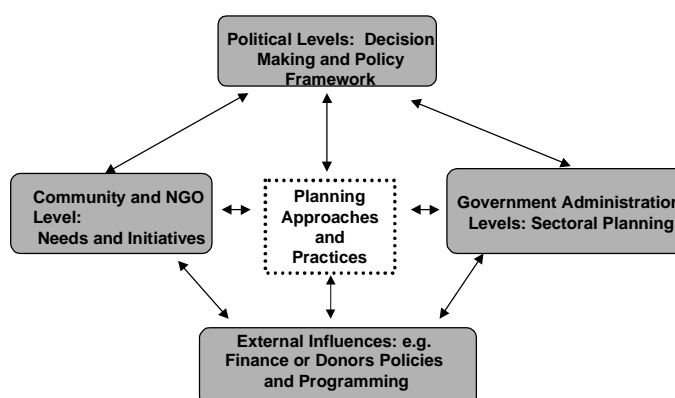
In countries of all kinds large dams typically involve higher political decision-making. For the 7 WCD case studies of large dams, the decision to proceed with large dams was ultimately taken by the Parliament, Cabinet or executive levels of government.

2.3 Influences on Planning Processes and Outcomes

There are a number of interfaces or influences on the way planning and decision-making processes evolve in different settings. Key categories of influences are illustrated in the Figure ES.2. They include:

- the political level, i.e. central government and the basic economic, developmental, and regulatory policies it establishes, as well as any role it plays in direct decision-making on very big projects;
- financing influences, including private investors as well as bilateral and multilateral financing institutions and programs;
- civil society stakeholders organised in communities or non-governmental organisations; and
- the varying administrative, regulatory, and planning roles of government at the sectoral level (energy and power, water supply, irrigation, etc.).

Figure ES.2: Illustration of Influences on Planning Approaches and Practices



During the consultations conducted for this planning approaches review, different views emerged about the nature and relative importance of these influences and their impacts on planning approaches

in different countries. While many issues were country specific, the general range of views may be summarised as follows.

Government political levels:

- general acknowledgement that the goal of planning is ultimately to support decision-making, which is a political process where trade-offs are made between competing interests;
- views that political levels of government are often presented with a limited set of options and must rely heavily on the administrative levels of government to characterise and analyse the full range of practical options; and
- views that once political momentum is established around individual projects or options it becomes difficult to introduce other viable options that may surface later in the planning process.

Government administrative levels:

- views that sectoral fragmentation and poor planning co-ordination (among power, agriculture, irrigation, etc.) inhibits optimal solutions and full realisation of IRP processes;
- views that competing sectoral interests often present difficulties in balancing demand and supply initiatives (e.g. irrigation departments concerned with water supply and meeting command area targets and agriculture departments responsible for agriculture efficiency, or electric utilities responsible for marketing power and consumer efficiency measures); and
- views that political considerations are often a major influence in deciding among candidate locations for dams identified in planning exercises, whereas site selection is a critically important issue in establishing the relative cost, benefit and impacts of developing different sites and alternatives to the dam.

Community and non-governmental organisation levels:

- views that local planning initiatives often have no place in or become lost in the government-based sectoral planning process and are among the lowest funding priorities;
- concerns over the limited access to financial resources for planning and implementation; and
- perceptions that communities view river basin and land (land-water) as local resources and means of sufficiency and livelihood, while sector based planners view water resources as a legal entitlement of the state to be used to maximise public welfare.

External influences:

- much is written in the literature on the influence of donor conditionality on developing countries; and
- with recent economic liberalisation trends, a major concern in some countries is the trend for finance considerations to override economic considerations in the selection of options.

ES-3. Toward Improved Planning Approaches

It is useful to make explicit several basic principles which good planning practice might appropriately reflect.

3.1 Principles for Planning

One point of departure for principles is the statement on integrated water resource provided in *Agenda 21* (UNCED 1993):

“18.8 Integrated water resources management is based on the perception of water as an integral part of the ecosystem, a natural resource and a social and economic good....[W]ater resources have to be protected, taking into account the functioning of aquatic ecosystems and the perenniality of the resource, in order to satisfy and reconcile needs for water....[P]riority has to be given to the

satisfaction of basic needs and the safeguarding of ecosystems. Beyond these requirements, however, water users should be charged appropriately.

18.9 Integrated water resources management, including the integration of land- and water-related aspects, should be carried out at the level of the catchment basin or sub-basin. Four principal objectives should be pursued, as follows:

- (a) To promote a dynamic, interactive, iterative and multi-sectoral approach to water resources management, including the identification and protection of potential sources of freshwater supply, that integrates technological, socio-economic, environmental and human health considerations;*
- (b) To plan for the sustainable and rational utilisation, protection, conservation and management of water resources based on community needs and priorities within the framework of national economic development policy;*
- (c) To design, implement and evaluate projects and programs that are both economically efficient and socially appropriate within clearly defined strategies, based on an approach of full public participation, including that of women, youth, indigenous people and local communities in water management policy-making and decision-making;*
- (d) To identify and strengthen or develop, as required, in particular in developing countries, the appropriate institutional, legal and financial mechanisms to ensure that water policy and its implementation are a catalyst for sustainable social progress and economic growth.”*

These basic principles can be extended and applied to the power sector as well as water, along the lines that follow, which summarise a larger number of principles articulated in the main text of this paper.

Resource Assessment: *Planning needs to be supported by ongoing nation-wide and regional programs to collect and analyse baseline data. Water resource assessments concern the quantity, quality, and uses of freshwater resources. Energy resource assessment is needed to characterise patterns of energy supply, delivery, and consumption by source and end-use.*

Integrative Multi-objective Planning: *Planning must encompass multiple objectives and strive for strategies, plans, and projects that are resilient and durable against the unexpected. Integrated planning should identify all technically feasible development options, their economic and financial impacts, and their environmental and social impacts. Planning frameworks should encourage stakeholders to reflect long-run needs and sustainability values in the planning process.*

Inclusive Planning: *Planning should reflect the trends toward transparency and participation. Affected populations need to be enlisted in resource-related planning at national, sectoral, and project levels. Participatory planning is most effective if continuous through the stages of planning. Women and other under-represented segments of society need to be fully involved in participatory processes. Planning needs to be transparent, so that the process, data, judgements, and decisions are available to stakeholders at all levels.*

Intergovernmental Co-ordination: *Distinct intra-nation planning processes relating to infrastructure development and services — whether delivered by government, the private sector, or by NGOs — should be co-ordinated to make mutually reinforcing contributions to national, regional, and local goals of development. Internationally, states sharing river basins need to formulate strategies and policies that at a minimum are co-ordinated, and preferably that aim to increase the mutually beneficial use of shared water resources.*

Capacity Building: *Skills of policymakers, professionals, civil society and community participants need to be sufficient to support their roles in carrying out the policy-making, data*

development, analysis, and implementation activities necessary for sustainable water and energy resource development and management.

3.2 Approaches for Emerging Good Practice in Planning

Integrated resource planning approaches reflect the set of principles offered above. The basic elements of integrated resource planning are well known. The major issues therefore revolve around political support and institutional adaptation in order to implement integrated planning approaches, and the provision of financial and other resources to support the deeper levels of analysis and more extensive participation that the approach requires. It is nevertheless useful to first touch on the basic conceptual elements of IRP, beginning with basic elements common to planning for both water resources and energy.

Methodological elements

The main methodological elements of IRP approaches are:

- existing policies and objectives of planning are reviewed;
- the performance of existing facilities is reviewed and options related to improving the quality services are considered;
- new demand and supply options are placed on an equal footing early in the process;
- externalities are considered in a multi-criteria framework;
- scenarios or plans consisting of groups of options are developed and tested against agreed policies and objectives;
- monitoring and adjustment of plans is considered after implementation stage based on lessons learned; and,
- the processes are inherently participatory and transparent.

IRP processes generally entail six steps:

- I. reviewing and confirming policy objectives including specifying the beneficiaries, the expected distribution of benefits and participation processes;
- II. analysis of current conditions including the lifetimes, performance and efficiencies of existing facilities and other assets (projects, transmission and conveyance systems, forecasts for demand, reliability and quality of services, environmental and social issues);
- III. identification of individual options to be tested and re-evaluated against assumptions about sustainability, economic, equity, environment social, technical performance, affordability criteria, etc;
- IV. identification of alternative plans (or scenarios) with different mixes of individual options that meet demand for services consistent with the objectives, risks and that satisfy political, environment, social, equity and economic concerns;
- V. implementation after approval of plans and projects by governments or regulating agencies; and
- VI. the final phase involves ongoing monitoring. Monitoring and auditing are needed to assure different stakeholders that agreed steps are being carried out. Problems in implementation need to be identified promptly and solved, and if not readily soluble, the project plan itself needs to be revisited and reconfigured in light of lessons from the implementation process.

One defining feature of integrated resource planning is to consider a wide array of options at different stages in the process: policy options, individual project alternatives and alternative plans. The purpose is not so much to exhaustively characterise all feasible options — the planning process does have to be manageable, as well as accessible to stakeholders — as to consider a sufficient number of diverse types of options to ensure that every conceivable *type* of option is analysed through the planning process. Diversity among options should reflect significant variations in size, technology, location, financial risk, and basic approach, as well as intended beneficiary.

IRP Application in Water Resource Planning

The main paper looks in more detail at IRP processes. IRP focussed on water resources is generally called integrated water resource planning (IWRP). There are many examples in the developed and developing world in both formative and advanced stages. From a methodological point of view, IWRP adopts the river basin, sub-basin or catchment areas as the basic planning unit. Planning may focus on a specific aspect of water resource use — such as irrigation use, or water quality - or it may be a multi-use and holistic related to the total societal and environmental use of the water resource.

In developing economies, civil society interests need to be reflected through organised and staffed NGOs, or through representatives from village, town or municipal councils. If potential options involve displacement of people, potentially affected communities need a direct representation in the process, at least regarding those specific options.

Initial options assessment would provide tentative projections of the costs and benefits and important environmental and social impacts of possible options, and allowing participants in the planning process to narrow the list of options. The options analysed may be subsequently grouped into alternative plans. As the planning become more focussed and detailed, selected options may enter the project planning stage. These typically require high quality data on hydrology, costs, and the range of environmental and social impacts.

IRP Application in Power Sector Planning

Integrated Electric Resource Planning (IERP) is an approach to energy planning comparing different demand- and supply-side options for providing electricity services on an equivalent basis, considering the full economic, environmental and social impacts. Traditionally, electricity planning has sought to expand supply resources to meet anticipated demand growth with very high reliability, and to minimise the economic cost of this expansion. IERP, however, broadens the range of supply and demand options considered in electricity planning - including new supply technologies (such as renewables) and demand-side management - as well as addressing the costs and benefits of transmission and distribution. IRP also takes into account the environmental and social costs of generation, transmission and distribution that are not captured in financial calculations.

Integrated resource planning in the power sector emerged in the 1980s in North America. It developed in response to the emergence of new issues and to shortcomings in more traditional planning approaches. IRP evolved from the conceptual framework of “least cost utility planning.” Least-cost planning stressed the importance of minimising the present value of long term economic costs while maintaining utility system reliability. Least cost planning is similar to IERP in that it considers multiple objectives, uses a long planning horizon, compares costs, and attempts to manage risk. As in the case of water resource planning, IERP differs from least cost planning in that it considers environmental protection to be an objective rather than a constraint, considers a full range of supply-side and demand-side options on an equal basis, and includes stakeholders as participants rather than observers or advisors to the process.

Integration of Water Resource and Power Sector Planning

Dams options can arise for consideration in power planning or in water-related planning processes. Integration of water resource planning and power sector planning can be addressed through co-ordination of IWRP process that are based on river systems and IERP processes that are not limited in geographic extent.

Establishing a working group that is charged with active ongoing co-ordination across the planning processes could link power and water planning. Often there is a Ministry of Water and Energy in countries with significant hydropower resources. Inputs from the power planning process can be

provided to water planners, and water planners can provide inputs to the power planning process at various stages.

Overall strategic priority should in general be given to water resource planning. River planning and regulation should aim for water supply to meet basic needs for potable water, for irrigation, and for other non-electricity uses, in a context of ecosystem and watershed protection. If hydropower can fit into the water resource planning and management framework, there is no reason not to consider it. As suggested in Agenda 21, there may be reason to “plan and develop multi-purpose hydroelectric power schemes, making sure that environmental concerns are duly taken into account” (UNCED 1993). Clearly, there are countries with untapped hydroelectric potential and few other indigenous resources for energy development. While it depends on national policy, in general, the resource would be examined first from the water resource planning and management perspective, for it is, in general, easier to find substitutes for hydropower, and even for electricity, than for water supply.

Local IRP

A critically important issues in the large dams debate is the ability and desire of many local communities to participate in planning activities. There are many examples of local community planning initiatives in water and energy resource development which ranging from the Swiss Canton planning model to a wide range NGO supported community-level planning exercises for rural water supply and water harvesting to locally-based renewable energy development. Numerous examples particularly from South Asia were provided to the WCD in the form of planning submissions.

Many local planning processes were IRP in character and aim. The legitimacy of local planning exercised is not in question. The issues that need to be addressed are the extent to which governments wish to empower local planning processes and how they will fit and be integrated with government-led sector planning process that are IRP or otherwise in nature. The most relevant point is the extent to which such planning initiatives are eligible for financing, and more importantly, for the projects identified in the process. Other issues relate to the degree to which government services can become “service oriented” rather than “project oriented” and thus support the outcome of local IRP processes.

Under certain circumstances, the biggest challenge is when sectoral IRP plans conflict with local IRP plans and, consequently, need to reconcile differences in the scale and type of resource development options.

There are examples of the adoption of local IRP-type planning approaches in the main text and in the electricity option thematic. Local IRP is being explored by growing numbers of electric utilities to reduce capital expenditures by deferring or avoiding expensive local transmission and distribution investments. Local IRP focuses on a geographically smaller area, and covers all the decisions, which can be made on local level. The options typically considered under local IRP include customer-based energy efficiency improvements, load control, local generation (including renewable resources) and storage, fuel switching, alternative rates, and targeted local transmission distribution reconfiguration and investments. The relevant information from higher planning levels is the cost of electricity supplied to this specific area, including financial and non-financial costs as well as the time-dependency of these costs. This information is then used to optimise the electricity system on the local level. Results from IRP produce inputs for national IRP.

Regional IRP: Planning Across Political Boundaries

As noted in the WCD thematic on River Basin Organisations, such organisations can create a structural framework within which IRP-type approaches provide basis for co-operation in planning, conflict prevention and resolution at the regional level. Regional IRP processes can be developed in response to situation-specific opportunities to increase regional societal welfare.

In the power sector area., opportunities exist in a regional power pool to improve, share and streamline the institutional processes that an individual utility or country may experience. Regional co-operation affords the opportunity for utilities in each country to diversify their energy mix and reduce their risks with dependence on a singular energy source. Specifically, opportunities may arise from least-cost generation resources in one country serving load in another, from sharing of electric generation reserve margins to reduce capacity requirements, from co-ordination of demand-side options for greater market impact, from the harmonisation environmental standards to the reduction of regional environmental degradation, etc. These opportunities optimise the resources use and lower the risk of stranded assets, at the same time allowing for grounds for regional co-operation to emerge.

The WCD's electricity options thematic paper reports locations where multi-nation regional power pool arrangements are being reinforced or are emerging. Regional power pools and interconnection co-operation is common place in OECD jurisdictions. Pooling and coordination are not yet regional planning, but can provide a foundation for developing regional IRP. The main text and the electricity options thematic provide examples where multi-nation planning has in fact emerged.

While there are numerous real and practical advantages to multi-nation regional IRP planning approaches, there are many challenges. Regional IRP approaches to planning are complicated by the various layers of participants, range of issues needing to be addressed, and individual country demands placed on the utility or water user. Additional problems of communicating across borders, language and cultural barriers, and differing demands placed on the member utilities will hamper or at least slow the process down. Political parties, national interests and objectives of one government may not align with those of another. While the IRP time horizon is fairly long, political changes may occur during the implementation stages, thus impacting the success of the proposed outcome. Also, the complexity of both a transboundary water resource and power plan will be that of satisfying a public participation process across borders. This will present a greater challenge to address concerns of the extended body of participants and for periodic, consistent, or regular communication.

Regional planing opportunities and challenges can be similar within large countries with strong state/province roles on resource policy. In the US, for example, there has been relatively little movement beyond regional pooling and interconnections to regional (multi-state) electric resource planning.

IRP in Market Economies and Different Regulatory Settings

The WCD electricity thematic notes that the basic concept of IERP, to optimise the electricity system from a societal perspective or to provide energy services at least societal costs, is still when generation markets are deregulated. To achieve this aim, it is necessary to shift from IRP which involves resource selection for utility systems, to IRP which informs the policy structure for the generation market.

In a competitive market, where private investors participate in the power sector, a legislative or regulatory IRP framework can still guide investment decisions, which have long term effects on the company performance. IRP in the broader sense, involving close co-operation between the power suppliers and government, can help to avoid stranded investments even where there is no central planning of power supply and demand, and can help tilt industry toward investments that anticipate future environmental regulations.

In developing countries, IRP in the broader sense is an appropriate tool to guide political and financial decisions particularly in the power sector considering the interests and needs of the population. Full deregulation of the supply industry is unlikely to happen fast in developing countries due to numerous competing demands on governments, thus monopoly components in industries will continue to exist. During this time it is important that IRP guide the large investment decisions.

ES-4. Methods and Tools to Support Emerging Good Practice

Numerous technical analytic studies are required to develop data describing current conditions, to develop estimates regarding future conditions, and to assess planning options within IRP or other planning frameworks. The options assessment element of IRP requires that multiple stakeholders in the light of multiple objectives assess multiple impacts of multiple options. To structure such assessments multi-criteria decision analysis (MCA) tools are increasingly used in power sector and water resources planning.

To illustrate, MCA techniques are increasingly used in hydropower screening and ranking studies. In their simplest form stakeholders are involved in deciding on a set of assessment criteria. These may include political, social, environment, economic, technical or risk criteria. Once the criteria are agreed upon, stakeholders then decide, as a group, on the relative weight or importance to be assigned to each of the criterion. Individual options are then scored against each criterion. Stakeholders typically must participate or at least agree on the procedure to scoring the options. In some cases the scores are based on quantitative data. In other instances the scores are more qualitative or indirect. In the next stage the individual options are given a composite score based on multiplying the score for each criteria by the weight of the criteria. In practice, the results are usually presented as a series of preference matrices for different categories and types of options. Stakeholders may then consider the preliminary results. Often in stakeholder-driven processes the analysts will be asked to recheck or verify the scoring of individual options against the criteria. Two examples of the use of MCA tools in hydropower screening and ranking options assessment are provided in the annex of the planning thematic paper.

MCA thus affords a method to consider policy options, individual demand or supply alternatives as part of options assessments, and alternative plans. The objectives that are significant in each instance may be defined through the stakeholder interests participating in a planning process. Criteria or attributes that reflect these objectives may then be listed. The criteria must be measurable in some way, quantitative or qualitative, but not necessarily in monetary terms. The scores of each option (policy, alternative or plan) for each criterion must be estimated as parts of the technical analytical studies underpinning the planning process. After the values of criteria are considered, stakeholders and political decision-makers can use their informed judgements.

It is worth noting that traditional economic cost-benefit analysis (CBA) retains an important role in MCA and IRP more broadly. Project specific CBA results (net present values, benefit-to-cost ratios, internal rates of return, etc.) are employed as one of the quantitative economic criteria in MCA formulations.

Ultimately, implementation decisions are taken at political levels, which may place greater or lesser weight on the outcomes of planning processes. In this context, MCA based approaches can help create negotiation grounds to decide which options are to receive prominence, and provide a basis to move toward societal consensus on exploring those paths and options more fully.

ES-5. Enabling Conditions for Improved Planning

The practical application of IRP and MCDA approaches is faced with several challenges. Lack of financial and other means to obtain basic data and establish needed information systems are the most common problems cited in developing economies. These can be overcome to some extent using multi-criteria approaches to deal with information uncertainty. Lack of institutional capacity and ability to put IRP concept into practice, and resistance by some groups against such concrete consideration of, and trade-off among, options are other barriers. For decision-makers and processes, bottlenecks in the IRP are the lack of specific information on the process, accessibility, consolidation and enabling legislation. More fundamentally, political and legal directions are needed to create the needed blend of authority and autonomy for planning processes.

A general prerequisite is political government policies that encourage or require sector-level planning and provide it with a modicum of autonomy and resources. Additionally, the findings of this review in the context of the planning principles suggested above provide a point of departure for identifying particular sets of enabling conditions for good planning practice at the sector and inter-sector level. These are:

- capacity building for stakeholder involvement;
- capacity building for technical support;
- adapting government planning strategies to power sector reform;
- adapting government planning strategies to reforms in irrigation and water supply;
- institutional strategies for cross-sector integration;
- fostering international co-ordination on river basin planning and management; and
- fostering international co-ordination on energy planning and management; and
- structuring development assistance to support country-driven planning processes.

Capacity building for stakeholder involvement. In addition to involving a range of relevant government agencies in planning, it will generally be important to involve stakeholders of the following types (adapted from ADB 1998):

- water users, individually or by group;
- electricity users, individually or by group;
- groups that have been under-represented, such as urban or rural poor;
- groups that may be adversely affected by projects, such as those who may be displaced;
- private sector sources of capital;
- private sector sources of technology and expertise;
- academic, professional, or research personnel with applicable expertise; and
- non-governmental organisations with environmental, community, cultural, or other purposes.

There are enormous differences amongst stakeholder groups in terms of financial and cultural resources they can bring to the planning process. This implies that resources to support stakeholders must be considered an integral part of the funding base for planning. Assisting groups of local, poor, or minority stakeholders is a legitimate and potentially valuable step for governments to include in planning processes. Institutional strengthening helps make the participation of groups meaningful to them and of value to the process as a whole. Groups that are organised and adequately financed are better able to participate. In particular, effective groups with significant community support are more able to represent their communities (and be accepted as legitimate representatives by other stakeholders) during negotiations over difficult issues that arise in considering dams options — issues like displacement, resettlement, and compensation.

Capacity building for technical support. Integrated resource planning uses more diverse analytical tools than traditional supply-side planning (which has the single objective of meeting demand for water or energy). Tools may include modelling and scenario analyses, statistical techniques, simulation, and MCDA. To apply and integrate this variety of tools, planning requires multi-disciplinary expertise such as experience in water engineering and modelling, water supply planning, natural resource valuation, community-based consulting and capacity building, and facilitation and mediation. Professional staff at planning agencies, water authorities, energy utilities, or other entities responsible for preparing resource plans may need training in the planning tools and techniques. Additionally, training in how to establish and manage planning processes may need to be provided for executive staff from the government ministries or commissions leading resource planning.

Adapting government planning strategies to power sector reform. The global trend of power sector reform has profound implications for dams-related planning. The reform process transfers investment risk to the private sector. It improves access to electricity markets for private power producers. These

results of reform tend to favour technologies that are lower in capital cost and have shorter gestation periods. Thus, gas turbine based technologies have thrived, at the expense of large, capital-intensive technologies, such as hydroelectric dams, which historically relied heavily on the involvement of government institutions and public funding. This result implies that consideration of large dams for power is to be initiated by governments, which should utilise multi-objective planning approaches resulting in projects that can be financed because they have been tested against alternatives and because they are socially and politically acceptable. The reform process also implies a shift in integrated electric resource planning to the governmental level where it can be used to establish benchmark plans for assessing overall power sector development and for formulating market regulations to foster sustainability objectives.

Adapting government planning strategies to reforms in irrigation and water supply. The trend in provision of water related services such as irrigation and supply is toward moving management to the lowest practicable level while gradually improving the efficiency of pricing, instituting user charges where they are absent. While this may mean privatisation or devolution at the level of local distribution operations, for the most part governments retain ownership of supply, transmission, treatment, and major distribution systems. Thus, the privatisation trend is much weaker for the power sector in comparison with other sectors in many countries. In water, the challenge for governments is to disentangle their vested interests as owners from their critical roles in (1) planning for resource management and (2) enhancing regulation on a foundation of clear water rights while assuring fair market competition with consumer protection.

Institutional strategies for cross-sector integration. Countries often have master plan frameworks in individual water-related sectors. Issues raised in this review suggest that key questions include how to evolve master plans toward more dynamic and adaptive resource planning; how to promote cross-sector co-ordination or, by instituting river basin or watershed planning, integration; and, in particular, how to integrate water related planning and power sector planning.

Integration can be addressed through co-ordination processes, and analytical procedures, and overarching priorities. In addition, there should [in each country] be a national water body that brings together government ministries whose duties impinge upon water use. Such a body provides one means of co-ordinating national strategic directions for water and energy and can help assure that hydropower development schemes are consistent with sustainable water resource management.

Structuring development assistance to support country-driven planning processes. The relationship between developing countries and donor countries can have strong implications for planning processes in the latter. Donor agencies have often focussed on specific *projects*, which can tend to drive planning (rather than planning driving projects as is urged here). Donor agencies exert a strong influence on planning by recipients, arising from the conditions for financing and from the agencies' internal evaluation processes. Moreover, there is an array of differing guidelines and standards. These influences can conflict with negotiated planning decisions within the country. Conversely, donors may require an assessment process that is transparent, participatory, and environmentally thorough as a condition of a specific project grant or loan, yet this requirement may promote discrete compliance steps by the recipient country more than the institutionalisation of ongoing sectoral planning.

In this context there is a promising movement under way at some bilateral and multilateral finance institutions — for example, the World Bank and the Asian Development Bank — to shift from a project-by-project mode toward more strategic approaches. The latter can better support the development of sustainable country-driven integrated planning processes.

It is believed that the planning approaches and practices summarised here, and in broad terms advocated, can more effectively encompass the competing perspectives and values at play in societies as they relate to the dams debate. The text of this paper includes evidence indicative of the possibilities, based on consideration of recent planning cases which have effectively used a number of the critical elements of multi criteria integrated resource planning.