

Energy Water Linkages
Phase 1A-Summary of Preliminary Findings from the
Reconnaissance Mission with National Energy and Water National
Stakeholders

Introduction. The overall aim of the ESCC Pillar 3 energy-water linkages¹ is to build regional energy and water security² through enhanced regional cooperation and strategic investment. This initiative³ in the Central Asia Region (Afghanistan, Kyrgyzstan, Kazakhstan Tajikistan, Turkmenistan, Uzbekistan) has the aim of strengthening regional cooperation in energy and water resources development and management.⁴ The conceptual approach is to develop a decision support system (DSS) to understand the energy-water linkages. The DSS combines the relevant physical, infrastructure, economic, social and environmental data and suitable analytical tools including models,⁵ and supports a multilevel dialogue process among key policy makers and technical specialists in the region, both at the national and regional levels. The DSS⁶ would be based on a transboundary approach that reflects the unique basin hydrology of the region, the large existing and potential water storage capacity in the region, the uneven distribution of energy resources and agriculture potential across the region and their demand and supply characteristics, and the development needs of all the sectors that must utilize in a sustainable manner the water resources of the region.

A World Bank reconnaissance mission visited Central Asia⁷ from August 21 to September 21 with the objective to meet with national energy and water technical specialists and begin formulating the technical and institutional baseline for an energy and water analytical and modeling framework for Pillar 3. Meetings were held with individual national design and institutions and in some cases ministerial counterparts.⁸ A consistent and open approach for discussion was maintained with each counterpart. The preliminary outcomes from the discussions are summarized below.

Overall objectives and direction of energy water linkages Though the countries responded to the program proposals with tempered optimism, they uniformly welcomed the initiative, and recognized that despite the numerous “initiatives” and “models” that have taken place in and for the region, none addressed the critical question of energy and water together at a broader transboundary scale. The countries agreed with goal to develop an independent, more transparent and technically acceptable integrated energy-water model as the core analytical framework on which to base a dialogue on acceptable options to resolve current and future problems. There are numerous difficulties and issues from counterparts’ perspective as explained individually and in detail to the Bank mission. Nevertheless, they suggested that the effort had to be made, and suggested the World Bank facilitate the process.

ESCC’s Pillar 3 analytical and modeling approach. All national counterparts emphasized the need to build a comprehensive and transparent analytical tool and database (the basis for a DSS) upon which the countries can technically agree. The DSS should enable a clear exposition of the facts and alternatives, linkages, and tradeoffs; it should be seen to reasonably representative of the physical and economic relationships and linkages, and it should foster a high level of technical acceptance. While details of the modeling systems that might be used were not discussed at these meetings, the discussions about

developing and using models indicated that a basin model that represents all the relevant energy and water linkages can and should be developed. While some advocated using models already developed, others agreed that there is significant modeling experience to build on should it be decided to build a new model. In principle, data for the model is available, but accessibility varies. However, the lack of confidence in and acceptance of some data and the numerous past efforts to model the basins was apparent. The Bank mission emphasized any approach towards defining the regional transboundary model architecture and output variables will involve national technical and political level engagement and ownership.

Institutional approach and capacities. From the country discussions it became increasingly apparent that the joint regional institutional framework, policies and rules of the former Soviet period, adopted immediately after independence for water and energy management, are breaking down in some important collaborative and technical aspects; there appears to be a widespread view that the current institutional arrangements should be reformed and strengthened, and made more transparent and effective. The World Bank observed challenges institutionally, as to: who might implement the proposed initiative in each country, lack of clarity of individual institutional mandates, current institutional operations and expectations. A specific institutional framework has not been defined for this effort. The Bank's approach during this reconnaissance mission was to listen to national counterparts discuss current structures, and possible future structures for bilateral and transboundary collaboration. It became evident that for any analytical and modeling effort to be effective, requires that the approach be economic and robust, and new institutional arrangements will be needed to create the confidence of all parties that the proposed solution will be effective and avoid unintended consequences.

Specific issues. Some specific issues identified by national counterparts:

- *The rise of national aspirations and development needs, the emergence of new and distinctive political cultures, as well as the drive for energy and water self-sufficiency has led to the breakdown of regional water and energy mechanisms borrowed from Soviet times. These difficulties have promoted an increasingly inward looking rather than regional and transboundary perspective. Bilateral agreements are not respected; rules are not followed between upstream and downstream riparians, and between downstream riparians.*
- *Though water allocation issues are in the forefront of tensions, there was greater concern expressed about extreme conditions and debilitating risks from floods, increased volatility from releases, recurring drought, and the increased frequency of these events (i.e. most recently the drought of 2008 and the summer floods in 2010).*
- *The balance between water allocation priorities for agriculture and energy appears to be shifting, but without the means to analyze options that would ease this shift and ensure benefits and support growth in each of the region's countries. Moreover, while considerable attention has been focused on the need to meet present and future energy demand growth, other important changes that have implications for these tradeoffs are taking place: for example, transformations are taking place in the important agriculture sector that will lead to changes in cropping systems and possibly water demand and water supply reliability requirements.*

- *Development and effective management of storage in the upper basin appears to be an option that might resolve problems of jointly managing energy and water – and joint management would appear to be essential – where and when to build, the size and characteristics, how to operate, and who should control the management of the storage are open but vital questions; currently, there no agreement on the location and no basis to explore possible agreements, size or operating modalities for this needed storage among the downstream and upstream countries, as well as between downstream riparians.*
- *National stakeholders noted that numerous models⁹ “initiatives” and “models” have been undertaken in and for the region however, none addressed the critical question of energy and water together at a broader transboundary scale. Though these models have degrees of limited accessibility, platforms are not transparent, and data is not accessible and not comprehensive. However, the national stakeholders requested any effort, if possible, should consider appropriate and relevant models.*
- *There were considerable discussions on data sharing among countries and the need for transparency and verification of information.*
- *In defining and evaluating priorities, trade-offs and options, it is imperative that the widest range of practical and pragmatic options be analyzed even though they are not presently favored by all countries.*
- *The World Bank consistently heard that modeling and analytics are required to have a sound economic basis and be commercially viable. No country can afford uneconomic choices that do not promote growth and contribute to the solution of national development issues and priorities in the context of regional resources; options should address core aspirations and needs in each of the basin countries, and yield significant benefits to each country rather than benefits to some at the expense of others (without fair compensation).*

Next Steps. National level workshops with energy and water technical specialists and policy-makers are proposed to take place in January 2010, to continue the discussions on energy water linkage, followed by regional workshop in early 2011.

Endnotes

¹ The intense interest in what is called the Region’s “energy-water nexus” stems in part from the degree to which peak demand for water for irrigation (in the summer season) is out of synch with the peak demand for energy (in the winter months), and the uneven distribution of storage and energy generation potential (mainly in the upper basin particularly Tajikistan and Kyrgyzstan) and irrigated agriculture (mainly in the lower basin on the arid plains in Uzbekistan, Turkmenistan and Kazakhstan) and the dilemmas this causes for the development and operation of necessary water storages to support both of these economically vital water uses.

² In the context of ESCC Pillar 3 the the World Bank Central Asia Energy Water Development Program (CAEWDP), references to the “region” or “regional approach” are referring to the Aral Sea Basin, which includes the Amu Darya and Syr Darya basins, and to a basin approach, that encompasses both of these basins. The present extent of the Central Asia (CA) regional electricity grid and the load sources are also limited to these two basins with the exception of exports (central Afghanistan and Iran) and parts of northern

Kazakhstan). Note that the closed Zarafshan basin, which lies between the Amu and Syr Darya rivers in Uzbekistan and Tajikistan, and northern Afghanistan are a part of the “region” and the Amu Darya basin.

- ³ ESCC Pillar 3 water energy linkages is consistent with World Bank’s CAEWDP Component 3 energy water linkages.
- ⁴ Pillar 3 had its genesis in the priority actions identified and adopted at the Central Asia Regional Economic Cooperation (CAREC) Energy Sector Coordination Committee (ESCC) workshop in Almaty in September 2009 in which ESCC and donor members, and representatives of the Executive Committee of the International Fund for the Aral Sea (EC-IFAS) and the Scientific Information Center of the Interstate Water Coordination Center (SIC-ICWC), participated
- ⁵ There have been efforts to comprehensively model the region’s water supply and demand system in the past, but these have not generally been accepted and trusted and hence have not provided the analytical platform needed to move the dialogue on regional cooperation forward. Whether by greater transparency, verification and testing of results or other mechanisms, this problem must be overcome.
- ⁶ The DSS is a critical element in the approach because it serves two key purposes among others: first, to illuminate the value and tradeoffs among a wide range of strategic options including infrastructure investment; and second to inform the dialogue towards a mechanism by which the countries of the region can sustain energy and water security and economic growth. Moreover, such a DSS is an essential tool for determining vulnerabilities and risks associated with global warming (changes in temperature and precipitation) and to evaluating alternative adaptation options.
- ⁷ The reconnaissance mission met with water and energy sector counterparts in: Bishkek, Kyrgyzstan; Astana and Almaty Kazakhstan; Dushanbe Tajikistan, Tashkent, Uzbekistan; and Ashgabat, Turkmenistan. One of the Bank’s consultants has extensive experience in Afghanistan and currently participated in completing a DSS system for Afghanistan water sector.
- ⁸ Institutions included planning, design and research institutions for water and energy, national Hydromets, and water basin organizations (BVO) in some cases at the policy level Water and/or Energy Ministers, and Prime Ministers.
- ⁹ To include and not limited to: National level GAMMS-based planning models, GEF Aral Basin (locked model), USAID TWEP-NASPI model, Syr Darya BVO, and EurAsEC water allocation and energy models of the Syr-Darya and Amu-Darya River Basin to name a few.