

Energy-Water Linkages

Preliminary Diagnostic and Proposed Activities

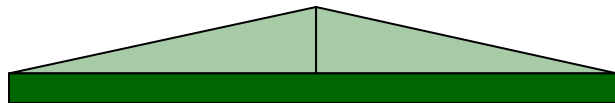
Energy Sector Coordinating Committee

CAREC

Almaty, Kazakhstan

March 25-26, 2010

Daryl Fields
World Bank



Energy Action Plan: Three Strategic Themes

Energy-Water Linkages

Action Plan Objective

To strengthen cooperation by integrating energy and water analysis.

Why

- **Hydropower** contributes to the reliability, stability and affordability of an energy system
- **Transboundary water management** is critical to maximize the value of hydropower to the region's energy sector.

Immediate Outputs

- **Diagnostic note**
- **Policy note on institutional strengthening and coordination**

How

Investment

Identify consensus projects to improve the rational and effective use of energy and water

Capacity Building & Knowledge Sharing

Enhance integrated energy-water models, analytical tools, and shared databases

Policy measures

Strengthen Central Asian institutions to lead the dialogue and analysis on rational use of energy-water resources

Work To Date:

September 2009 Discussions

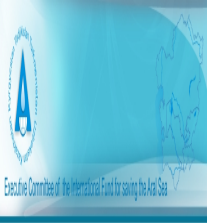
- **WHAT:**

- Presentations by regional and international experts
- Roundtable discussion on analytical needs

- **WHO:**


- Saghit Ibatullin, Chair, EC-IFAS, Central Asia
- Jeff Richey, University of Washington, United States
- Sanjay Pahuja, World Bank, India
- Paul Vassilev, BC Hydro and Power Authority, Canada
- Anatoly Sorokin, Scientific Information Centre, Central Asia
- Roundtable discussion

What We Heard


- 
- Improve quality of information
 - Increase access to information
 - Ensure use of mathematical models



- Agreed tools for regional analysis are not available
- Need to use integrated approach and advanced world experience
- Bring together national experts in a regional team

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- Use layers of spatial data to integrate across resources
 - Take advantage of emerging public data
 - Simulate interactions
 - Present results visually

- Multi-sectoral approach critical to understand trade-offs and motivate inter-ministerial dialogue
- Data challenges can be overcome

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- Recognize that not all interests can be easily quantified
 - Inclusive process is important in developing, calibrating and quality assuring the model/analysis
 - Use simulations to understand trade-offs and system flexibility

- Modeling and analytical tools will be required to understand the energy impact of climate change
- Uncertainty will play an even larger role in managing water and energy

First Diagnostic

Opportunities exist to strengthen regional analysis of energy-water linkages through:

- i. Better use of publicly available **data**, and enhanced data collection and sharing
- ii. **Advances in modeling** for natural resource management
- iii. Broader and more systematic engagement by **experts from all countries**
- iv. More focus on **needs of end-users** and decision-makers
- v. **Expanding analytical components** especially for energy management, climate change and land-water interactions
- vi. Ensuring **transparency and training**

Sept 20 09

March 20 10

December 2010

December 2011?

First Diagnostic



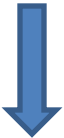
Phase 1a: Analytical and Modeling Architecture

Phase 1b: "First Generation" Model

Terms of Reference for Detailed Analytical and Model Enhancements (if needed)

Recommendations for institutional platform for analysis and dialogue

Recommendations for data collection and sharing



Phase 2: Implementation of Recommendations

First Diagnostic

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graph TD; A[First Diagnostic] --> B[Phase 1a: Analytical and Modeling Architecture]; A --> C[Phase 1b: "First Generation" Model];
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Phase 1a: Analytical and Modeling Architecture

Phase 1b: “First Generation” Model

What: Establish a consensus view on modeling needs and institutions

How: Consultative approach

- Consult on analytical/model architecture and “philosophy”
 - e.g., outputs, modules, management tools, scenarios to meet needs of all users
- Establish a Modeling and Decision Support Technical Working Group (all countries, coordinated by IFAS, all relevant sectors)
- Share current models and analytical tools, and seek opportunities for international exchanges

Output: Recommendations for detailed analytical model enhancement and management

- High priority data needs
- High priority modules that require additional research/development (e.g., energy operations, climate change, socio-economic indicators)
 - Most appropriate modeling platform
- Institutional arrangement for ongoing use, maintenance and sharing of analytics

First Diagnostic

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graph TD; A[First Diagnostic] --> B[Phase 1a: Analytical and Modeling Architecture]; A --> C[Phase 1b: "First Generation" Model];
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Phase 1a: Analytical and Modeling Architecture

Phase 1b: “First Generation” Model

What: Build a basic basin model using readily available data

How: Independent consultant

- Collect data from international, commercial and local (Central Asia) sources
- Develop a dynamic information framework to store and enable overlap of sectoral information
- Roughly simulate impacts of climate change, water productivity and water management
- Hold workshops to share model architecture and results

Output: Basic model identifying key resources and linkages; basic simulations for pilot sub-basin

- Warehouse of publicly available data
- Geo-referenced map of primary water infrastructure
 - Basic interactions of hydrology and resources
- Input to recommendations for “second generation” model

Discussion

- **Is the diagnostic accurate?**
 - I.e., Need for review of current modeling and analytics; more focus on transparency and information sharing; model more directly linked to user needs
- **Is the approach appropriate?**
 - First activities focused on (i) consultations on modeling needs; and (ii) “first generation” model?
- **For Phase 1a) what suggestions do you have for consultation on modeling needs?**
 - Individual interviews followed by workshops?
- **For both Phase 1a) and 1b), who would you recommend be invited to:**
 - Technical Working Group
 - User advisory group
- **Is a sub-committee from ESCC needed?**