Session:

Water–energy nexus
How do we optimise services?

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For more information: www.hydropower.org/congress
Water Energy Nexus – How Do We Optimize Water and Energy Services?

World Hydropower Congress
Beijing, 19 – 21 May 2015

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sei-strategy.org
Objective of the session

“Identify hydropower’s central role within the water – energy nexus”
Perspectives 1: the water & energy nexus – a linked system

- **Water for energy production**
  - In the production process: pump, clean, cool, treat
  - In hydropower generation
  - In biomass production for fuels

- **Energy (electricity) for water management and supply**
  - Pump, treat, store for multipurpose use
  - Desalinization
  - Smart monitoring & decision support systems using modern ICT
Perspectives 2: the water-energy-production-eco-system nexus

1. Energy production
   - Water use in all steps of the thermal energy value chain
   - Water storage for hydropower
   - Water for biofuels

2. Primary production
   - Agriculture (irrigation & rainfed)
   - Forestry
   - Fisheries

3. Industry & urbanization
   - Domestic use
   - Industrial use
   - Waste water treatment
   - Tourism
   - Navigation

4. Ecosystem services
   - Water quality management
   - Biodiversity & conservation
   - Green infrastructure, flood & drought protection
   - Ecosystem flows

Perspectives 3: the "nexus" is scale and context specific

• Global scale
  – Climate change mitigation & adaptation (low carbon economy)
  – Meeting the coming Sustainable Development Goals (SDG)

• Macro-Region scale (multiple countries)
  – Economic integration, trade, stability
  – Power market development, grid integration
  – Building common objectives, norms and values - "EU energy union"

• National scale
  – Policy cohesion to address multiple national objectives
  – Balancing services in the energy system
    • Lever of intermittent renewable energy

• Basin/catchment scale
  – Balancing multi-stakeholder needs, IWRM
  – Finding synergies, assessing tradeoffs, win-win opportunities – multiple use

• Local scale: rural and urban
  – Resource stocks and flows external and internal
  – Disaster risk prevention

Nexus value add

- Increases the understanding of dynamic systems taking multiple sector objectives into account
  - Analytical approaches that are scale and context specific
  - From qualitative to quantitative analysis
  - Linkages/challenges/options

- Contributes to assess governing options at different scales
  - Norms and institutional structures
  - Policy coherence

- Identifies management options & innovation needs
  - Resource planning
  - Investment options
  - Operational aspects, synergies & tradeoffs
  - Solution oriented

Based on SEI Water-Energy-Food Nexus Initiative 2015
Two key questions today

1. What is the business case for hydropower in the nexus?

2. Where can we see critical knowledge or research gaps to further identify the role of hydropower in the nexus?