



Energy-Water Nexus Roadmap Workshop

BREAKOUT SESSION 1. PROBLEM AREA, ENERGY SUPPLY

BREAKOUT SESSION #1 MATRIX: Problem Area, Water for Energy Supply.

	Energy Supply Activity	Water-related Issues, Problems, Concerns					
		0-10 years	Trend (↑↔↓)	Certainty/ Confidence	10+ years	Trend (↑↔↓)	Certainty/ Confidence
①	Extraction						
②	Fuel production						
③	Electricity production						
④	Renewable sources						
⑤	Other						



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BREAKOUT SESSION 1 QUESTIONS

What are/will be the primary water-related concerns impacting...

- Extraction of oil, natural gases, coal?
- Production and refining of fuels (oil- or biomass-based)?
- Electric power generation (including both hydropower supply and thermal plant cooling)?
- Renewable energy production?

Probe participants about water-related concerns, including...

- Cost of water.
- Absolute availability/Temporal and spatial availability.
- Quality.
- Regulatory prohibitions/restrictions.
- Competing demands.

What is the trend for each of these limiting factors? Are they growing in importance (that is, are they becoming more of a limiting factor to energy production)?

Is the cost/availability/competing uses of water inhibiting energy production or the planning for future energy projects? At what point will cost/availability/competing uses inhibit the ability of the energy sector to meet the needs of your state/region?

Of all the factors that will impact energy production in your state/region, where does water cost/availability/etc. rank? Will water be more of a limiting factor than other constraints?



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BREAKOUT SESSION 2. PROBLEM AREA, WATER SUPPLY

BREAKOUT SESSION #2 MATRIX: Problem Area, Water Supply.

Water for ...	Issues, Problems, Concerns in/on ...							
	Surface water	Trend (↑↔↓)	Groundwater	Trend (↑↔↓)	Economic development/ diversification	Trend (↑↔↓)	Environment ^[1]	Trend (↑↔↓)
⑥ Urban use ^[2]								
⑦ Agricultural use								
⑧ Energy production								
⑨ Electricity generation								
⑩ Recreational use								

[1] Environment to include ESA concerns, ecological remediation, maintenance/enhancement of in-stream flows, etc.

[2] Urban use to include water provided for industrial use



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BREAKOUT SESSION 2 QUESTIONS.

What are the primary issues, problems, or concerns related to the impacts on surface water from urban/municipal use? Ag use? Energy production?

- In the near-term?
- In the long-term?
- What is the trend?
- What is your confidence level in this?

What are the primary issues, problems, or concerns related to the impacts on ground water from municipal use? Ag use? Energy production?

- In the near-term?
- In the long-term?
- What is the trend?
- What is your confidence level in this?



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BREAKOUT SESSION 3. NEEDS/GAPS IDENTIFICATION

BREAKOUT SESSION #3 MATRIX: Needs and Gaps Identification.		
To address ...	We Need ...	
	Near-Term (0-10 years)	Long-Term (10+ years)
Priority Problem		



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BREAKOUT SESSION 3 QUESTIONS.

Focusing on the highest priority Problems identified on Day One ...

What do you need to address the priority Problems your region/state is likely to experience in the next 10 years?

Do you need improved technologies? If so, what is the delta or modification necessary? How much better do technologies need to be? Do you need better understanding or knowledge? If so, what in particular do you need to understand?

If the problem doesn't exist today, but is projected to exist in 10 years, what will be the cause of the problem? What will you need to address the problem? How much better must a technology/process/knowledge be to address the future Problem?



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BREAKOUT SESSION 4. SOLUTIONS IDENTIFICATION

BREAKOUT SESSION #4 MATRIX: Solutions, Approaches, Innovations.				
To address ...	We should investigate the following...			
	Solution, approach, or innovation	Payoff timeframe	Actor(s)	Risk/Reward
Water for Energy Priority Need 1				
Water for Energy Priority Need 2				
Water for Energy Priority Need 3				
Water for Energy Priority Need 4				



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BREAKOUT SESSION 4. SOLUTIONS IDENTIFICATION

What opportunities or options do you see for addressing the priority Problems and Needs/Gaps raised over the past two days? What **innovations and approaches** are most needed and of highest priority to assure an adequate supply of water for energy? What are the major impediments, investment risks vs. rewards, and leverage opportunities?

Are there opportunities to be found in:

- Technology research, development, demonstration, and commercialization?
- Economic and market-based approaches?
- Policy and regulatory changes/additions?
- Educational outreach to public, policy-makers, others?
- Efficiency gains?
- Other areas/approaches?

For each innovation/approach/opportunity, what organizations are most appropriate to lead the development/implementation?

What are the relative roles, challenges, and opportunities for technology improvements vs. public policy/regulation vs. market economics vs. public priorities, attitudes and behaviors re: improving energy and water supplies and use efficiencies?

Are there any 'showstopper' regulations, legislation, policies, etc. that might reduce the ability of even the perfect technology/application to meet the need/solve the problem?