

NETL Water-Energy Workshop
Water Management for Fossil Energy Systems
August 20 2014, Baltimore, Maryland

Breakout Session C

Facilitator: Curtis (Dale) Cunningham Recorder: Jessica Mullen

Each of the sessions provided a review of areas where R&D funds can best be utilized over the near term. The order of discussion was based on prioritization of the categories to be used by each of the Brainstorming Groups. Each group participant received two red stickers. Participants used these to vote for their area of greatest interest for prioritizing discussion among the categories listed below. This ensured that sufficient time would be available to capture discussion on the areas of greatest interest to that group.

The order of discussion was based on prioritization of the categories from the Brainstorming Groups:

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|--|------------------------|
| 2. Cooling Systems: | Total Votes = 4 |
| a. <i>(Wet and Dry)</i> | |
| b. <i>Incremental & Step Change Improvements</i> | |
| 3. Water Treatment and Reuse: | Total Votes = 7 |
| a. <i>Economic Pathways for Zero Liquid Discharge</i> | |
| 4. Process Efficiency and Heat Utilization: | Total Votes = 3 |
| a. <i>Pathways for produce more power per unit of water withdrawn, consumed, and treated</i> | |
| 5. Data, Modeling and Analysis: | Total Votes = 0 |
| a. <i>Tools to enable regional and plant level decision making</i> | |
| 6. Other topics | Total Votes = 0 |

Cooling Systems:

- Role of hybrid systems for seasonal demands and impact on materials heat transfer
- Concern no one solution will fit all plant needs. Concern regulations will force all plants to be a one-off design to meet compliance
- Research into seawater for cooling
- Research to use geothermal cycle to recover loss
- Research into other working fluids to replace water demand and materials

Water Treatment and Reuse:

- Impact of Federal and state regulations on water
- Cost to transport water will drive many options for water reuse
- Closed systems modeling for water demand and utilization within community, between industries and sources
- Research for water storage – not enough to meet demand or capture runoff
- Research needs to balance stakeholder needs and address common attributes
- Cost and technical challenges for water treatment
 - Beneficial use of all materials: biogas, fly ash, ...
- Is zero-discharge feasible? What can be done to benefit from waste streams
- Research into flue gas water recovery
- Use of saltwater and brine with or without treatment

Process Efficiency and Heat Utilization

- CO₂ impact of water needs and technologies to minimize water use
- Waste heat from CO₂ capture for water treatment
- Use of geothermal (solar?) energy for regenerative CO₂ capture
- Integration of industrial partners for water resource island to maximize reuse
- Research into low-temperature heat evaporative systems for water treatment

Data, Modeling and Analysis

- Data integration and analysis tools across Agencies for sharing resources
- Establish Best Practices for industry participation
- Establish water analysis framework for power generation assessment and impacts on water use
- Impact of regional climate change on demand for area population growth

Other Topics

- Cross-agency issues: Who controls water priority and regulations
- Non-traditional water sources and ways of use
- Water collection from other industries for power generation applications

Attendees:

Cunningham, Dale (Facilitator)	Sextant/NETL
Chu, Paul	EPRI
Mullen, Jessica	USDOE - NETL
Toy, Lora	RTI International
Conrad, Regis	US DOE
Hansen, Bryan	Burns & McDonnell
Jain, Ravi	InnoSeptra LLC
Larson, Aaron	POWER Magazine
Omara, Kate	US EPA
Sjostrom, Sharon	ADA-ES, Inc.
Snyder, Seth	University of Chicago
Teng, Xinjun	Southern Company