Group F Problem Statements/ Needs/Solutions

E1 & W1 Problem statement
- Lack of environmental accounting methods to allow comparative analysis of various water and energy technologies

E1 & W1 Needs
Environmental Accounting
- Need better standards and methodologies for decision support systems to capture full value of water

E1 & W1 Solutions
- Develop, test, evaluate standardized methodologies for decision support to capture full environmental accounting
- NBS, ASTM, NBII, ASHRAE (look at Standards producing organizations)
- DOE put together consortium, steering committee to direct actions

- Educational function/outreach to various college programs
- Develop methods to include water intensity in energy planning/decision making and energy intensity in water planning /decision making

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E2 Problem
Water produced from energy extraction is used beneficially

E2 Needs
- Regulations that match water quality w/ end use
- Need for legal/regulatory reform to promote maximum beneficial use
- Need to clarify ownership of produced water

E2 Solutions

- Identify markets for degraded / produced water
  - Quality
  - Quantity
  - Duration
  - Location
- Reduce treatment costs for treatment of produced water
  - Refiltration cost reduction for R/O
  - Improved membrane efficiencies

- Pilot programs to test produced water reuse

E3 & W3 Problem

- Current dependence on centralized energy generation and water/wastewater treatment may be unsustainable and needs to be complemented by distributed generation

Need E3 & W3
- Asset management
- Condition of asset
- Current needs
- Projected future need
- Compare alternatives including water and energy use
- Gap analysis between future needs and current resources
- Include water/energy in Distributed analysis on a regional basis
- Refine methodologies

E3 & W3 Solutions
- Develop new <u>systems analysis tools</u> for energy/water sustainability
- Developed by labs and universities
- Users – waste water treatment, electric/water utilities
- <u>Pilot Projects</u> for regions (local scale first the move to larger projects)

- <u>Models</u>
  - Data
  - Identify limitations
- Develop <u>decision support tools</u> to support integration of mixed systems (Distributed to centralized)

Water W1
Problem stmt
Lack of information or understanding of the value of water in terms of true cost, opportunity cost and spatial and temporal variations in value.

Needs W1
- Need for reliability index for specific water rights
- Need standardized protocol

- Need predicative model for long term value of water
- Need quantified Federal/Tribal reserved rights
- Need to quantify regulatory, e.g., ESA, CWA
- Need real time monitoring data

Solutions
- Develop standards /methodologies for water appraisals
  - Economists, etc.
  - real estate appraisals
- Develop reliability index and std protocols for determining water right(s) reliability
  - What is the percentage of time that right will be available
  - What is the availability, when, and how much (temporal and spatial)
  - What are the opportunity costs (replacement costs)

- Done by hydrologists/ water rights experts, biologist, chemists
- Water rights Database development
- Need real time flow monitoring system

Problem W2

Lack of regional (water shed) planning, coordination, implementation and management across jurisdictions and ownership to integrate land-use and water-supply

Needs W2

(Number 1 & 3 combined)
Mechanism for regional planning (watershed)

- Need to define scale of hydrographic neighborhoods
- Need analytical tools that incorporate water/land

- Model to integrate land and water
- Tucson example –
- Demand forecasting
- Need for uniform stds
- Gauging systems
- Integrated measurement and monitoring system
- Need for data stds to inform water planning

Solution W1 & W2
- New technologies for measuring/monitoring
- Gauging stations currently $50K, and $15K to operate

- Develop common data stds land use and water use for integrated land, land use and water supply planning and management
- Data mapping

- Develop protocols for integrated land, water, and wastewater

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Problem W3 & E
Failure to pay attention to water conservation (supply curves of water)

Needs W3 & E
- Need full definition of the value of water saved
- Determine and quantify value
- Better water efficiency metrics
- Need incentives/subsides for recycled water (example – treated water to ocean)
- Need severance Taxes water "lost" to ocean

Solution W3 & E

- Replace aging water meters
- Develop incentives for water recycling
- Demo projects
  - Collaborative partnering
    - DOE/WERF/AWWARF/Water Reuse/EPA/USGS