

Eastern Region, Group E, Problems Flipcharts

Warm-up Discussion

- Resource Allocation Issue
 - Recognizing the dynamic
 - Changing it from a resource to a "Controlled" resource
- Market issue
 - market to allocate resource for its most efficient use
- 71% of Earth's surface is water 97% of water is in ocean, 3% in land
 - Global Process
 - Cost to deal with salinity
- Need to consider ocean as possible solution to water problems
- Understand social impacts and associated costs
- Other Issues to Consider
 - Equity Fairness social issues
 - Merit goods
 - Issues may be forced on us by government regulation
 - All of this will greatly impact market
 - Public awareness of water issues is not the same as energy
 - Value of water
 - Despite incentives to build refineries, oil companies are not building
 - Need to build near water sources
 - Imbalance of energy supply and water location
 - Impact of where you put these plants on local labor force
 - (Shift on economics of region)
- No single solution for every part of the country
 - Solutions by regional state, etc.
 - customized
- Federal regulatory template needed
 - i.e. how we deal with transmission
- Economic opportunity for those places where new power plants are located
- In the long-term need to examine renewables and other sources of energy
- LNG petroleum industry is looking at future energy source
 - bringing in from outside
 - fuel cell/hybrid
 - coal gasification
 - nuclear/hydrogen 30-40+ years

Priority Problems, Not in Rank Order

Energy Problems

- As water quality degrades, we need more energy to treat the water for its various uses
- Liability and risk are increasing as applied to all problems
- Risk to energy generators fuel extractors, stakeholders of not having water and energy available to meet needs

Short term Water Problem

- Mechanism for allocating water during drought
- Insufficient tools for managing water demands for electricity generation and increasing supplies
- Considerable amount of energy we generate goes for water use.
- Ongoing degradation of water quality for intended use
- Multi-jurisdictional constraints and competing authorities on water and energy

Medium-Long Term Water Problem

- No clear value of water as an important resource
- No Mechanism for allocating scarce water resources among competing users- depletion of surface and groundwater, contamination
- Emerging competing uses of water
- Lack of public awareness of water issues

Energy Problems

Row 1, Extraction

- In some regions, coal is running out. Major economic impact to the region. Impact to water quality
- How do you do it efficiently and get it to market. Cost benefit
- The produced waters-poor quality
 - Can have a huge impact and or impact by extraction process
 - Need to turn into an opportunity; need a market or less costly method to turn into beneficial use
 - Near term problem and long-term opportunity
- Acid mine drainage from deep mine -Frosberg University Study
 - Legacy problem
 - Passive technologies currently being used--need improved methods
- R & D needed on produced water side of problem
- Liability and risk is increasing as applied to all problems, tend to increase over time

Row 2, Fuel Production

- Where water comes from for hydrogen production is a major factor in where to locate
- Refineries located near Mississippi River
- Need transportation via water-canals shrinking
- Trend towards coal gasification to reduce Co2 emissions-but this has water reuse issues
- Future expansion of refineries will require more and more water
- Biomass-water from inception is a problem
- Other energy sources where water at inception is a problem
- Genetically Modified-don't know long-term issues of using
- Risk and liability associated with spills/getting into the water table (many requirements and regulations)
- Energy Bill calls for production of ethanol- 4 billion gallons a year-does not address water needs
- If company cannot get access to a waterway, they cannot get product to market(infrastructure for water based commerce)
- Diversion of water for other uses takes away water originally used for transportation

Row 3, Electricity Production

- Due to low water supply curtail electricity production
- Fed/local authority asking for new plants to use a close loop system
- Regulations regarding quality of water going in and coming out of the plant (high expense for treatment of water)
- Increasing consumption of better quality water use through closed loop system
- New competing uses of available water:
 - Recreational
 - Agricultural
 - Manufacturing
 - Drinking water/municipal use
- Systems solutions management needed
 - using less water increases the cost of producing electricity
- Researchers are linking higher cost energy to health problems

Row 4, Renewable Sources

- We need to think in non-traditional ways to address these water energy problems- Ocean, hydro power, ethanol, and biomass
- Capture energy out of waves and currents

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- Geothermal
- Solar and wind have low to no water needs
- Renewables that need fresh water and those that don't
- Water conservation efforts
- Wind and ocean have some ecological issues involved
- Hydro power has huge ecological impacts for local indigenous plant life.

Water Problems

- Difficult to identify issues without agreed upon assumptions
- Eastern region--population
 - Driving south-desal to supply
 - Potable water--more energy
- Who owns the water rights?
- How much water is really being used
- No single overarching/central planning czar for water

Row 6, Urban Use, Surface water impacts

- Storm water runoff and waste water treatment-water pollution, pharmaceuticals, fertilizers, etc.
 - Requires energy to treat and transport
- Protection of capture area (watershed) for the rain (excess water is a problem for the east)
- Need to look at alternative supplies of water
 - i.e. re-allocating
 - treatment (desal)
 - additional storage
 - water market mechanisms

Row 6, Urban Use, Groundwater impacts

- Recharge-if not properly done wells will dry out
- Sustainable yield--need to define
- Salt water intrusion in coastal aquifer
- Manufacturer's unregulated use of other state's water and reselling it.
- Aquifer storage and recovery causes problems in many areas
- Surface water and groundwater are connected-start to compromise surface water flows-what you do to one impacts the other "Water Follies"
- Water pollution in underground storage tanks MTBE problem not sure how bad it is and how long has it been there?
- Pharmaceuticals, etc.
 - Clean water will become more scarce as water becomes more polluted and requiring more energy to treat it.

Row 6, Urban Use, Economic Development/Diversification

- The more you pave the world, the more you have surface to collect the water
 - flooding
 - erosion
 - pollution
- In order to forecast development you need to know where water will come from
- More energy required for development
- Very water intensive

Row 6, Urban Use, Environment

Urban developments displace environment concerns
Ecosystem restoration =new competing demand
Recreational fisherman

Row 7, Agricultural Use, Surface water impacts

- TMDL total maximum daily load- agricultural activities lead to nutrient loading in surface water
 - Also for Urban

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- Sediment: alters streams significantly
- Feedlot and animal farm run-off with feed additives
- Agriculture for fuel/energy production
- Concentrating more dense footprint- greater impact
- Do more with less land
- Producing to feed livestock

Row 7, Agricultural Use, Groundwater impacts

- Draws a lot of water (high demand)
 - large, complex farms require more water and energy
- Groundwater appears a "free good" to Eastern Agriculture

Row 7, Agriculture Use, Economic Development

- More product per unit of land Higher localized impact
- Whose resource is it?
- Water rights issues are complex and inconsistently applied
- In East, groundwater rights have not been successfully tested

Row 7, Agriculture Use, Environment

- Impact of environmental law on practices allowed on ag land
- run-off from agriculture impacts surface and groundwater and thus the environment
- Hypoxia in Gulf of Mexico and Chesapeake Bay, etc.

Row 8, Fuel Production, Surface water impacts

- Extraction-Refining-Transportation
- Major impact on water quality
- Competitive demand for energy production compared to other demands
- Use a lot of surface water to transport fuel-subject to spills and other problems
- Run-off problems from coal mining

Row 8, Fuel Production, Groundwater impacts

- Impact on water quality
- relationship between surface and groundwater issues
- Deep well injection from refining and petro-chemical plants is largely unknown
- Ditto from all the above issues already noted
- What is the cost impact of competing groundwater use?

Row 8, Fuel Production, Economic Development

- competes with resources necessary for economic develop
- Difficult to develop the area due to past existence of plant location
- Economy factors - more and more products will come from outside the US

Row 9, Electricity Production, Surface water impacts

- Waste water treatment processes (tap to toilet)
- 19-20% of energy of energy produced goes to water consumption
- Consumptive use increase from cooling towers
- Degraded surface water quality
- Increased chemical loading
- Fluctuation in water levels causes changes in hydrology of river and surface water that feeds in
- Water quality impacted by dam operations

Row 9, Electricity production, Groundwater impacts

- Contamination issues from underground tanks
- Similar issues to surface

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- Can be positive factor in creating recreational use opportunities
- Electricity Economic
- Enables economic development
- Displacement of people and animals(dams, man-made lakes)