Energy Water Nexus: The Need for Water Rights and Markets

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Overview

- Growing demand; more uncertain supplies.
- Interface between water and energy.
- Water rights less secure and defined and water markets limited.
- Misallocation, incentives, lack of information on value.
- Current nature of water markets.
- Nature of water rights.
  - Resource.
  - Path dependency fixed quantities not shares.
  - Imbedded in institutions.
- Regulatory constraints—vague concepts, many agencies, public trust.
- Way forward.
Current State of Water Markets

- Very local, limited reported trades—few observations.
  - Sharp price differentials—Truckee Basin $17,685/AF ag to urban, $1,500/AF ag to ag sales; South Platte $6,519/AF for ag to urban; $5,309 ag to ag sales.

<table>
<thead>
<tr>
<th></th>
<th>Agriculture–to–Urban Leases</th>
<th>Agriculture–to–Agriculture Leases</th>
<th>Agriculture–to–Urban Sales</th>
<th>Agriculture–to–Agriculture Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Price</td>
<td>$74</td>
<td>$19</td>
<td>$295</td>
<td>$144</td>
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<tr>
<td>Mean Price</td>
<td>$190</td>
<td>$56</td>
<td>$437</td>
<td>$246</td>
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<tr>
<td>Number of Observations</td>
<td>204</td>
<td>207</td>
<td>1,140</td>
<td>215</td>
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</tbody>
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Welfare gains from shifting water from agriculture to urban: 1% or 3% of current irrigation water and move it to urban, given the existing price difference results in annual welfare gains of about 24% of the current value of the water market.

Water transfers in western states:

**Number of Transfers 12 Western States**

- Ag-to-Ag
- Ag-to-Envir
- Ag-to-Urban
- Grand Total
Trading varies sharply by state—Colorado, Arizona, Texas, California.

California—mostly annual leases.

Colorado—active market in the Colorado Big Thompson Project.

Differences lie in the institutional structure of the state—water rights, water supply institutions, as well as urbanization and aridity.
Water Rights

- Appropriative surface water rights—first possession. Priority.
- Unequal sharing of risk across priority rights holders.
- Give fixed diversion quantities to a highly variable stock. This exacerbates return flow externalities.
- Opposition to trades by low priority parties.
- Wide range of standing to object to trades.
- Groundwater—varies across the states. Mostly open access.
- Most effective—shares versus stocks. Colorado Big Thompson.
- Imbedded in institutions—Irrigation Districts and BOR.
Regulatory Constraints

- Beneficial use, preferential uses—political decisions.
- No injury rule—downstream parties, but also pecuniary injury.
- Multiple agencies, irrigation districts—public irrigation districts—water is a common, not private resource with many heterogeneous interests—land owners, tenants, school district officials, agricultural implement sellers, real estate agents.
- Public interest, public trust—shift toward more central management, just as other resources—fisheries, air quality are shifting more toward RBM.
Concluding Remarks

- Efficiency goals—increasingly valuable resource. Water rights.
- Equity goals—private and public goods provided. Tension.
- Improved allocation; information on alternative uses; incentives for wise use and investment.

Way forward:
- Clarify water rights within water institutions—irrigation districts, Bureau of Reclamation.
- Clarify rights within constraints of actual water quantities.
- Streamline trading options within water basins.
- Define water rights to groundwater and provide for exchange.
- Support trades across basins. Streamline approval process.
- Promote long-term trades and sales.