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Data and Modeling Conflation Issues in Energy and Water Systems

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Data and Modeling Conflation Issues in Energy and Water Systems

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US Energy Sustainability

A critical piece is missing



Data and modeling protocols can facilitate or constitute barriers to integrated Energy-Water planning

- Integrated planning requires a clear understanding of the diversity of stakeholders and their specific data needs.



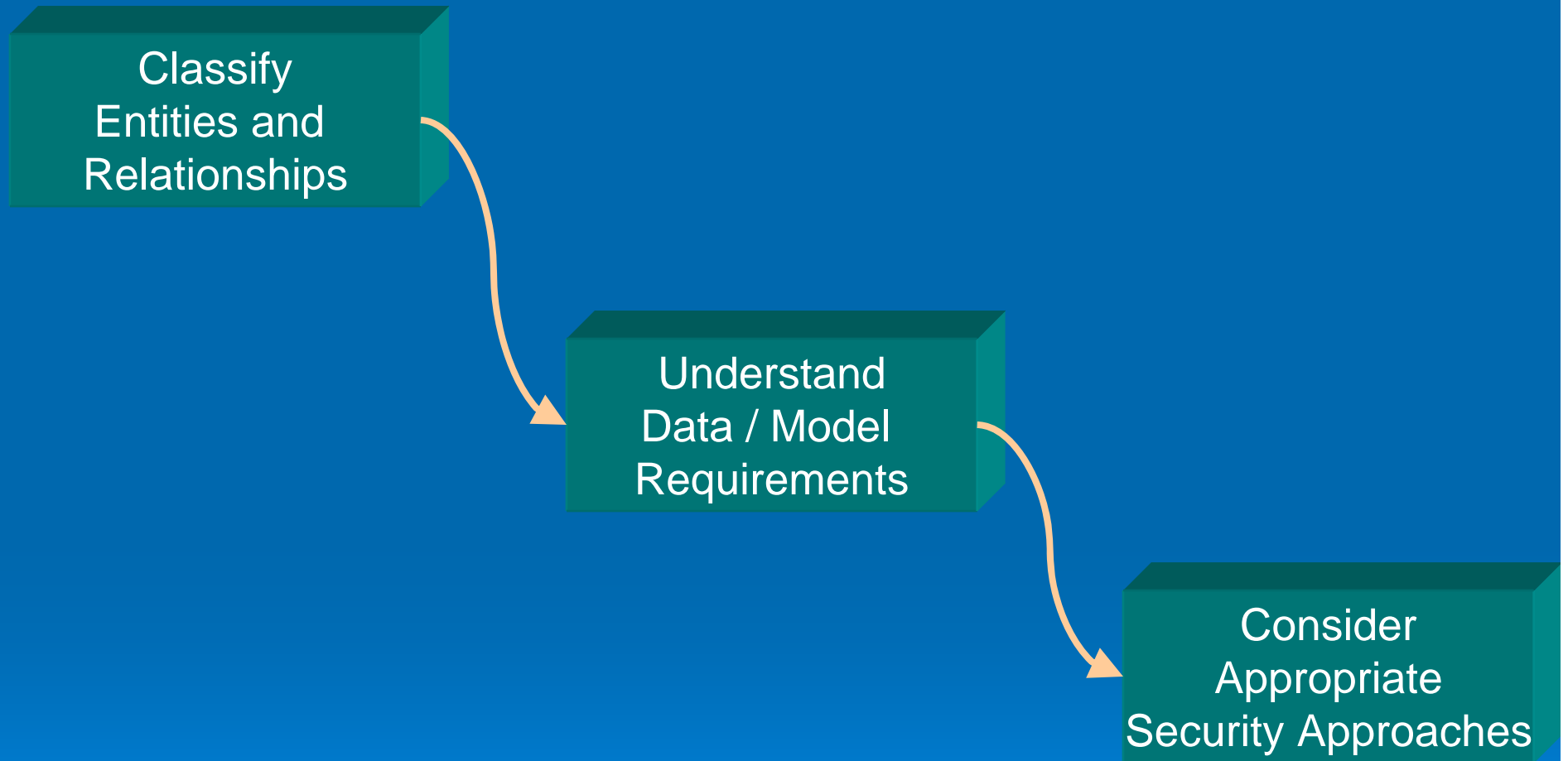
- Specific data sharing approaches need to be tailored to the unique Energy-Water situation.

New Awareness of the Energy-Water Nexus (EWN)

- Integrated Planning within the EWN:
 - Different Communities
 - Different Organizational Models
- Maximizing buy-in:
 - Maintenance of organizational priorities
 - Security of Data and Models

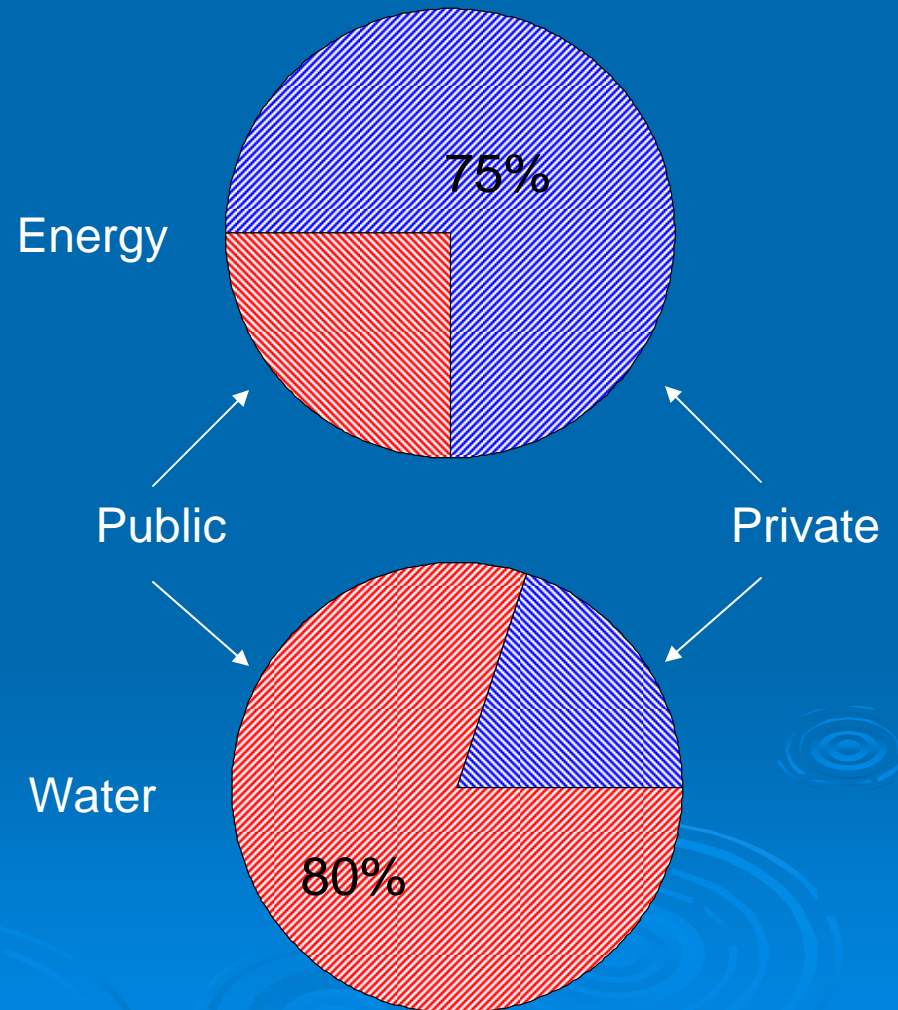


Our Study:

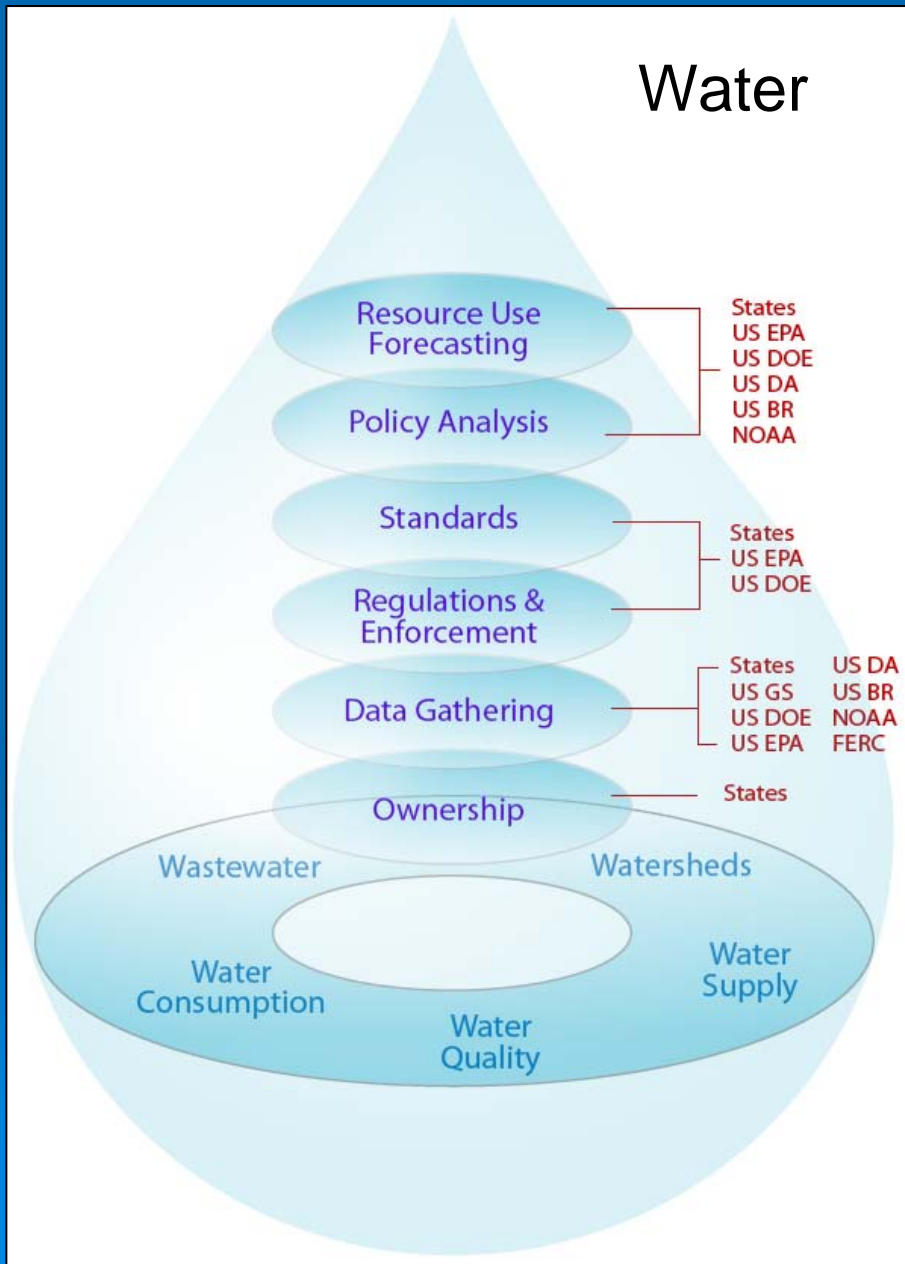


Energy Utilities and Water Providers – A complex world

1. Investor Owned
(and Privately Held)
 - Regulated
 - Unregulated
2. Federally Owned
 - Large-scale
3. Other Publicly Owned
 - State
 - Municipality / Regional
4. Cooperatively Owned
 - Local / Regional (Water)



Diversity of Agencies Involved in Data



Energy

Placeholder for figure from Camilla

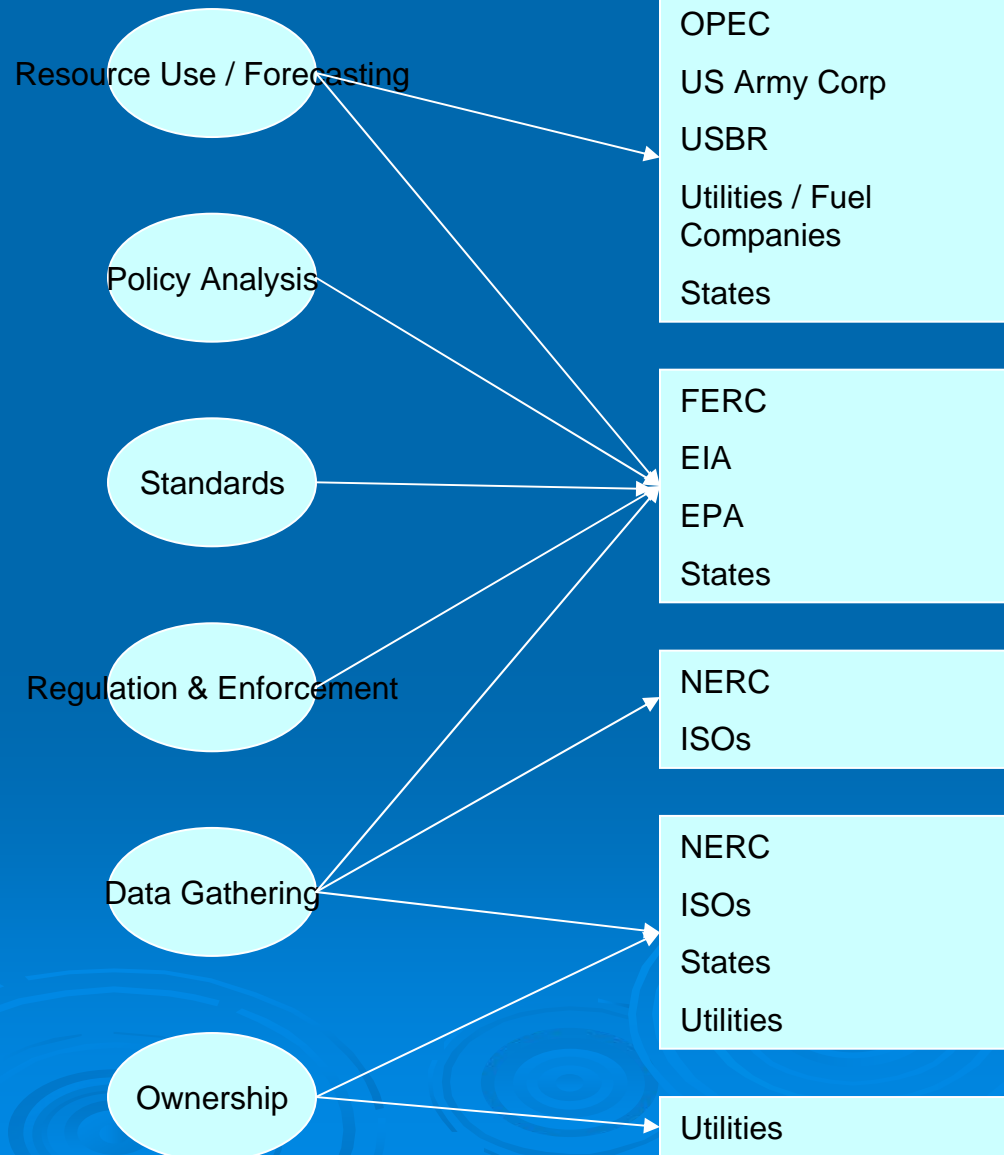
Energy

Supply

- by type
- by time
- by region

Demand

- by sector
- by time
- by region

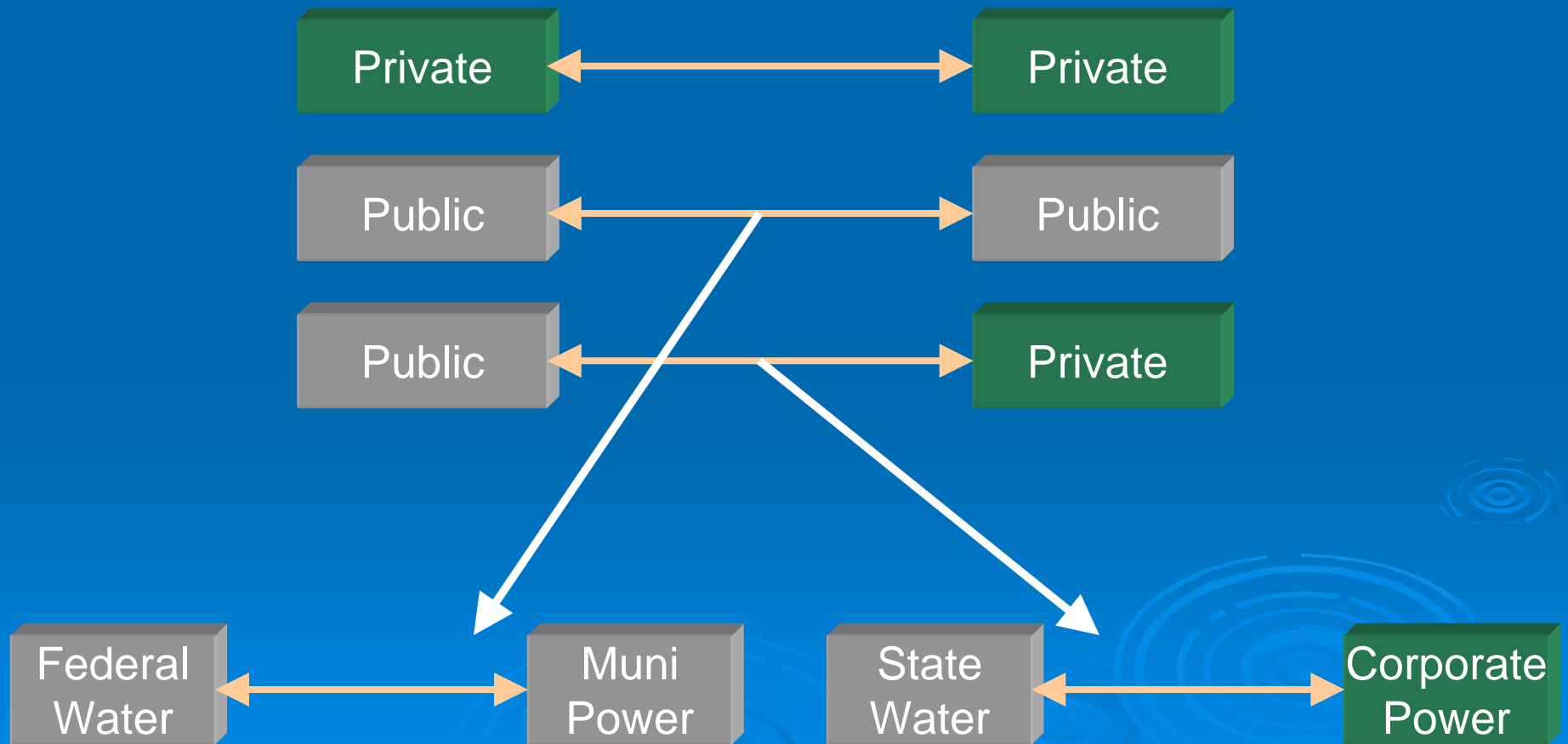


Additional Participants in Planning

- State Utility Commissions
- State Environmental and Coastal Commissions
- Tribal Nations
- NGOs
- Watershed coordinating groups

Relationships in the EWN

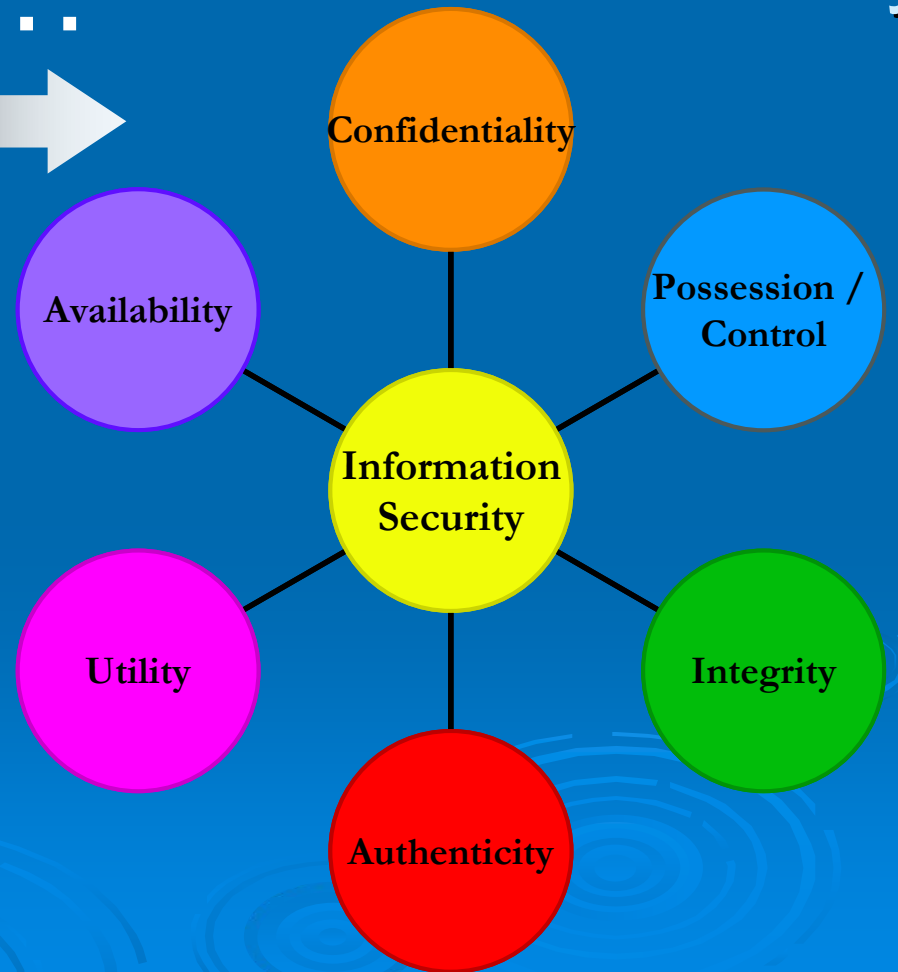
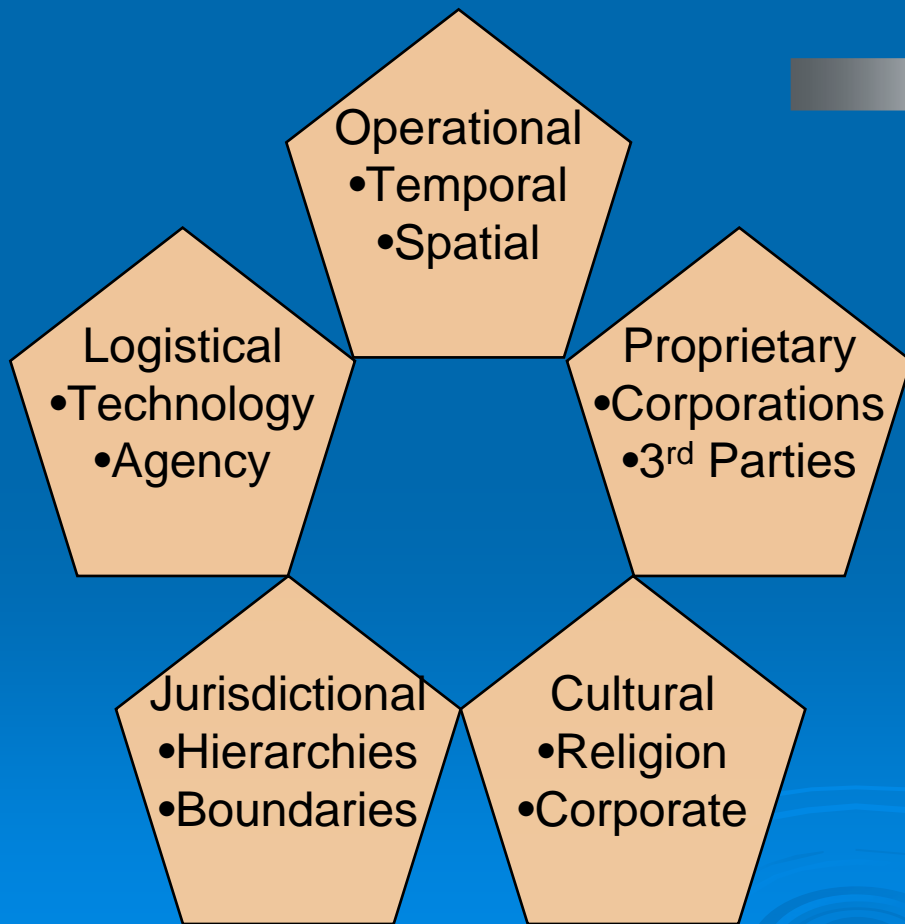
Relationships between participants are shaped by their jurisdictional, organizational, and geographical structures:



We need to translate:

Obstacles to Data
Sharing

to... Components of
Information Security



Lessons Learned from other industries

- US Census
 - Summarization and Generalization
- Intelligence Community
 - Pedigree / provenance of data
- Securities and Exchange Commission (SEC)
 - Secure network protocols (e.g. passwords)
- Department of Defense
 - Stakeholder consensus of standards and methodology *from the beginning*
- Food and Drug Administration
 - Formalization of Data Standards, Confidentiality

Large-Scale Government Relationships

➤ TVA Example

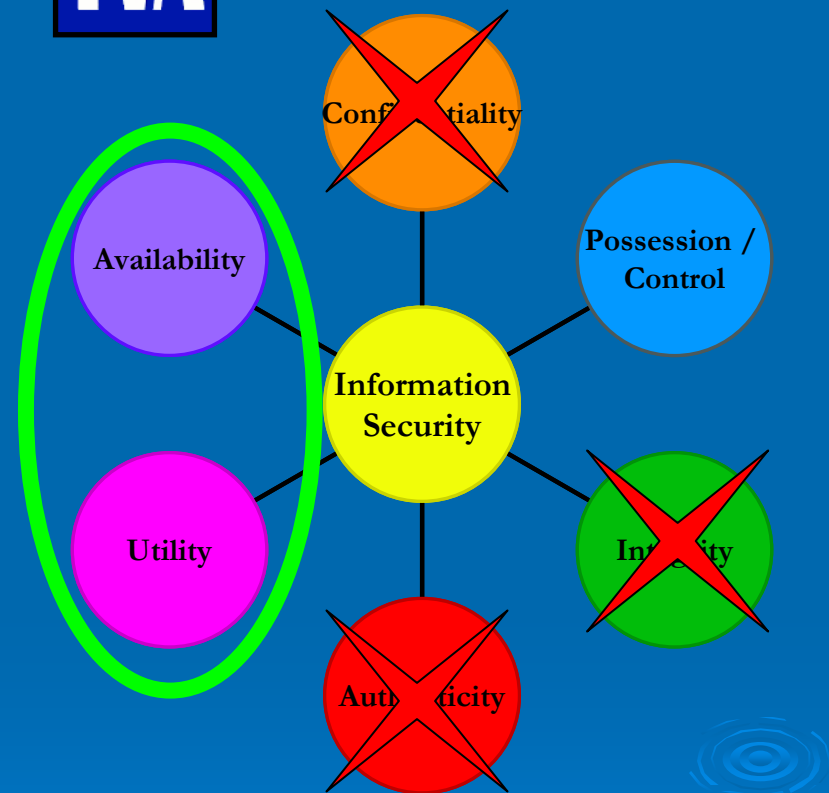
- Nation's largest public power company 170B kWh in 2005
- Hydro (10%), Fossil (62%) & Nuclear (28%)
- 7 states, 158 local distributors, 8.6M people, 48 dams
- TVA : electricity, water quality transportation

➤ Significant Stakeholders

- Bureau of Reclamation, Army Corps of Engineers: dams and locks
- Southeastern Power Administration (SEPA): electricity administration

➤ Potential solutions

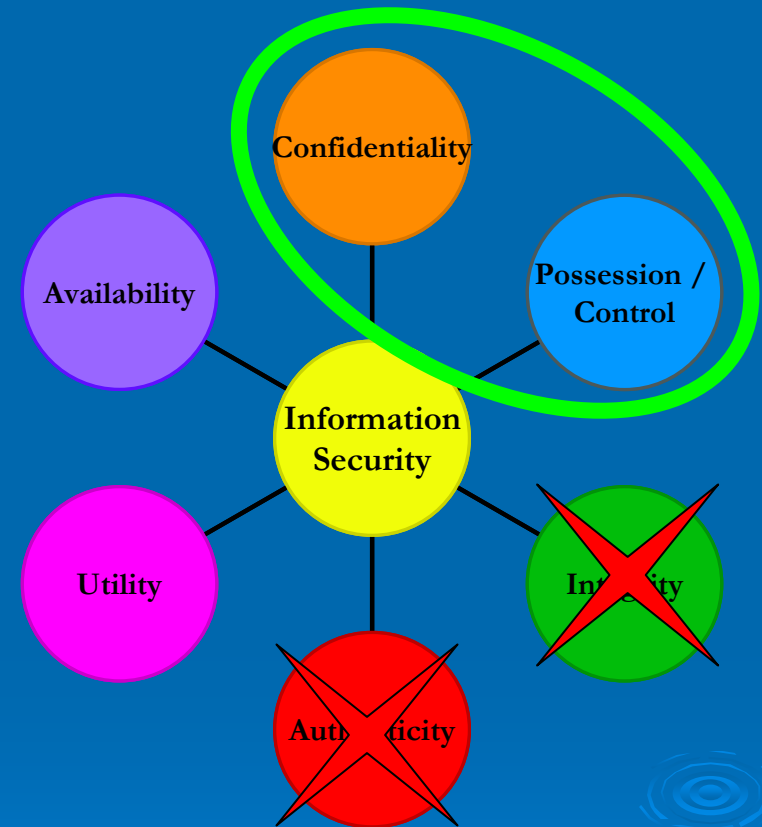
- Open, top-down data administration
- Leverage current infrastructure



Grass-roots Relationships

➤ The Laramie River Station

- Cooperatively owned
- Feeds both E & W Interconnect
- 2004 drought necessitated purchase of water from 35 local wells



➤ Potential Solutions

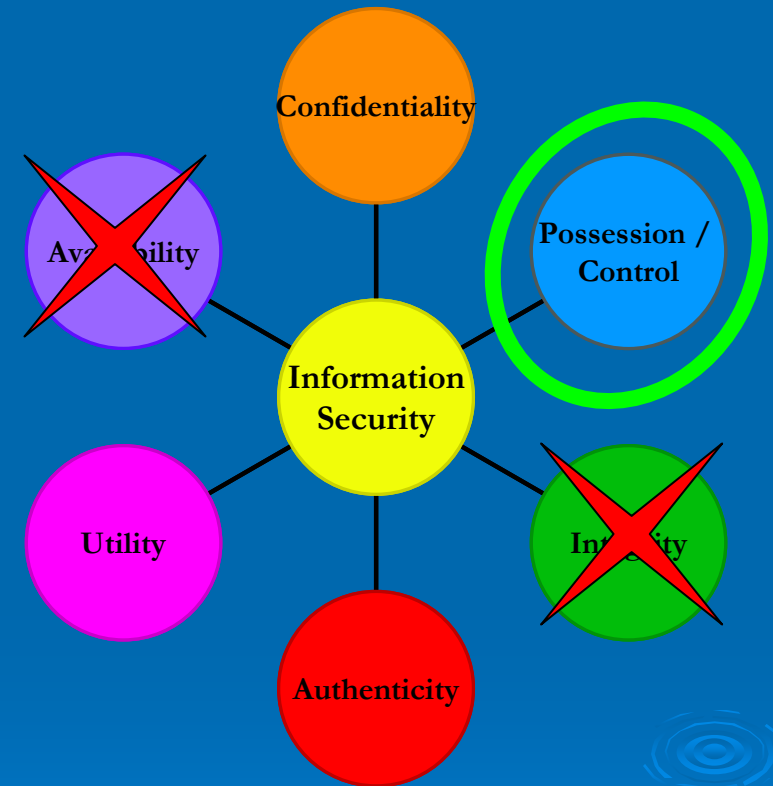
- Peer-to-peer network
- Guidelines and standards-based methodologies for data generalization
- Protection of proprietary nature of data

Third-party / Consultants



➤ New York City

- NYC's "PlaNYC" 2030
 - Water & Power among "Top 10 Goals"
 - Increase Population
 - NYState Reliability Council : 80% of power has to come from inside city
- NYPA (State) owns small-scale gas
- ConEdison Distribution
- Consulting companies vs. City Agencies



➤ Potential Solutions

- City takes ownership
- Partner with State and consulting companies
- Centralized control
- Licenses data, use



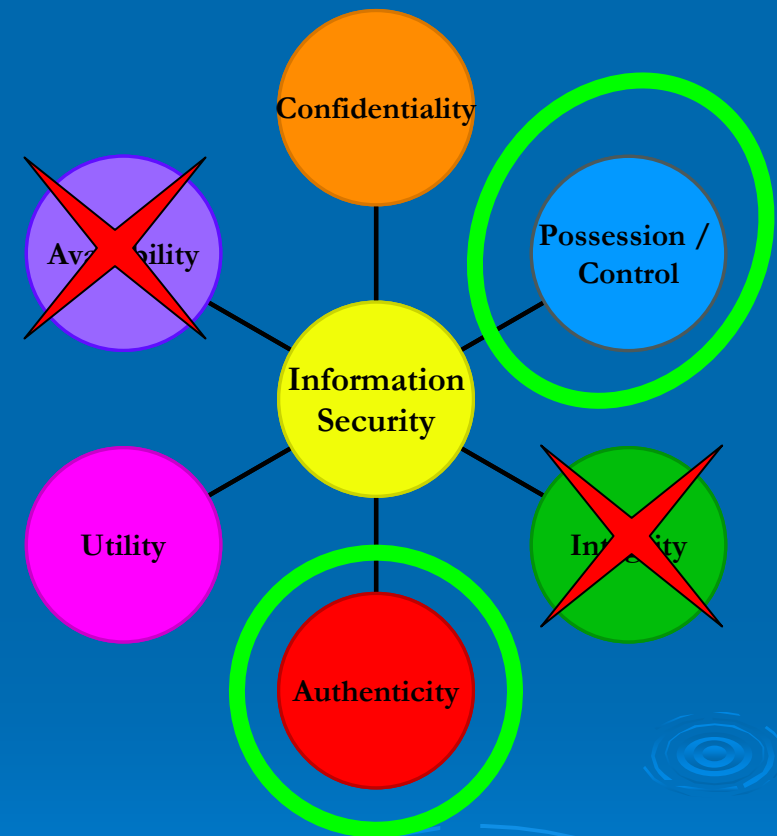
Tribal Nations

➤ Black Mesa, Peabody Coal Mojave Generating Station

- 1971-1995 Coal sluiced 275 miles to Laughlin, NV
- Hopi: “Water is Sacred”
- Inequity of electric distribution
- History of distrust with Peabody, USA
- Lack of Energy or Water representation in Tribes

➤ Potential Solutions

- Acknowledge cultural differences
- Clarity about ownership of resources
- Shared control between tribes
- Data transfer as currency
- Data Library (check in- check out)
- Secured network with distributed and documented control



Conclusions

- Successful relationships are necessary in order to facilitate integrated planning
- Matching security needs for data necessitates understanding:
 - Relationships
 - Data needs
 - Cultural context

We welcome input!

Examples and experiences of data sharing between Energy & Water stakeholders

- Case Studies
- Solutions
- Lessons Learned

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