Welcome
to
Princeton Water Innovation Summit

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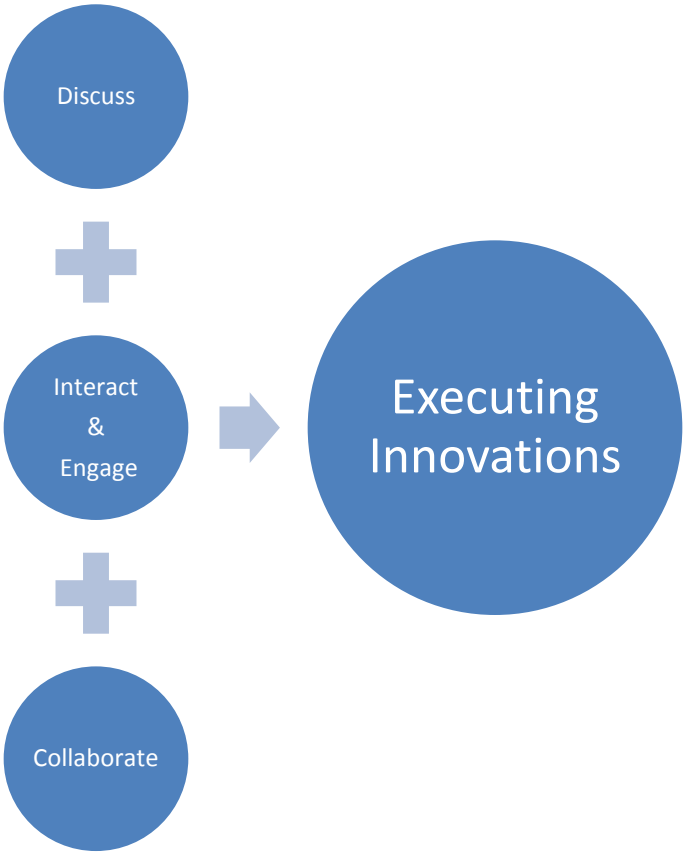
Why are we here & What we hope to accomplish ?

- Discuss
  - Water challenges in the infrastructure, energy, industrial sectors.
  - Review best practices that have been successfully implemented
  - Identify areas of opportunities for innovation and growth
- Interact & Engage
  - With like minded water leaders from industry, scientific & financial sectors
- Collaborate
  - Among the industrial participants, scientists to drive innovation and accelerate implementation of ideas



Water Infrastructure

- Aging & Failing
- Investments needed Globally > 1 Trillion; Lack of Funds
- Adoption rate of new technologies – Slow
- Risk Averse – Comfortable with status quo
- Decisions – Slow and cycle time long
- Actual Treatment capital investment less than 50% of the overall investment




NEED NEW IDEAS, APPROACH, and REINVENTION

Energy Requirement for Water Supply & Treatment

- Moving Water takes more energy than treatment
- Is onsite treatment and safe reuse a viable option ?
  - Challenges
  - Regulatory & Economical barriers
  - Cultural & Social Barriers
- Current Best Practices

Table III-1. Energy Requirements for Water Supply and Treatment in California (CEC, 2005)

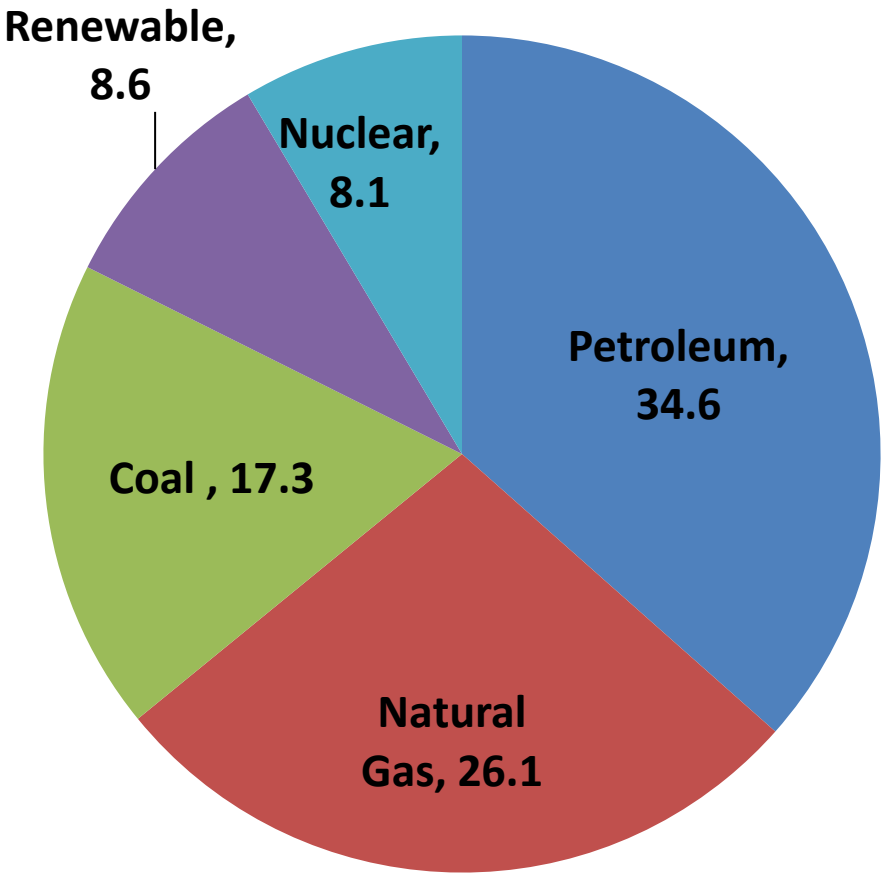
	kWh/Million gallons	
Water Cycle Segments	**Low**	**High**
Supply and Conveyance	0	16,000
Treatment	100	1,500
Distribution	700	1,200
Wastewater Collection and Treatment	1,100	4,600
Wastewater Discharge	0	400
TOTAL	**1,900**	**23,700**
Recycled Water Treatment and Distribution for Non-potable Uses	400	1,200

(*) Sandia National Labs Report to Congress 2010

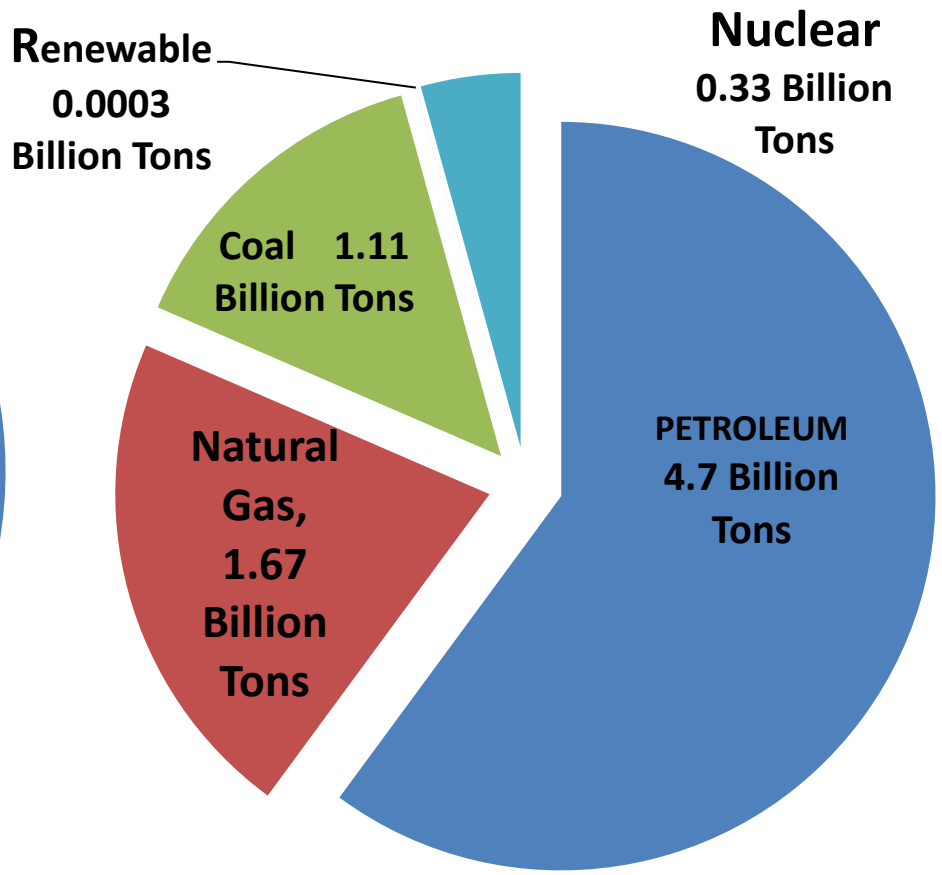
Water

Energy

Annual Energy & Water Consumption by Energy Source in USA



Energy in Quadrillion BTU



Water Usage in Tons

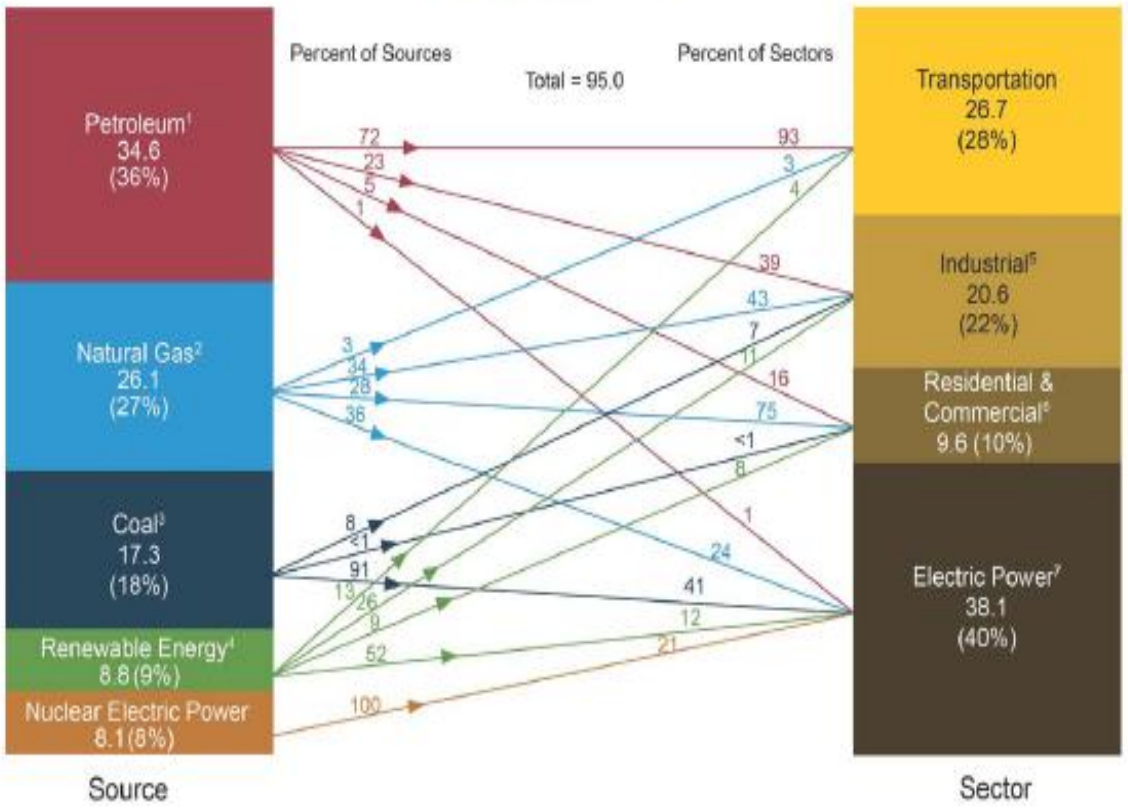
Energy - Water

8-68 gallons/ MMBTU

2-32 Gallons/ MMBTU

2-32 gallons/ MMBTU

780 Gal/Mwh



Reduction & Reuse

Cooling

[1] Does not include biofuels that have been blended with petroleum—biofuels are included in "Renewable Energy."
[2] Excludes supplemental gaseous fuels.
[3] Includes less than 0.1 quadrillion Btu of coal coke net imports.
[4] Conventional hydroelectric power, geothermal, solar/photovoltaic, wind, and biomass.
[5] Includes industrial combined-heat-and-power (CHP) and industrial electricity-only plants.
[6] Includes commercial combined-heat-and-power (CHP) and commercial electricity-only plants.
[7] Electricity-only and combined-heat-and-power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes 0.2 quadrillion Btu of electricity net imports not shown under "Source."

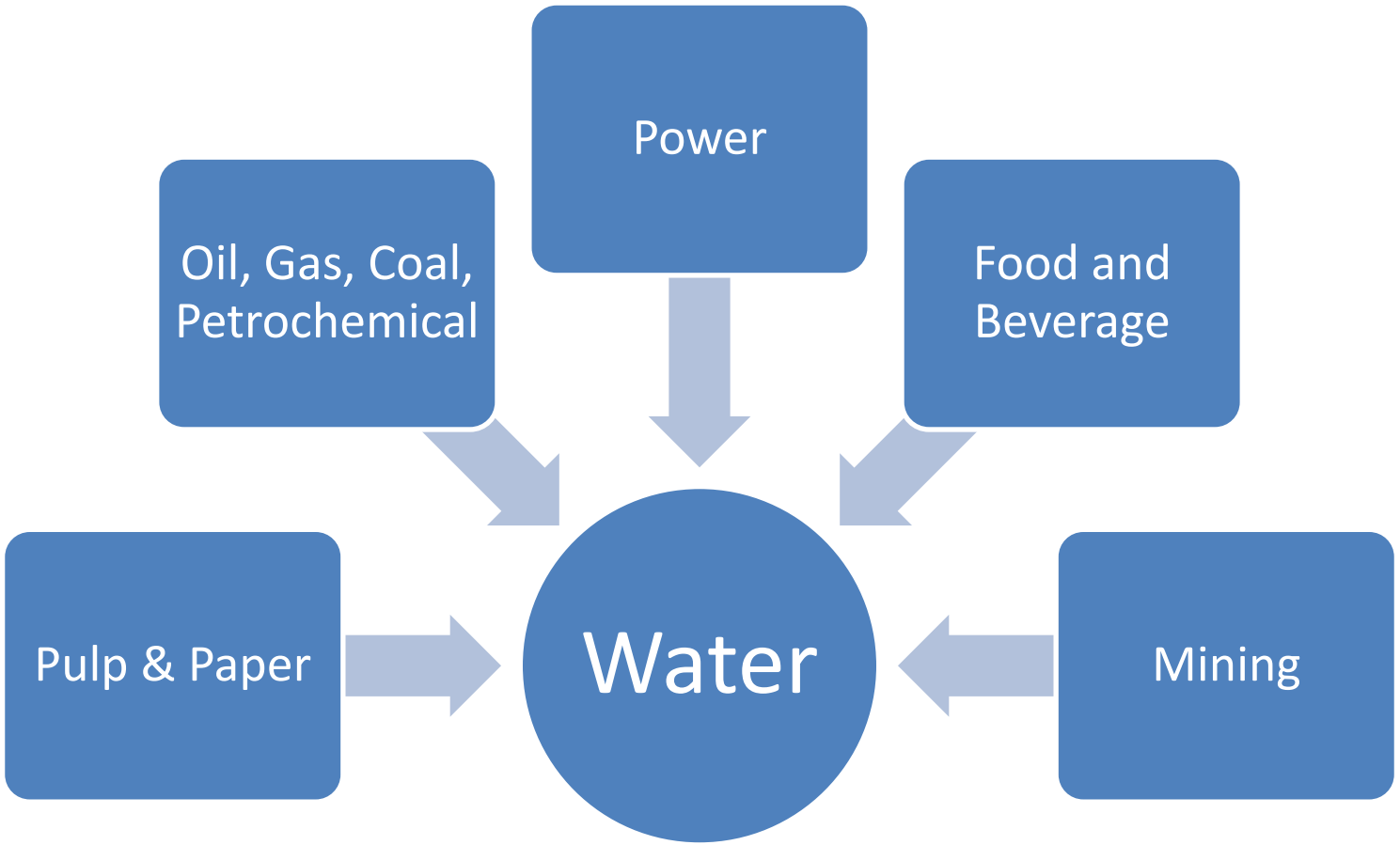
Notes: Primary energy in the form that it is first accounted for in a statistical energy balance, before any transformation to secondary or tertiary forms of energy (for example, coal is used to generate electricity). • Sum of components may not equal total due to independent rounding.

Sources: U.S. Energy Information Administration, *Monthly Energy Review* (January 2014), Tables 1.3, 2.1-2.6.

INDUSTRIAL WATER

FACTORS DRIVING SUSTAINABLE REUSE

Water Consumption by Industries



REDUCE & REUSE

Some of the Companies Represented