Resource Planning

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SOUTHWEST GAS CORPORATION

The Perfect Storm is Gathering in Arizona

- Explosive population growth
- Huge and escalating power needs
- Decreasing water supply
- Using Arizona’s resources to benefit other states

Considerations for Resource Planning

- Energy Supply/Infrastructure
- Water
- Environment/Natural Resources
- Human Impacts
- Energy Future

Supply/Infrastructure

- Southwest Gas is the voice of experience on natural gas
- Common statements expressed by some Arizonans:
  - *“Everyone knows there’s an insufficient supply of natural gas in North America.”*
  - *“We don’t have enough natural gas for both generation and heating homes.”*
  - *“Natural gas supply should be freed up to generate more electricity.”*

“Everyone knows there’s an insufficient supply of natural gas.”

- **FACT:** Most natural resources are in finite supply and therefore must be used prudently.
- **FACT:** The issue is how natural gas supply is being used.

"Everyone knows there's an insufficient supply of natural gas."

- **FACT:** Over 90% of the 200,000 MW of new power capacity added in North America since 2000 is fueled by natural gas.
- **FACT:** Lack of resource planning for natural gas-fired power plants may impact power supply reliability if firm gas capacity is not obtained.

"Everyone knows there's an insufficient supply of natural gas."

- **FACT:** The new Energy Policy Act of 2005 provides incentives for increasing natural gas production and supply.

“We don’t have enough natural gas for both generation and heating homes.”

- **FACT:** Southwest Gas has adequate gas available for present and future customers, due to good supply planning and securing firm capacity on pipelines.

"We don't have enough natural gas for both generation and heating homes."

- **FACT:** New natural gas power plants in Arizona must consider natural gas supply and capacity requirements.
  - All new power plants built in Arizona since 2000 use natural gas
  - One 1060 MW power plant alone uses more natural gas annually than all of SWG's residential Arizona customers

"Natural gas supply should be freed up to generate more electricity."

- **FACT:** Using natural gas to generate electricity is not always the best way to use this precious resource.
- **FACT:** Electricity is inherently less efficient than natural gas. Power plants are only 28-55% efficient.
  - Generation losses
  - Transmission losses

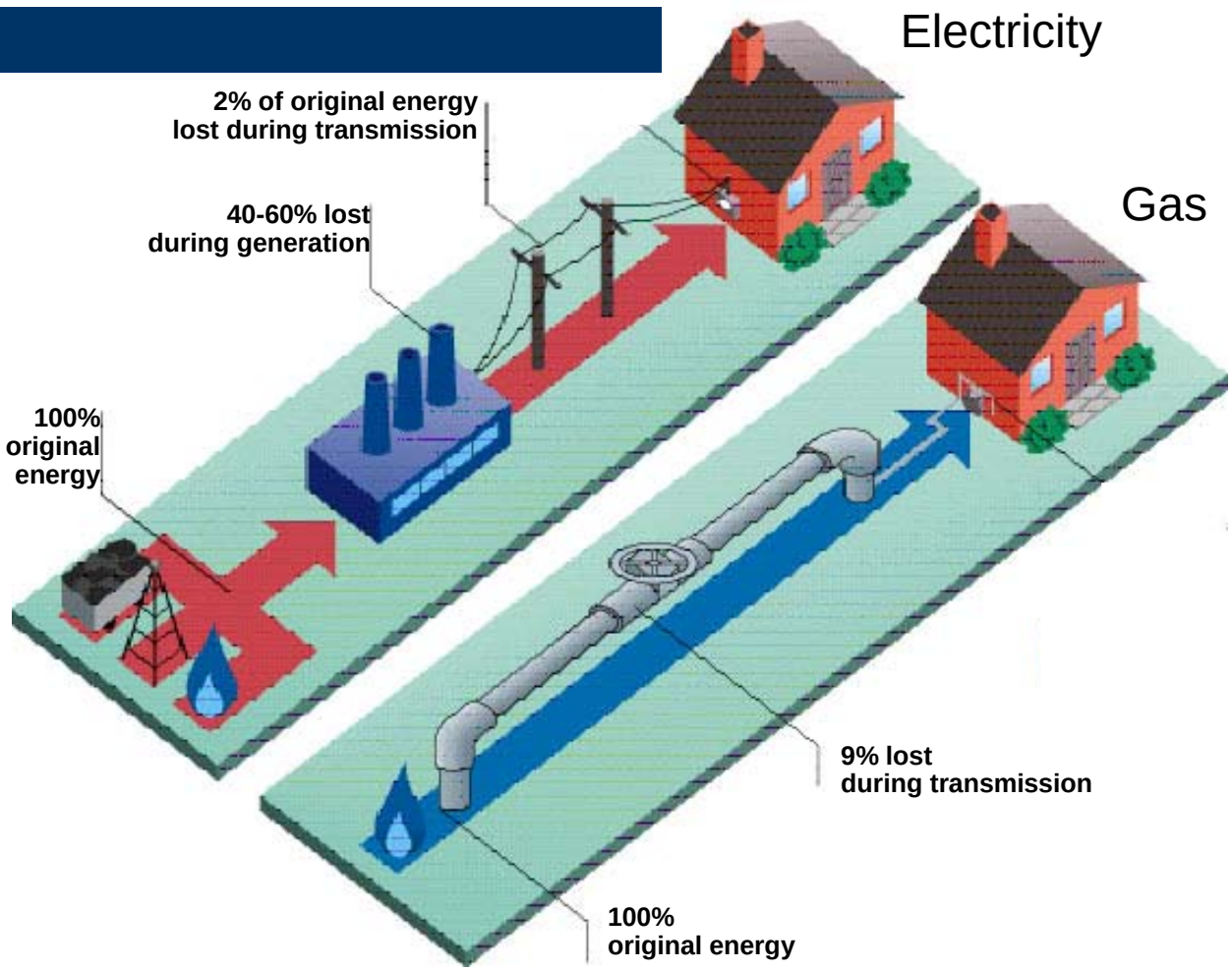
“Natural gas supply should be freed up to generate more electricity.”

- **FACT:** Natural gas production and delivery are 90% efficient.

Why use a more efficient form of energy to produce a less efficient form of energy?

Total Energy Efficiency

- Measuring energy used throughout entire fuel cycle to better meet goals of energy efficiency



Total Energy Efficiency

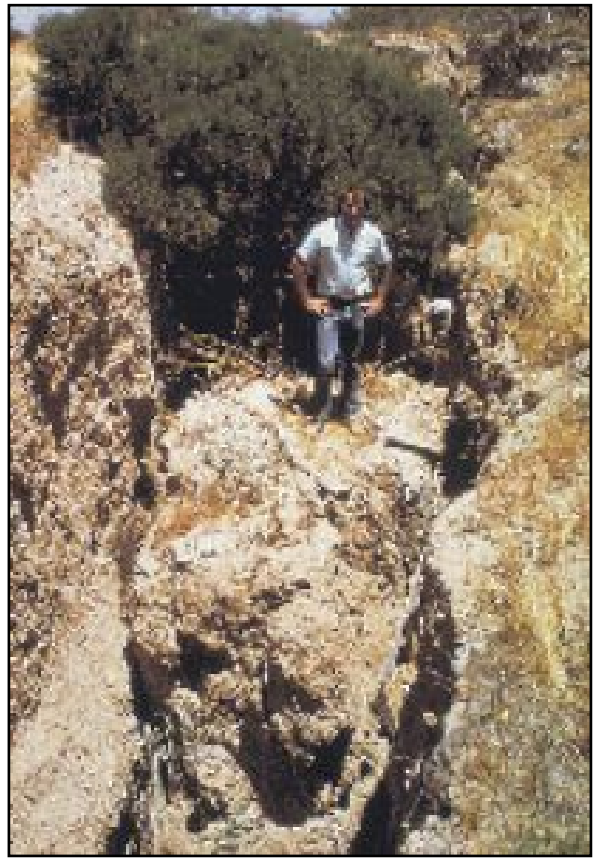
- Energy Policy Act of 2005 calls on National Academy of Sciences to study whether goals of energy efficiency are best served by measuring energy at the point of use or over the entire fuel cycle

Water

- One power plant can use as much water (2.5 billion gallons) in one year as 40,000 Arizona residents

Water

- Power plants can deplete the water table
- Can contribute to land subsidence



Some of the most spectacular examples of subsidence-related earth fissures occur in south-central Arizona.

USGS Fact Sheet-165-00
December 2000

S.R. Anderson/U.S. Geological Survey

Sign warning motorists of subsidence hazard was erected after an earth fissure damaged Snyder Hill Road in Pima County, Arizona, 1981.

Environment/Natural Resources

- Merchant plants are using Arizona's resources
  - But sell much of their power outside Arizona
  - Air quality degradation
  - Exporting power/importing problems

Human Impacts

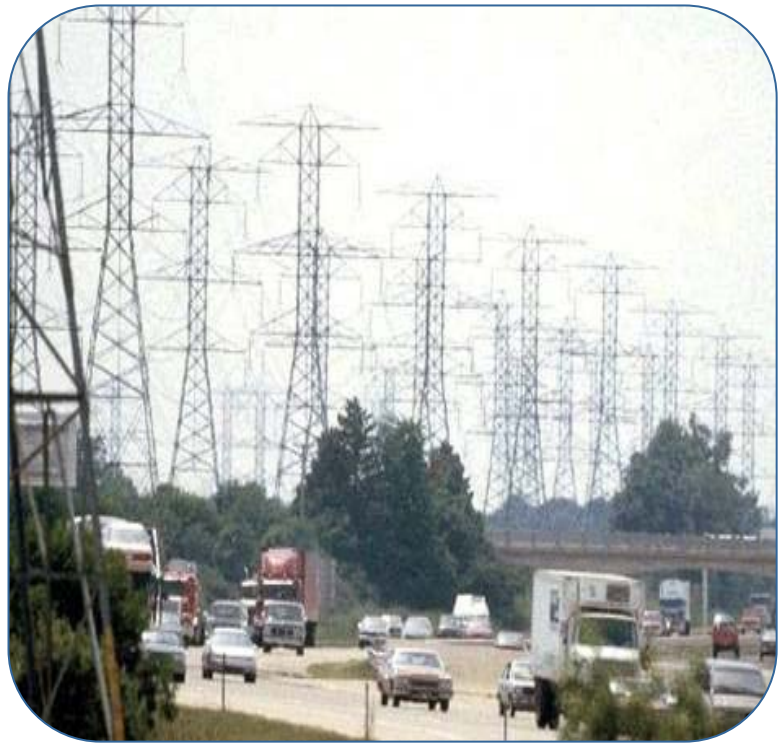
- Health impacts

"…fine particle pollution from power plants shortens the lives of 75 Arizonans each year… causes 10,971 lost work days, 56 hospitalizations and 1,960 asthma attacks every year…."

U.S. Environmental Protection Agency

Human Impacts

- Siting issues
  - NIMBY syndrome



Human Impacts

- Preserve consumer energy choice
  - Keep enough natural gas available for residents and businesses, rather than using it to generate electricity

Energy Future

- Wisdom, foresight, and decisiveness now will ensure energy reliability for the future
  - Energy efficiency and conservation are the best short-term strategies

Energy Future

- Resource planning should include distributed generation and CHP
  - Readily available
  - Economical
  - More energy efficient (75% vs. 28-55% for conventional generation)
  - U of A has a large (14-16 MW) installation
  - ASU project: 8 MW by April 2006
    - May increase to 16 MW in three years
  - CHP/DG targets should be set

Energy Future

- Natural gas can buy time for the development of economically feasible renewables

Energy Future

- Arizona has the ability to use renewable wind and solar energy sources
  - But not yet economically viable for wide-scale use
- Environmental pragmatism
  - Balancing good public policies with the realities of the marketplace

Summary

- Recommendations for Resource Planning
  - Consider total energy efficiency and resource optimization first, to reduce the need for additional power plants and the use of associated natural resources
  - Require natural gas-fired power plants in Arizona to secure firm capacity on natural gas pipelines

Summary

- Recommendations for Resource Planning
  - Account for water usage and the impacts on the water supply in resource planning
  - Include a full accounting of the environmental and human impacts during the approval process for power plants

Summary

- Recommendations for Resource Planning
  - Make the right decisions to preserve Arizona's energy future


The perfect storm is coming.