# *Planning for the Future*

## Energy Management in a Changing World

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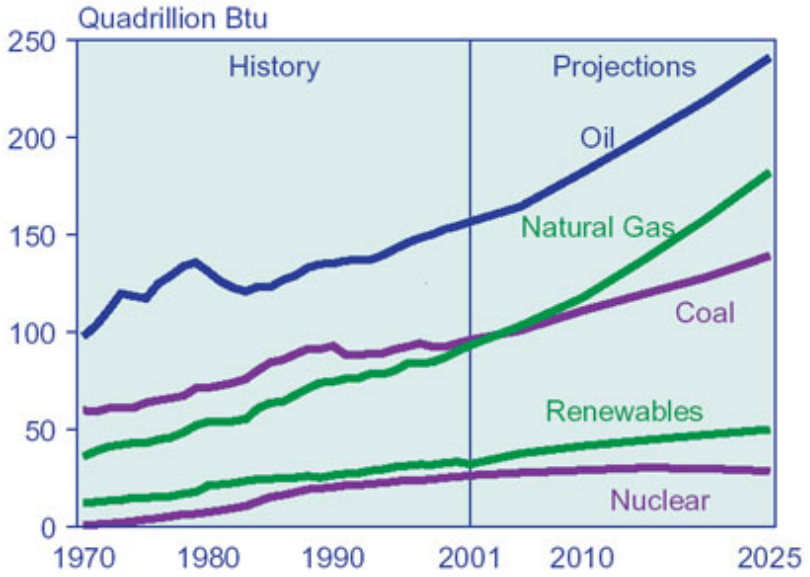
# Planning for the Future

- The changing world and other drivers for effective planning.
- Comprehensive energy planning.
- Putting the plan together.
- Adapting to change and new issues.

# The Changing World

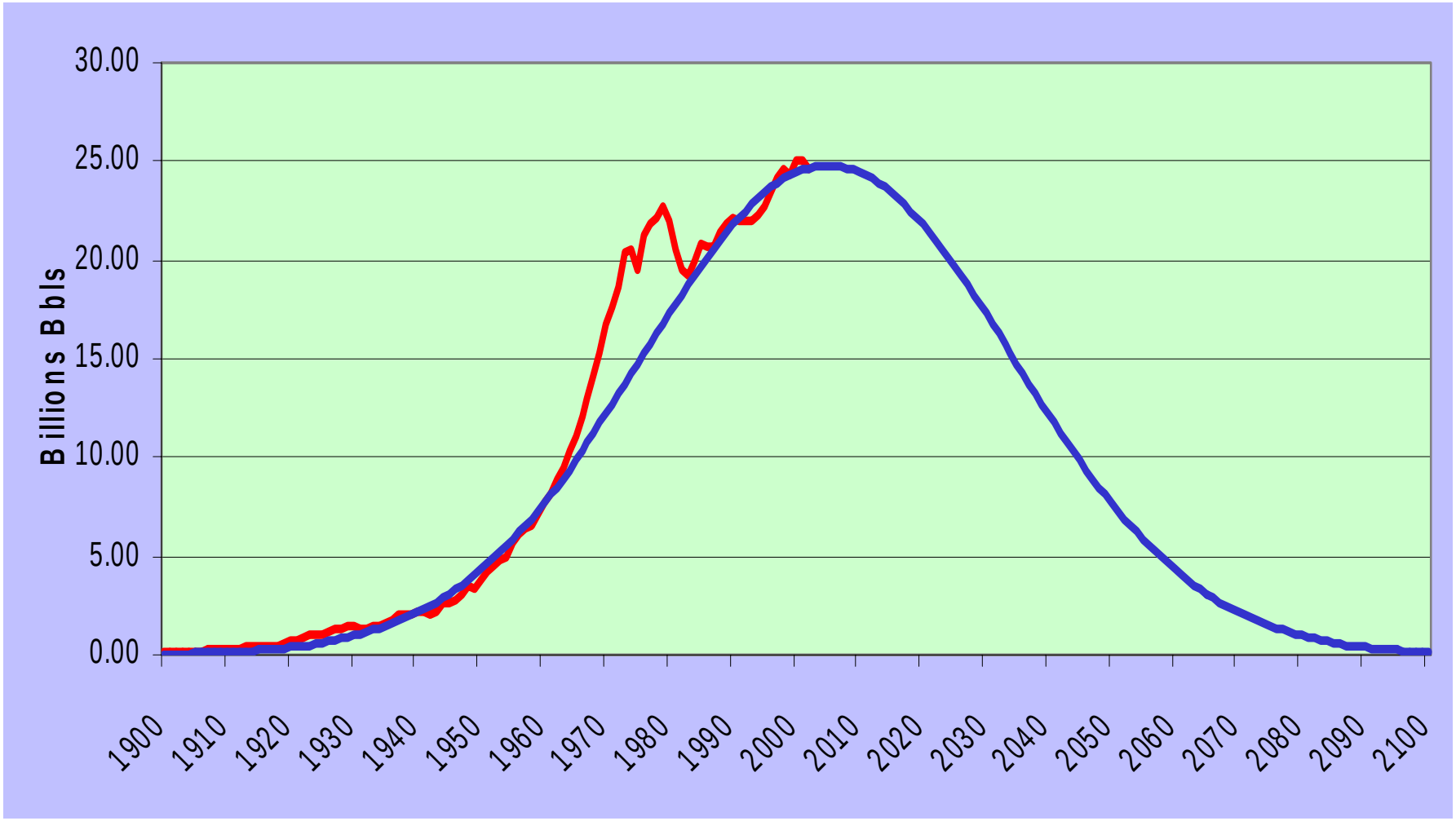
- Current world energy situation and prognosis.
- EIA projections are interesting but not reality.
- Petroleum and Natural Gas

**Figure 7. World Energy Consumption by Energy Source, 1970-2025**



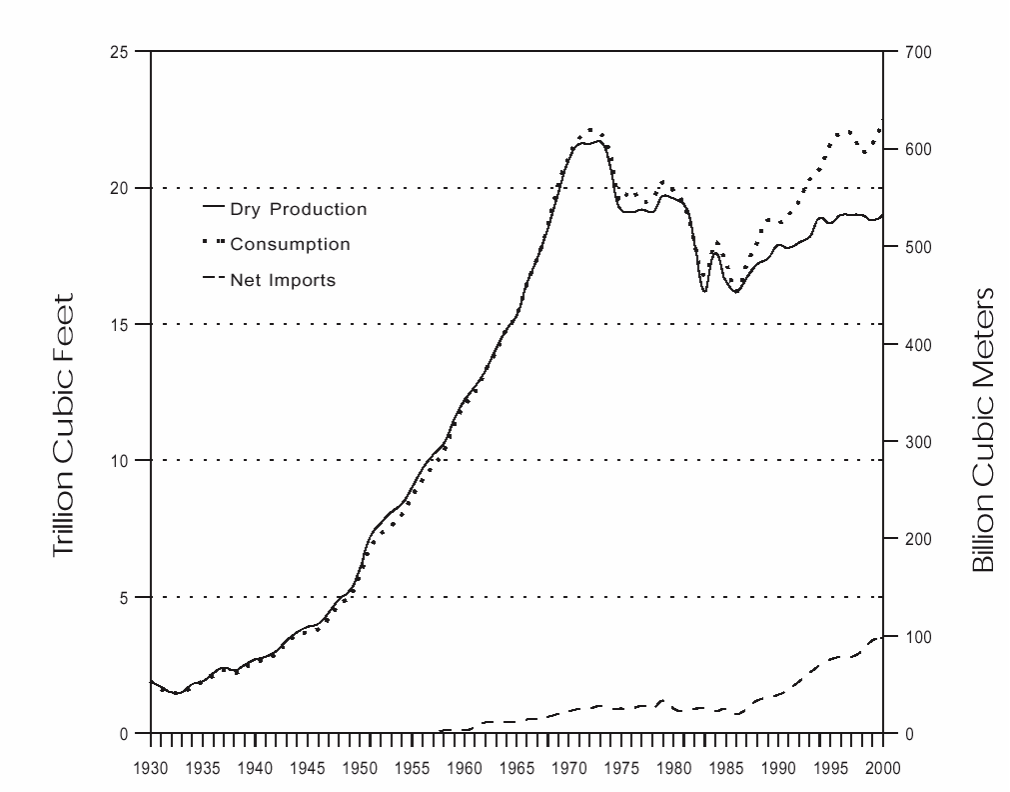

Sources: **History:** Energy Information Administration (EIA), *International Energy Annual 2001*, DOE/EIA-0219(2001) (Washington, DC, February 2003), web site www.eia.doe.gov/iea/. **Projections:** EIA, System for the Analysis of Global Energy Markets (2003).

# World Crude Oil Supply up to Present Year



# Domestic Natural Gas Production

- Natural gas is an abundant resource, just not where we have access or pipelines.
- US Natural gas production has plateaued and trending downward.
- We now import to make up for our increases in consumption.
- Price volatility is high and will continue to be so.



# The Changing World

- So what's left:
  - Coal is abundant, but has significant problems.
  - Wind is the fastest growing energy source.
  - PV is next.
  - Efficiency and conservation are the best bet.
- Whatever the future will bring, it is not what we are expecting.

# Other Drivers for Energy Planning

- New Energy Policy Act?
- Energy security – systems and sources.
- Sustainability and productivity issues
- Lack of in-house funds and resources.
- Energy market transformation.
- Energy technology revolution.

*Comprehensive approaches required.*

# Other Drivers for Energy Planning

- New Energy Policy Act?
  - Significant new goals are coming.
  - New baseline year for Feds.
  - 2 percent per year reduction requirements.
- Energy security – systems and sources.
- Sustainability and productivity issues
- Lack of in-house funds and resources.
- Energy market transformation.
- Energy technology revolution.

# Other Drivers for Energy Planning

- New Energy Policy Act?
- Energy security – systems and sources.
  - Hardening of systems.
  - Ensuring sources:
    - Dual fuel
    - Storage
    - Renewables
    - Efficiency
- Sustainability and productivity issues
- Lack of in-house funds and resources.
- Energy market transformation.
- Energy technology revolution.

# Other Drivers for Energy Planning

- New Energy Policy Act?
- Energy security – systems and sources.
- Sustainability and productivity issues:
  - Sustainability of the built and natural environments is the enduring issue for the 21st century -- Greening of the Government Executive Orders (4)
  - Sustainable development requires a new paradigm for installation planning and land use.
  - Productivity of workers is paramount.
- Lack of in-house funds and resources.
- Energy market transformation.
- Energy technology revolution.

# Other Drivers for Energy Planning

- New Energy Policy Act?
- Energy security – systems and sources.
- Sustainability and productivity issues.
- Lack of in-house funds and resources:
  - Consider all funding sources such as ESPC, UESC, public benefit funds, grants, etc.
  - Truly consider contractors as partners as your success depends on their success.
- Energy market transformation.
- Energy technology revolution.

# Energy Market Transformation

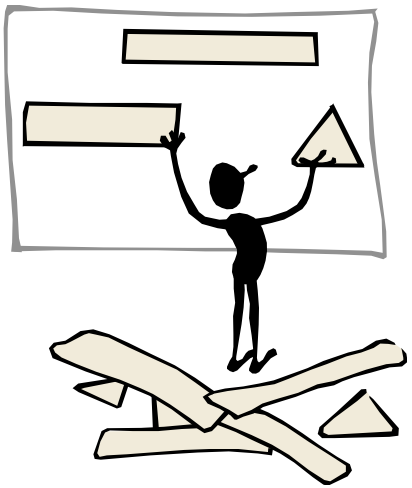
- True competition in electricity will begin in earnest in 4-8 years after deregulation (state dependent) and all this will take longer to play out than expected.
- Once true competition comes, so do changes:
  - Large customers may go with nation-wide contracts.
  - Drop in electrical prices may not be realized.
  - The genie cannot be put back in the bottle – this will continue.
- Change and mergers will continue to dominate.
- Integrated resource planning will return and installations and campuses are a viable market for cogeneration and distributed generation.

# Technology Revolution

- Renewables now competitive:
  - Wind
  - Solar Thermal
  - Geothermal Heat Pumps
  - Micro climate/heat island amelioration
  - Others coming (PV)
- Distributed generation
  - Microturbines
  - Fuel Cells
  - Co- and Tri-generation

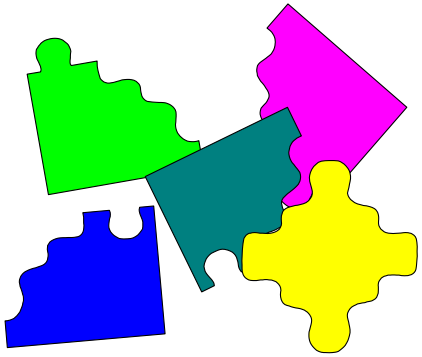
*A 25 kW Solar-Driven Engine at Salt River Project (AZ) which uses landfill gas to power engine at sundown. June 2003. Courtesy of www.stmpower.com*

# Opportunities for the 21st Century



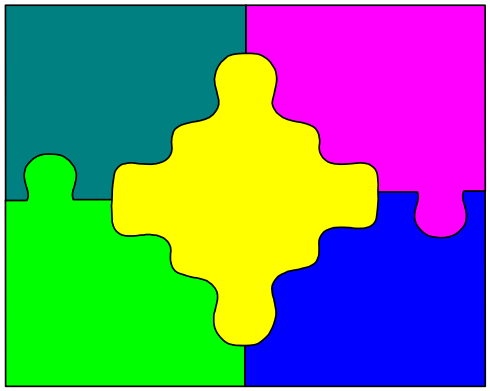
- Enduring issues:
  - Lack of project money and resources.
  - Existing buildings and internal systems.
  - Legacy utilities and central energy plants.
  - Energy security and resources.
- Technology Infusion (what's here, what's coming).
- Sustainability of the built environment:
  - Smart growth
  - Green buildings.

# Comprehensive Energy Planning



- Must take a holistic approach - new security and environmental emphases.
- Must incorporate many options and programs to get the job done (goals, metering, security, technology, privatization, & market transformation).
- Must pick an optimum path without stepping into pitfalls while balancing supply and demand issues.
- Must instill vision and discipline into the energy management process - holistic with overall installation/facility management (master planning, natural resources, heat islands, & new construction).

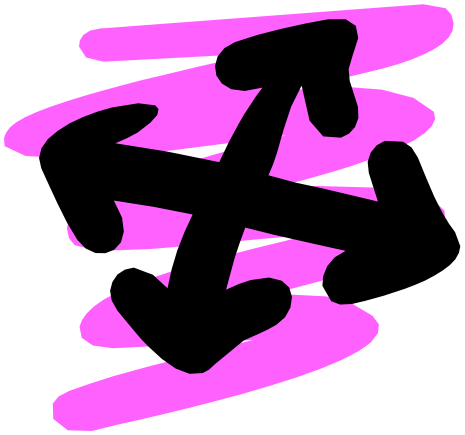
# Planning Process



- 10 year planning horizon.
- Review past efforts and progress.
- Determine current guidance and practices.
- Define goals and desired end state.
- Apply tools and determine technical opportunities based on technologies and analysis models.
- Define fiscal options, economic evaluations, and optimize strategy (outsourcing versus in-house).
- Develop implementation plan and M&V approach.
- Follow-up and periodically revise plan as needed.

# Adapting to New Issues

- Change happens.
- It won't be what we expect and it isn't always pleasant.
- Think of your plan as a set of building blocks that can be rearranged and adapted as new situations and criteria arise:
  - Drop some.
  - Tweak some.
  - Change time frames.



# Final Thoughts

- Measure your progress and periodically assess the plan's reality to the current situation.
- Keep your end-state in mind and reconsider funding and resources each year.
- Plan your energy purchases in increments and work with volume buy organizations such as DESC.
- Always be aware of the bigger picture and how your plan fits into it.