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**New Coal Plant Development**

Presented by

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THE LAW OUT WEST



# Background

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- 50% of electric power in the U.S. is generated with coal, 19% with natural gas
- In the 1990s, natural gas generation grew at a rapid rate and few new coal plants were built
  - Low capital cost, shorter construction time, lower air emissions, low natural gas prices
- Since 2000, the price of natural gas has risen and become volatile.
- Without the Alaska gas pipeline or LNG imports, domestic natural gas supply will not meet demand

# Background

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- As a result, there is a resurgence of new coal-fired power plants
  - 159 new plants are in the works—planning stage, permit applications pending, permits issued, construction or operations commenced
  - However, there is intense opposition to new coal plants, especially conventional pulverized coal steam boilers

# Opposition to New Coal Plants

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- Opposition is based largely on air quality concerns
  - State-of-the-art coal plants meet strict emission limits and emit far less sulfur dioxide, nitrogen oxides, particulate matter and mercury than older coal plants
  - However, natural gas turbines emit less of these pollutants than new coal plants
- To be permitted and built, new coal plants must meet both technology-based and health-based emission limits and not impair visibility in Class I areas

# Opposition to New Coal Plants

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- Even so, pressure has built to meet growing demand for electricity with non-polluting renewables (wind, solar) and with conservation/demand-side management
  - Tax credits and Renewable Portfolio Standards provide motive and incentive to expand renewable capacity

# Opposition to New Coal Plants

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- EIA forecasts a 60% increase in nonhydroelectric renewables by 2030, but the share of the generation portfolio would remain small, going from 2.3% to 3.6% of total generation.
- National Commission on Energy Policy states it is a myth that “energy independence can be readily achieved through conservation measures and renewable sources alone.”

## Baseload Power and Coal

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- Wind and solar are more expensive and intermittent resources, and do not meet baseload needs
- Most electricity will continue to be generated from fossil fuels
- EIA forecasts that most capacity additions in next 10 years will be natural gas-fired plants,
- But, coal generation will increase to 57% of total generation by 2030 with natural gas declining to 16%.

## Baseload Power and Coal

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- Forecasts are based on assumptions. If assumptions change (economic growth, fuel prices, advances in technology, changes in weather patterns, public policy, legislation) forecasts are subject to change
- In the current environment, unless natural gas becomes more plentiful and the price stabilizes at relatively lower levels, the renaissance in coal-fired generation is likely to continue

# Coal and the Clean Air Act

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- New coal plants are subject to stringent regulatory requirements
- Technology-based
  - Best Available Control Technology (BACT)
  - New Source Performance Standards
  - Clean Air Mercury Rule

# Coal and the Clean Air Act

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- Health-based National Ambient Air Quality Standards
- Environmental requirements—visibility in Class I areas
- Emission reduction requirements
  - Clean Air Interstate Rule
  - Mercury cap and trade

## Coal and the Clean Air Act

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- IGCC alternative has potential for being cleaner than conventional coal plant, according to many
- Advocates have asserted IGCC must be considered in determining BACT
  - EPA issued 2005 guidance letter saying IGCC is not required to be considered as part of BACT
  - Lawsuit challenging this guidance was settled without answering the question whether IGCC must be part of a BACT determination

## Coal and the Clean Air Act

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- As Clean Air Act requirements become more stringent, meeting these requirements becomes more challenging, both technologically and economically
- But many or most new conventional coal plants can meet current requirements
- Despite meeting health-based, technology and environmental standards, new coal plants encounter vigorous opposition, including public advocacy, administrative appeals, litigation.

## Coal and the Clean Air Act

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- At this time, Clean Air Act rules do not preclude development of new conventional coal-fired power plants or mandate alternatives
- A key and growing reason fueling strong opposition is climate change

## Coal and Climate Change

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- Scientific reports and media attention have increased concern about climate change
- Intergovernmental Panel on Climate Change Report—90% probability that most increase in global average temperatures since mid-20th century is attributed to anthropogenic greenhouse gas emissions, and a continuation of or increase in current emissions likely would result in greater changes
- Time magazine “Special Report on Global Warming”, April 3, 2006 — “Be Worried. Be Very Worried.”

## Coal and Climate Change

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- At least five bills in the Senate—cap and trade, reduce GHG emissions over time; some have safety valve provisions
- States have taken steps to address climate change
  - California Global Warming Solutions Act of 2006—25% reduction in GHG emissions statewide by 2020, including electricity consumed in state and generated out of state.
  - RGGI—Northeast and Mid-Atlantic state regional GHG reduction plan
  - Five Western Governors announced a regional cap-and-trade program in February 2007

## Coal and Climate Change

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- This year, the U.S. Supreme Court will decide *Massachusetts v. EPA*, and rule whether EPA has authority under the current Clean Air Act to regulate CO<sub>2</sub> emissions from vehicles. The court may or may not rule on the merits.
- There are no currently effective federal or state rules regarding GHG emissions. If the court rules EPA has authority to regulate CO<sub>2</sub> under the Clean Air Act, it is unknown whether or when they might do so, or what the regulations would look like

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## Coal and Climate Change

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- Climate change concerns have fueled opposition to new conventional coal plants, which emit  $> 35\%$  of total CO<sub>2</sub> emissions in the U.S.
  - Some advocate that demand growth should be met solely by renewables and conservation
  - Some predict federal GHG legislation is inevitable, so until rules, risks and technology become clearer, no new coal plants should be built
  - Many argue for IGCC technology, or take the view that *if* coal plants are going to be built, they should be IGCC plants

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## Coal and Climate Change

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- IGCC converts coal into syngas that is combusted in a gas turbine
- The process can remove sulfur, mercury and other impurities and reduce emissions from the gas turbine
- It is widely believed that the IGCC process has the potential to emit lower levels of criteria pollutants than a conventional coal plant
- For many, the biggest advantage of IGCC is it can be adapted to facilitate removal and capture of CO<sub>2</sub>

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## Coal and Climate Change

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- However, IGCC is not firmly proven as a commercially viable technology at this time
  - Only two operating plants, which after a decade have not established the same level of availability as a conventional coal plant
  - There are no demonstration plants burning subbituminous or lignite coal

## Coal and Climate Change

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- There are several R&D efforts to encourage clean coal and IGCC development
  - Clean Coal Power Initiative
  - FutureGen
  - Energy Policy Act of 2005

## Coal and Climate Change

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- Many expect that IGCC will become an established technology in the foreseeable future
- If proven reliable, DOE says IGCC it will be a more cost effective method to capture CO<sub>2</sub> than adding aqueous amine control technology to a pulverized coal plant.
- However, other voices suggest it is premature to conclude IGCC will be superior to pulverized coal respecting CO<sub>2</sub> capture—MIT study

## Coal and Climate Change

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- Concerns about climate change may be valid, and certainly are widespread. However, this concern has not yet translated into enactment of legislation.
- Uncertainties regarding future legislation, air quality requirements, technology choices, reliability, costs, available financing and other issues present challenges to utilities who are planning how to meet future growth in the demand for electricity

## Coal and Climate Change

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- Given the uncertainties, it might make sense to defer development of new coal-fired plants
- But given anticipated needs, it is not always possible to defer action
- Because the future is unclear (legislation, technology) planners are presented with challenging choices

# Coal and Climate Change

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- Favoring conventional coal technology
  - Known and reliable
  - Predictable costs
  - Can meet health-based and environmental standards

# Coal and Climate Change

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- Downside for conventional technology
  - Future cost of meeting possible climate change rules, compared to IGCC alternative, is uncertain
  - Opposition and potential delays may be more intense than for IGCC plant

# Coal and Climate Change

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- Favoring IGCC technology
  - belief in some quarters that future GHG rules are inevitable and
  - IGCC thought by many to be more cost effective in capturing CO<sub>2</sub>

# Coal and Climate Change

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- Downside risk for IGCC
  - Not fully proven commercially, not proven for lower rank coals
  - Although many forecast the costs, excluding CO<sub>2</sub> capture, will be competitive with pulverized coal technology, the available data is limited
  - Uncertain whether in fact IGCC will be superior method to capture CO<sub>2</sub>
- What we see at the moment is that most development of new coal-fired generation are pursuing conventional coal technology, but there is not a uniform consensus

# Coal and Climate Change

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- Carbon sequestration
- Capturing CO<sub>2</sub> is not the complete answer to controlling emissions—it must also be managed once it is captured
- Geologic sequestration is a primary focus
- March 1, 2007 EPA guidance for pilot projects for underground injection of CO<sub>2</sub>
  - Study health and environmental impacts, impacts on groundwater, integrity of injection wells, monitoring methods, risks or release of CO<sub>2</sub>

## Coal and Climate Change

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- Rules for commercial scale projects not expected until 2012 at the earliest, with some anticipating 10 or 15 years or more in the future.
- Sequestration costs will increase the cost of electricity. Current cost is \$100-300 per ton, DOE hopes with R&D program to get cost to \$10 per ton by 2015.

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