

# **Wisconsin Energy Proposed IGCC Plant Lessons Learned**

Clean Coal Roundtable

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**we energies**



# Presentation Overview

- Project Timeline Update
- Deciding on Coal Option
- IGCC Strategy
- Design Basis
- Permitting process
- Financial Evaluation
- Next steps



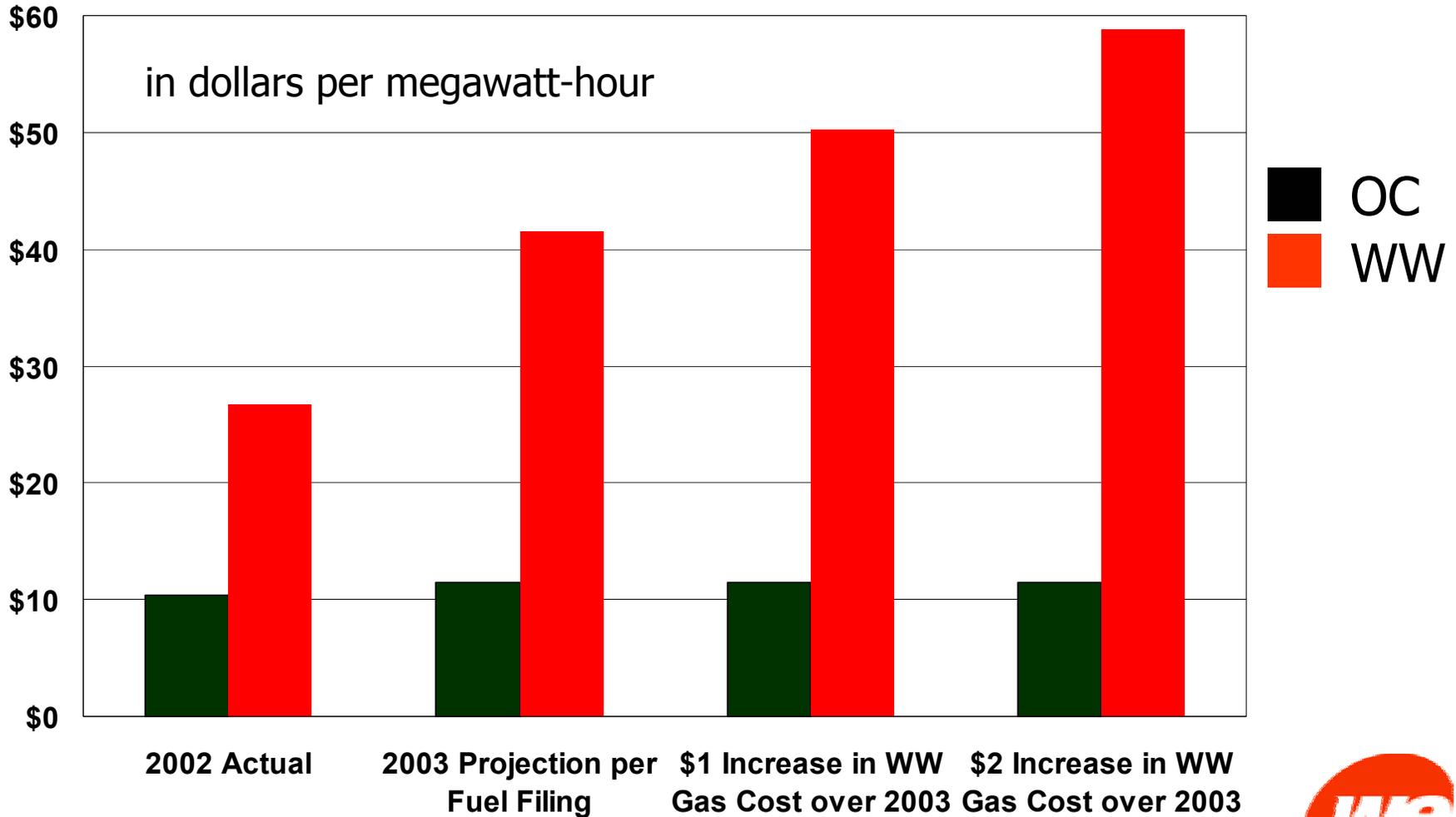
# Timeline for Significant Events

- Power The Future announced (Sep-00)
- Application to PSCW (Feb-02)
- CPCN issued (Nov-03)
  - 2 SCPC units approved
  - IGCC not approved
    - Not economic
    - Encouraged future study
- Air Permit issued (Jan-04)



# Fuel Cost Comparison

## Oak Creek coal vs. Whitewater natural gas



# IGCC Strategy

- A developing technology
- Potential for low emission rates
- Potential for low heat rate
- Current technology is 530 MW but may evolve to 600 MW by 2011
- Keeping coal as an option



# Design Basis

- Two train, 530 MW net nominal
- Baseload electric generating facility
- Located at existing Oak Creek site
- Coal/Petroleum coke blend
- Oxygen-blown, spare gasifier
- Sulfuric acid produced



# Air Permit Limits

	<b>IGCC</b>	<b>SCPC</b>	<b>NGCC</b>
<b>SO<sub>2</sub> (lb/MBTU)</b>	0.03	0.15	0.0006
<b>NO<sub>x</sub> (lb/MBTU)</b>	0.07	0.07	0.006
<b>PM (lb/MBTU)</b>	0.011	0.018	0.015
<b>Hg (lb/TBTU)</b>	0.56	1.12	n/a
<b>VOC (lb/MBTU)</b>	0.004	0.0035	0.004
<b>CO (lb/TBTU)</b>	0.03	0.12	0.006

Based on air permits issued for PTF projects



# IGCC Cost Estimate

- Power Block from Fluor
- Site Common Systems from Bechtel
- Project Development Costs from We Power
- Added 5% for LSTK with cost, schedule, and performance guarantees
- \$1739/kw (single unit)
- \$1579/kw (two unit)
- 13% higher \$/kw than SCPC



# Modeling Assumptions

	<b>IGCC</b>	<b>SCPC</b>	<b>NGCC</b>
<b>Net Capacity (MW)</b>	600	615	545
<b>Capital Cost (\$/kw)</b>	1579	1400	541
<b>Variable O&amp;M (\$/MWH)</b>	0.82	2.01	1.97
<b>Fixed O&amp;M (\$/kw-yr)</b>	33.49	20.07	4.11
<b>Capacity Factor (%)</b>	77	85	36
<b>Heat Rate (BTU/kwh)</b>	8300	8700	6820
<b>EFOF (%)</b>	10	2	5
<b>Planned Outage (weeks)</b>	4	4	2
<b>EAF (%)</b>	82	90	91

Costs based on a 2 unit plant



# CPCN Order Points

- Return On Equity
  - 12.9% requested
  - 12.7% authorized
- Cost Of Debt
  - To be determined
  - Moody's Index
- Capital Structure
  - 58/42 Equity/Debt requested
  - 55/45 Equity/Debt authorized
- 30 Year Lease



# Facility Lease Analysis

- 3Party Covenant
  - 20% Equity
  - Lower interest rate for debt
  - IRR drops over 40%



# Proposed Incentives

- Energy Tax Incentives Act of 2003
  - Production Credit
    - COE Reduction = 2%
  - Investment Tax Credit
    - COE Reduction = 7%
- 3Party Covenant
  - COE Reduction = 18%



# Next Steps

- IGCC remains on our radar
- Possible third unit at Oak Creek
- Supporting role for technology advancement
- Maintaining up to date intelligence



# Key Points

- Cost is an issue
  - IGCC commands a 10 - 15% premium over pulverized coal
  - Regulators are not willing to have their customers subsidize IGCC development
- Chief reliability concern is with integrating a chemical plant with a combined cycle plant.
- Coal remains an option
  - Conventional coal technology can be permitted
  - IGCC must meet BACT, MACT or LAER
  - Future plants must be cleaner

