

Wabash River Energy Ltd. Project Update

WABASH RIVER ENERGY LTD.

2002 PROJECT UPDATE

*Operating Experience at the
Wabash River Repowering Project*

CLIFTON G. KEELER

PRODUCTION MANAGER, WABASH RIVER ENERGY, LTD.

GLOBAL ENERGY INC.

October 28, 2002



Wabash River Energy Ltd. Project Update

Wabash River Energy Ltd. Project Update

- 2002 Operating Statistics & Highlights
- 2003 Fuel Cell Installation
- Wabash in Perspective
- Expectations for E-Gas™ Today

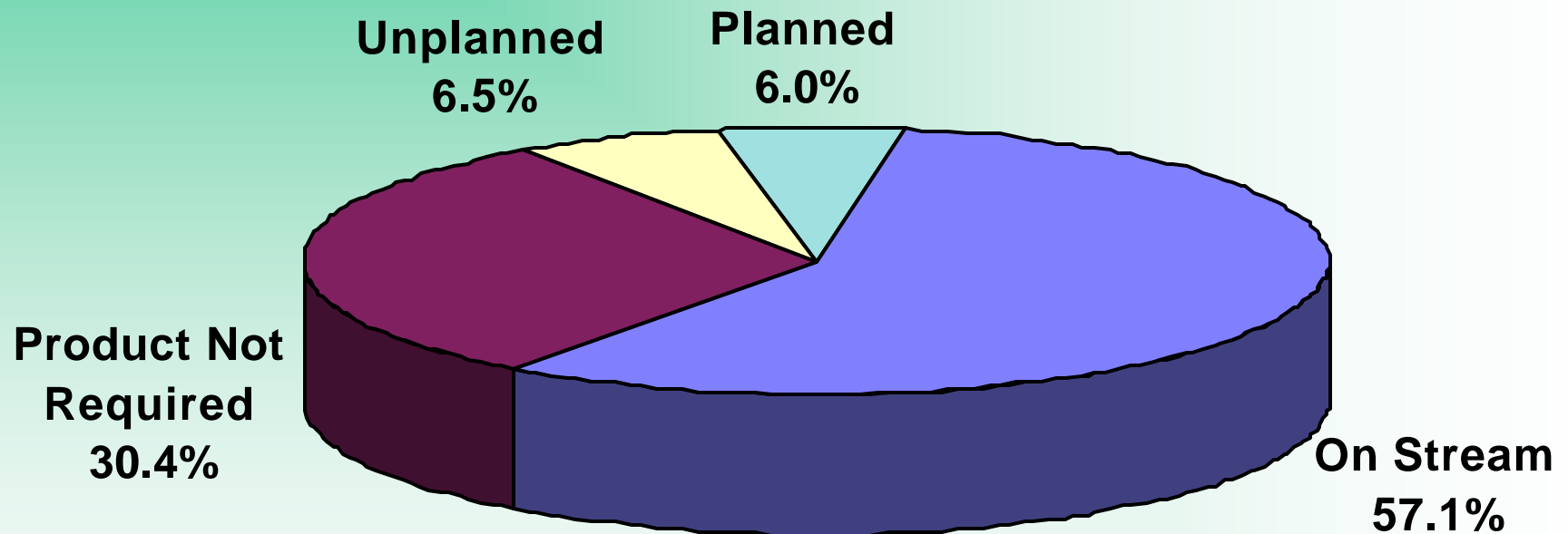
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Wabash Plant Configuration / Rating

- 2,500 tons/day coal or 2,100 tons/day petcoke; all 2002 operation was on petcoke
- Single train gasification Unit
- Rated Capacity is 1,780 mmbtu/hr or 200 mmscf/day (22% moisture)
- Spare gasifier but not on-line

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2002* Gasification Unit Operating Statistics



*Data through October 18, 2002

October 28, 2002



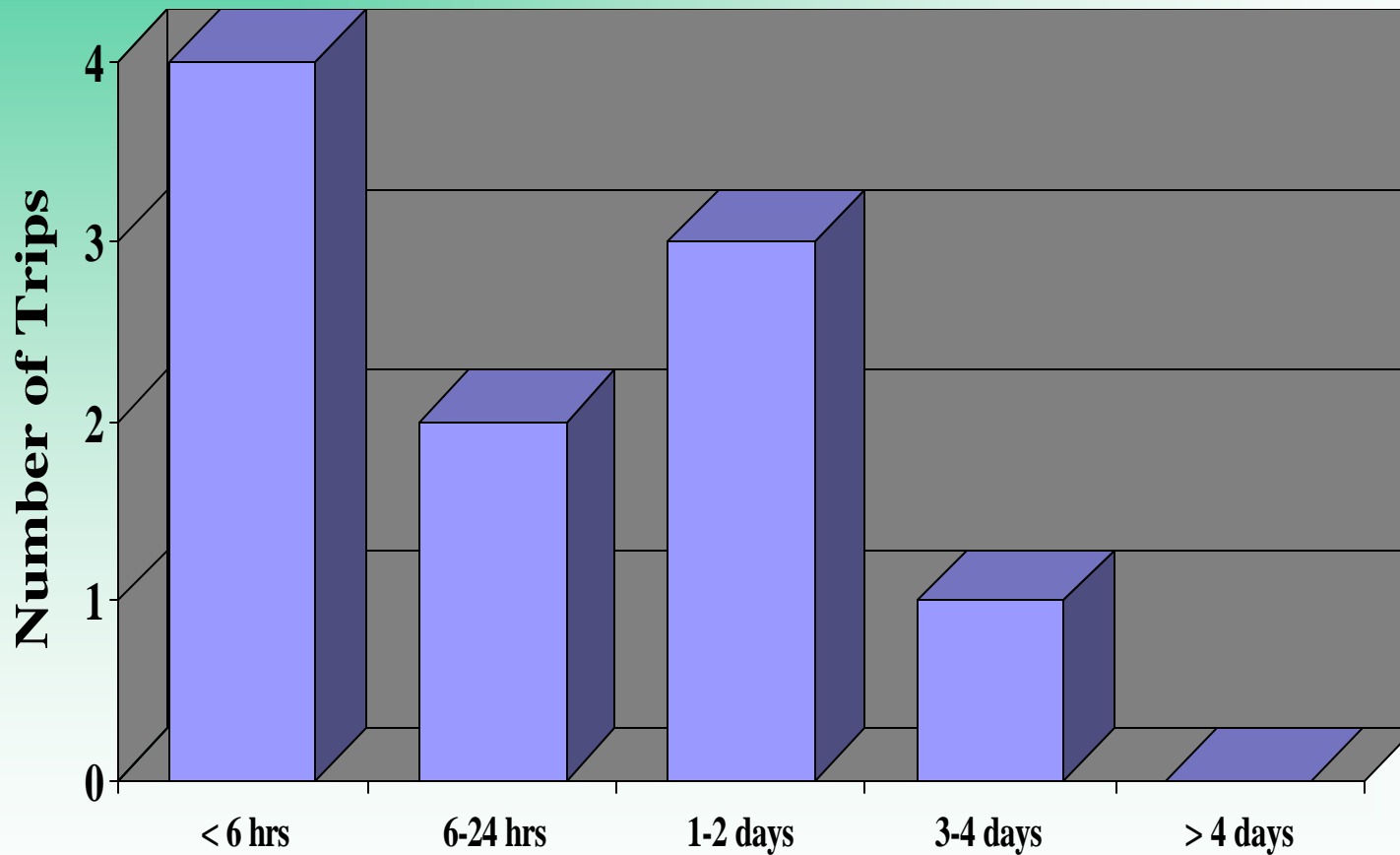
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2002 Gasification Downtime Causes

Downtime Cause	% of Year
Syngas cooler tube leaks	2.55%
Slag quench plug	1.04%
Cracked instrument nozzle	0.63%
Erratic slurry pump flow	0.53%
Slurry mixer replacement	0.48%
Faulty vibration probe on MAC	0.31%
Low LIN levels prevents start-up	0.22%
Remaining 8 average < 7 hrs each	0.73%
Total of all downtime	6.49%

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Syngas Interruptions by Outage Length



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2002 Gasification Unit Performance

- **Availability = 84.4%**

Availability = On-stream % + Product not required% * [1-(Forced outage rate/100%)]

- **Forced outage rate = 10.2%**

Forced Outage Rate = $\frac{\text{Unplanned outage hours}}{\text{Unplanned outage hours} + \text{on-stream hours}} \times 100\%$

- **Annual Loading Factor = 58.1%** (Product not required for 30.4% of year)

Loading Factor = Yearly production / rated capacity

- **YTD* Production = 7,224,561 mmbtu or 33,823 mmscf**

*Data through October 18, 2002

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2002 Operational and Project Highlights

- Utilize Wabash employees for maintenance
 - Take ownership
 - More productive
- Installed Mechanical Vapor Recompressor
 - Required due to trace amounts of arsenic and selenium in process blowdown
 - Produces condensate quality water
- Improved performance of char filter elements
 - Now capable of annual outages

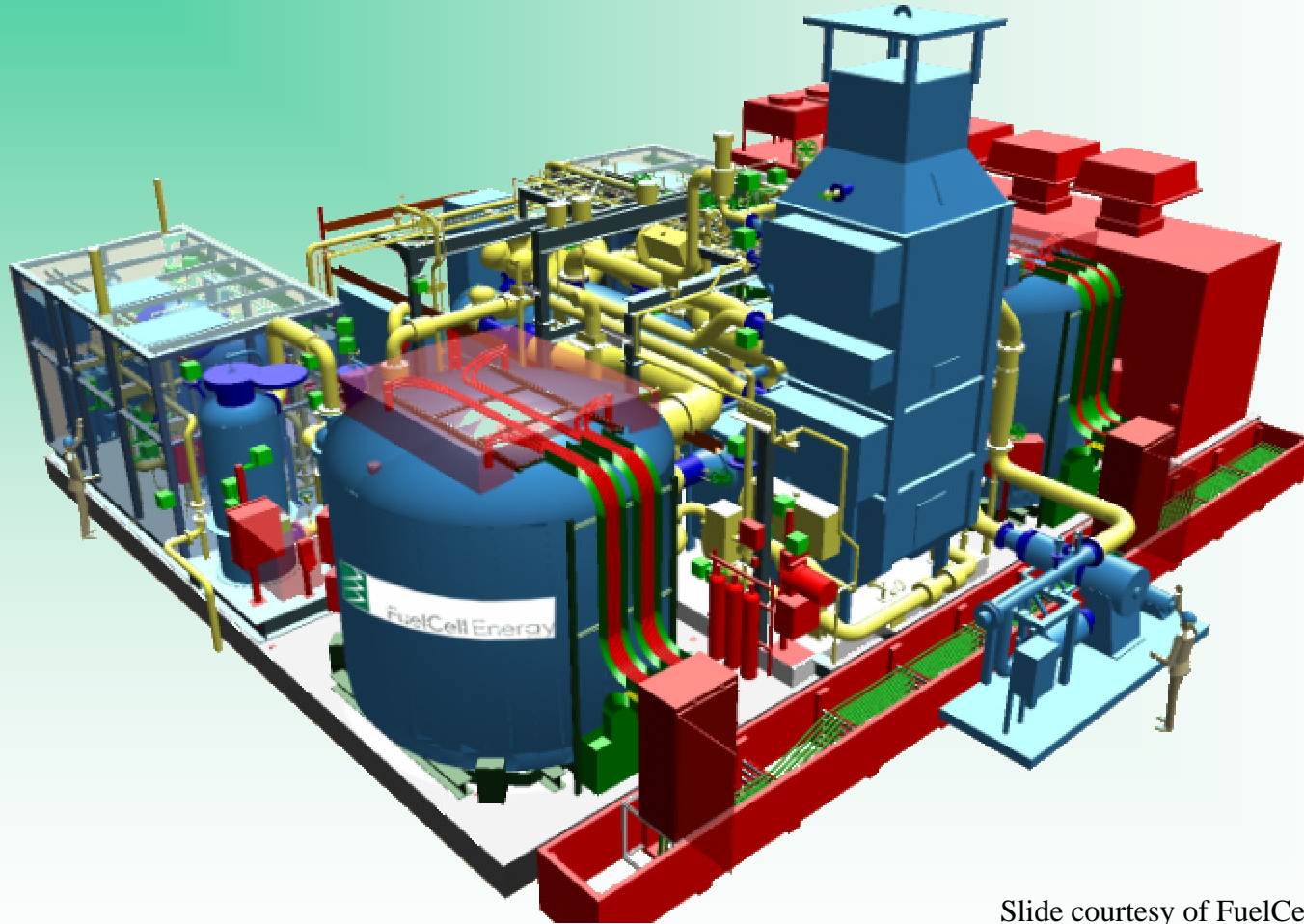
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More 2002 Highlights

- Did not “Vessel Enter” the gasifier or dry char from May 2001 to April of 2002
- Current mixers at 2,156 coke hrs and plan to re-use for our winter campaign
- Record 3rd quarter production
 - 94.3 % availability

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2 MW Fuel Cell Test Installation

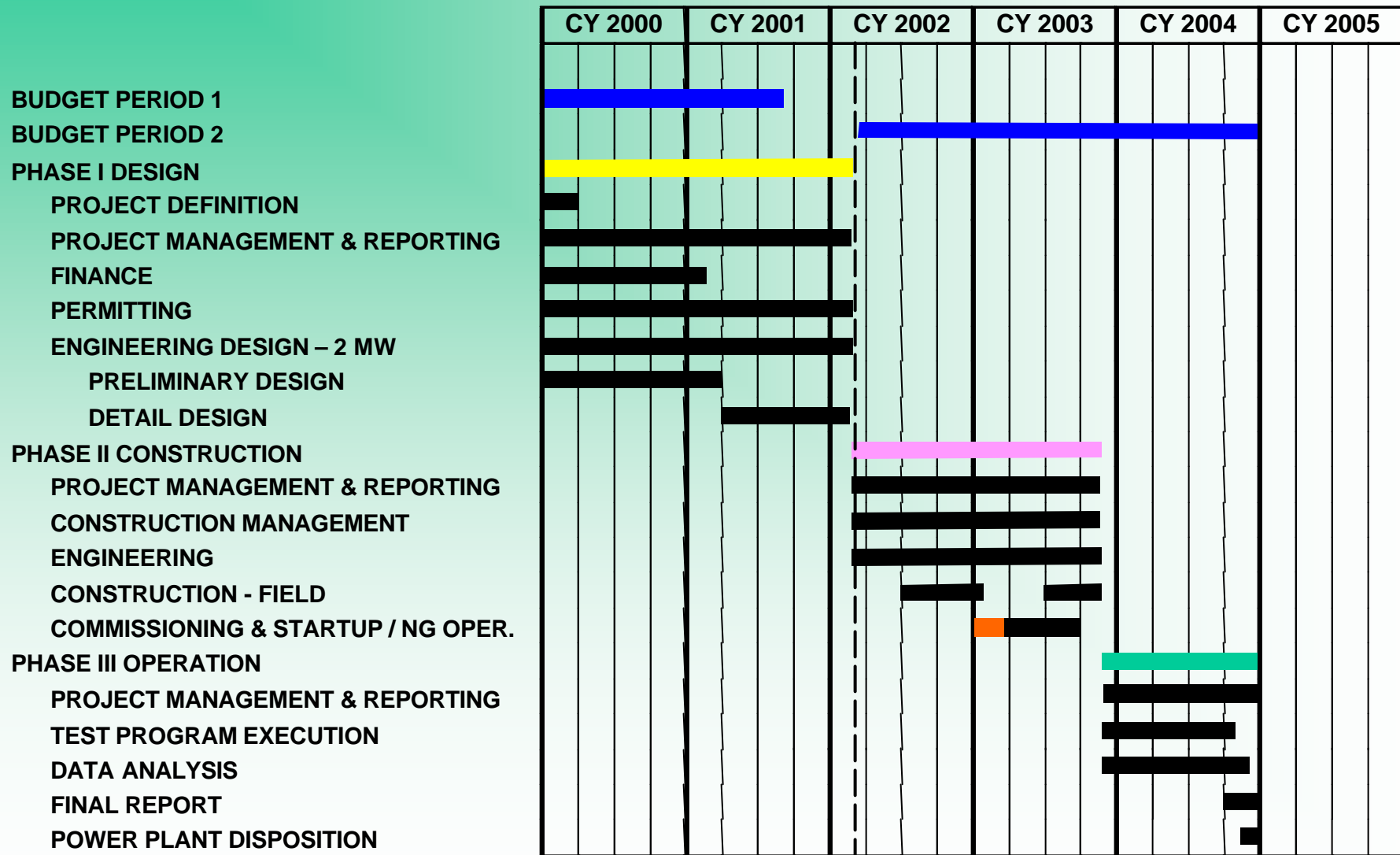


Slide courtesy of FuelCell Energy

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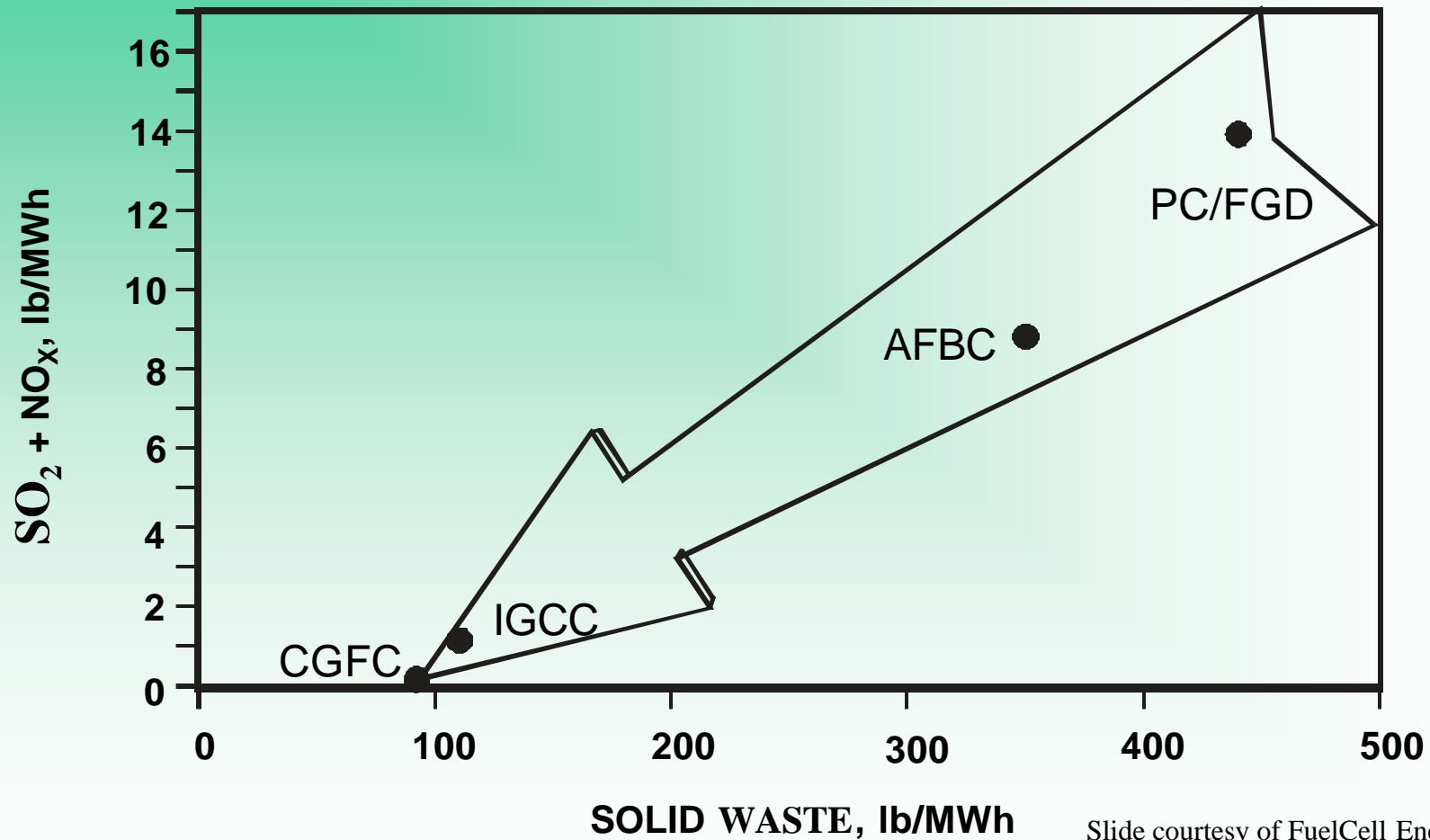


Wabash IGCC Fuel Cell Demonstration Schedule



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Environmental Impact Comparison



Slide courtesy of FuelCell Energy

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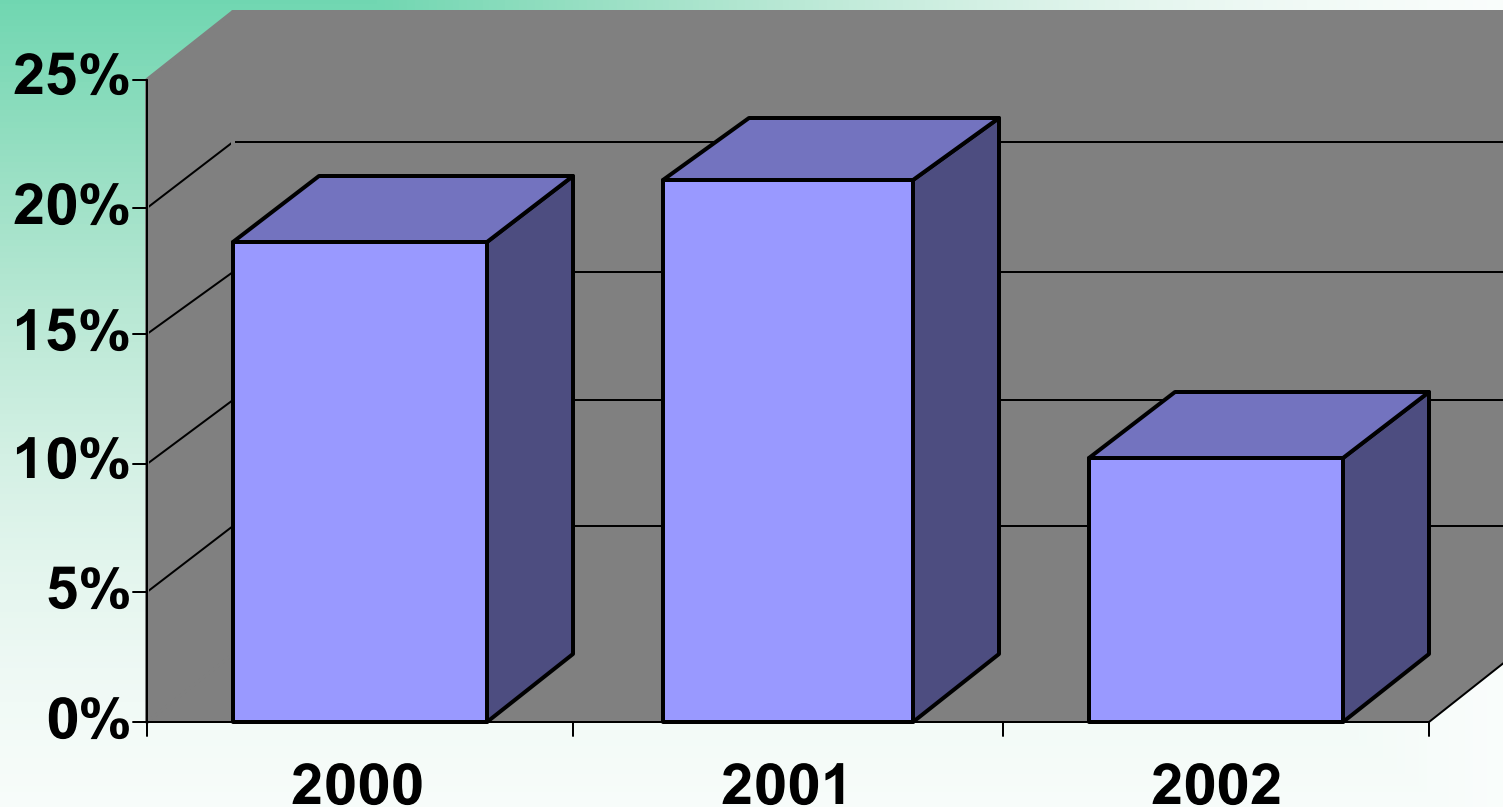
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Forced Outage Rate for the Last 3 Years

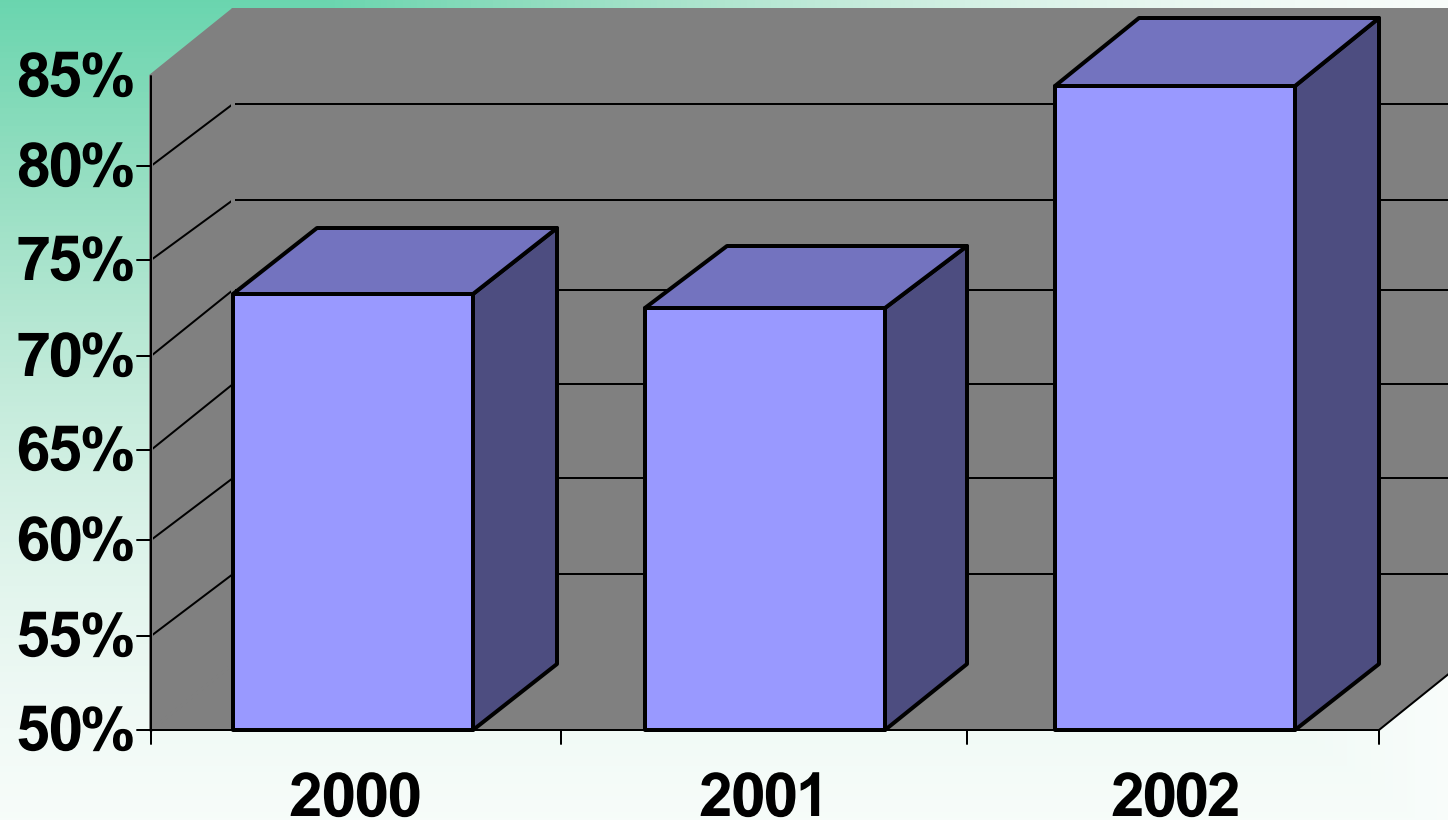


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Wabash Availability for the Last 3 Years



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3 Year Reliability by Sub-System

$$\text{Reliability} = 1 - \frac{\text{Forced Outage Hours}}{\text{Period Hours}} \times 100\%$$

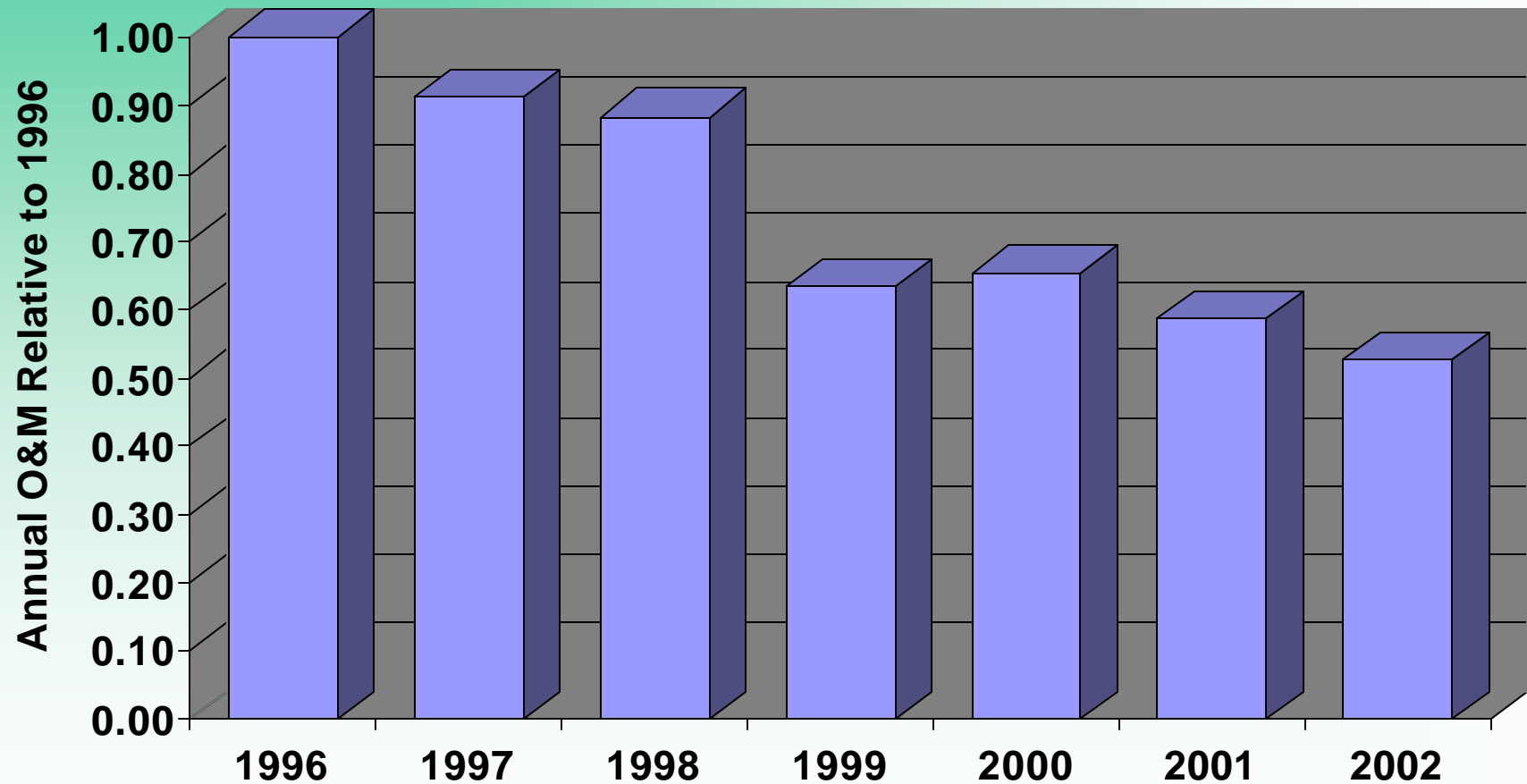
Sub-System	Reliability	Sub-System	Reliability
Syngas Moisturization	100.00%	Sour Water Treatment	99.92%
Raw Syngas Conditioning	100.00%	Particulate Removal	99.89%
Rod Mill & Hopper	100.00%	Low Temp Heat Recovery	99.44%
COS Hydrolysis	100.00%	Slurry System	99.34%
Chloride Scrubbing	100.00%	Sulfur Recovery	99.06%
Syngas recycle compressor	100.00%	Slag Removal System	99.06%
2nd Stage Gasifier	100.00%	1st Stage Gasifier	99.02%
Cooling Tower System	100.00%	Air Separation	98.48%
Acid Gas Removal	99.96%	Primary Boiler	97.46%

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Wabash O&M Costs for the Last 7 Years



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Other Wabash Achievements

- Less than 0.1 lb of SO₂ emissions/mmbtu of feed.
 - Over 300,000,000 lbs of equivalent SO₂ captured
- Developed operating experience and cost effective maintenance
 - 32 operators → 24 operators
 - Outages: Quarterly → 3 per year → 17-day semiannual.
- 1,649 documented improvements implemented at Wabash since 1996.

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Industry - Government Partnership

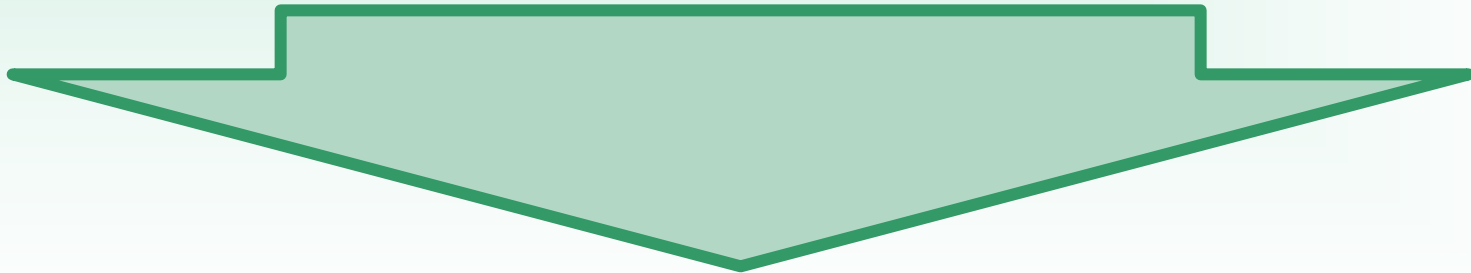
Wabash 1995

\$1,600/kWh

8,910 btu/kWh

100+ People

O&M Cost: 6% of CAPEX



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Results of Partnership

- ✓ Competitive Utility Demonstration
- ✓ DOE Char Filter Slipstream Testing
- ✓ Bechtel/Nexant/Global IGCC Optimization
- ✓ Switch to Market-Based Syngas Sales
- ✓ Continuous Improvement Process
- ✓ Demonstrated fuel flexibility



A mature Wabash that can stand on its own

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Mature E-Gas™ Technology Today

1995

- \$1,600/KWh
- 8,910 Btu/KWh
- 100+ People
- O&M: 6% of CAPEX

2002

- \$1,100 – \$1,200/KWh
- 8,400 Btu/KWh
- 45 People
- O&M: 4% of CAPEX

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In Summary

- 2002: most reliable year ever for Wabash
 - 84.4% availability
- Fuel Cell will demonstrate the next level
- E-Gas™ has reached Maturity at Wabash
 - Competitive with new coal power technology
 - Gasification is environmentally superior to all other coal-based power technologies

Wabash River Energy, Ltd.



**Clean
Competitive
Mature**