GE Energy

IGCC – a Coal Solution for a Carbon Constrained Environment

Large CCS Projects Meeting
5 Sept 2006
Brussels

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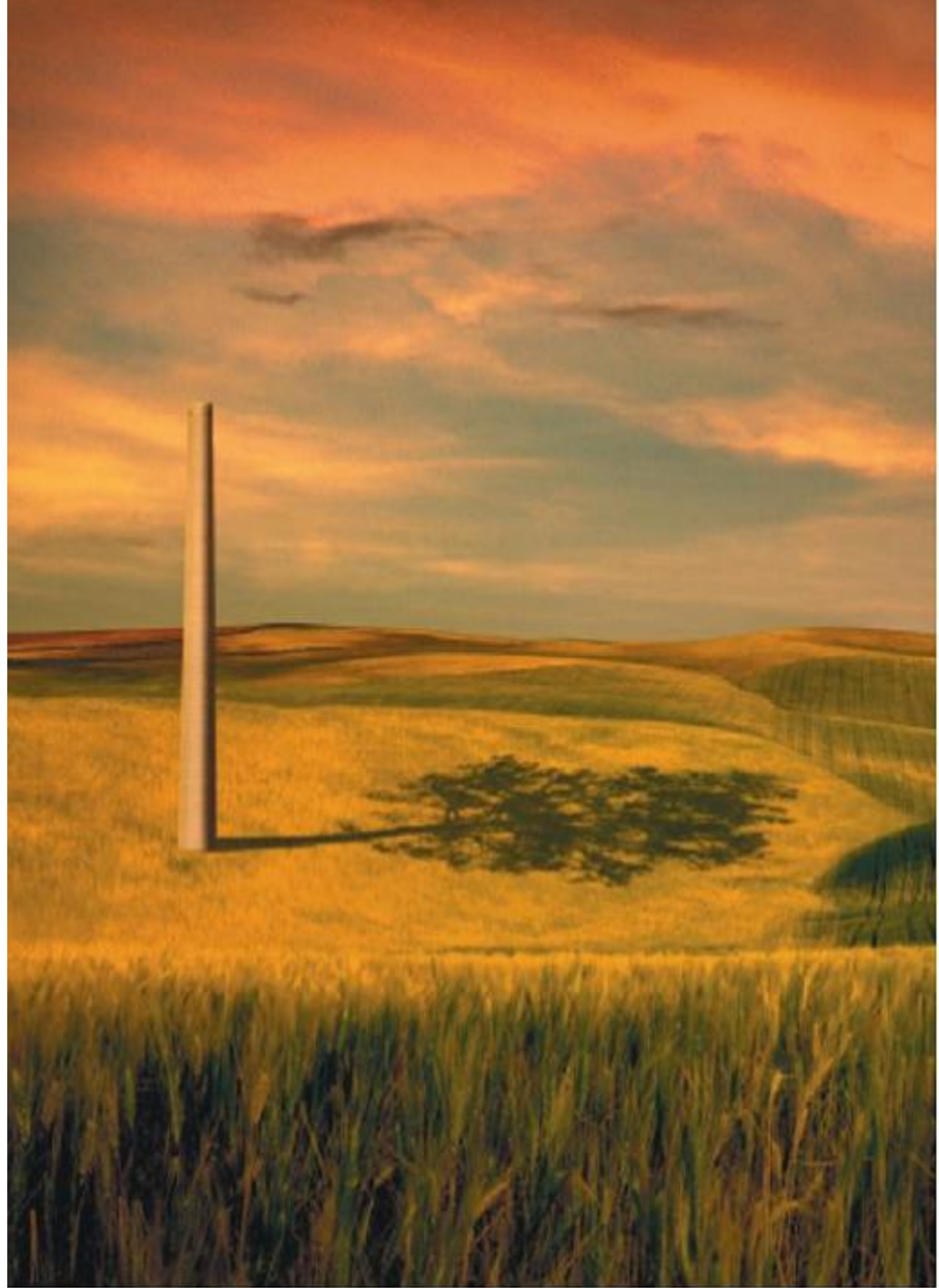

GE … A global company with a strong European presence

Operations in over
100+ countries

300,000+ employees worldwide…

95,000 in Europe

Manufacturing facilities in **40+** countries…

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GE … Six businesses

Infrastructure

- **Energy**
- Oil & Gas (Global HQ Italy)
- Water
- Energy Financial Services
- Aircraft Engines
- Rail
- Aviation FS

Commercial Finance

Industrial

Healthcare
(Global HQ – UK)

NBC Universal

Consumer Finance

GE Energy … Technology Diversity

Power Generation

Gas / Steam Wind Hydro

Services

Aero

Nuclear

“We are living in a carbon constrained world.”

Jeff Immelt

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ecomagination commitments

1. **Double** revenue from $10B to $20B
2. **Increase** R&D investment from $750 MM to $1.5B
3. **Improve** our energy efficiency and lower our GHG emissions
4. **Keep** the public informed on progress

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ecomagination products include…

Renewable resources

Our 3.6 MW turbine can power ~1,200 average U.S. homes.

Cleaner coal

GE's "one-stop shopping" for IGCC power generation

H System Turbine

Capable of achieving 60% efficiency efficiency.

All Carbon Driven

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“The ability to lead innovation
will be the primary management
focus for this decade.”

—Jeff Immelt

“I never perfected an invention that
I did not think about in terms of the service it might give others… I find out what the world needs, then I proceed to invent.”

—Thomas Edison

GE acquired ChevronTexaco's Gasification Business June 30, 2004

THE WALL STREET JOURNAL.

GE Discusses 'Clean Coal' Plants in Bid to Market New Technology

By KATHRYN KRANHOLD
Staff Reporter of THE WALL STREET JOURNAL
October 4, 2004

General Electric Co., the leader in manufacturing natural-gas-fired turbines for power plants, is negotiating with several electric companies to build new "clean coal" power plants, as it moves to create a global market for the costly, environmentally friendly technology.

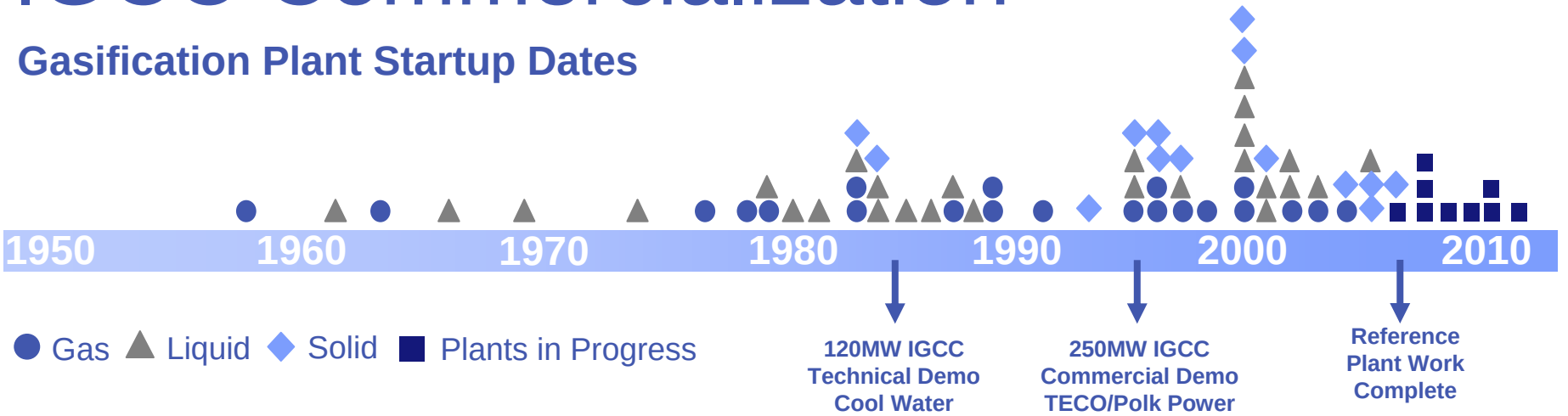
As part of its push into so-called coal-gasification technology, GE is scheduled to announce today a partnership with U.S. engineering and construction giant Bechtel Corp. in which the two companies plan to jointly a standardized

The "plant will save our customers money in the future" over its 30 to 40 year life, he says.

GE has estimated the coal-generation market at about $25 billion a year as power companies start replacing aging plants. Smith Barney analyst Jeffrey Sprague stated in a recent report that the gasification technology "has the potential of capturing a dominant share of coal power generation capital expenditures" by the end of the decade. He notes it is in its "embryonic stage." GE said it expects sales gasification technology to reach

IGCC Commercialization

Gasification Plant Startup Dates



The Puzzle

- CAPEX too high (+25%)
- COE too high (+10%)
- No system guarantees or warrantees … only license
- Poor initial RAM

The Solution

- GE acquired CVX gasification and formed ref plant alliance with Bechtel
- Single point turnkey offering with strong guarantees
- Rigorous new product development programs including low rank coals

GE IGCC Technology … A Complete Package

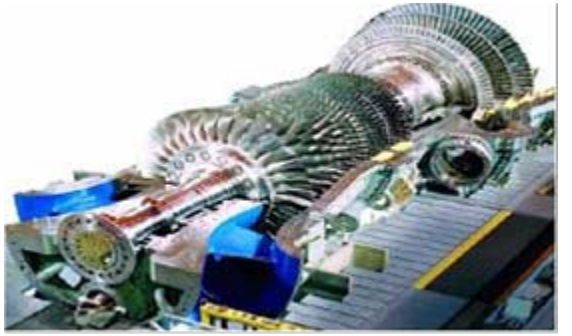
Gasification

- Commercial experience leader
- Proven process design expertise
- Guaranteed product performance

Optimized System Integration

Power Generation

- Manufacturing excellence
- Power block equipment design
- Technology development process



IGCC Technology

- Full plant system integration
- Optimization of plant systems
- Integrated plant controls
- Overall optimization from feedstock to plant output

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GE multiple IGCC Offerings

IGCC Reference Plant – GE and Bechtel's IGCC Alliance

- Optimizing power generation with gasification – increased output to 630MW (7FB)
- Reference design reduces CAPEX & cycle time – premium over SCPC down by 50%
- Single point solution – full wrap & performance guarantees
- Design to be complete by end '06

IGCC Non- Reference Plants

- Custom IGCC power plants
- Co-production – polygen applications (power, steam, H_2, methanol, FT liquids
- Performance guarantees
- Multiple EPCs

IGCC Power Block Supply

- GTs for all gasification technologies

NGCC to IGCC Fuel Conversion Projects

- Under-utilized assets
- IGCC performance guarantees possible with GE power blocks

GE IGCC Commercial Experience

Project	GE Scope*	Size (MW)	Feedstock	COD
PSI Global (US)	Power	262	Coal/Petcoke	1995
Tampa Electric (US)	Syngas/Power	250	Coal/Petcoke	1996
Sokolov (Czech Republic)	Power	350	Coal	1996
Schwarze-Pumpe	Power	120	Lignite	1996
(Germany)	Power	100	Resid Oil	1997
Pernis (Netherlands)	Syngas/Power	550	Visbreaker Tar	2001
Sarlux (Italy)	Syngas	510	Asphalt	2001
ISAB (Italy)	Syngas	280	Visbreaker Tar	2001
Api Energia (Italy)	Syngas/Power	160	Cracked Tar	2001
ExxonMobil (Singapore)	Syngas/Power	160	Fluid Coke	2002
Valero (US)	Syngas	342	Asphalt	2003
NPRC (Japan)		**3,072 MW**		**> 2 Decades**

*GE Scope: Power = GE provided power generation equipment, Syngas = GE provided gasification technology

IGCC Launch Plant Status

Edwardsport, Indiana

Meigs County, Ohio

Cinergy IGCC Project

- 2Q'05 completed IGCC feasibility study (GE & Bechtel 630MW Reference Plant)
- 9/22 Cinergy announced it would begin contract negotiations with GE & Bechtel for FEED

AEP IGCC Project

- 2Q'05 completed IGCC feasibility study (GE & Bechtel 630MW Reference Plant)
- 9/29/05 announced FEED study with AEP
- 3Q'06 FEED will be complete
- 2010 expected commercial start up

FEED – Front End Engineering Design

2nd AEP IGCC project

2nd AEP IGCC Project

- Site Mason County, West Virginia
- GE & Bechtel 630MW Reference Plant
- 8/17/06 announced FEED study with AEP
- End '06 FEED will be complete

GE Energy

4200 Wildwood Parkway
Atlanta, GA 30339

News Release

GE ENERGY, BECHTEL SIGN FRONT END ENGINEERING DESIGN AGREEMENT FOR AEP'S SECOND 'CLEANER COAL' PROJECT

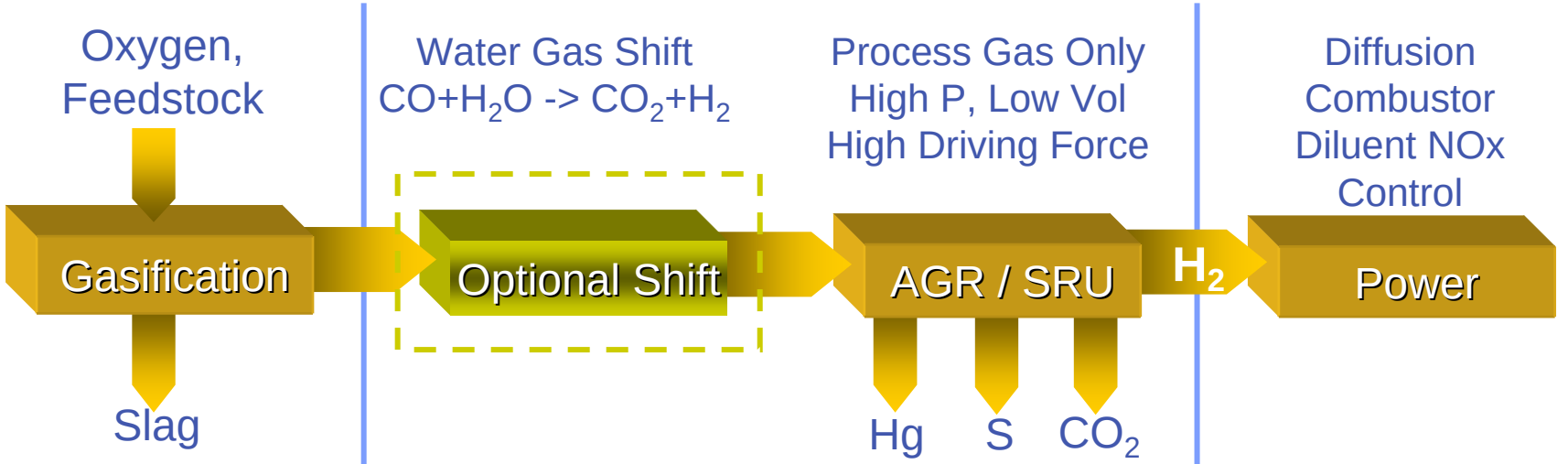
630-MW Plant Planned for West Virginia Site

ATLANTA, GEORGIA – August 17, 2006 – GE Energy and Bechtel Power have signed their second agreement with American Electric Power (AEP) to move forward with plans for an integrated gasification combined-cycle (IGCC), or cleaner coal, power plant.

Under the agreement announced today, GE and Bechtel will proceed with the front-end engineering design (FEED) phase for a proposed, 630-megawatt IGCC plant in Mason County, West Virginia. Appalachian Power, an AEP subsidiary, would operate the plant, which would be located next to Appalachian's existing Mountaineer power plant.

In September 2005, GE and Bechtel signed a FEED agreement with AEP, one of the nation's largest electricity generators, for a proposed IGCC project in Meigs County,

IGCC CO_2 Capture Readiness



Proven Gasification

- 60+ GE Licensed Gasification Units operating worldwide
- 12 with solid feedstock

Proven Shift & CO_2 Capture Process

- >25 GE Licensed Gasification Units operating worldwide using shift reaction to produce H_2
- >25 GE Licensed Units operating worldwide using AGR technology to completely remove CO_2 from shifted syngas

Proven Turbines

- 28 GE Gas Turbines operating at 50%+ H_2
- Validated F-class combustion to 90% H_2

GE High H_2 GT Commercial Experience

	Customer/ Site	GT Model	No.	Gas	Features
1	ExxonMobil Singapore	MS6241FA	2	IGCC	44.5% H2
2	Georgia Gulf	MS7001EA	3	Blend	Methane+50% H2
3	SUV Vresova	MS9001E	2	IGCC	46.8% H2
4	BASF/ Geismer	MS6001B	1	PG	Up to 80% H2
5	Koch Refinery	MS6001B	1	RFG	12% to 50% H2
6	Daeson Korea	MS6001B	1	PG	up to 95% H2
7	Shell Int'l	MS5001P	1	RFG	60% H2, propane
8	Reutgerswerke	MS3002J	1	PG	60% H2
9	Tenerife	MS6001B	1	RFG	~70% H2
10	Cartagena	MS6000B	1	RFG	66% H2
11	San Roque	MS6000B	2	RFG	70% H2
12	Antwerpen	MS6000B	1	RFG	78% H2
13	Puertollano	MS6000B	2	RFG	Up to 60% H2
14	La Coruna	MS6000B	1	RFG	Up to 52% H2
15	Rotterdam	MS6000B	1	RFG	59% H2
16	AGIP/ Milazzo	MS5001P	1	RFG	30% to 50% H2
17	Cochin Refineries	MS5001P	1	RFG	50% H2
18	Mobil/ Paulsboro	MS5001P	2	RFG	20% to 60% H2
19	Uhde NUP	MS3002J	1	TG	~60% H2
20	Donges	GE10	1	RFG	76% H2
21	Zarqa Refinery	PGT10	1	RFG	82% H2

IGCC=Syngas; RFG=Refinery Gas; PG=Process Gas; TG=Tail Gas

- 6B 95% H_2 (Daeson)
- 6FA 44.5% H_2 (Exxon, Motiva)
- 7FA 37.2% H_2 (Tampa, PSI)

F-class H_2 Combustion Validation … Video Capture of Flame Structure 85-90% H_2

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High H_2 GT Development

Development Goal

- Reliable, high temperature (high efficient), fuel-flexible and low-NO_x (diluent free) combustion of H_2 rich syngas

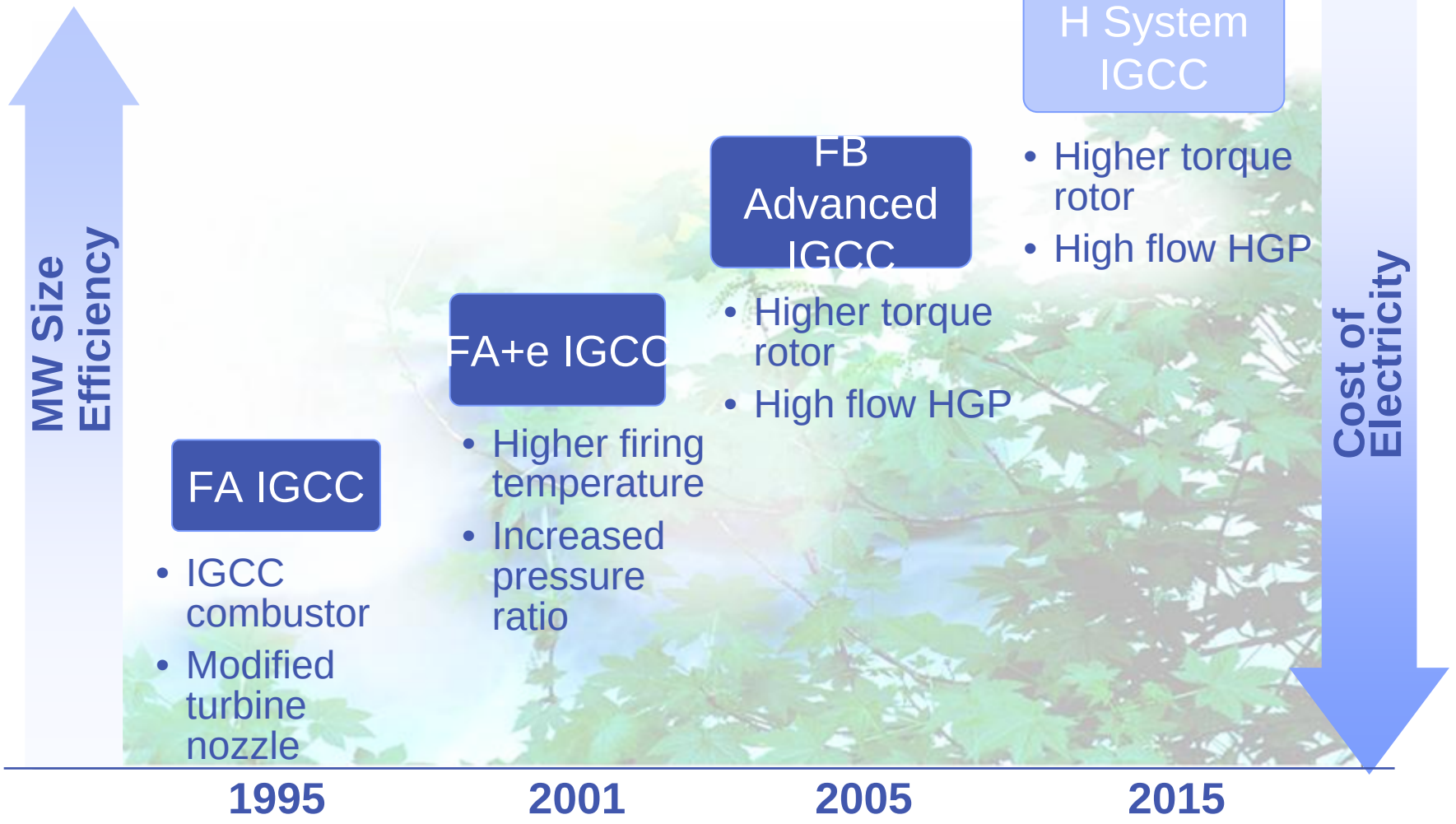
Development Needs

- Advanced materials and thermal barrier coatings

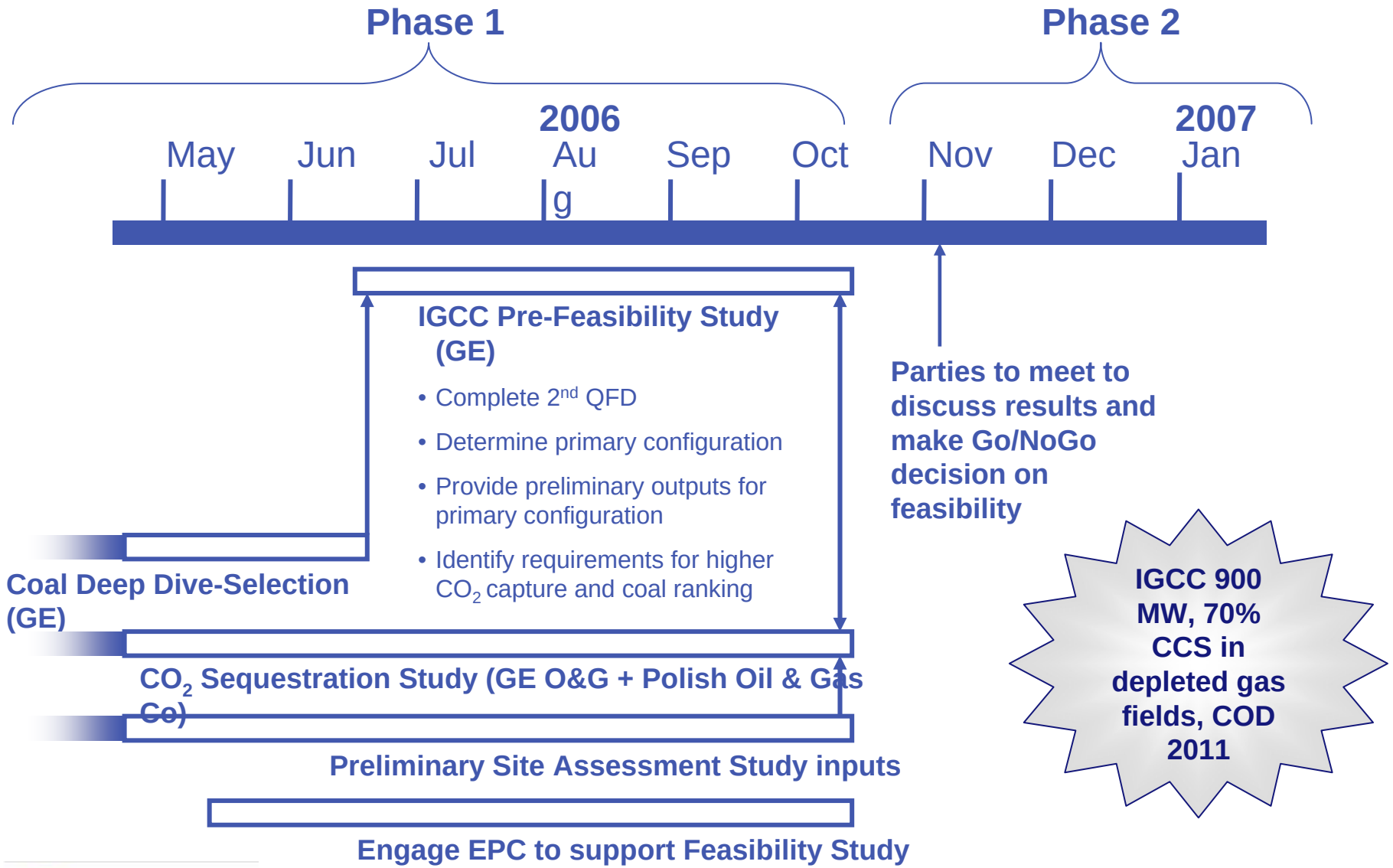
- Leading edge H_2 combustion modeling and experimental validation … aero-thermodynamic models to validate and optimize tradeoffs between emissions, efficiency and RAM (model examples: reacting CFD, fuel-air mixing, flame shape, combustion stability and heat transfer and thermal predictions)

- IGCC process evaluations for optimal gas turbine integration and demos to validate concepts … impact of reduced fuel mass flow on power generation output

Gas Turbine Evolution … Driving "Cleaner Coal" Economics



Poland IGCC CCS Project Timeline

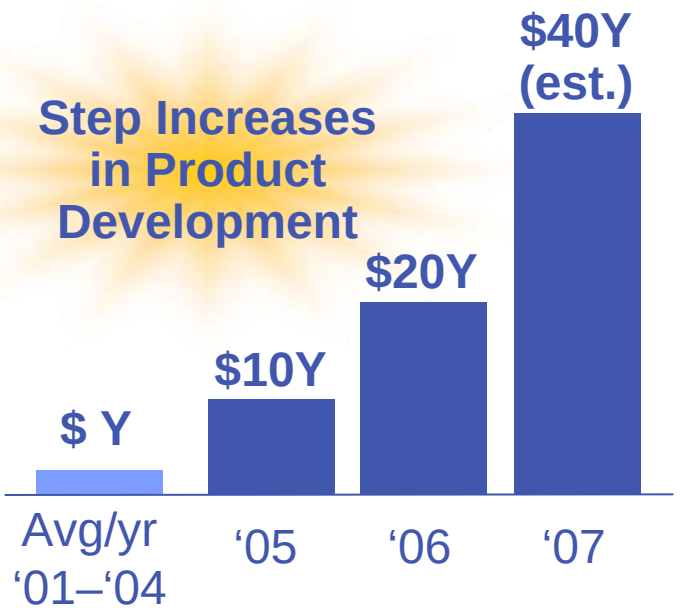


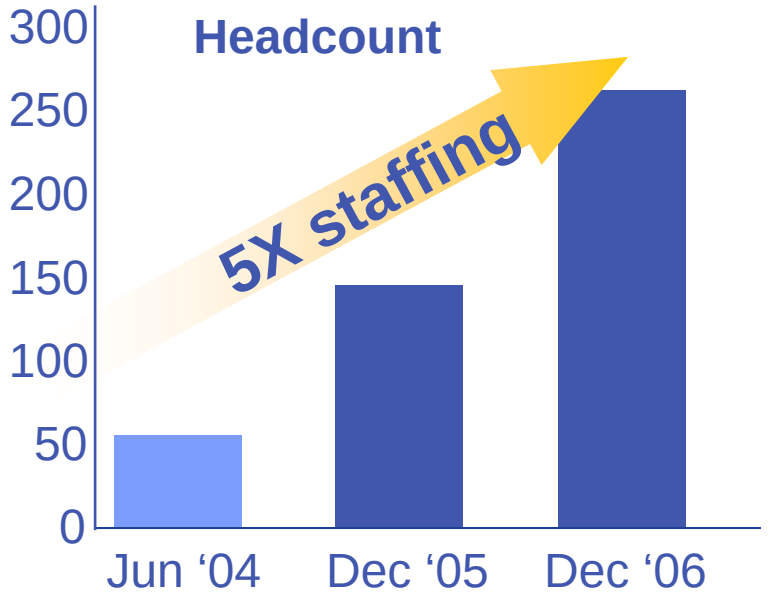
Closing Remarks

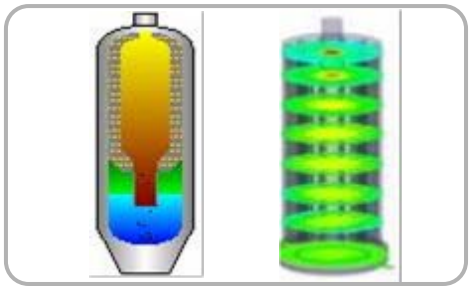
- IGCC employs proven technology … IGCC with pre-combustion capture can provide power from coal with low CO_2 now
- Viability depends on technical and economic feasibility of carbon capture and sequestration
- IGCC provides significant cost advantage in pre-combustion S and Hg cleanup and carbon treatment
- IGCC is highly flexible in configurability for various levels of CO_2 capture
- Compelling reasons for IGCC to be an integrated part of energy and environmental strategies

Back-Up

Investing for Success

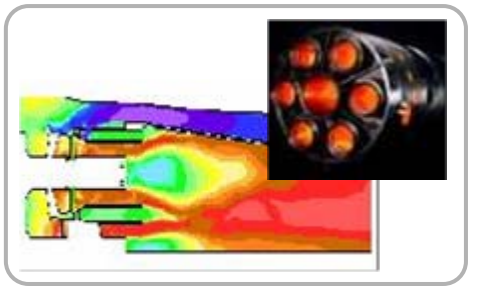






Gasification Technology

Power Generation Technology



Advanced Technologies

GE's Global IGCC Resources

GE Energy's Gasification Business Headquarters
Houston, TX

Global Research Center Headquarters
Niskayuna, NY

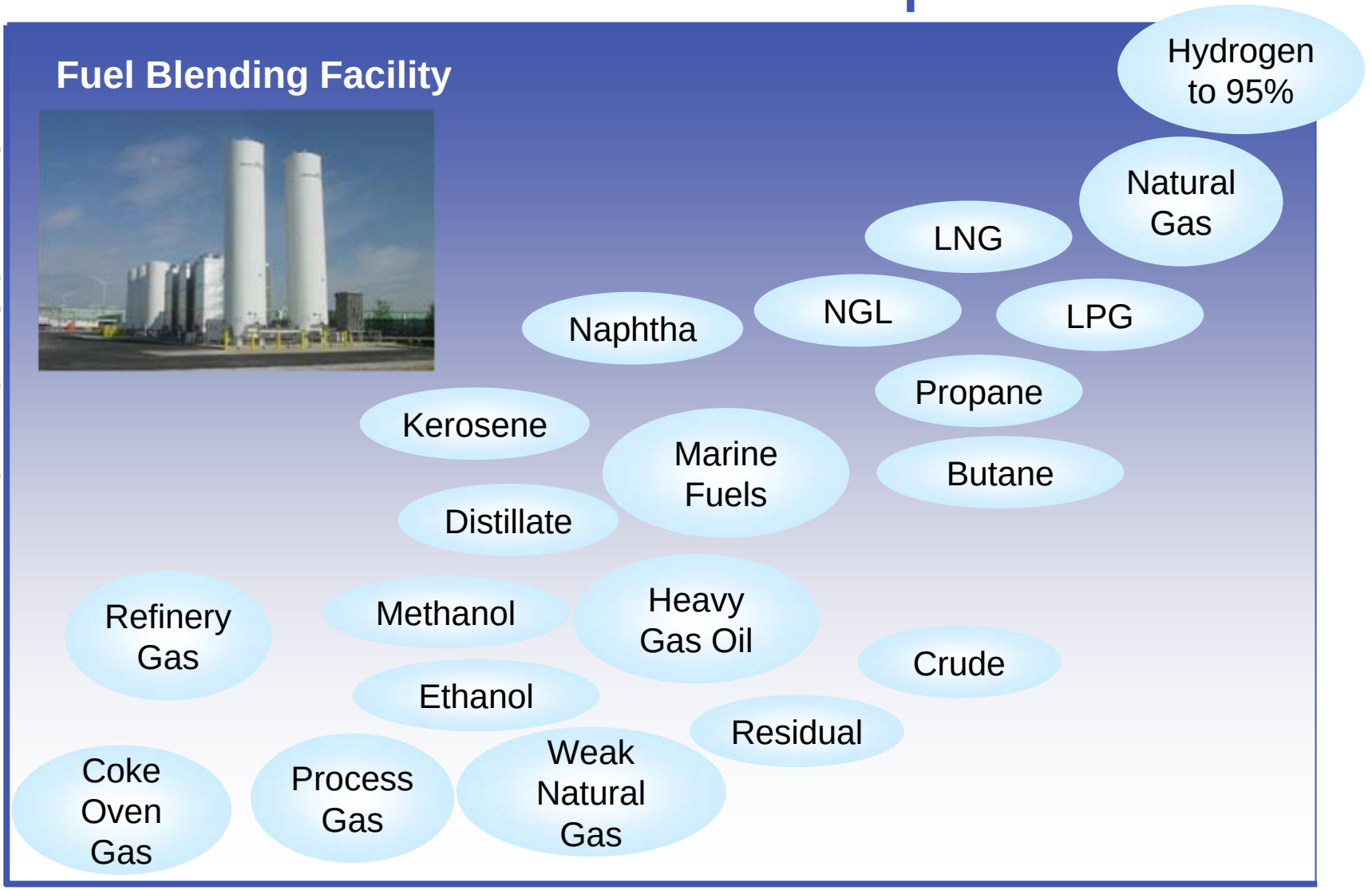
John F. Welch Technology Centre
Bangalore, India

Europe Technology Center
Munich, Germany

GE Energy's Manufacturing Sites
Belfort, France Greenville, SC

China Technology Center
Shanghai, China

GT Combustion Fuels Experience



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