

IGCC – Sustainable Power Generation

CFFS FORUM ON CARBON CAPTURE & STORAGE & CLEANER FOSSIL FUELS STRATEGIES IN THE MIDDLE EAST & NORTH AFRICA

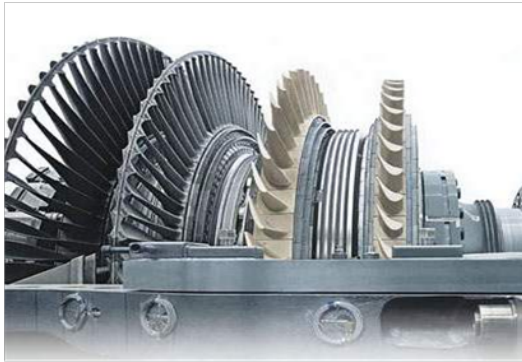


imagination at work

GE Energy

Employees: 65,000 • '08 revenue: \$38.6B • Operating in 140 countries

Power & Water



- Power generation
- Renewables
- Gas Engines
- Nuclear
- Gasification
- Water treatment
- Process chemicals

Oil & Gas



- Drilling/production for ...
land, offshore, subsea
- LNG and pipelines
- Refining/petrochemical
- Industrial power gen
- Complete lifecycle
services

Energy Services



- Contractual agreements
- Smart Grid
- Field services
- Parts and repairs
- Optimization
technologies
- Plant management

Fuels landscape ... today

Increasing volatility/unpredictability in fuel markets

Oil, Gas and Coal prices are off cyclical highs ...

What happens next?

Oil



Natural
Gas



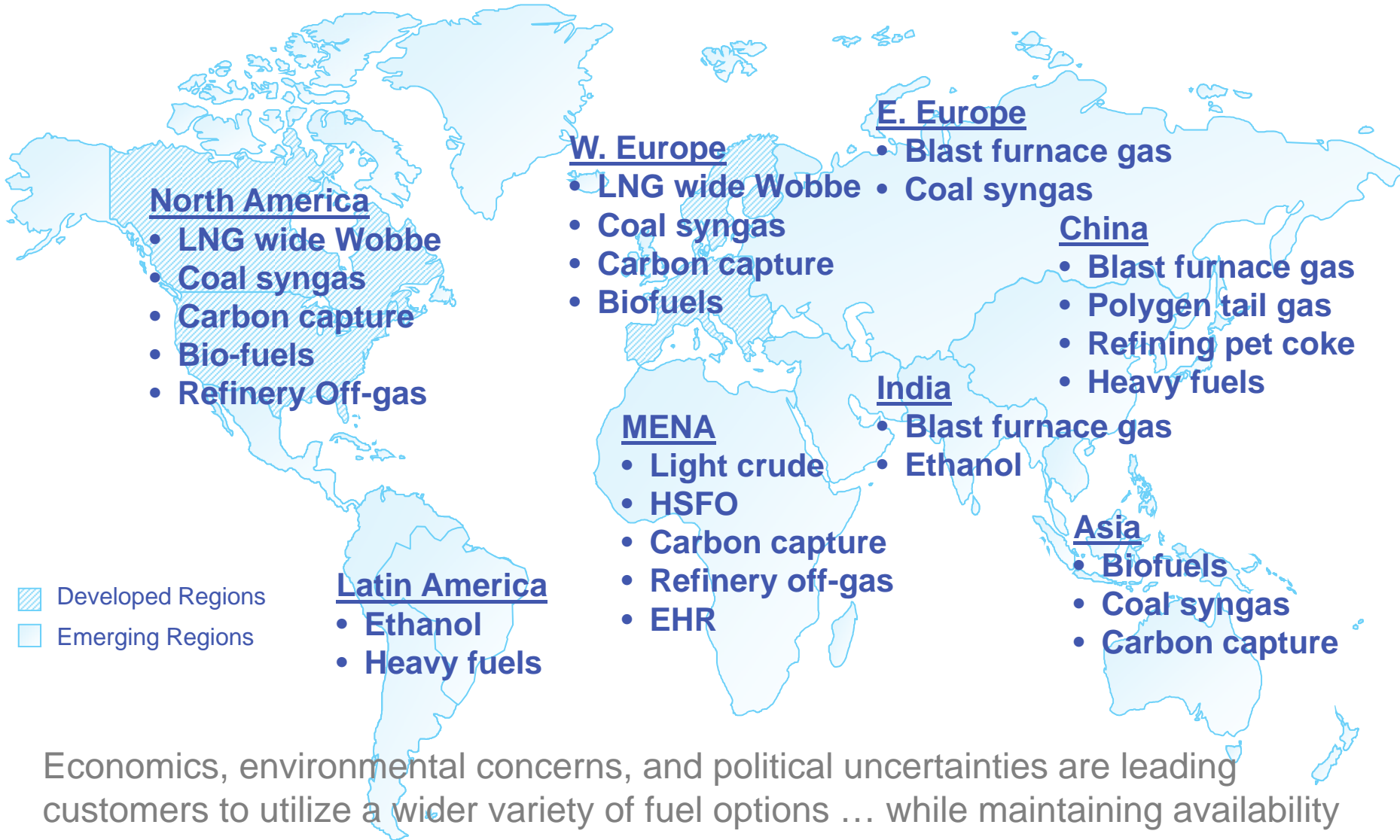
Coal



> Numerous tension points

- Global economic slowdown ... emerging markets demand
- De-carbonization - taxes and feed-in tariffs
- Inventory recovery ... new supply cuts and disruptions
- Capital scarcity ... new risk paradigm

Global fuel market



Economics, environmental concerns, and political uncertainties are leading customers to utilize a wider variety of fuel options ... while maintaining availability

Feedstock/Product Flexibility

Gasification Technology

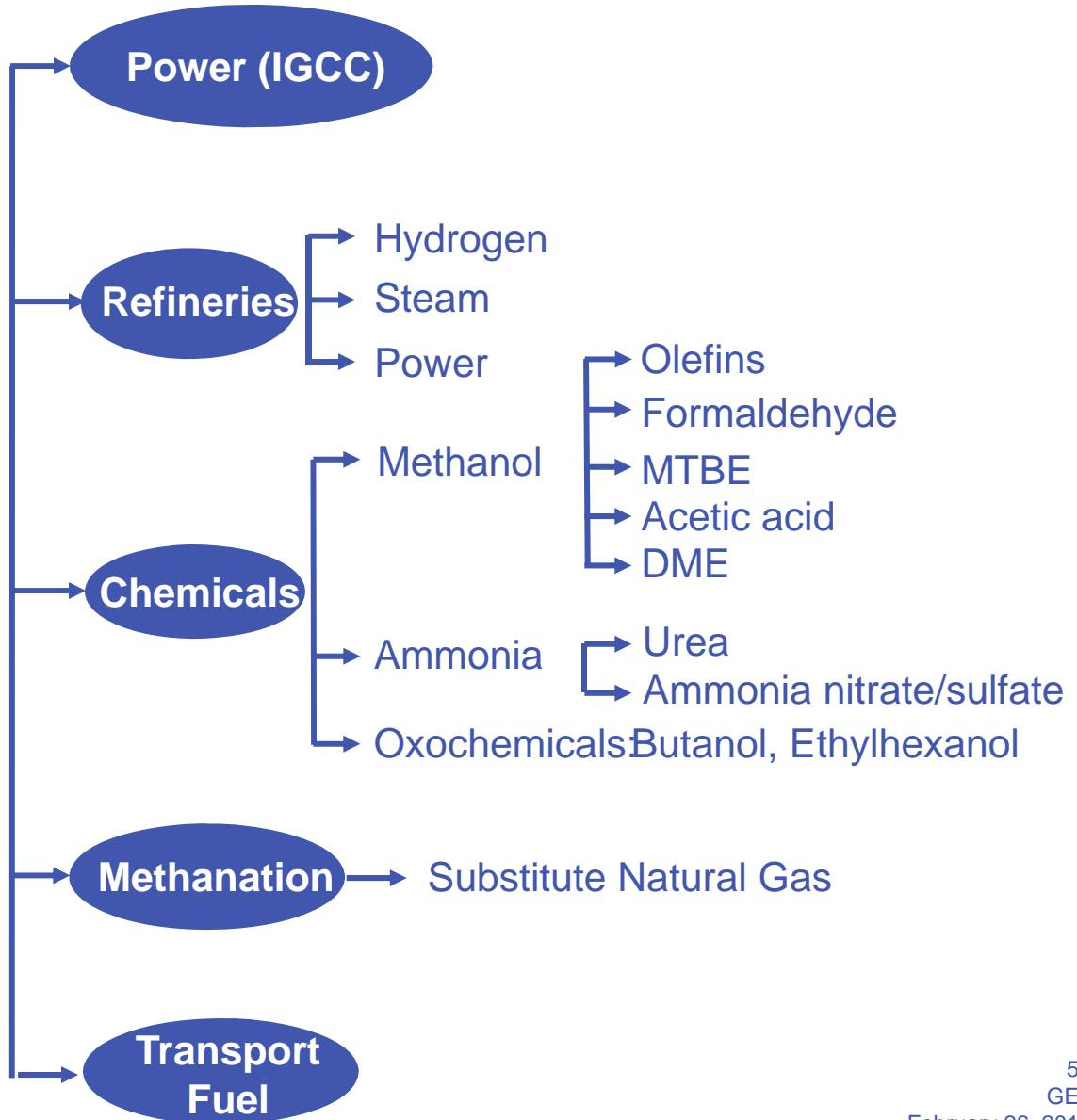


Syngas

(H₂+ CO)

Feedstocks

- HFO
- Pet coke
- Asphalt
- Vacuum Residue
- Coal



GE IGCC commercial experience

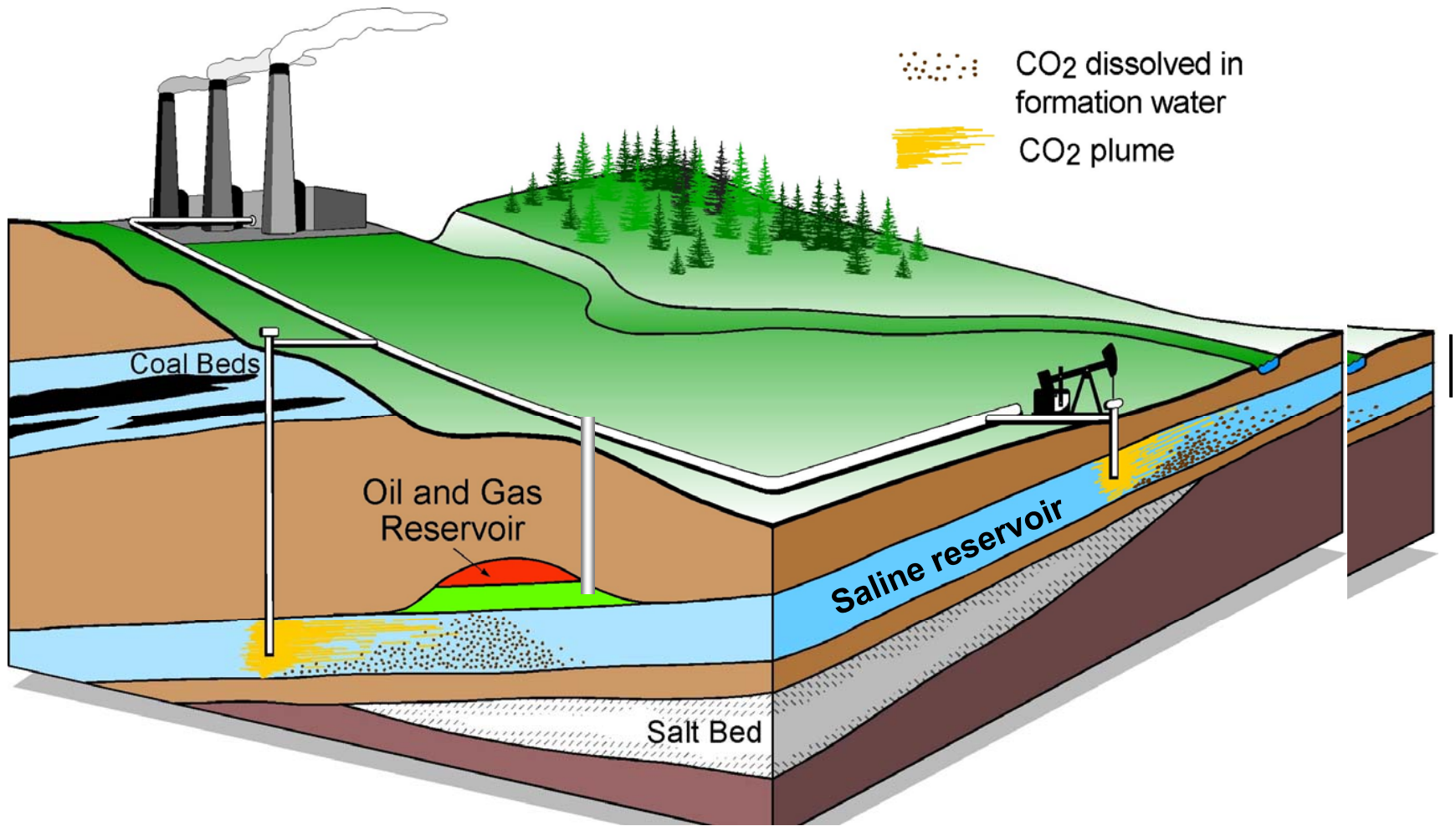
Project	GE Scope*	Size (MW)	Feedstock	COD
PSI Global (US)	Power	262	Coal/Petcoke	1995
Tampa Electric (US)	Syngas/Power	250	Coal/Petcoke	1996
Sokolov (Czech Republic)	Power	350	Coal	1996
Schwarze-Pumpe (Germany)	Power	120	Lignite	1996
Pernis (Netherlands)	Power	100	Resid Oil	1997
Sarlux (Italy)	Syngas/Power	550	Visbreaker Tar	2001
ISAB (Italy)	Syngas	510	Asphalt	2001
Api Energia (Italy)	Syngas	280	Visbreaker Tar	2001
ExxonMobil (Singapore)	Syngas/Power	160	Cracked Tar	2001
Valero (US)	Syngas/Power	160	Fluid Coke	2002
NPRC (Japan)	Syngas	342	Asphalt	2003
Nexen Opti (Canada)	Power	160	Asphaltenes	2008

3,232 MW

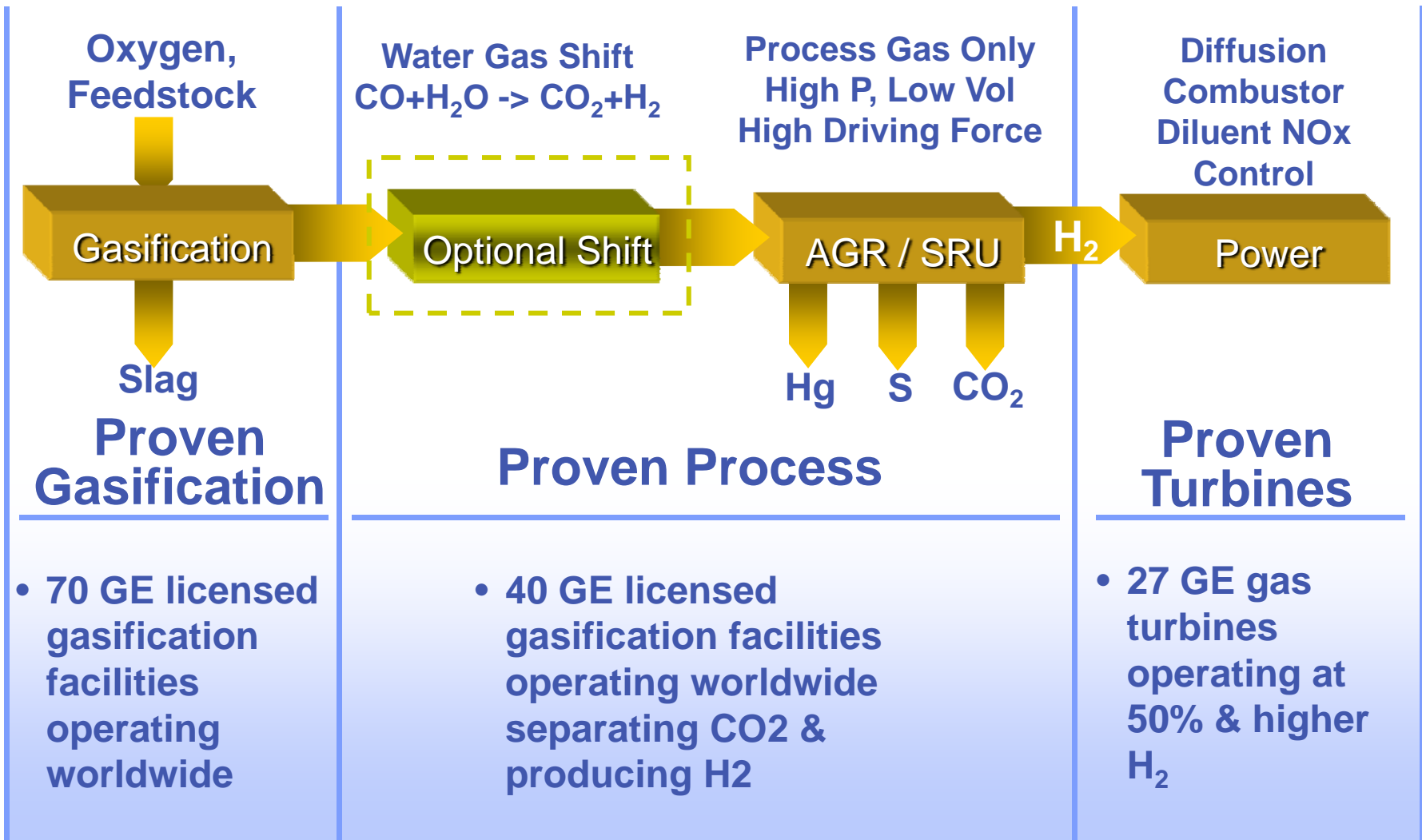
> 2 Decades

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

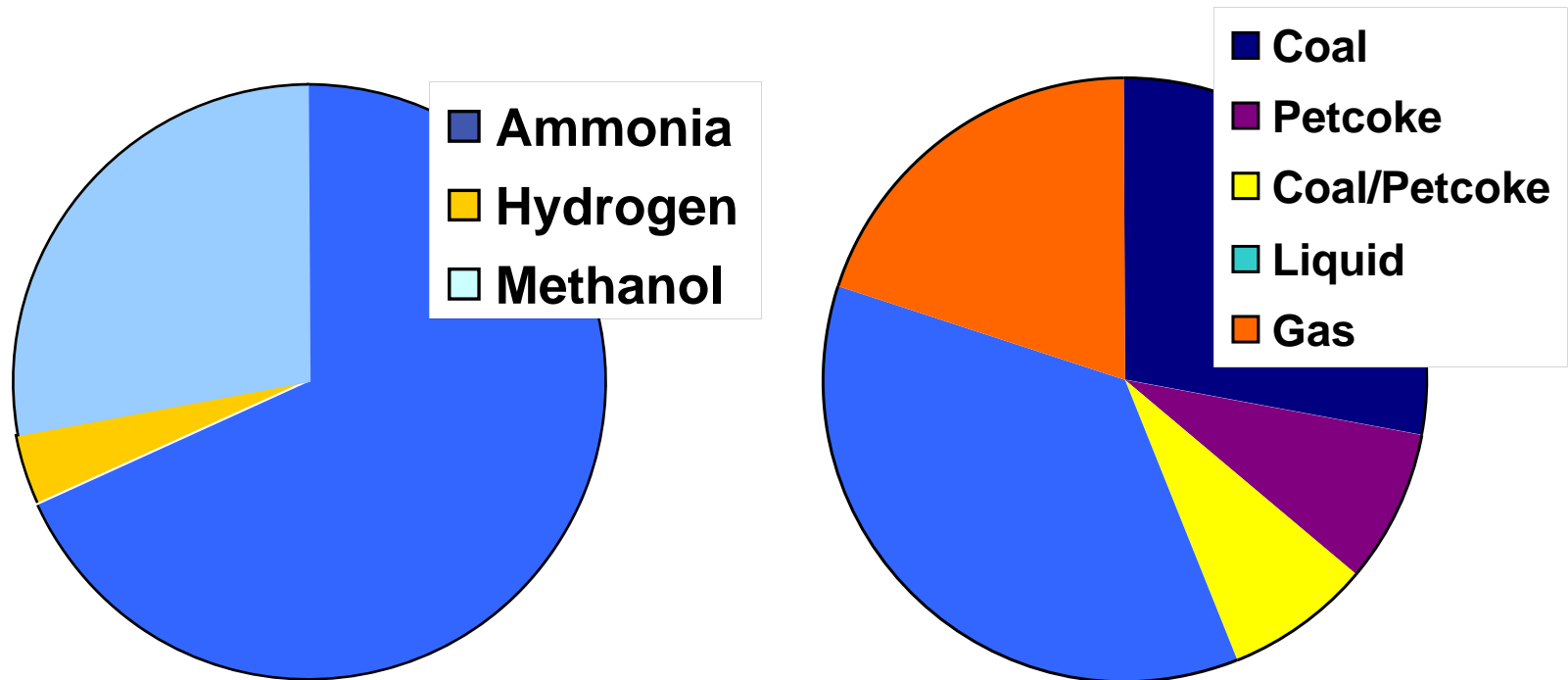
The Technology of CCS & EHR



IGCC CO₂ capture ready...today



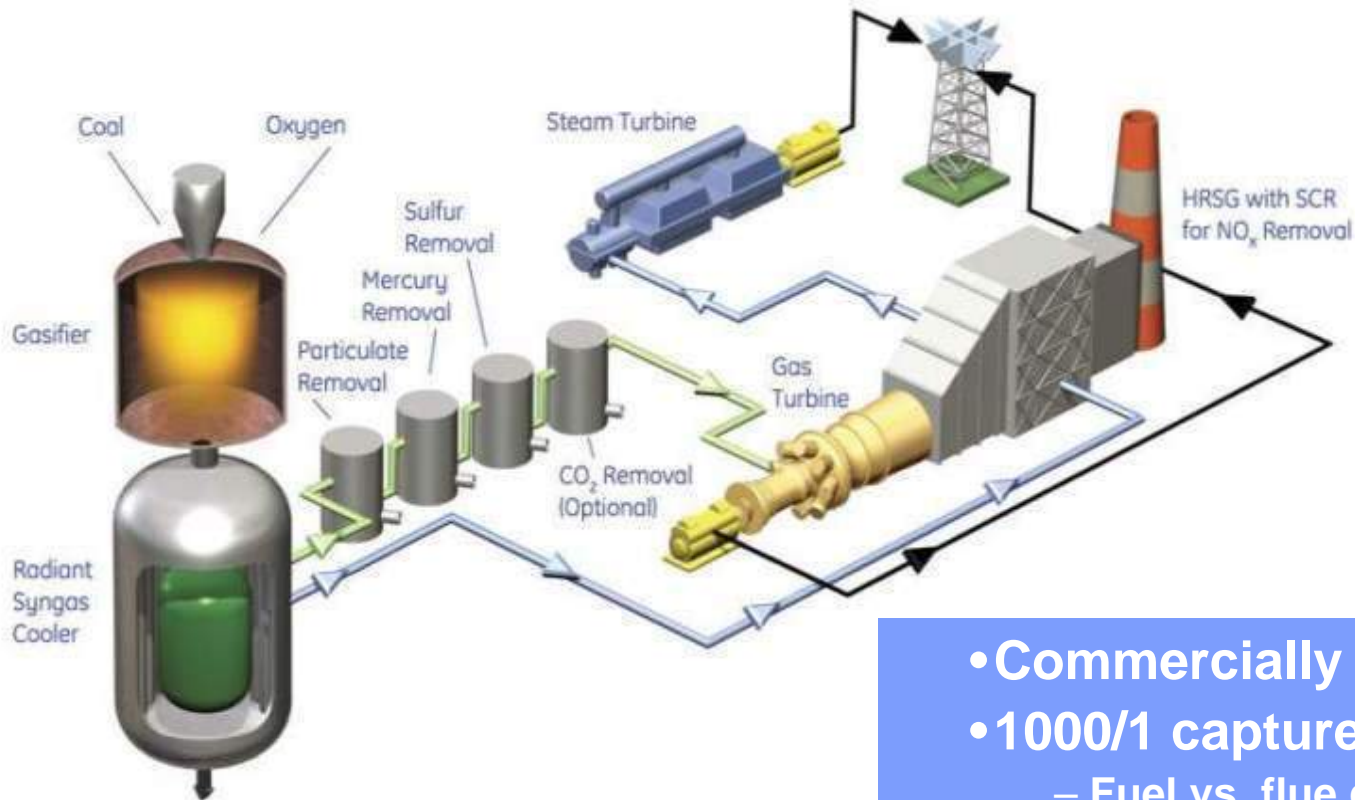
Commercial gasification & carbon capture



Capture+Shift Equivalency to CC

- Ammonia Plant => 90% CO₂ Capture
- Methanol Process => 70% CO₂ Capture

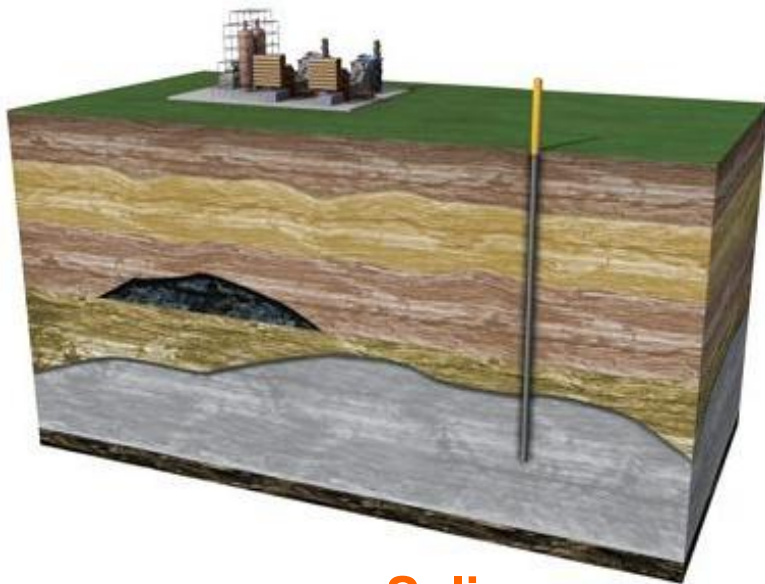
IGCC pre-combustion capture



- Commercially ready today
- 1000/1 capture advantage
 - Fuel vs. flue gas: 8/1
 - Pressure: 42/1
 - CO₂ Concentration: 3/1
- Lower water consumption
- Useful byproducts
- High sulfur capability

GE & Schlumberger Alliance

**IGCC
Plant**



**Saline
Reservoir**

Total Carbon Solution

- Schlumberger: site selection, characterization, design & construction, monitoring, decommissioning
- GE: IGCC & carbon capture

Alliance Benefits

- Aligns buying cycle
- Coordinates engineering & construction of storage & facility
- Integrates operations/maintenance profile
- Develops CO₂ specs based on specific projects and geologic formation

Purpose

- Accelerate the use of IGCC with CCS technology
- Technical & commercial certainty for coal-based power generation

What's the future for gasification?

What the industry has today:

Proven technology

A sense of urgency around carbon **policy**

Potential projects & **customers**

We need to advance understanding...

IGCC – Sustainable Power Generation

Q&A



imagination at work