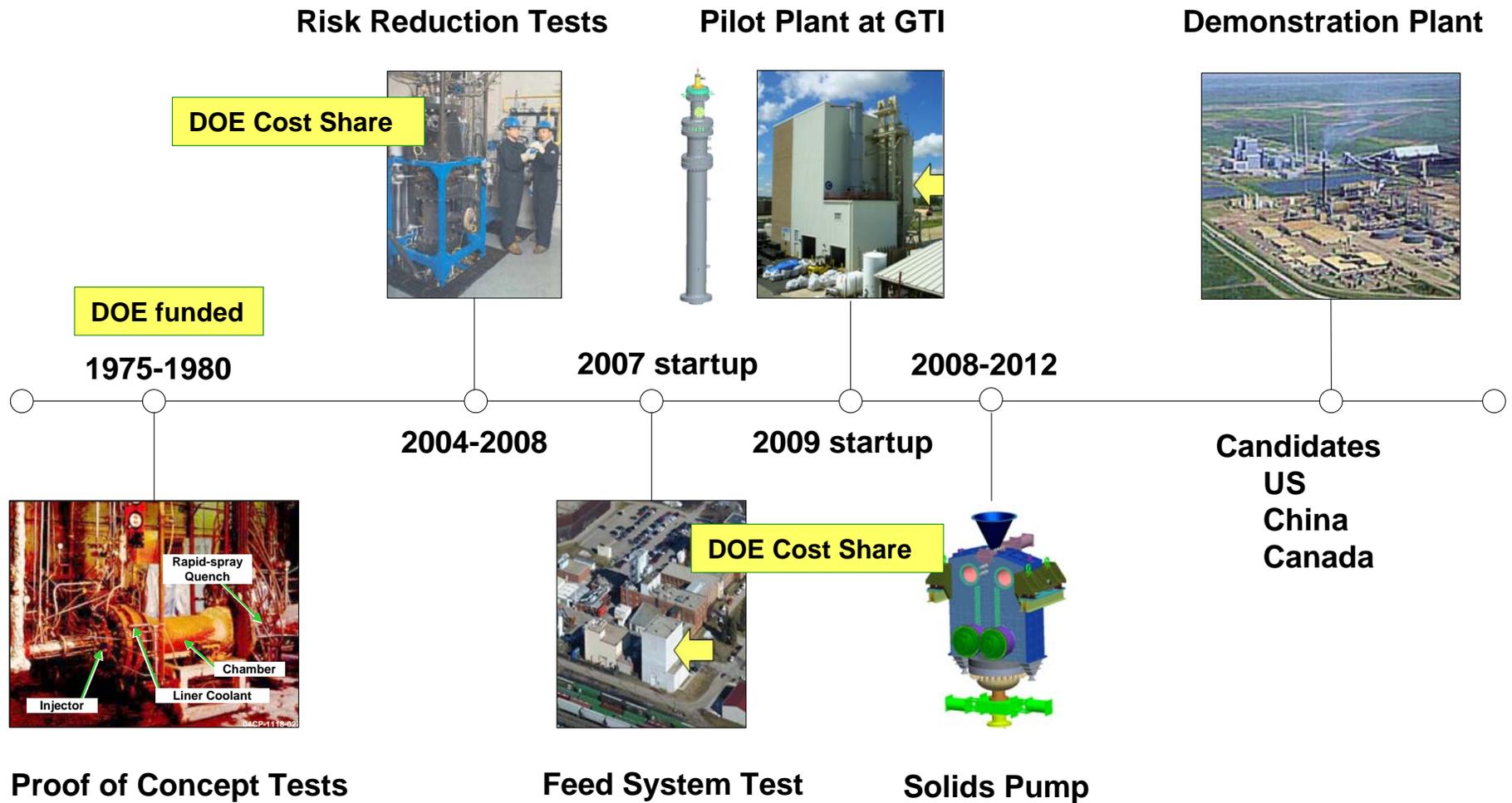


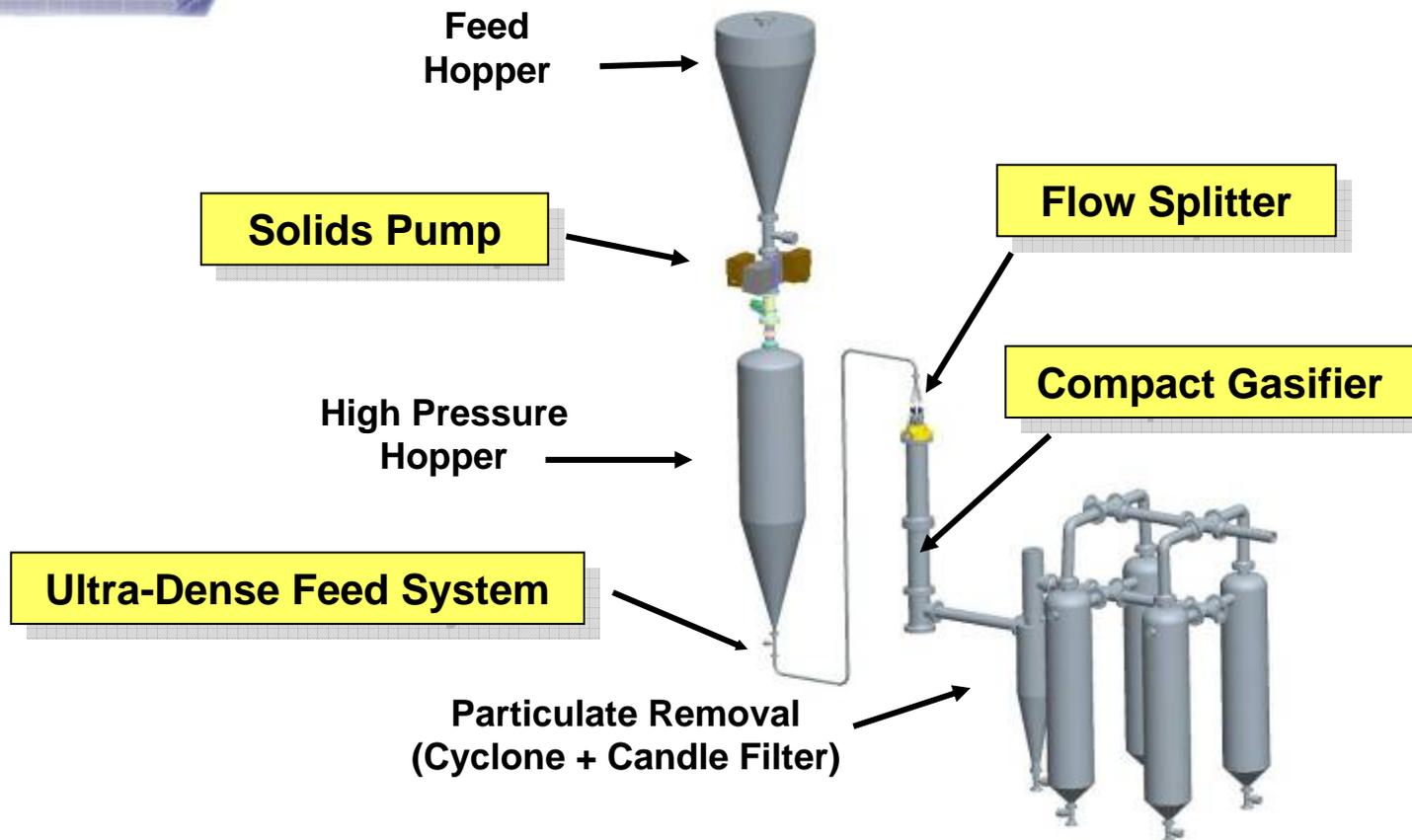
PWR Gasification Timeline

DOE is a Key Partner



Pratt & Whitney Rocketdyn1

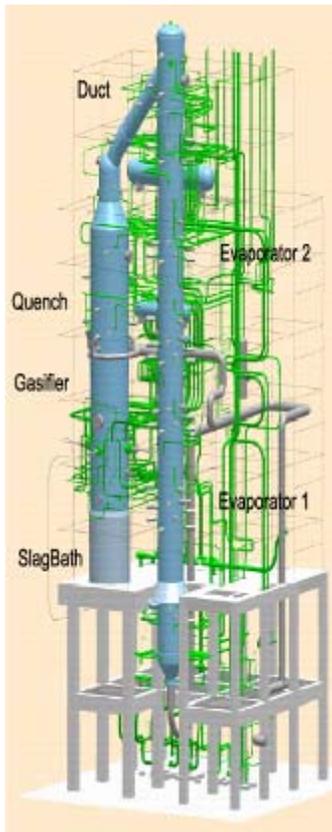
PWR Compact Gasification System



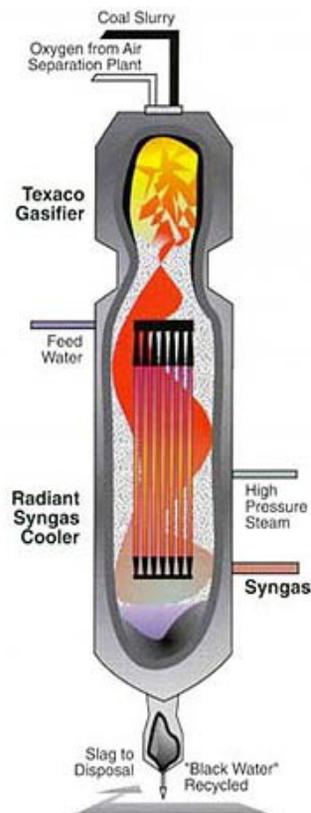
- Key Development Items are Shown in Yellow
- Other Items are Commercially Available

Benefits of the Compact Gasification System

Current Market Leaders



Source: Shell paper (2004)



Source: DOE paper (2006)



Benefits of PWR Technology

- **90% size reduction (gasifier)**
- **50% lower cost (gasification system)**
- **99% availability (gasification system)**
- **99% carbon conversion**
- **80% to 85% cold gas efficiency**
- **Dry feed system**
 - **Lower oxygen consumption**
 - **Gasify all ranks of coal, petcoke, and biomass blends**
- **Pump replaces lock hoppers**
- **High pressure / water spray quench**
 - **Ideal for H₂ production**
 - **Low cost CO₂ sequestration**

Cost Advantages Confirmed by Independent Analyses



	Power (IGCC)	Power (IGCC)	Hydrogen	Hydrogen
Compared Versus	GE	Shell	GE	GE
Feedstock	Coal	Coal	Coal	Petcoke
Capex Benefit	10%	20%	24%	20%
Cost of Product Benefit	15%	21%	27%	25%
Study Performed By	NETL (Worley Parsons)	NETL (Worley Parsons)	NETL (Worley Parsons)	Jacobs

Overall Plant Cost Savings

- **10% to 24% lower capital cost**
- **15% to 27% lower cost of product**

Development Partners

Performed Due Diligence Before Investing



- PWR has teamed with ExxonMobil Research and Engineering (EMRE) to develop and commercialize the technology
- DOE is cost-sharing development of the Dry Solids Pump and Feed System under a Cooperative Agreement
- Alberta Innovates: Energy and Environmental Solutions (EES) is cost-sharing definition of a demo plant for an Alberta location and funding tests with Alberta feedstock
- Zero Emission Energy Plants, Inc. (ZEEP) is launch customer with a global license to develop gasification plants

