U.S. Department of Energy
Energy Efficiency and Renewable Energy

Fuel Processing

Valri Lightner

Energy Efficiency and Renewable Energy

Hydrogen, Fuel Cells and Infrastructure Technology Program

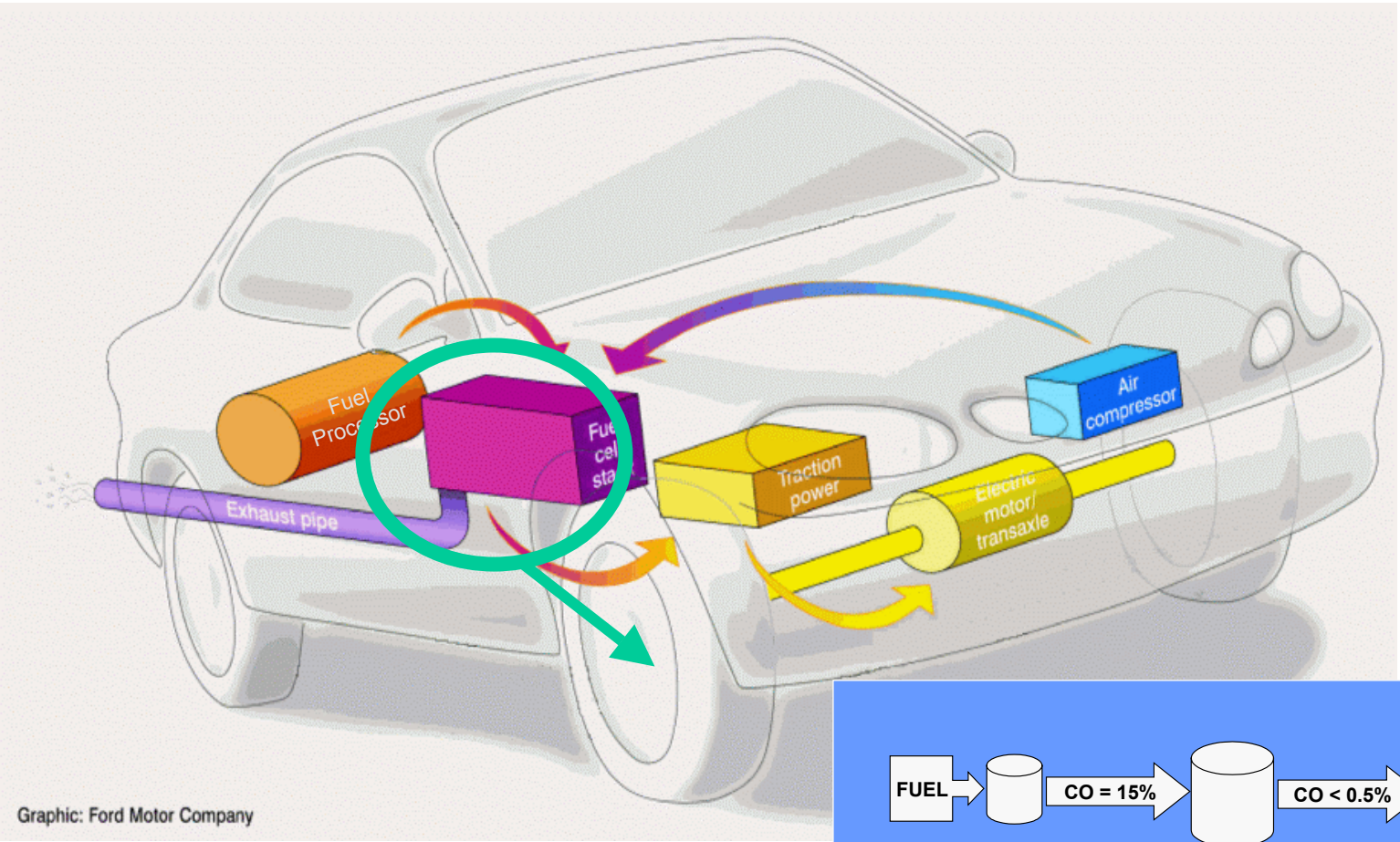
Fuel Cells Team

FORS 5G-086

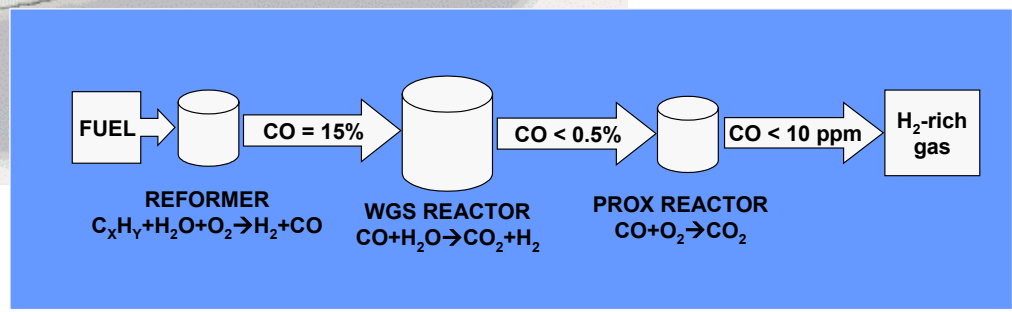
(202) 586-0937

valri.lightner@ee.doe.gov

Fuel Processing

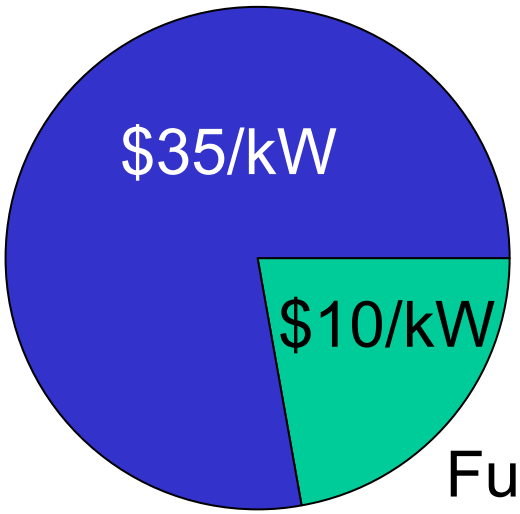


Graphic: Ford Motor Company



On-Board Fuel Processing Barriers

Fuel Cell Power Systems
$45/kW by 2010



Fuel Processor

BARRIERS

- Fuel processor start-up/ transient operation
- Durability
- Cost
- Emissions and environmental issues
- H_2 purification/CO cleanup
- Fuel processor system integration and efficiency

On-Board Targets and Status

Fuel Processor for 50 kWe (net) Fuel Cell Systems

Fuel processor generating hydrogen-containing fuel gas from reformulated gasoline containing 30 ppm sulfur, average

Characteristics	Units	2003 status	2005	2010
Energy efficiency	%	78	78	80
Power density	W/L	700	700	800
Cost	$/kW	65	25	10
Durability	Hours	2000	4000	5000
Cold start-up time to max power @ +20ºC ambient temp.	Min	<10	<1	<0.5

Funding and Partners

- FY03 enacted: $24.7M
- FY04 request: $19M
- Key research partners – Nuvera, U Michigan, Catalytica, GE, UTRC, Ohio State U, Tiax, ANL, LANL, PNNL, ORNL, NETL

Accomplishments

- Demonstrated in the lab an advanced fuel flexible fuel processor subsystem for automotive fuel cells achieving >80% hydrogen generation efficiency, at a power density of 800W/l and a specific power of 550W/kg.

Major Milestones

- Go/No-Go review in late 2004 to determine the future course of on-board vehicle fuel processing activities. Review will focus on ability to meet <0.5 minute start up time to minimize the energy penalty and other critical technical target.

Future Direction

- No solicitations currently planned
- Go/No-Go milestone will refocus program area direction
- Emphasis on stationary reforming, auxiliary power, and improved water gas shift catalysts