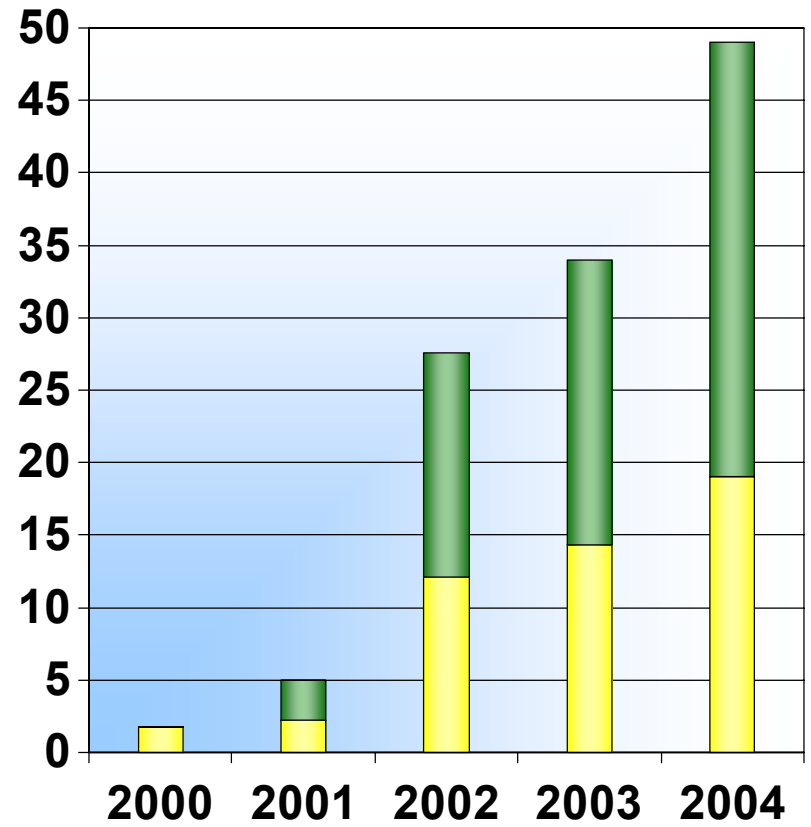
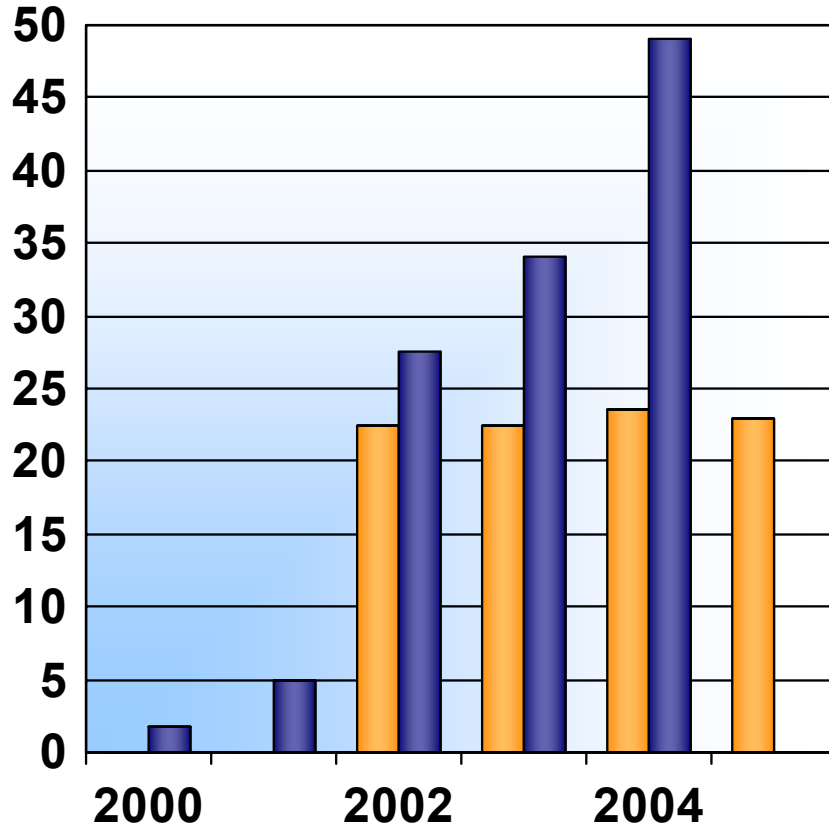


SECA Budget (\$M)



 Request
 Funding

 Industry Teams
 Core Technology Program

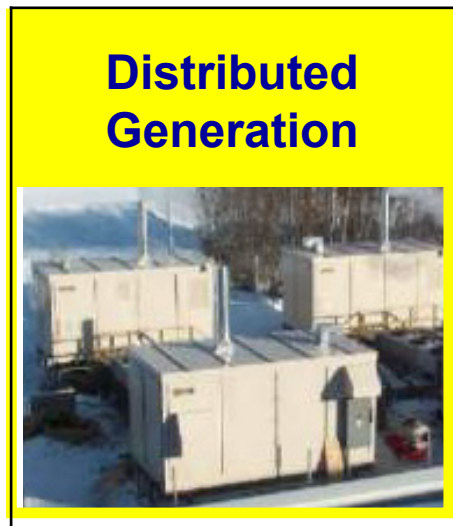


National Initiatives

- Clean Coal
- Global Climate Change (CO₂)
- Clear Skies (NO_x)
- Hydrogen
- Energy Security

**Distributed
Generation**

**Advanced Coal Technology/
FutureGen**

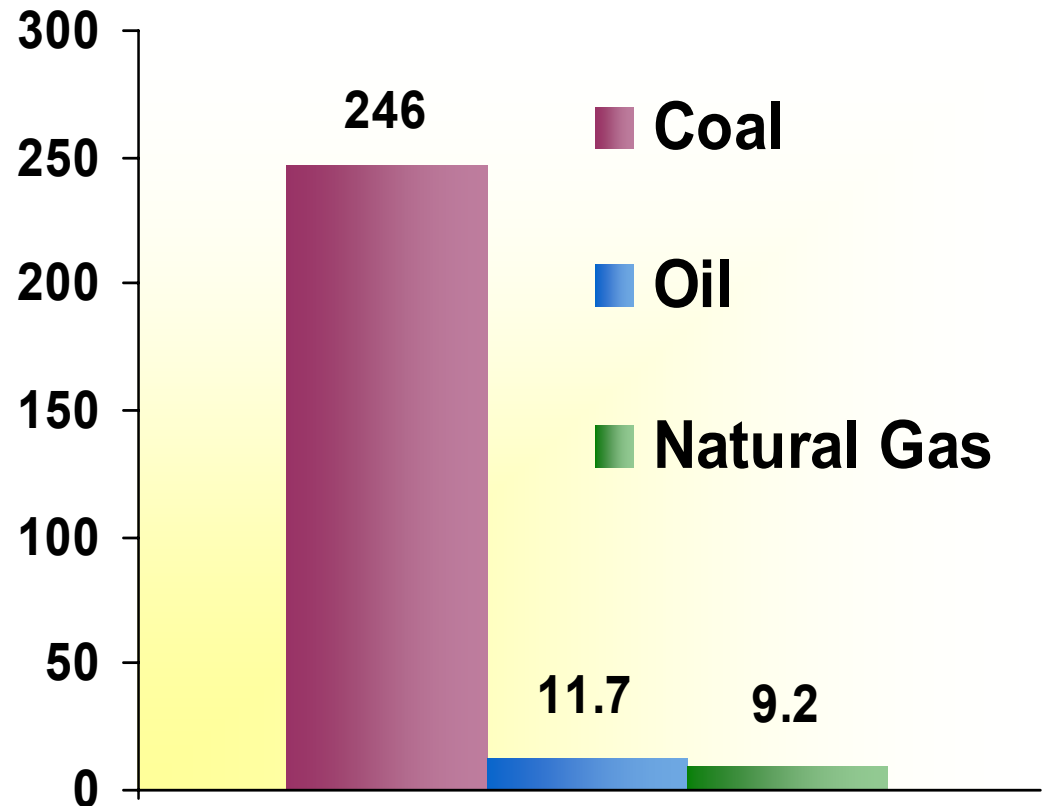


Why Future Gen and Sequestration?



**U.S. Fossil Fuels Reserves/Production Ratio
Shows Years Supply at Current Production**

- Abundant reserves
- Low and stable prices
- Technology improvements
 - Enable near-zero emissions of air pollutants/GHGs



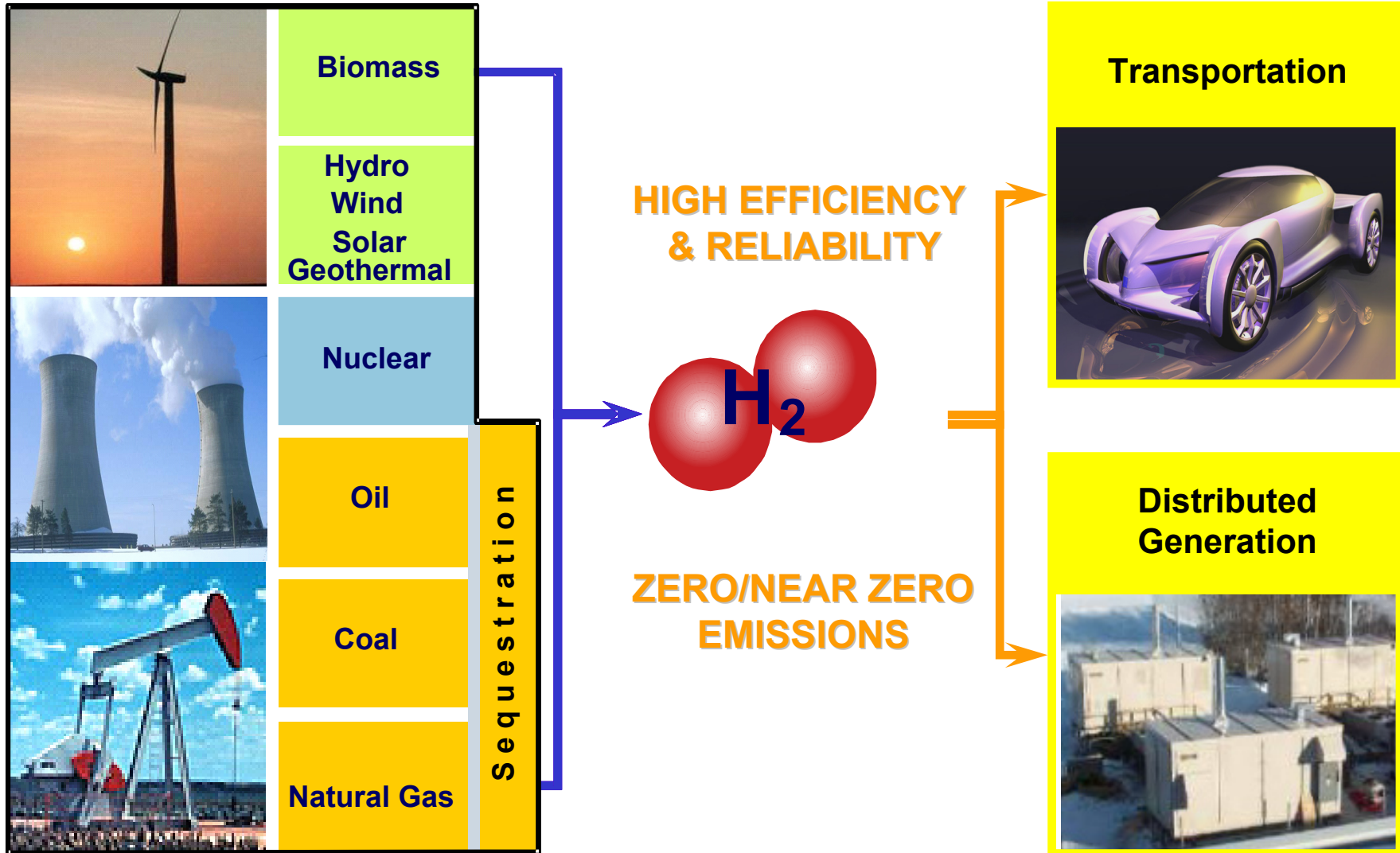
*EIA- U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves:
2001 Annual Report, November 2002;
Coal: BP Statistical Review, June 2002, World Energy Council*



Hydrogen Economy & Fuel Cells

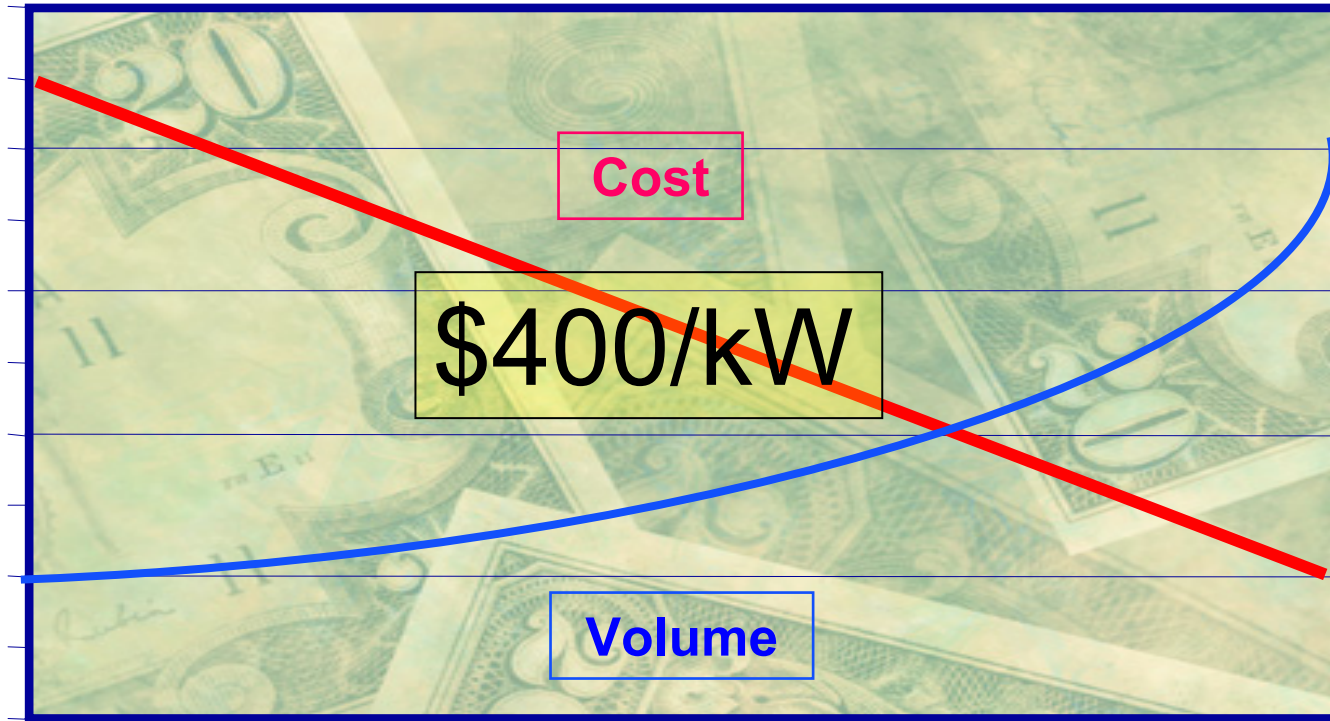


Hydrogen from Domestic Resources can significantly reduce our demand for oil by the year 2040

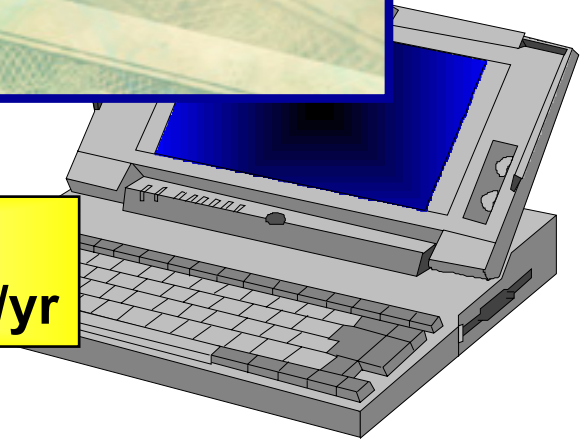


Source: US DOE Energy Efficiency & Renewable Energy

SECA Fuel Cells in 2010



Low Cost/High Volume
\$400/kW/ > 50,000 units/yr



SECA Program Structure



Industry Input



Project Management



Program Management

Needs



Research Topics



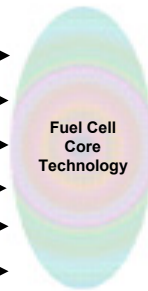
Industry Integration Teams



Technology Transfer

	University	National Lab	Industry	Small Business	
Fuel Processing					→
Manufacturing					→
Controls & Diagnostics					→
Power Electronics					→
Modeling & Simulation					→
Materials					→

Core Technology Program




Fuel Cell Core Technology



SECA Industrial Partners



 **Power Systems**

DELPHI
Driving Tomorrow's Technology

Acumentrics
Advanced Power & Energy Technologies



 **Power Systems**

 FuelCell Energy

SIEMENS
Westinghouse



VersaPower



SECA: Making Fuels Cells a Reality



2005

- **1st Generation Prototypes**
 - Testing & Evaluation

2010

- **\$400/kW Modules**
 - Residential, Commercial, Industrial CHP
 - Transportation APUs

2012 - 2015

- **FutureGen - SECA fuel cells available**

2020

- **MW-Scale SECA fuel cells for Advanced Coal Power Plants**



Priorities: *Core Technology Program*



1	Gas seals	<ul style="list-style-type: none">• Rigid and compressive seals
1	Interconnect	<ul style="list-style-type: none">• Modifying components in alloys• Coatings
1	Failure Analysis	<ul style="list-style-type: none">• Models with electrochemistry• Structural failure criteria
2	High Temperature Heat Exchanger	<ul style="list-style-type: none">• Identification and/or development of materials
2	Cathode performance	<ul style="list-style-type: none">• Micro structure optimization• Mixed conduction• Interface modification
2	Fuel Processing/ Anode	<ul style="list-style-type: none">• Metal oxides with interface modification• Catalyst surface modification• Characterize thermodynamics/kinetics
3	Material cost	<ul style="list-style-type: none">• Lower cost precursor processing

