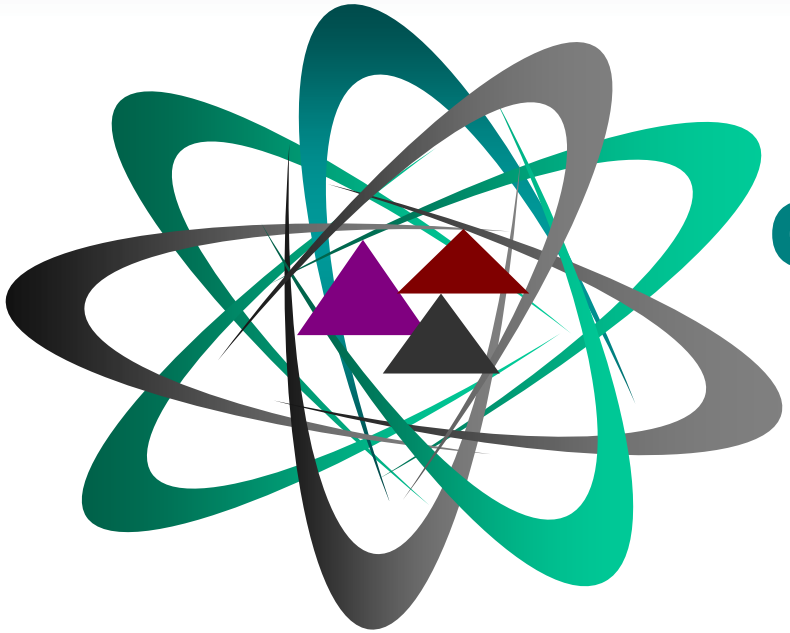


The Future Role of Nuclear Power

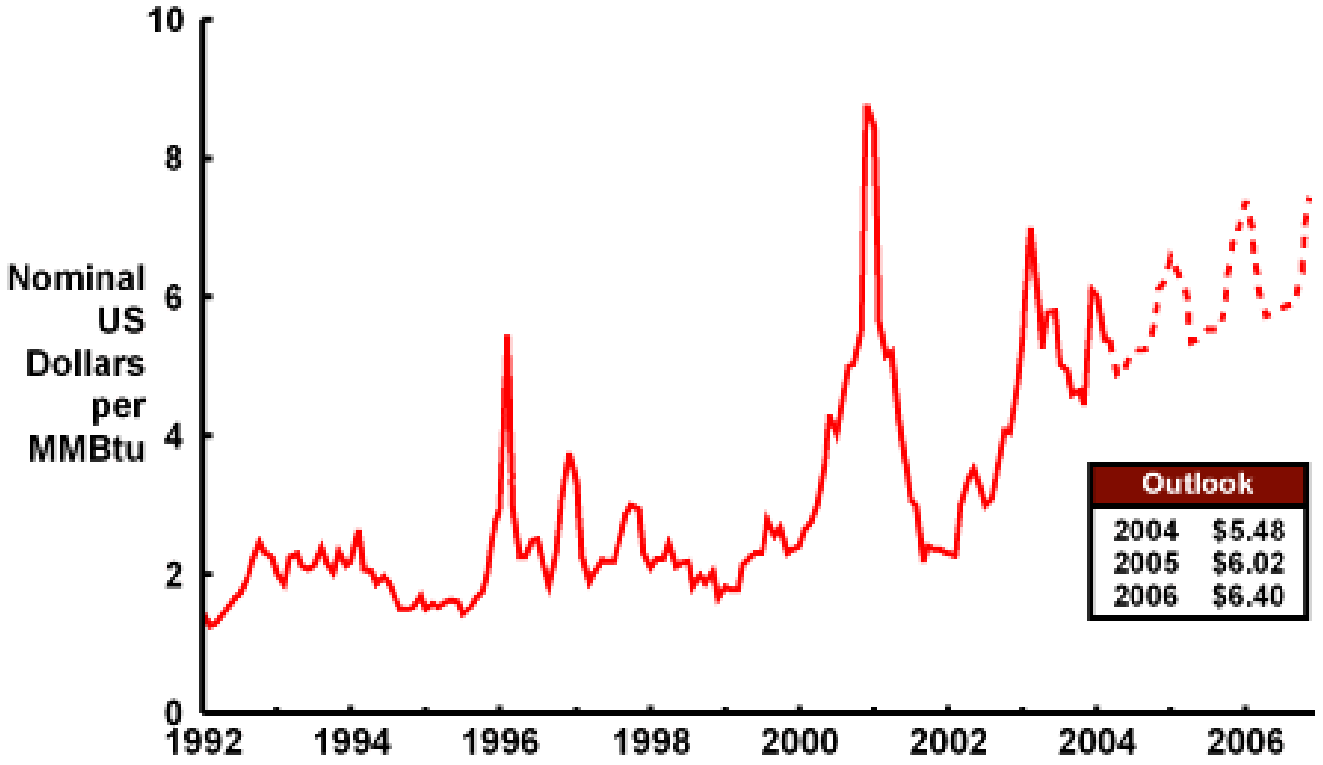
Michael Sellman

President and Chief Executive Officer

Nuclear Management Company, LLC

Figure 11

Spot Natural Gas Prices—Henry Hub



Source: Cambridge Energy Research Associates.
40334-9

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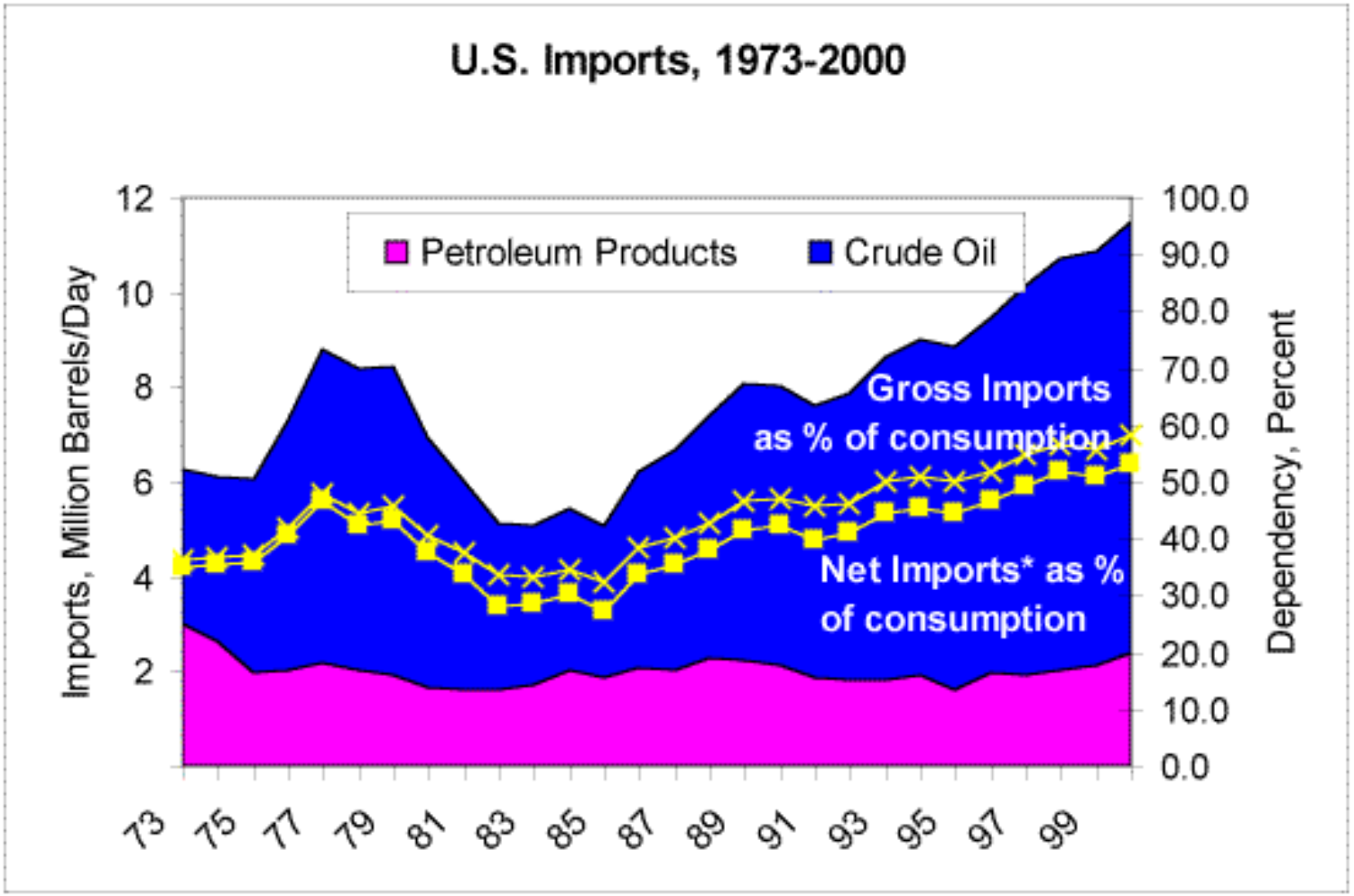

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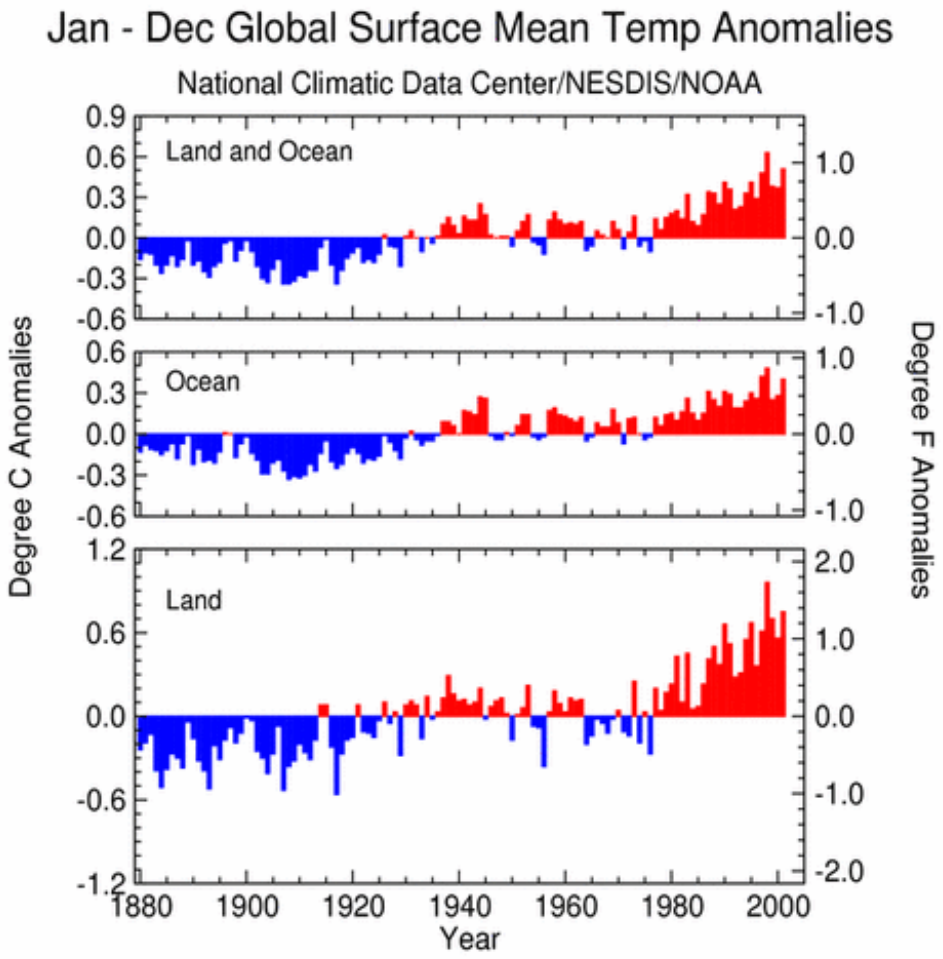

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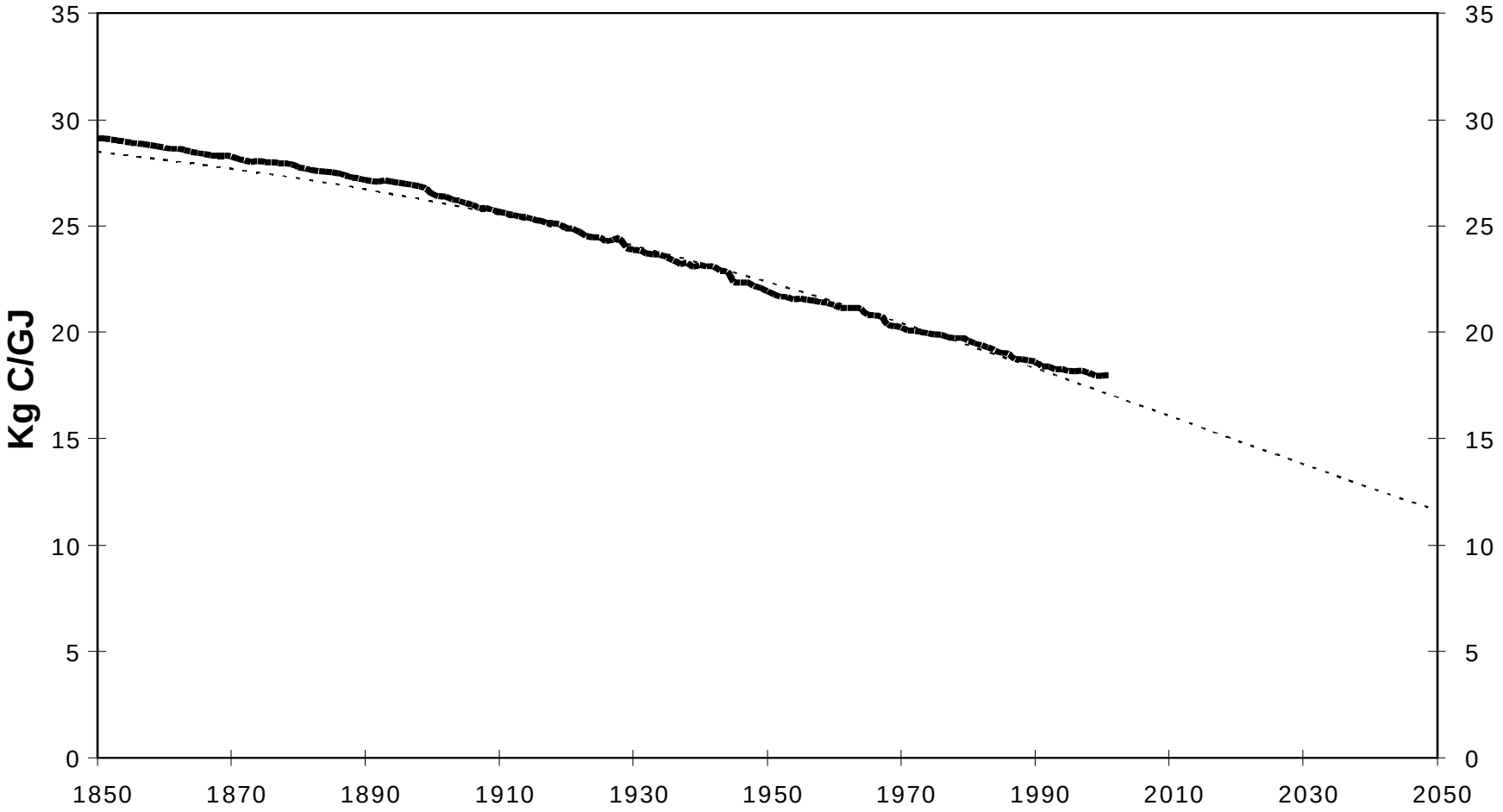
Falling Global Carbon Intensity of Primary Energy



Data sources: IIASA, BP (1965-2001), CDIAC http://cdiac.esd.ornl.gov/trends/emis/em_cont.htm


OIL
OIL
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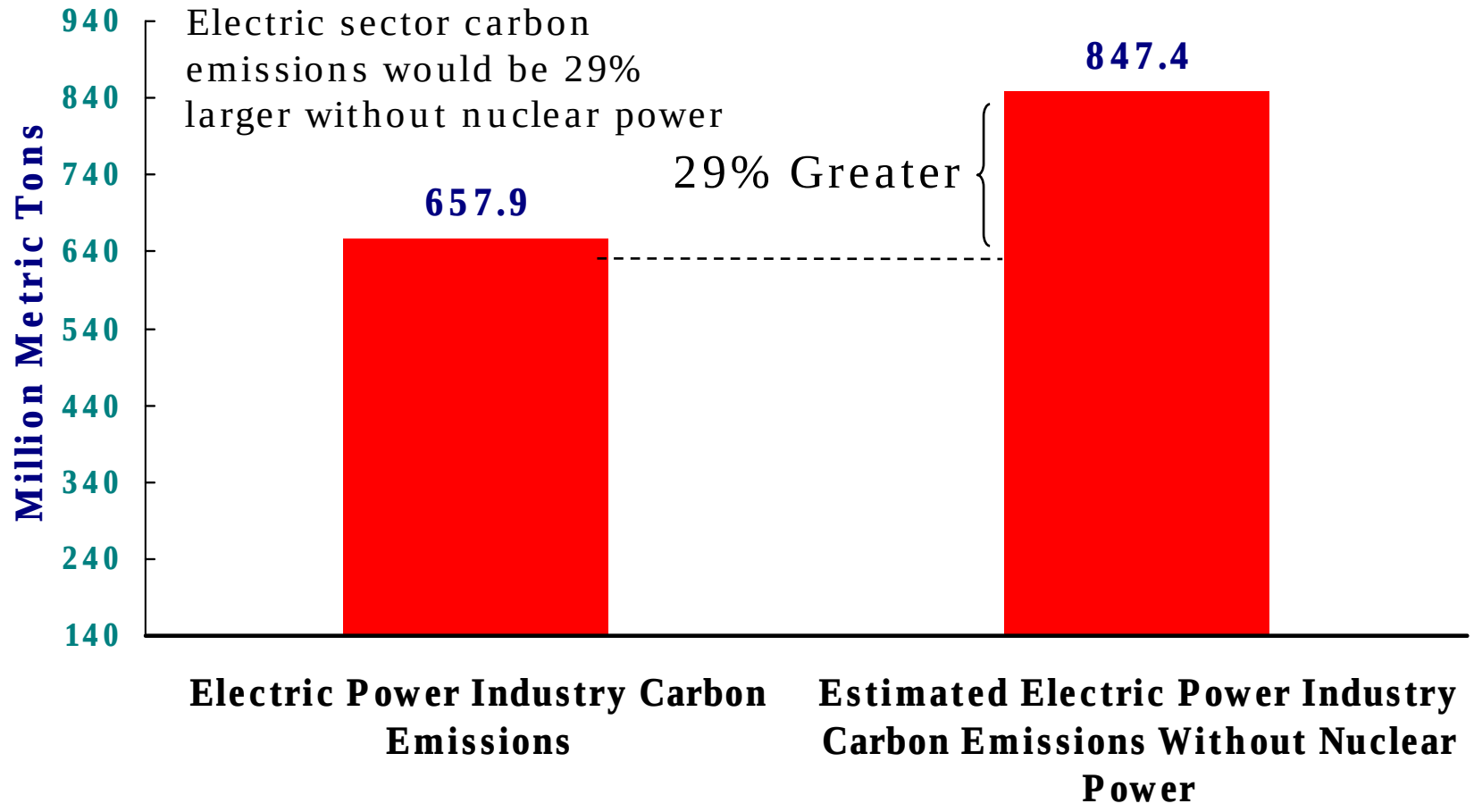
OIL


OIL
OIL

Nuclear Power's Contribution to Limiting Carbon Emissions (2002)



Emissions avoided by nuclear power are calculated using regional fossil fuel emissions rates (from the Environmental Protection Agency's Continuous Emission Monitoring System) and individual plant generation data from EIA. Total emissions are calculated from EPA CEMS data. Updated 9/03 - NEI

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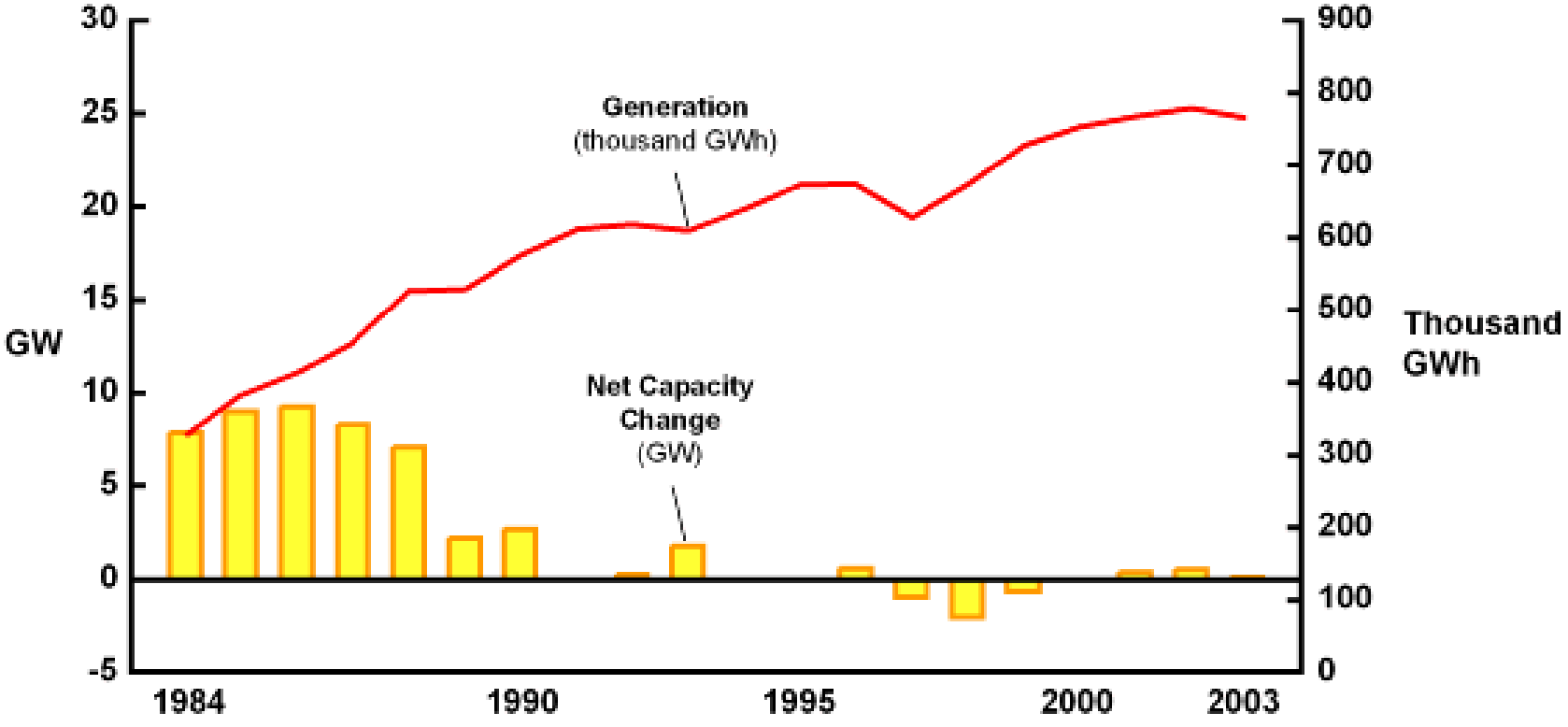
Increased Nuclear Utilization, Flattening Out

Figure 8

Net Capacity Change versus Generation: Nuclear, 1984–2003



Source: Cambridge Energy Research Associates.
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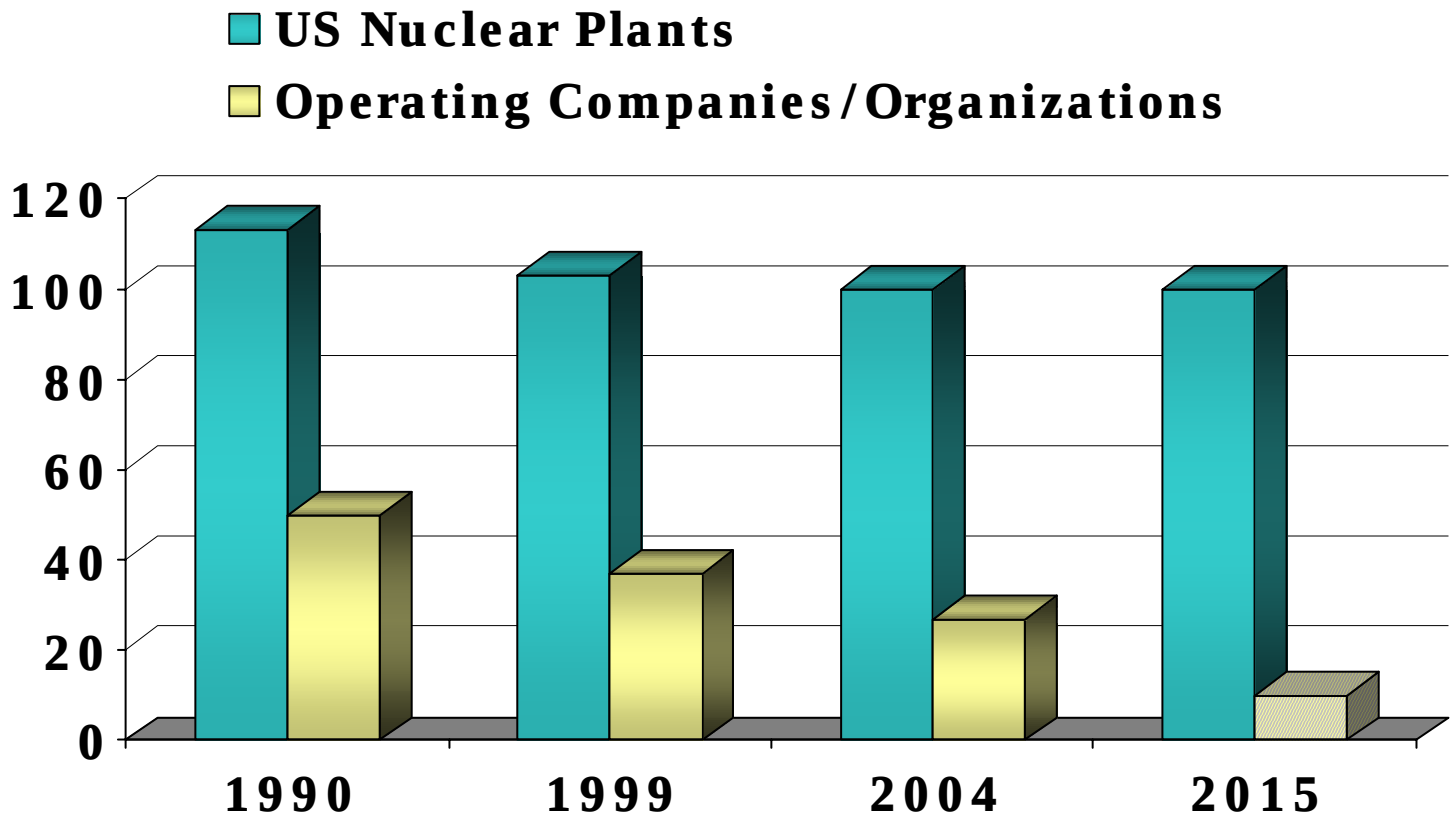
US Nuclear Market Consolidation



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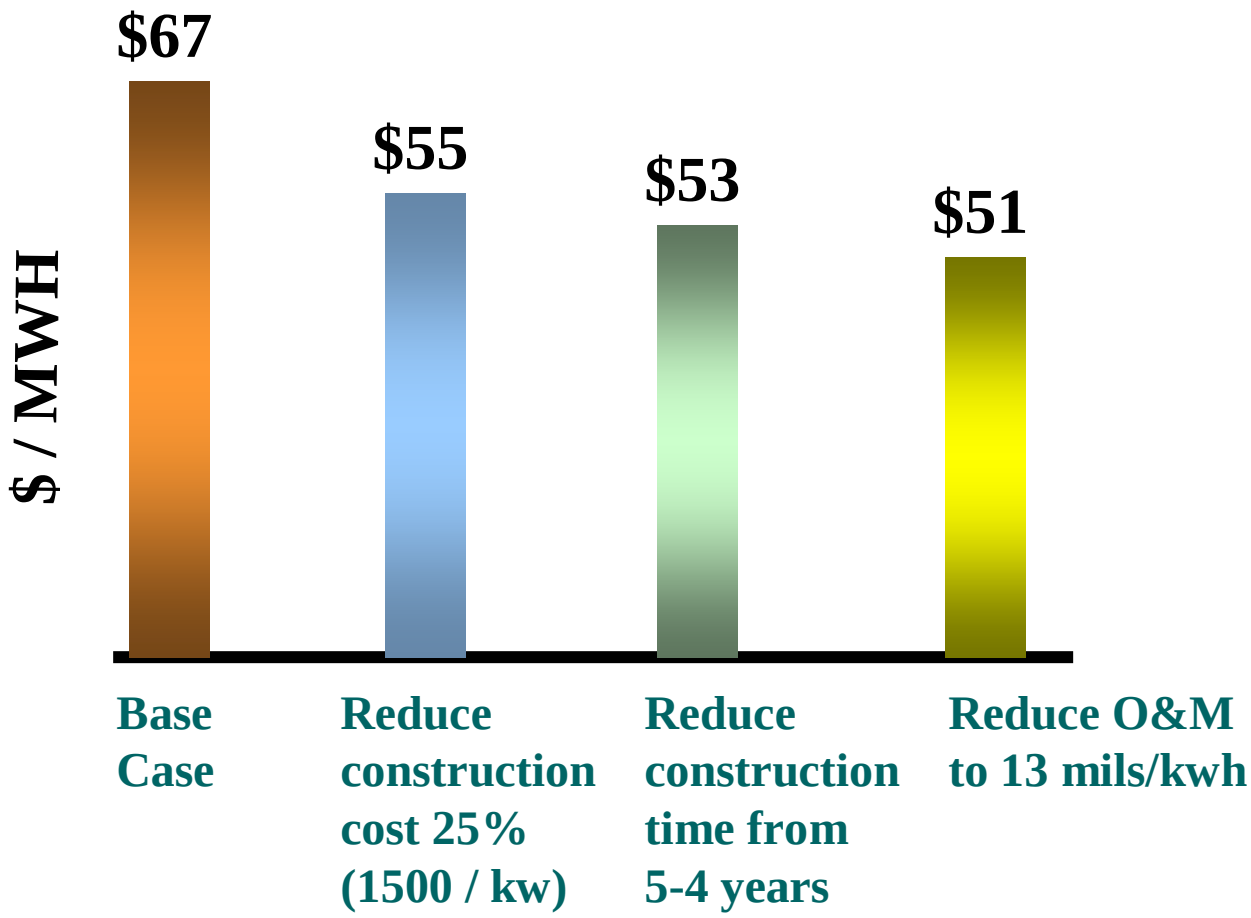
Plausible Changes in MIT Study



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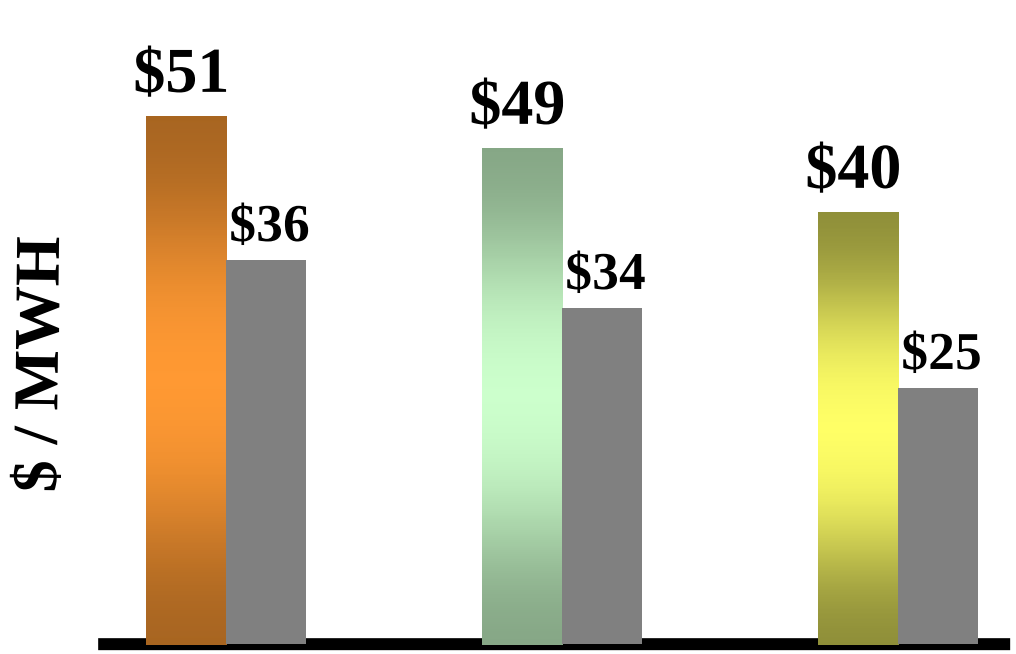
Additional Requirements



1.8¢ kwh production tax credit/8 years

$1500/kw construction
4 yr construction period
13 mil operating cost

Improve capacity factor to 92%

Reduce construction cost to $1100/kw

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Capturing Fossil Waste Cost

"If fossil energy had to pay the cost of garbage disposal, nuclear would be the low-cost option. The garbage of fossil plants is CO2."

--Burton Richter, Shared 1976 Nobel Prize in Physics

Item	Power Costs (cents per kwh)		
	Nuclear	Coal	Gas
Capital & Operation	4.1 – 6.6	4.2	3.8 – 5.6
Waste Sequestation	0.1	2 – 3	1 – 1.5
Total	4.2 – 6.7	6.2 – 7.2	4.8 – 7.1

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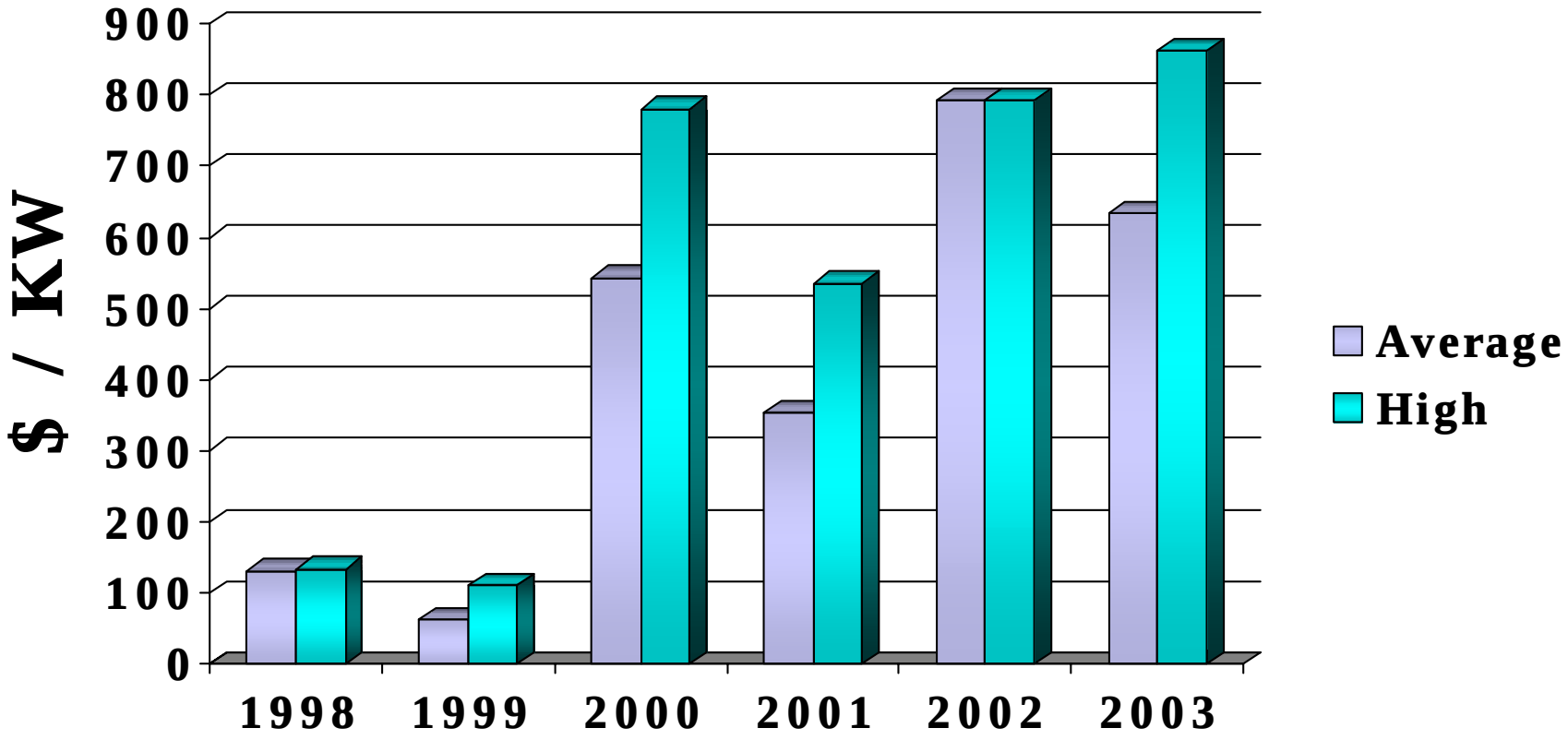
Market Value



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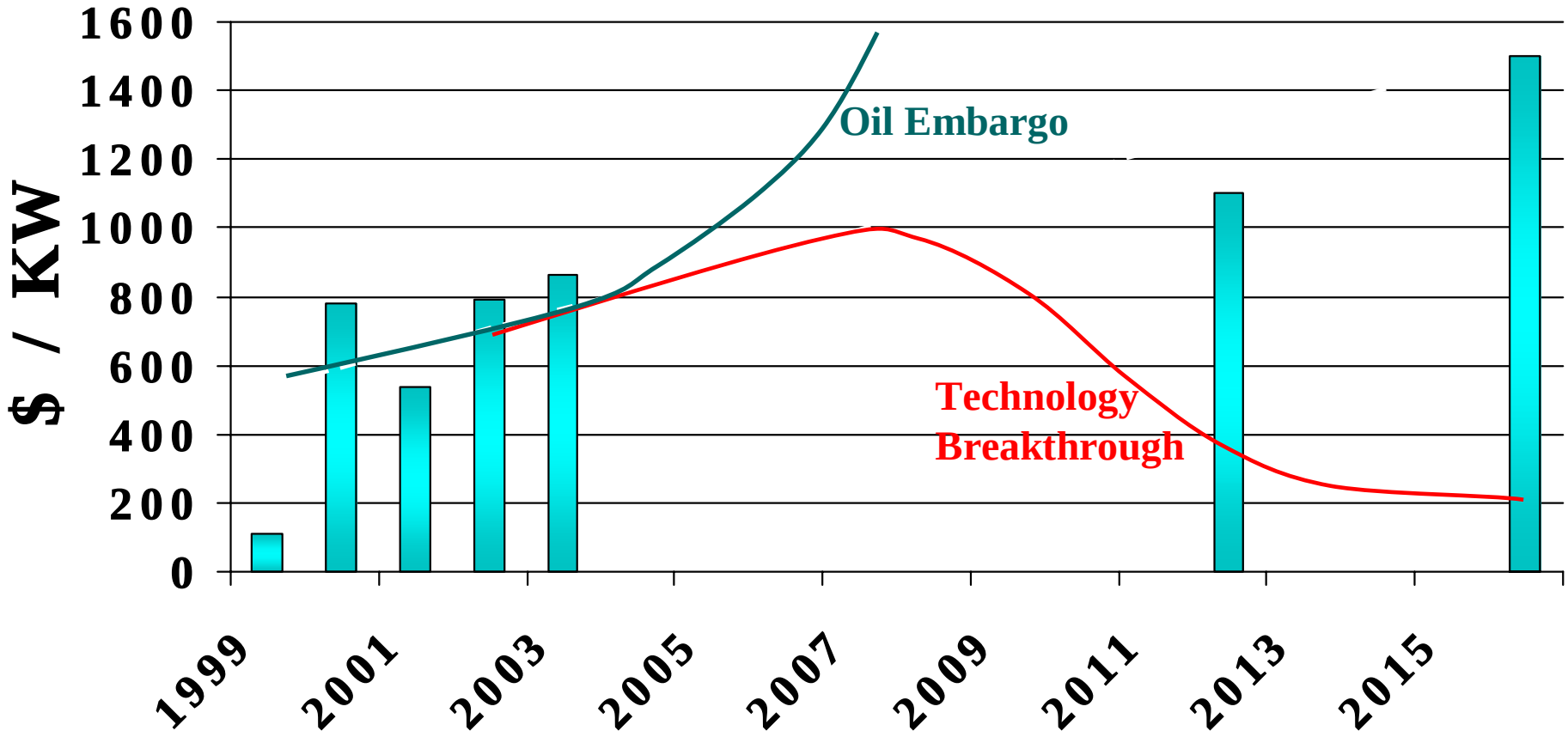
When Will We Build New Nuclear?



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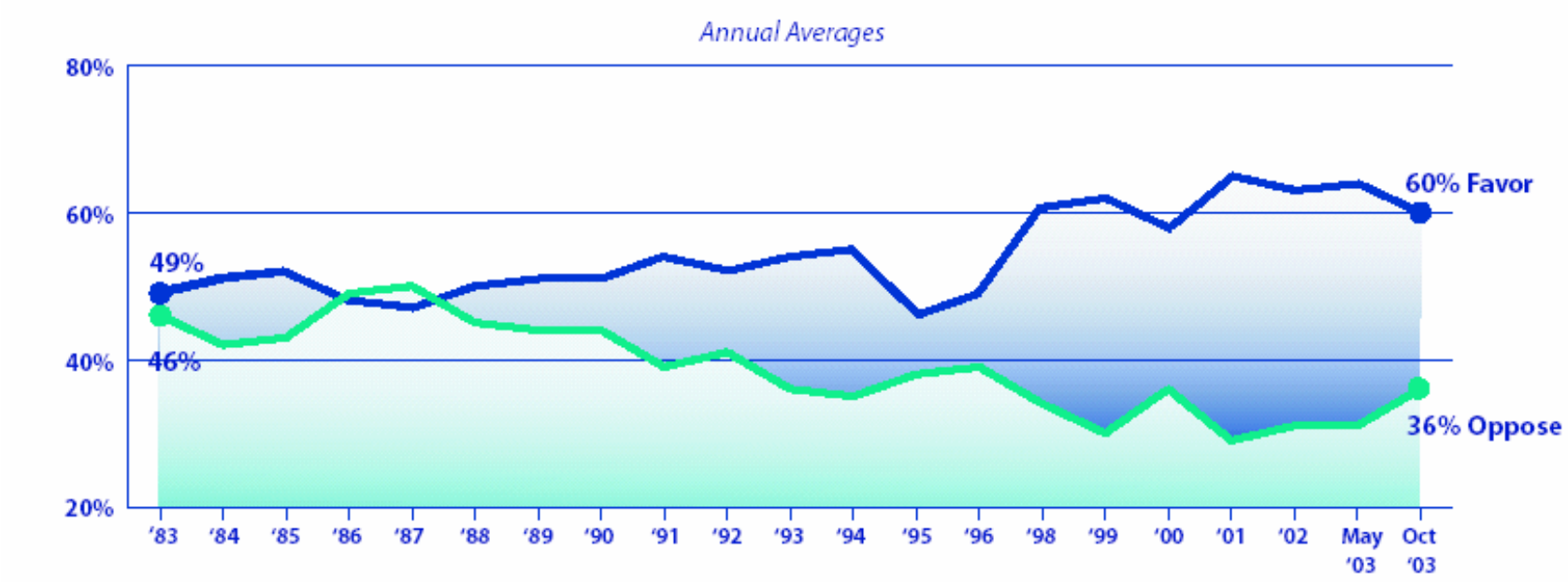
Favorability to Nuclear Energy



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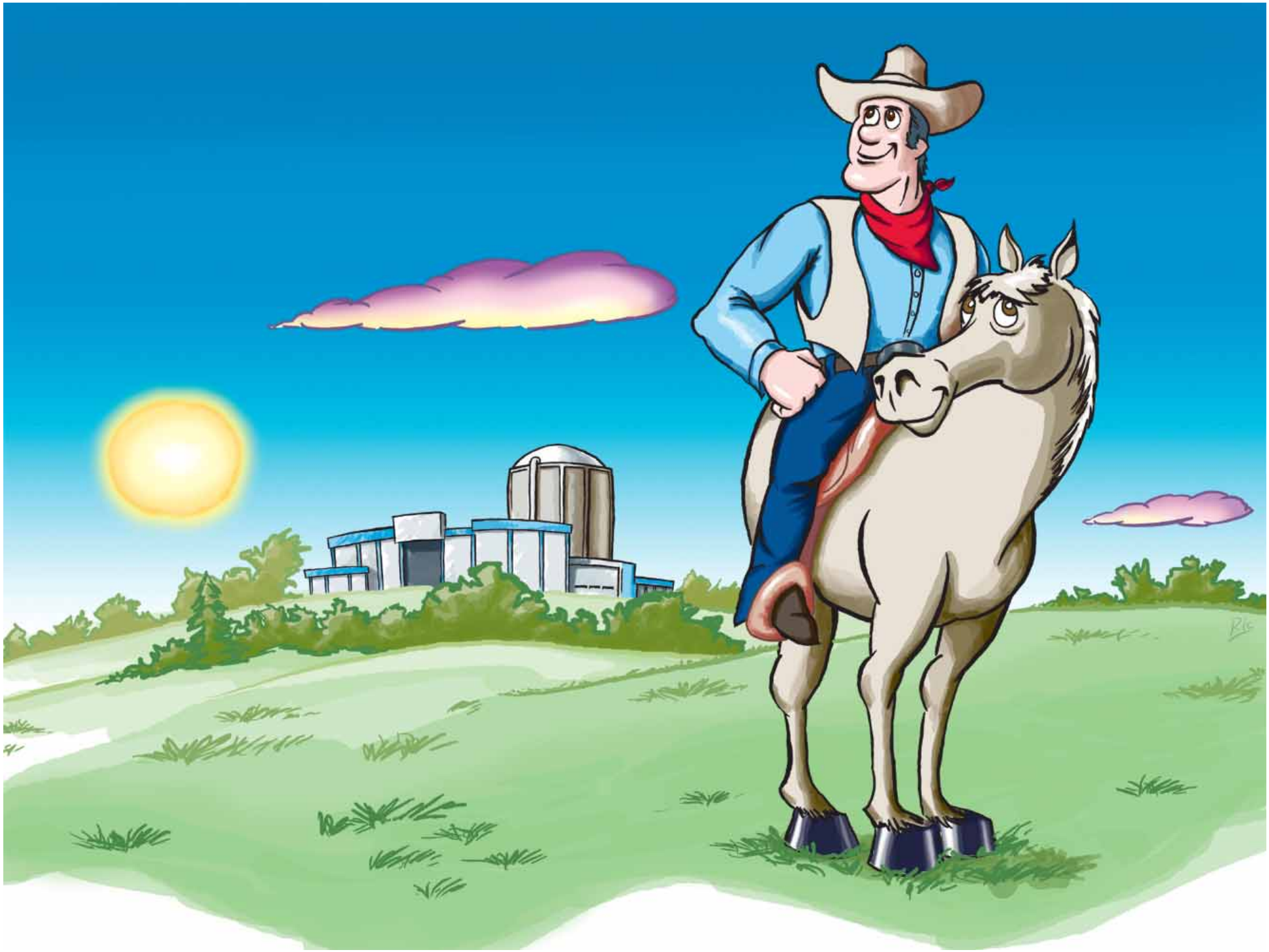
Marlboro
Country



Advancing the Next Generation

- Design passively safe, multi-purpose reactors with minimal staffing needs
- Involve environmental groups up front, win multi-party political support
- Reduce construction costs to $1100/kw
- Educate the public, re-invigorate collegiate nuclear engineering programs

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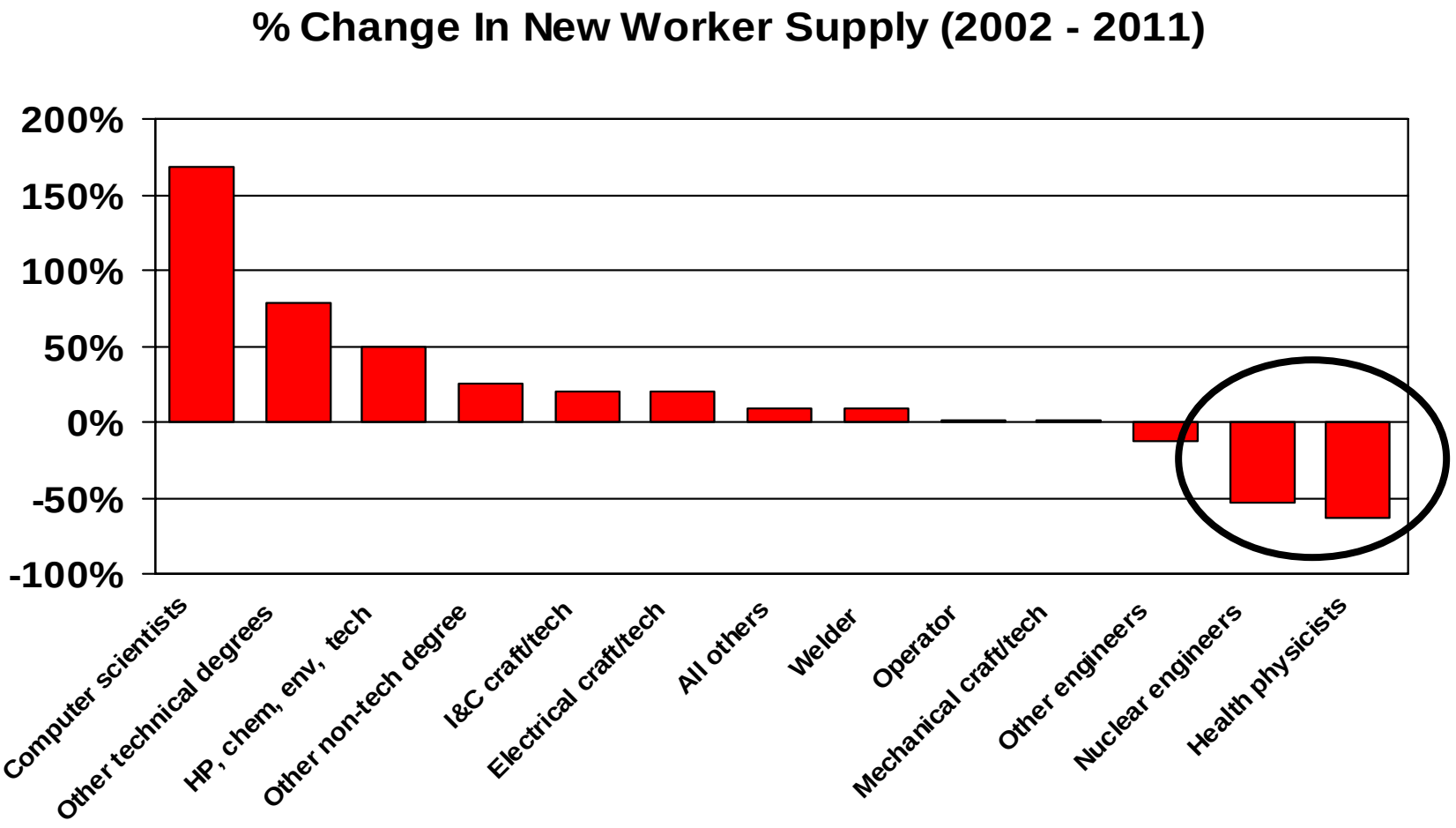
Worker Supply Projected to Decrease in Key Areas



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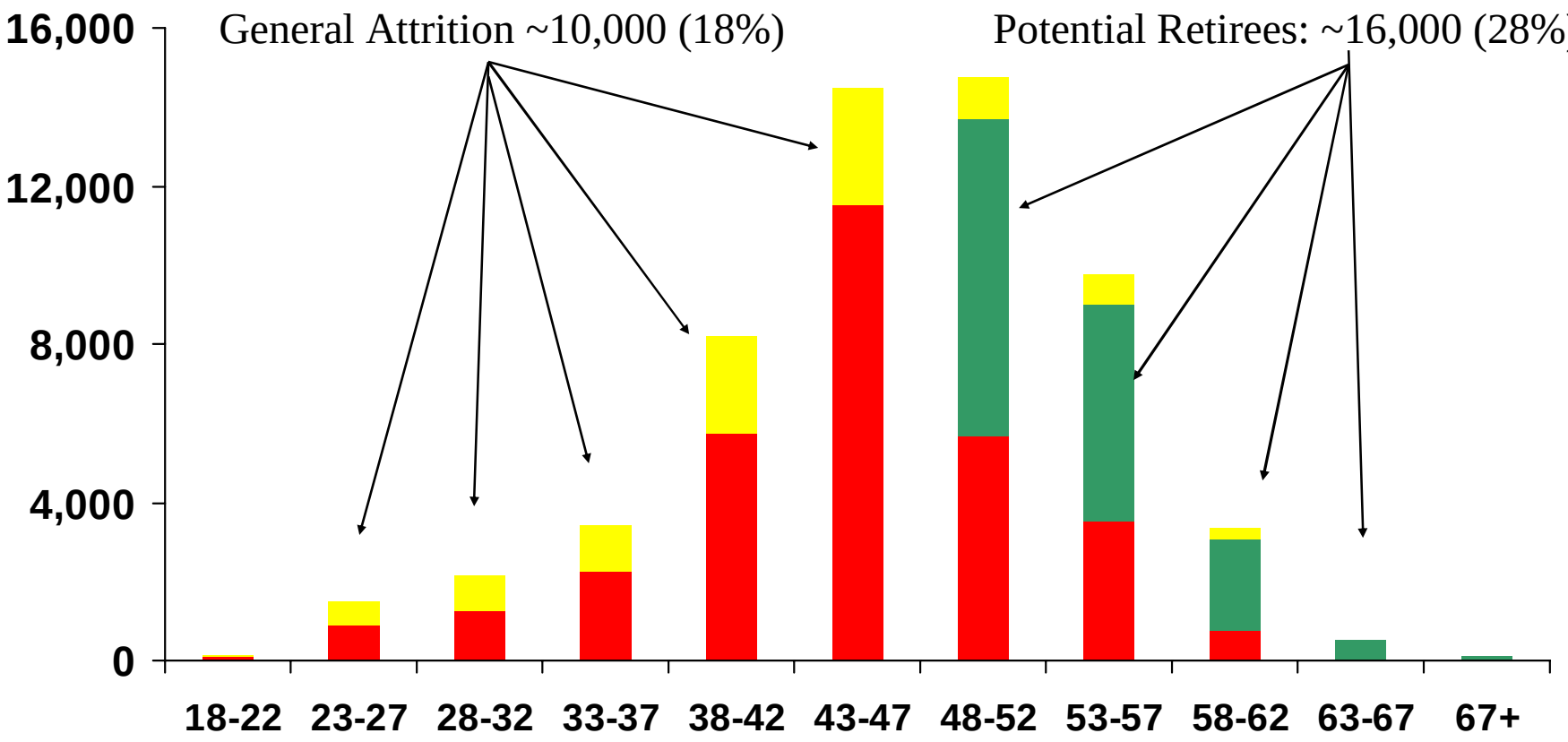
Source: 2001 NEI Staffing Survey.

Nuclear Power Generation



1. Potential Retirees are defined as employees that will be older than 53 with 25+ years of service, or older than 63 with 20 years of service, or older than 67 within the next five years.

Source: NEI Nuclear Staffing Survey

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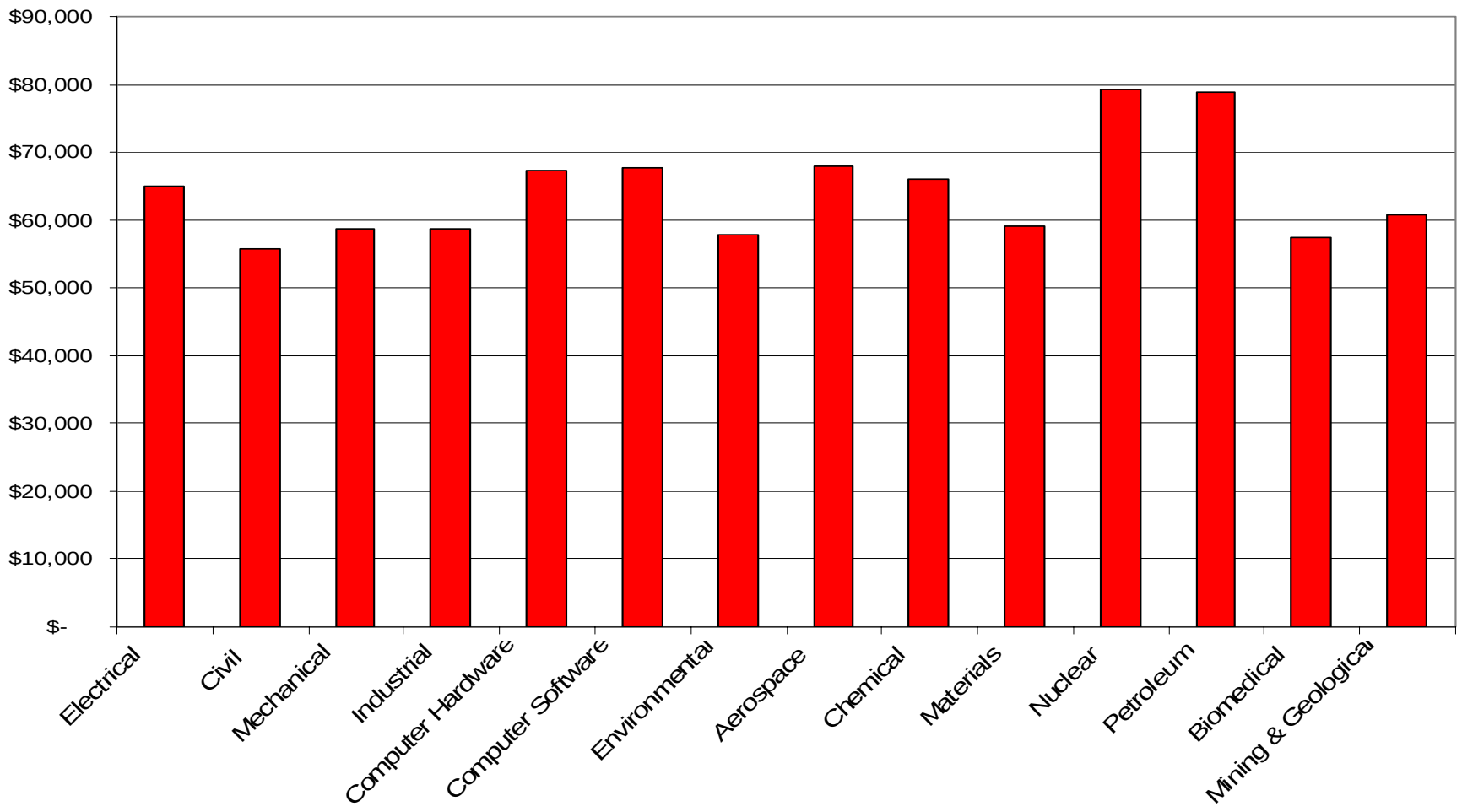
Median Incomes for Engineering Specialties



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Source: 2002-2003 U.S. Department of Labor Bureau of Labor Statistics "Occupational Outlook Handbook"

Repository Requirements in the US by 2100

Nuclear Futures		Legislative Limit	Existing License Completion	Extended License Completion	Continuing Level Energy Generation	Continuing Market Share Generation	Growing Market Share Generation
Cumulative discharged fuel in 2100 (MTiHM)		63,000	90,000	120,000	250,000	600,000	1,400,000
		Existing Reactors Only <-----			-----> Existing and New Reactors		
Fuel Management Approach		**Number of Repositories Needed**					
----> No Recycle	Current Management Approach (under existing repository legislation)	1	2	2	4	9	21
	Expanded Repository Capacity	1	1	1	2	5	11
Reprocess and Recycle <----	Separations, Limited Thermal Recycle, Repository Capacity Expansion	1	1	1	1	2	5
	Separations, Repeated Combined Thermal and Fast Recycle	1	1	1	1	1	1
	Separations, Repeated Fast Recycle	1	1	1	1	1	1

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Gen IV Nuclear Energy Systems

Multiple Missions

- Electricity Production
- Hydrogen Production
- Advanced Fuel Management Technology

Technology Choices

- SFR – Sodium Cooled Fast Reactor
- VHTR – Very High Temperature Reactor
- GFR – Gas Cooled Fast Reactor
- MSR – Molten Salt Reactor
- SCWR – Supercritical Water Cooled Reactor
- LFR – Lead Cooled Fast Reactor

Source: DOE Nuclear Energy Research Advisory Committee & GIF

Nuclear Power 2010

DOE/Industry share costs of lowering barriers to new nuclear construction

Goals

- Build New Nuclear Power Plants
- Improve Current Plant Performance

Challenges Addressed

- Improved Licensing Processes
- Gen III Reactor Designs
- Accelerated Construction Schedule
- Enhanced Business Environment

3 ESP Awards

- Dominion Energy - North Anna
- Entergy - Grand Gulf
- Exelon - Clinton

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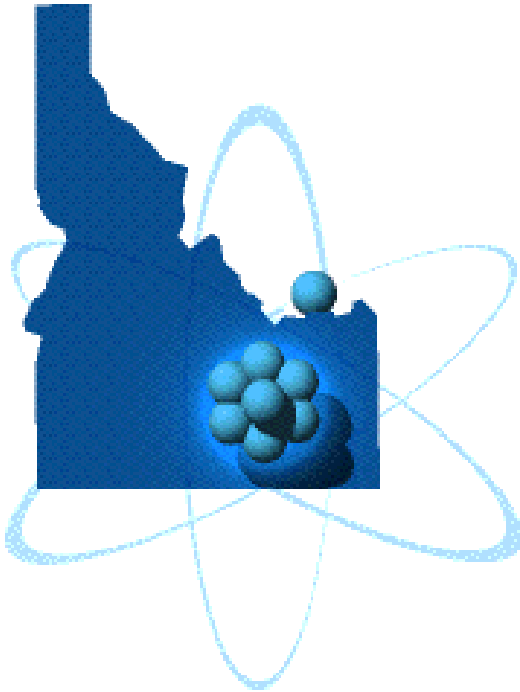
Role of Idaho National Laboratory

DOE's lead lab for nuclear technology development

INL R&D is major part of DOE's cost share

Supports Project "Integrator" responsible for:

- Implementing NGNP project
- Forming NGNP consortium
- Directing design, development, construction, demonstration of NGNP



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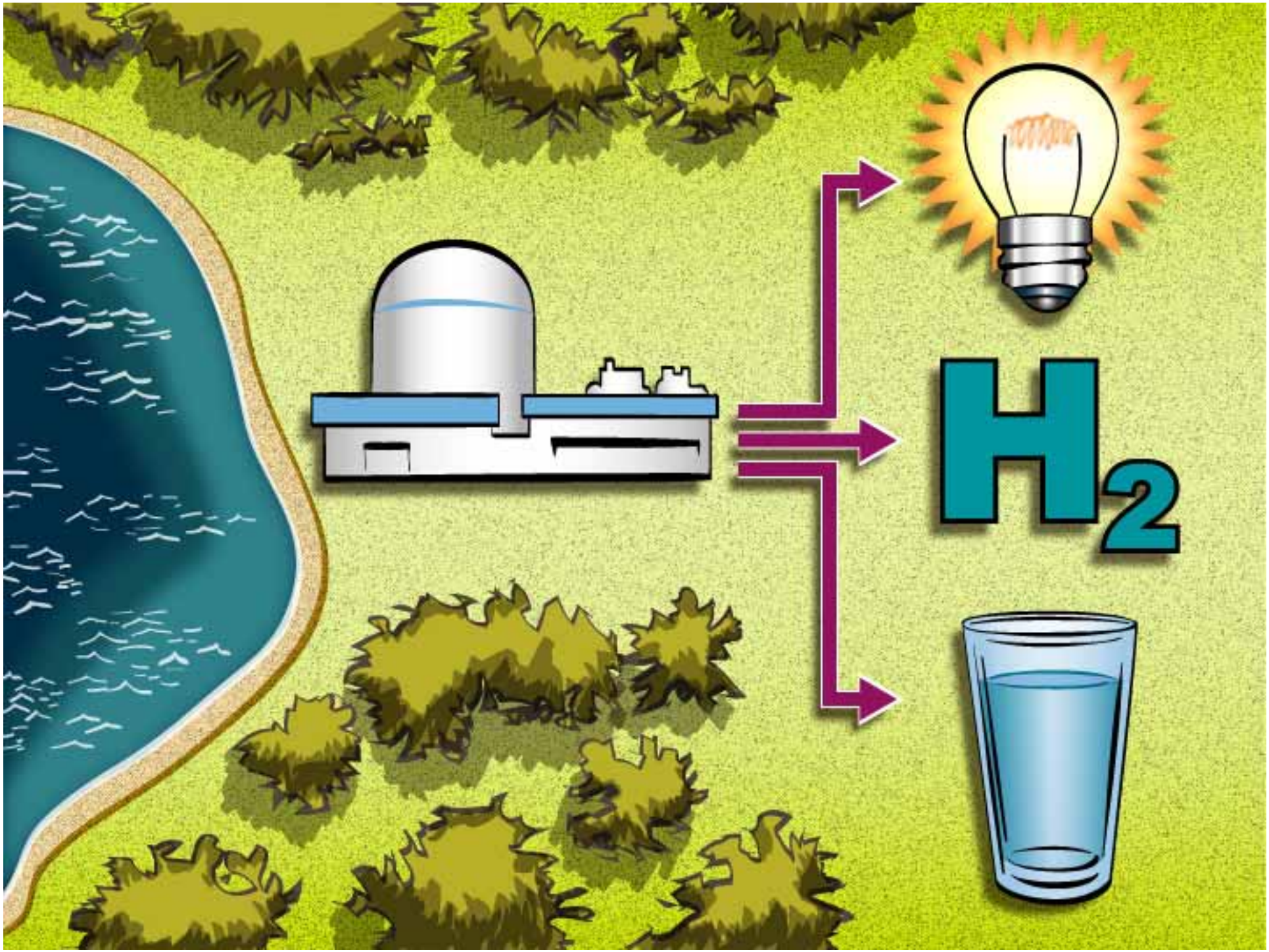
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