# U.S. Department of Energy ISM Champions Workshop

## September 15, 2010

James O. Ellis, Jr.
President and Chief Executive Officer
Institute of Nuclear Power Operations

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# Nuclear Power … in the U.S.

104 commercial operating reactors

Generate 806 billion kilowatt-hours annually – 20% of total electricity generated

Highest levels of performance

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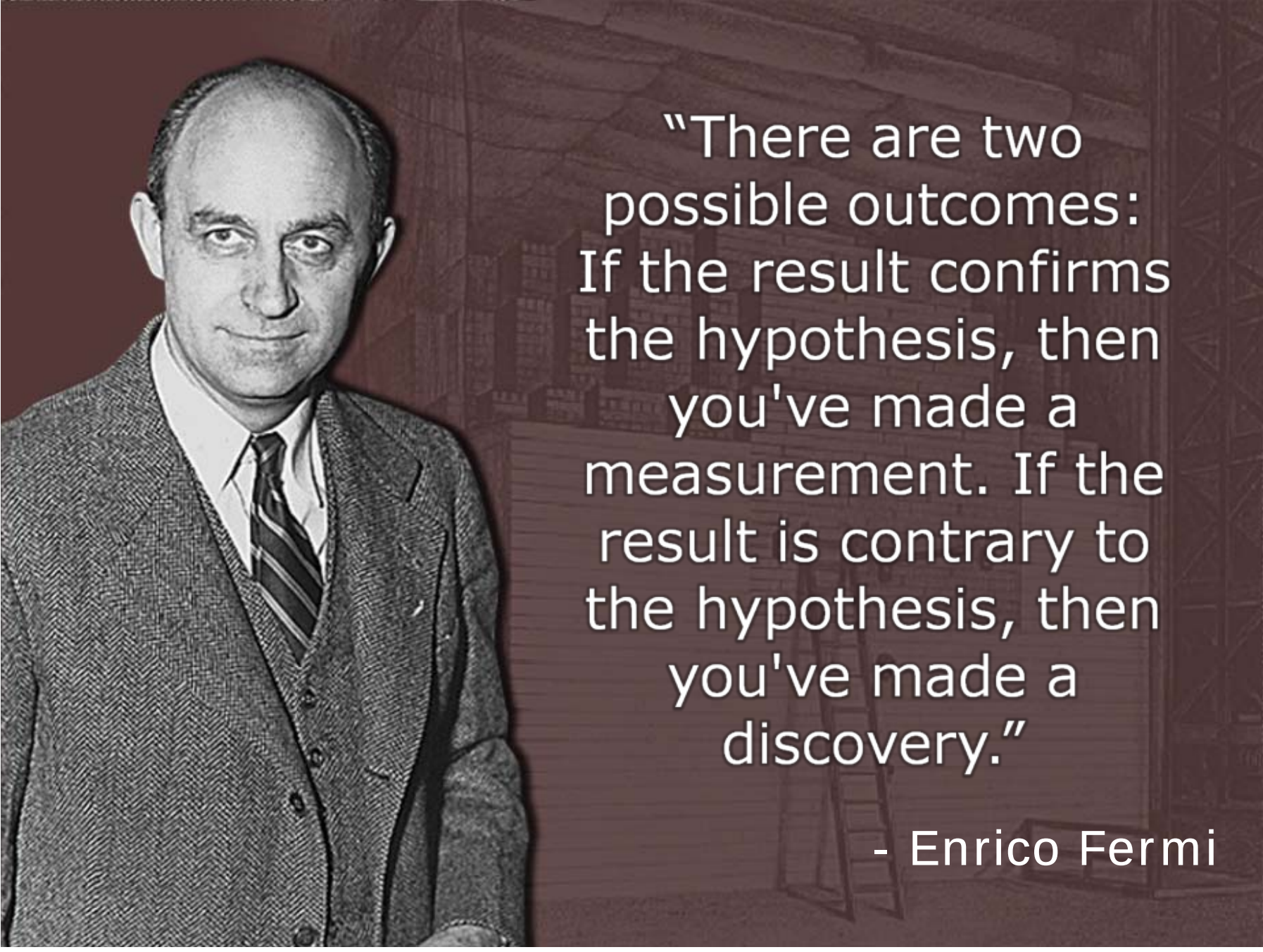
# Nuclear Power … Globally

439
commercial
operating
reactors

Generate nearly
2,600 terawatt-hours
annually – 14% of
total electricity
generated

61
reactors under
construction

Generally
high levels of
performance


"There are two possible outcomes: If the result confirms the hypothesis, then you've made a measurement. If the result is contrary to the hypothesis, then you've made a discovery."
- Enrico Fermi

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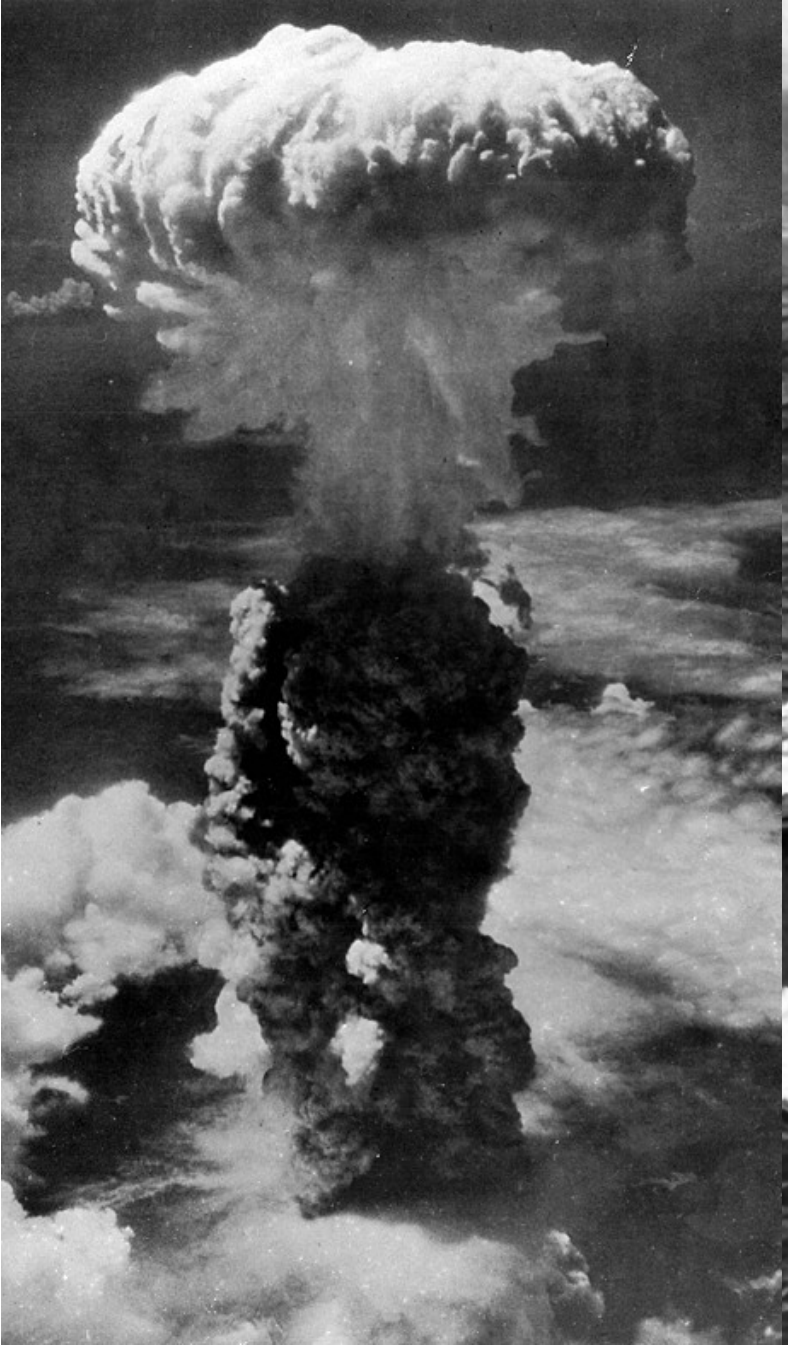

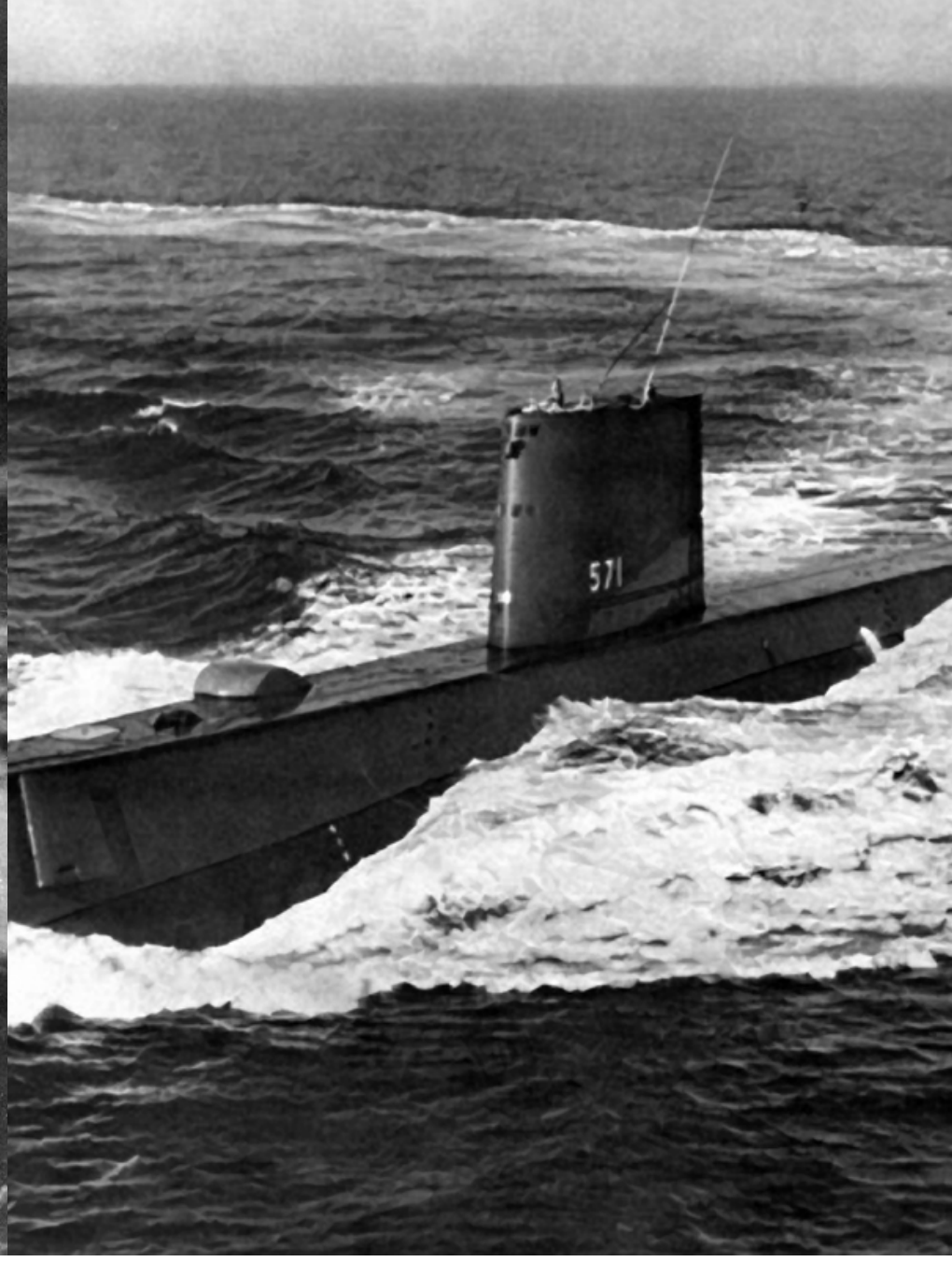


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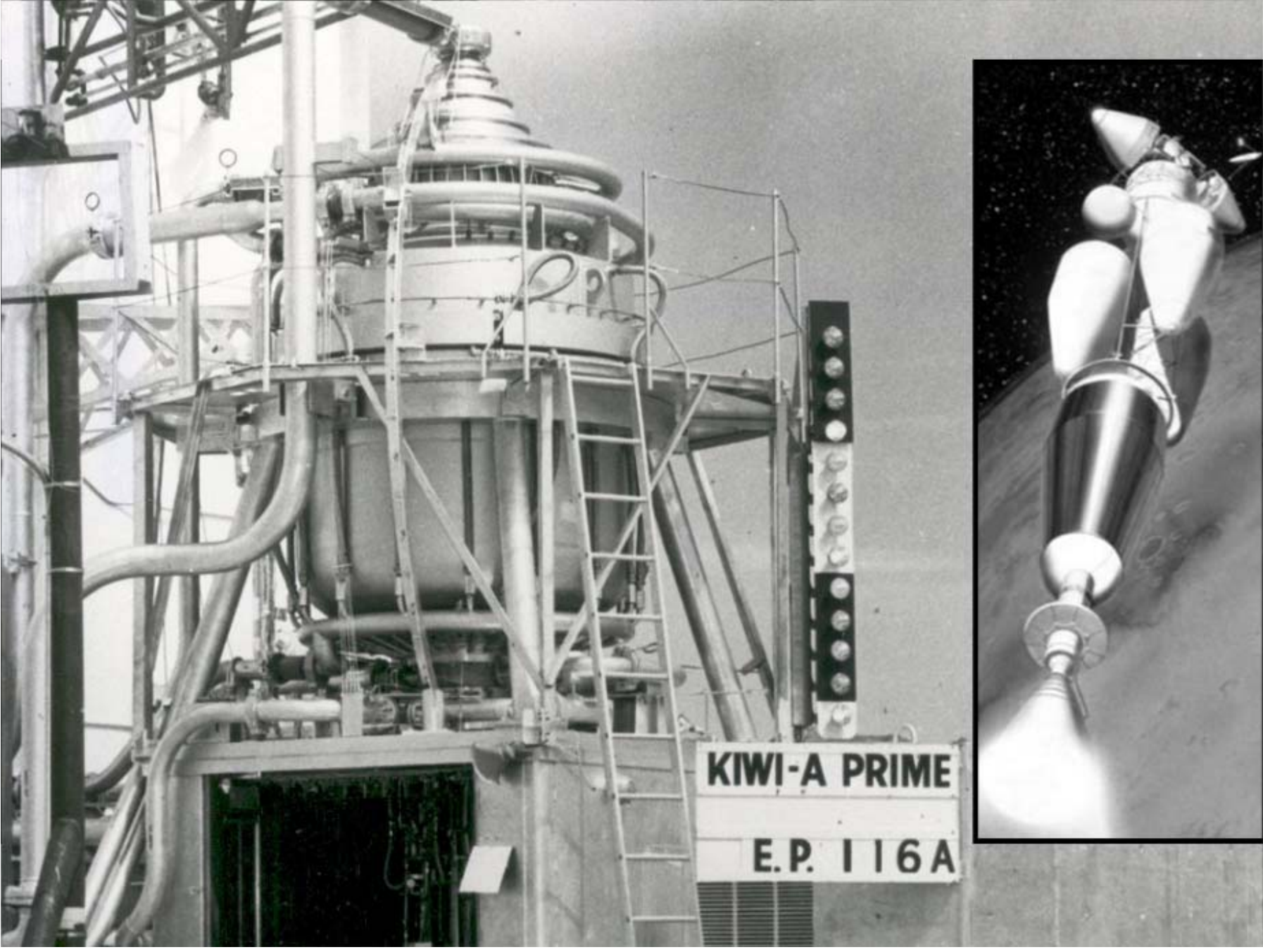


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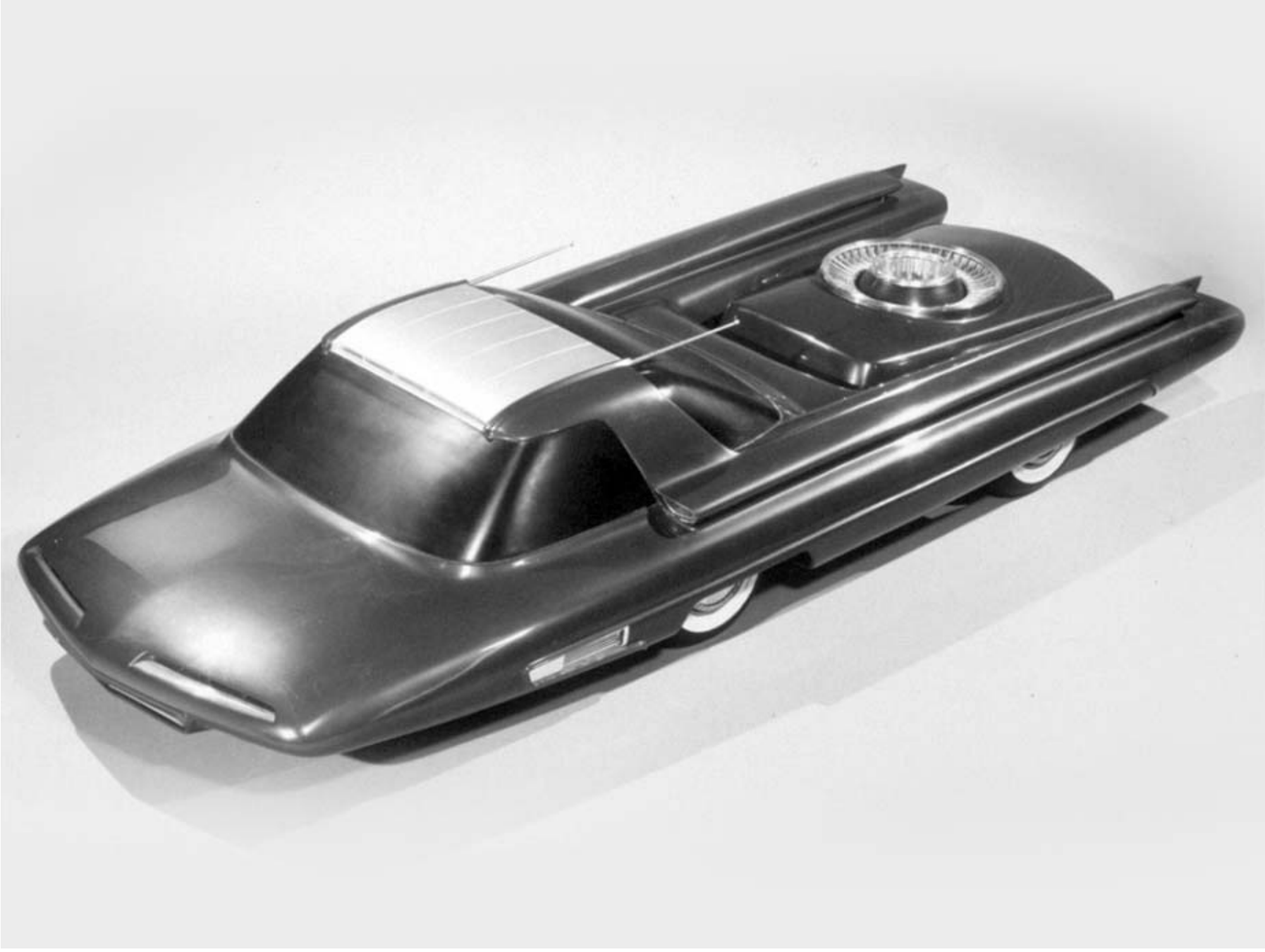

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# Bandwagon Market

- 237 nuclear plants ordered from 1965-1978

# Challenges of Early Success

- Growth
- 54 integrated utilities
- Overestimating the market
- Underestimating the risks

1979

- Plants cancelled
- Billions lost
- Trust eroded

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# President's Commission on the Accident at Three Mile Island

- Set and police standards of excellence
- Systematic gathering and analysis of operating experience
- Accredited training
- Operator training and plant simulators

# Mission

To promote the highest levels of safety and reliability – to promote excellence – in the operation of commercial nuclear power plants.

# Our Core Work

Evaluations

Analysis and Information Exchange

Assistance

Training and Accreditation

# Operating Experience

## Reporting of events ...

- Nuclear, public and personnel safety
- Generation capability
- Plant construction or modification
- Generic implications
- Beneficial lessons learned
- Classified emergencies
- Other requirements

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# Effective Self-Regulation

- CEO engagement
- Nuclear safety focus
- Industry support
- Accountability
- Independence

# INPO Today

- 342 employees
- 64 on-loan employees
- 11 employees on reverse loan
- $99.7 million – 2010 budget

# INPO Today

- 26 U.S. members – companies with 104 commercial operating reactors
- 20 international participants
- 23 supplier participants

# INPO Members

American Electric Power
Duke Energy
Energy Northwest
OPPD
Xcel
Detroit Edison
PSEG
NPPD
FirstEnergy
PPL
PG&E
Ameren
Exelon
Constellation Energy
Southern California Edison
WCNOC
Dominion
Luminant
TVA
Progress Energy
Entergy
SCE&G
Arizona Public Service
South Texas Project
Southern Nuclear
NextEra

**26 companies – 104 reactors**

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# INPO Supplier Participants

AREVA
Bechtel
Westinghouse
WSI
USEC
Toshiba
Fluor
GE
ENERCON
Hitachi
B&W
Williams
URS
Honeywell
Kiewit
Mitsubishi
Scientech
Day & Zimmerman
Nuclear Fuel Services
Louisiana Energy Services
Sargent & Lundy
Black & Veatch
Shaw

**23 companies**

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# INPO International Participants

Hydro-Quebec
Canada

British Power
United Kingdom

New Brunswick Power
Canada

Electrabel
Belgium

Electricite de France
France

KHNP
Korea

Chalk River Labs
Canada

Eskom
South Africa

UNESA
Spain

Nuclearelectrica
Romania

JANTI
Japan

Eletronuclear
Brazil

Slovenske Elektrarne
Slovak Republic

Taiwan Power
Taiwan

Comision Federal De Elect
Mexico

Ontario Power Generation
Canada

Nuklearna Elekt. Krsko
Slovenia

Bruce Power
Canada

ENEC
United Arab Emirates

**20 members**

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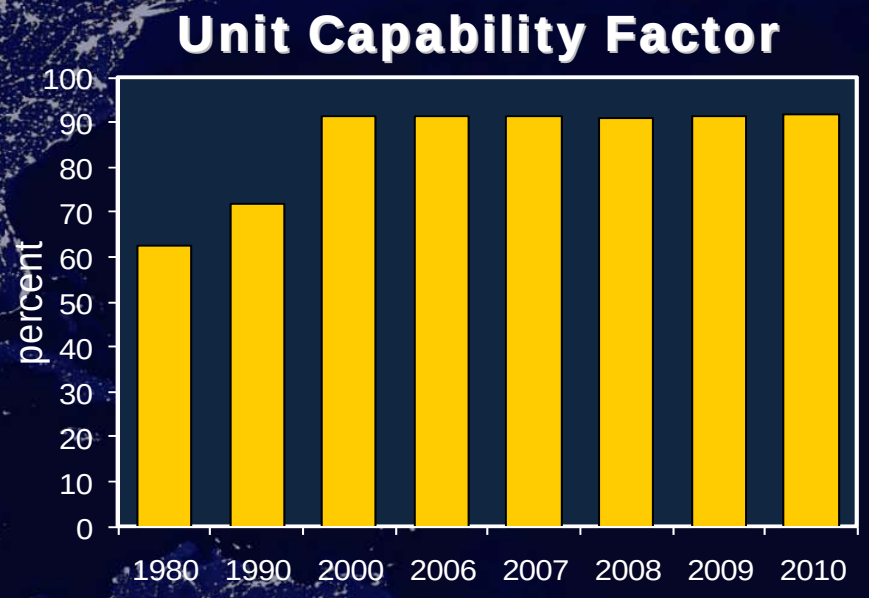
# DOE Interaction

- Assist visits to DOE sites
  - 4 per year
- Operating experience
  - 40 DOE sites with INPO member site access
- Attendance at INPO workshops, CEO Conference
  - 40-to-70 people per year

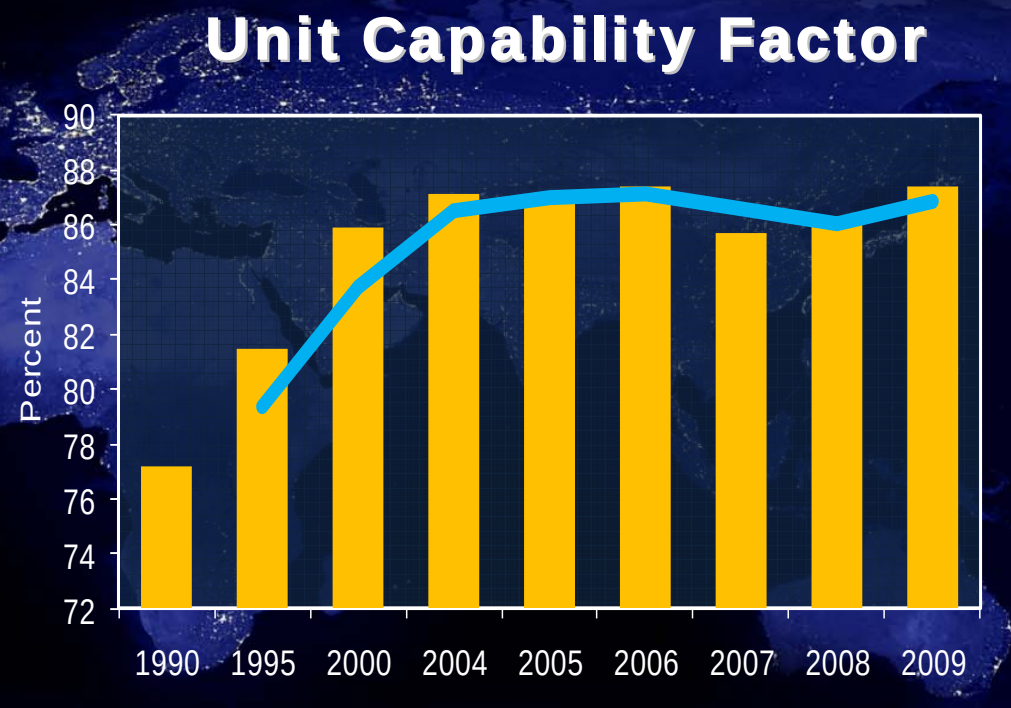
# U.S. Industry Performance

- Best ever… global leader
- Leadership, human talent, plant equipment, problem recognition and correction



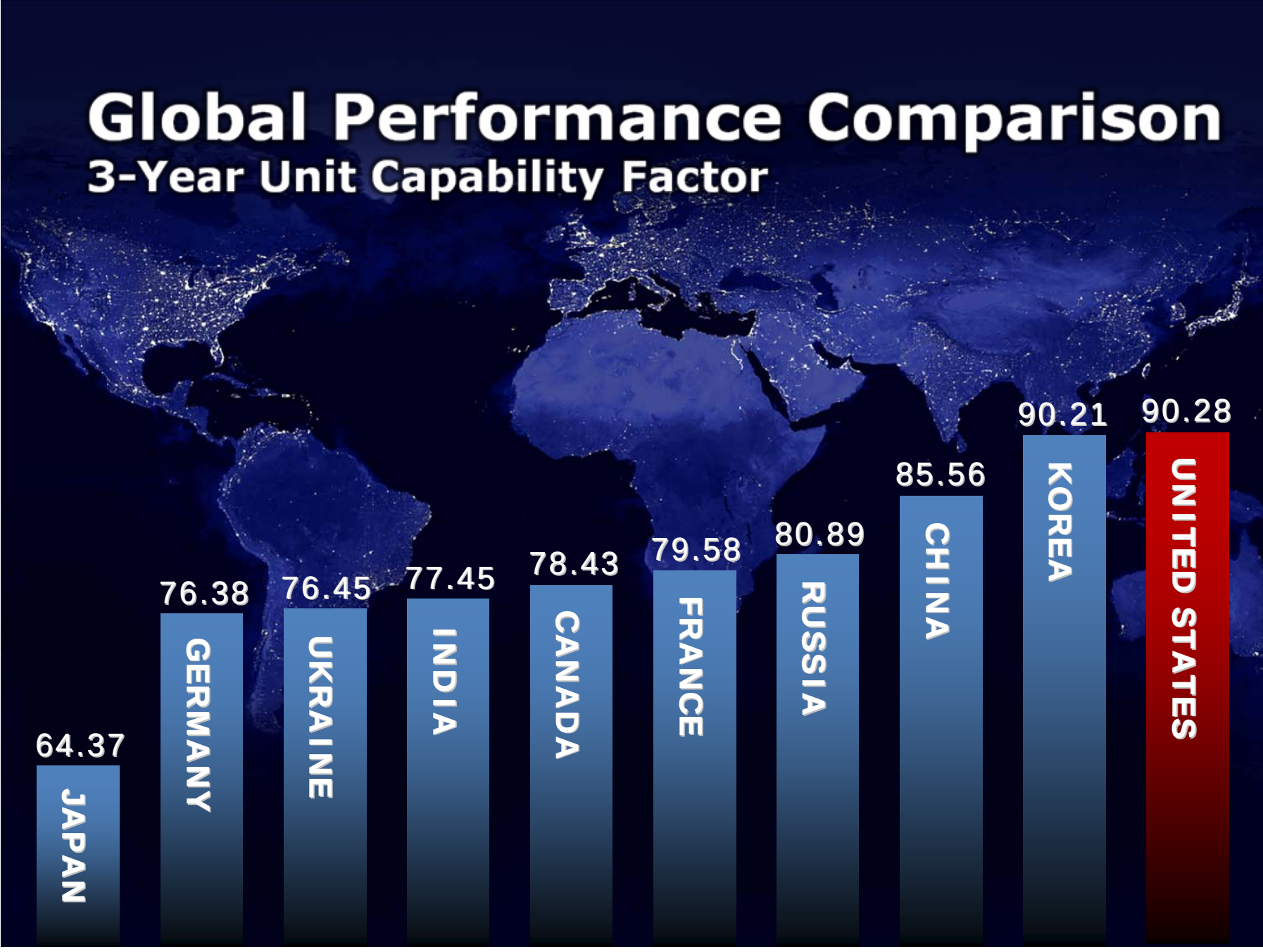
# Global Performance

- Generally high levels of performance
- Similar improvement trend – though not quite as high



# Global Performance Comparison

## 3-Year Unit Capability Factor

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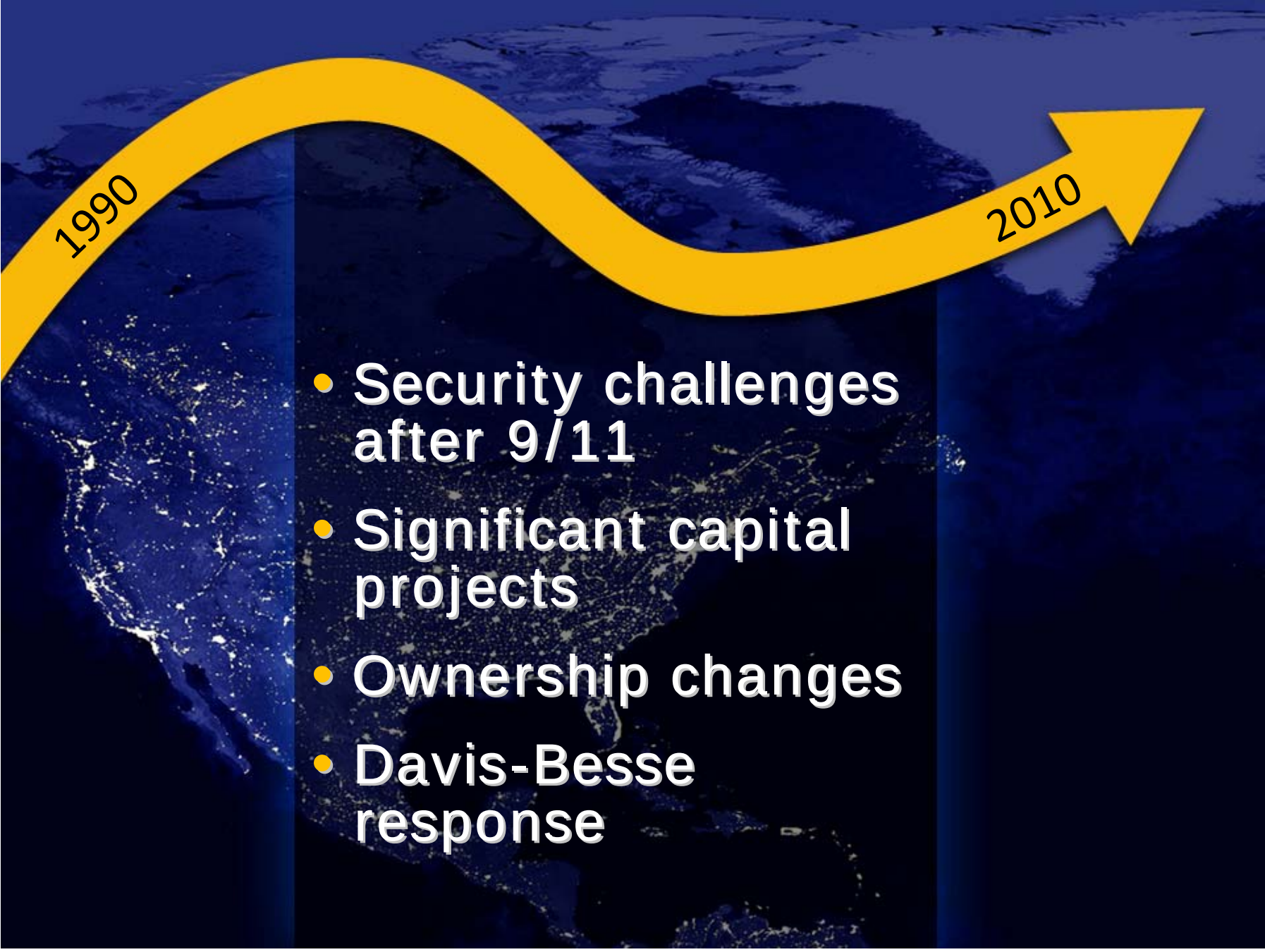


- Security challenges after 9/11
- Significant capital projects
- Ownership changes
- Davis-Besse response

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- Performance improvement
- Complacency

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**"In times of change the learners inherit the Earth, while the learned find themselves beautifully equipped to deal with a world that no longer exists."**

Eric Hoffer
U.S. philosopher
and author

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# Pathways to New Missions...

## Shaping the future

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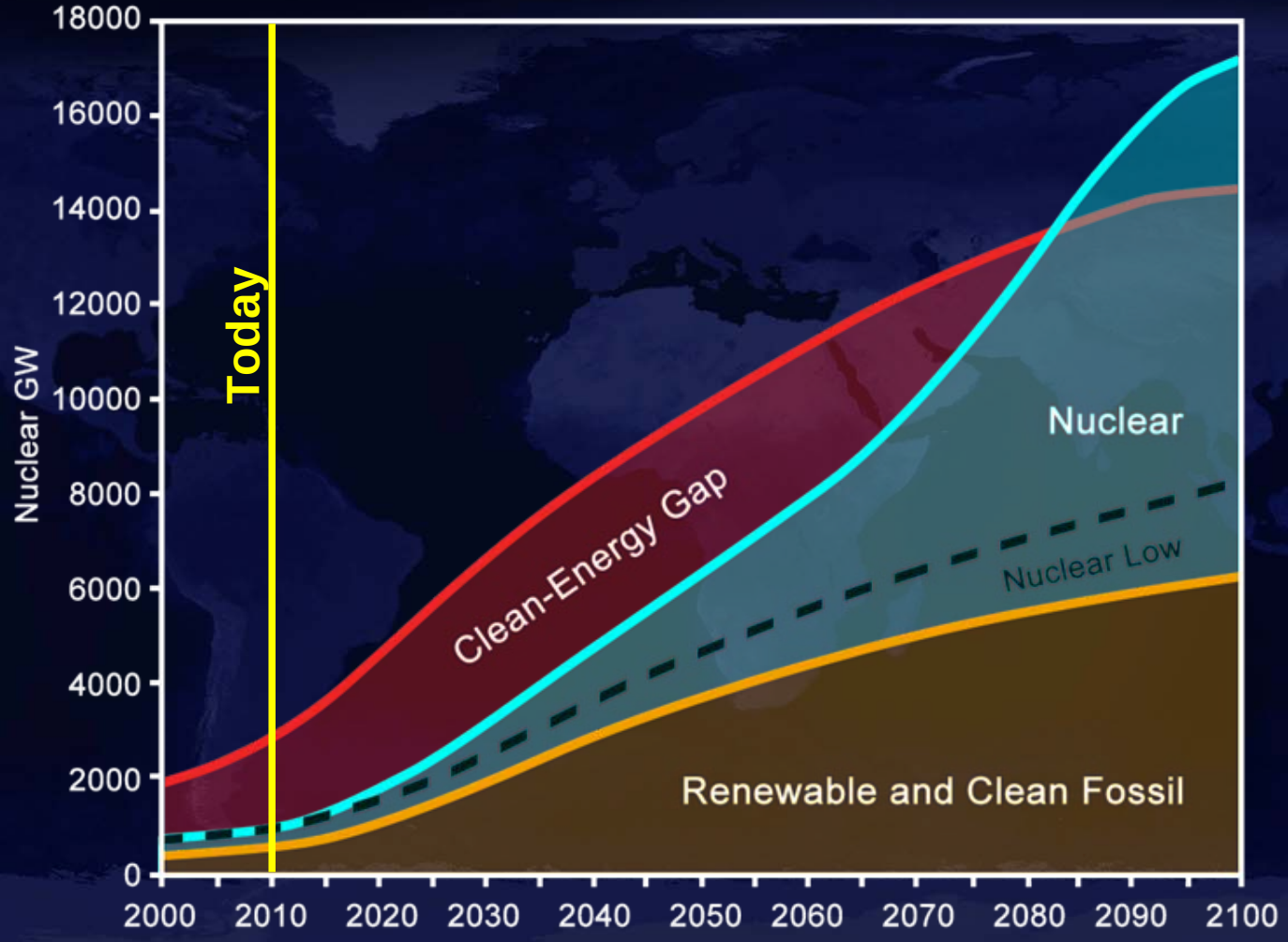
# The clean-energy gap to continued global growth and prosperity

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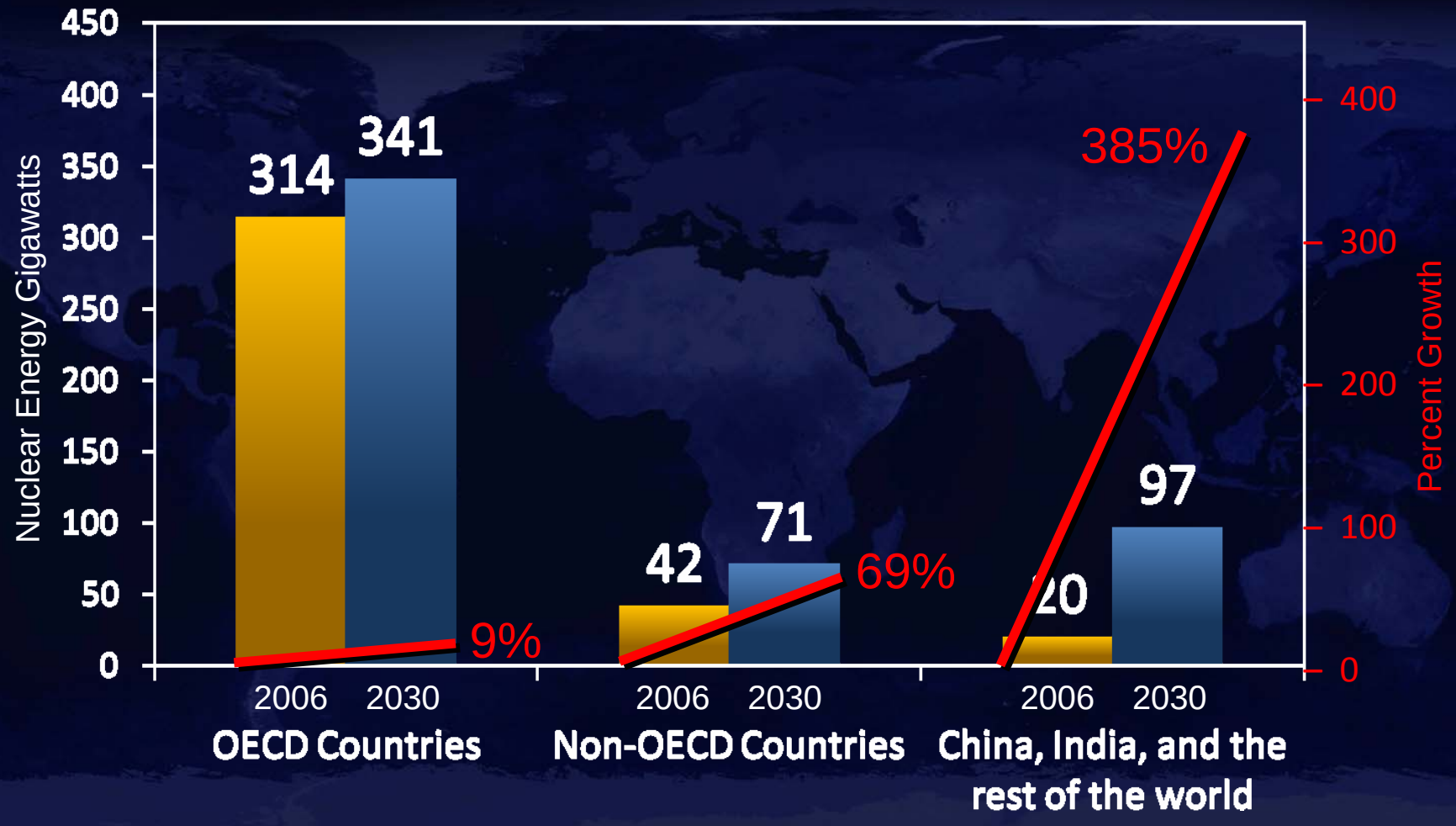
# Closing the clean-energy gap to continued global growth and prosperity…

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Aerial of Plant Vogtle Units 3 and 4 foundation excavation. April, 2010.

© Southern Company

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# Vision

Setting the global standard in nuclear safety. We demand *EXCELLENCE* of ourselves and expect it of others.

# Energy generates prosperity

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# And it makes quite a difference

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# Energy generates prosperity

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# Per Capita Electricity Consumption

**(kilowatt-hours per year)**

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## United Nations
## Johannesburg Plan of Implementation

# Poverty Eradication

| | World's Population | Average Per Capita Income |
|---|---|---|
| Developed countries | 15% | > $40,000 |
| Developing countries | 85% | < $2,000 |

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# Prosperity Shared Broadly

Development Transition → Gains from development reach all countries

Upward Convergence of Living Standards → 1 percent increase in per capita income requires a 0.5% increase in electric generating capacity

# Ensuring Global Nuclear Safety

- Industry performance – organizational accountability
- Diversity – regulatory approaches and standards vary
- Workforce opportunities
- New entrants – emerging nuclear countries

# Promoting Global Nuclear Safety

National Regulators

National Industry Organizations

Nuclear Technical Societies

Owners and Operators

IAEA

Builders and Vendors

National Governments

INPO

WANO

WNA

Nuclear Advocates

Environmental Groups

# Global Nuclear Safety

## ...a coalition of the willing

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Between the mission
and the vision,

Between the present
and the future,

Between the reality
and the dream,

There is one important word:

HOW

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It's all a question of how.

And it's the HOW that makes all the difference.

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