

Securing our nuclear future



Presented to:

University of Western Ontario

Presented by:

Duncan Hawthorne
President & Chief Executive Officer

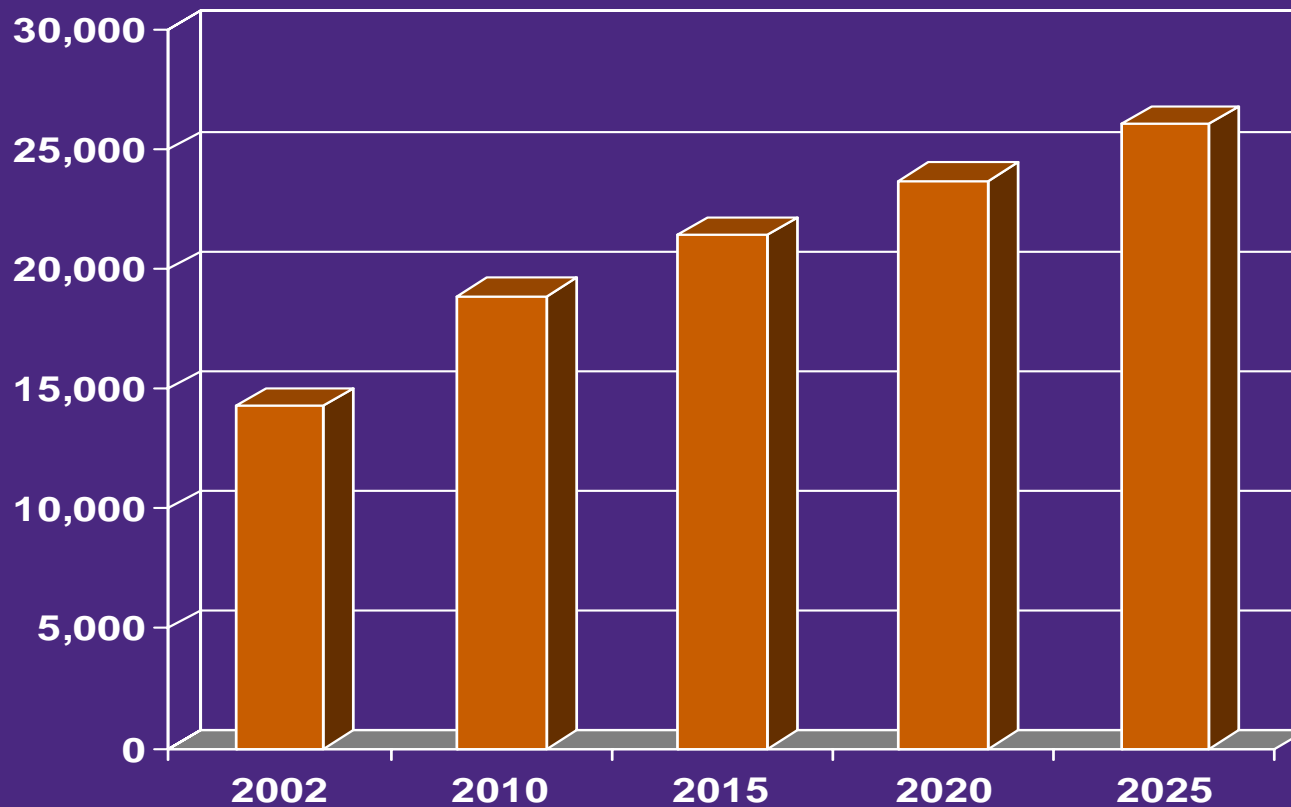
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Global Energy Factors

- Increase in worldwide demand.
- Security of supply concerns
- Aging infrastructure
- Market designs changing
- Greater recognition of environmental concerns
- Society preference for renewables... **but changing !!!!**

Given this common set of global energy factors the need for new nuclear is clear. For this reason, the debate over new nuclear is taking place throughout the world.

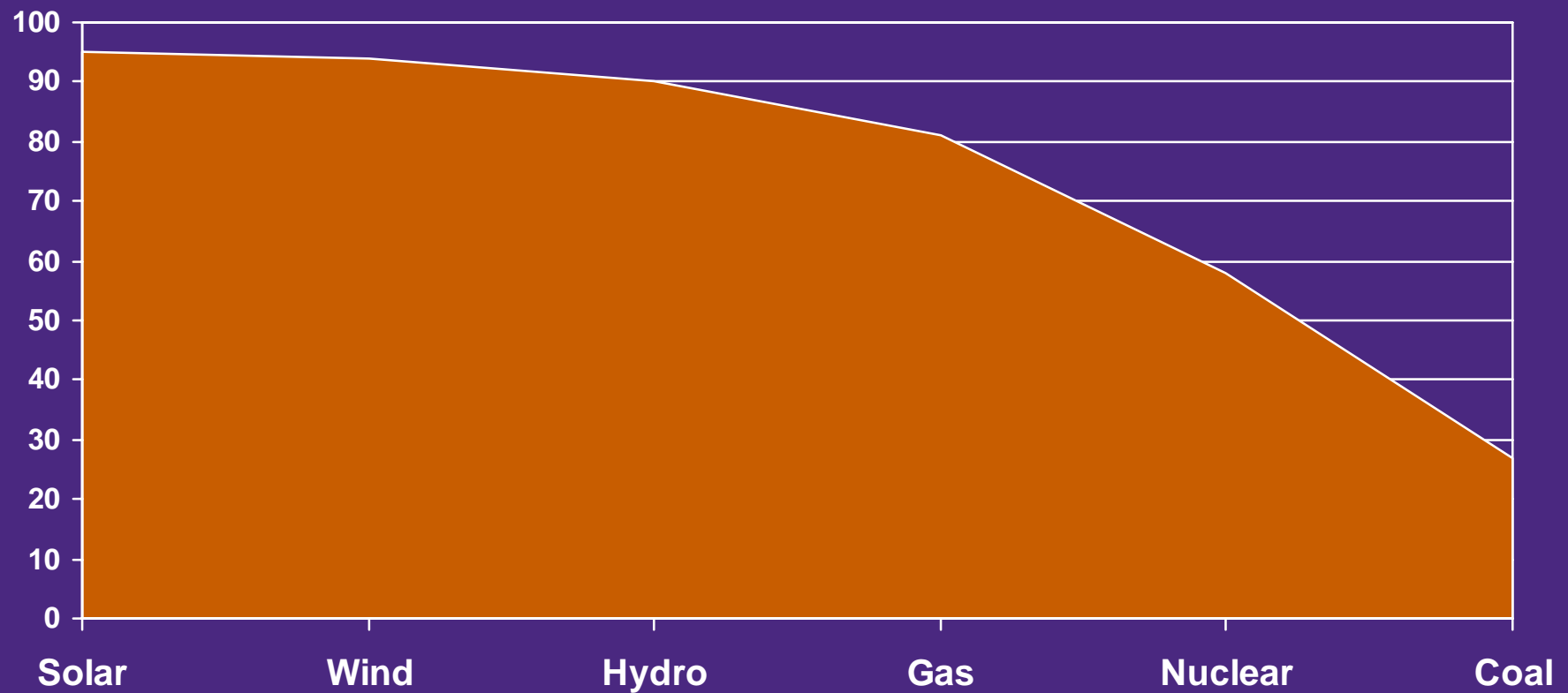
Global Electricity Demand

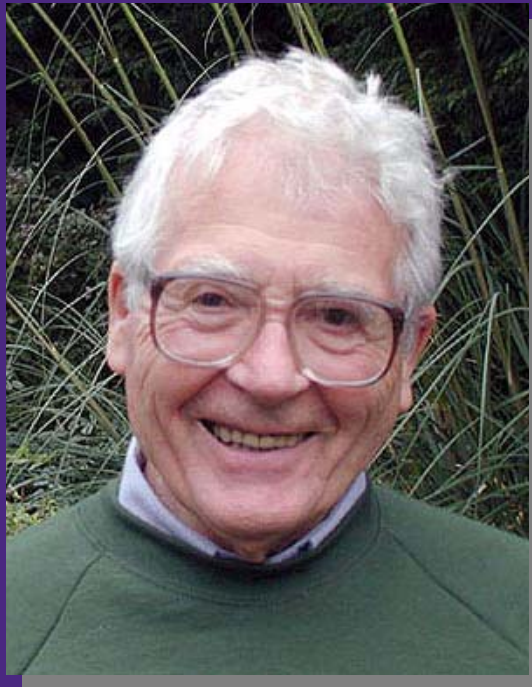


By 2025 electricity consumption from emerging economies will increase by over 250%.

*Billion Kilowatthours

Public Opinion





“There is no sensible alternative to nuclear power if we are to sustain civilization.”

James Lovelock, preeminent world leader in the development of environmental consciousness

Nuclear in the world today

- There 440 commercial nuclear power reactors operating in 31 countries, with over 364,000 MWe of total capacity.
- These units supply 16% of the world's electricity, as base-load power, and their efficiency is increasing.
- 56 countries operate a total of 284 research reactors.

The vast majority of these commercial nuclear power reactors will be reaching their end of life in the next 2 decades and will require either refurbishment or replacement.

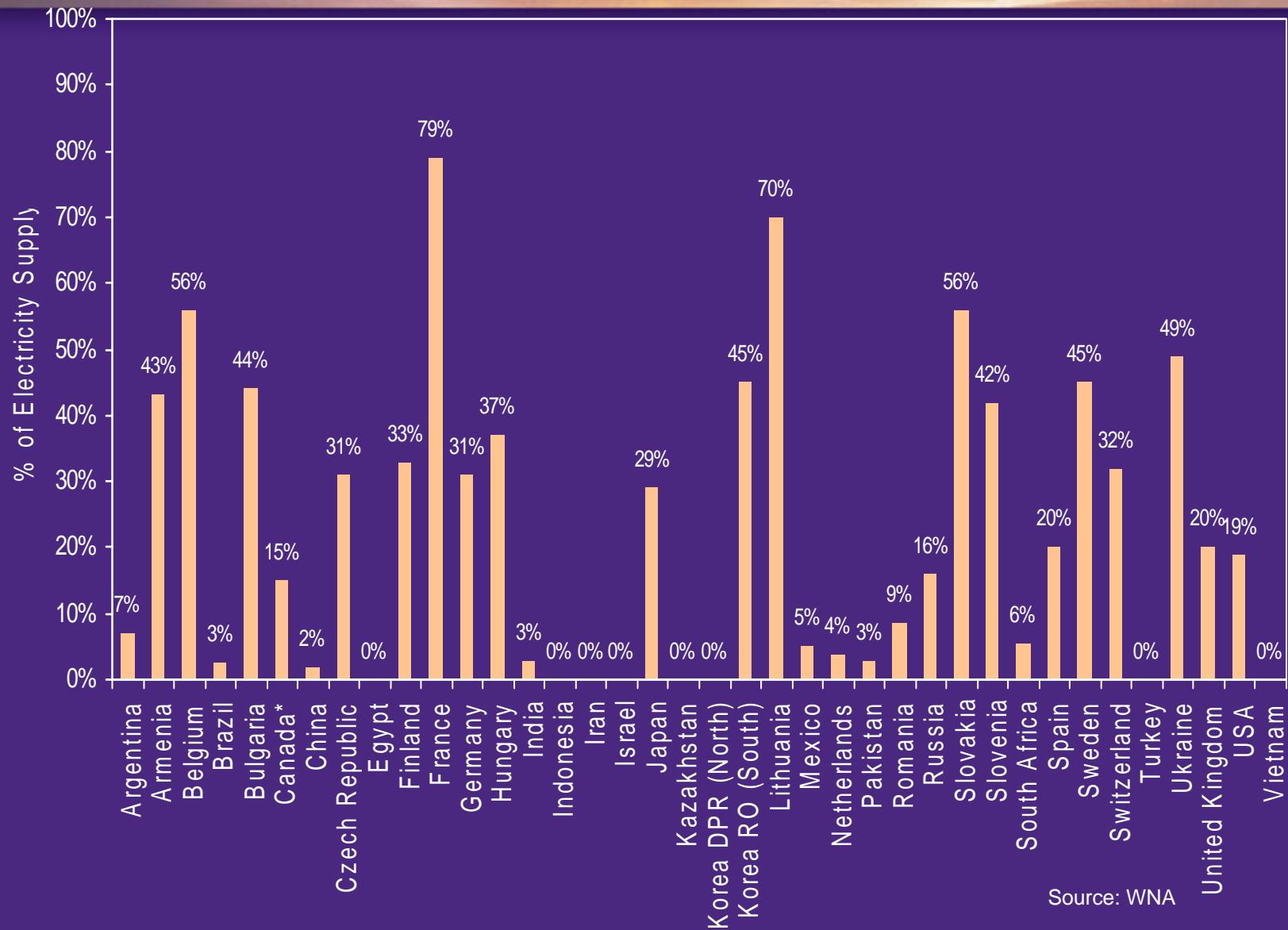
Reactors Globally

Type	Main Countries	Number
Pressurized Water Reactor (PWR)	United States, France, Japan, Russia	268
Boiling Water Reactor (BWR)	United States, Japan, Sweden	94
Gas-cooled Reactor (Magnox & AGR)	United Kingdom	23
Heavy Water Reactor (CANDU)	Canada, China, Romania	40
Light Water Graphite Reactor (RBMK)	Russia	12
Fast Neutron Reactor (FBR)	Japan, France, Russia	4
<i>Total</i>		441

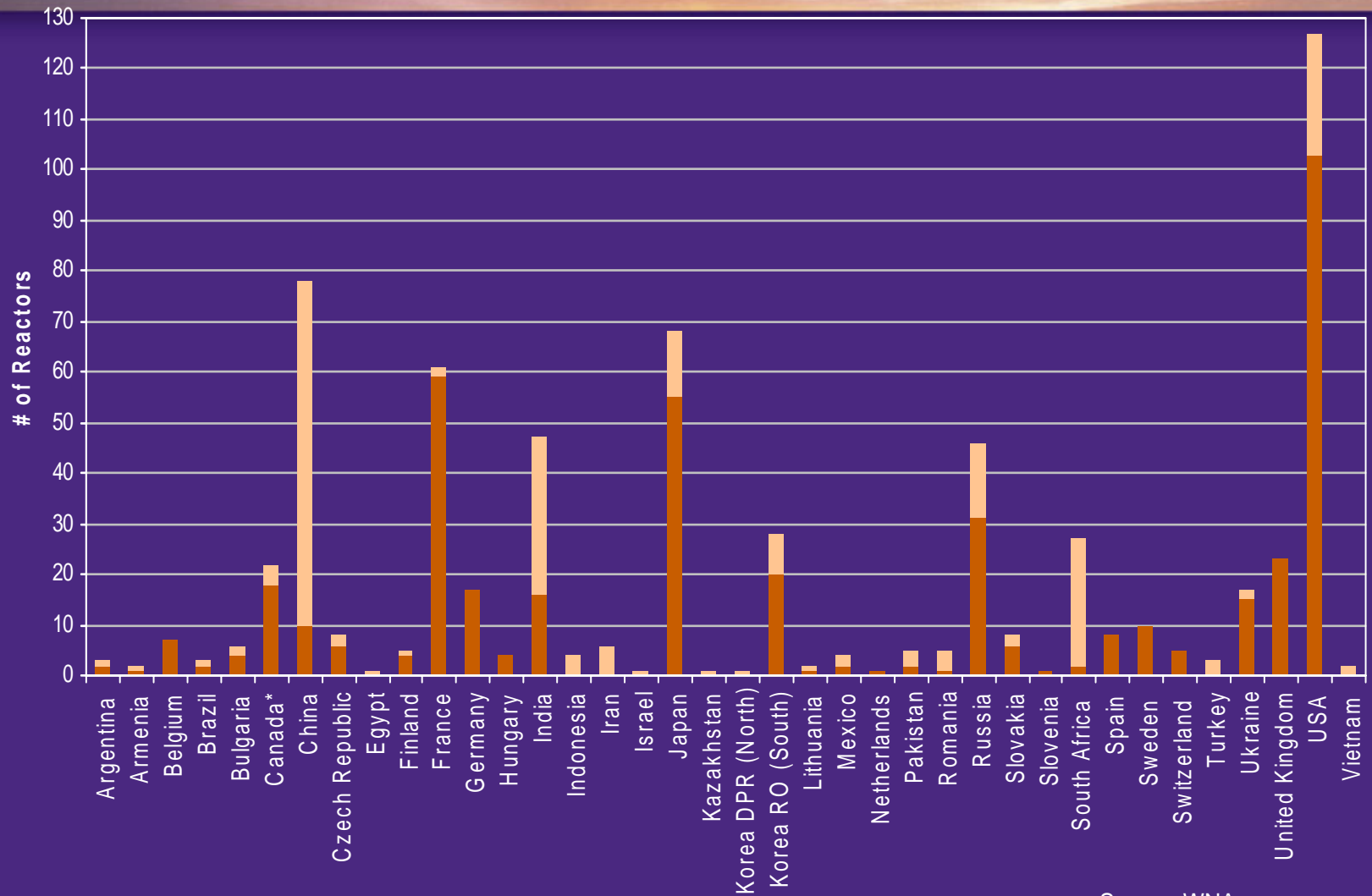
New Reactors Globally

Approximately 30 power reactors are being constructed in 11 countries:

Type	Main Countries	Number
Pressurized Water Reactor (PWR)	China, India, Russia, Japan, Finland, Pakistan	21
Boiling Water Reactor (BWR)	China	2
Heavy Water Reactor (CANDU/PHWR)	China, India, Romania	6

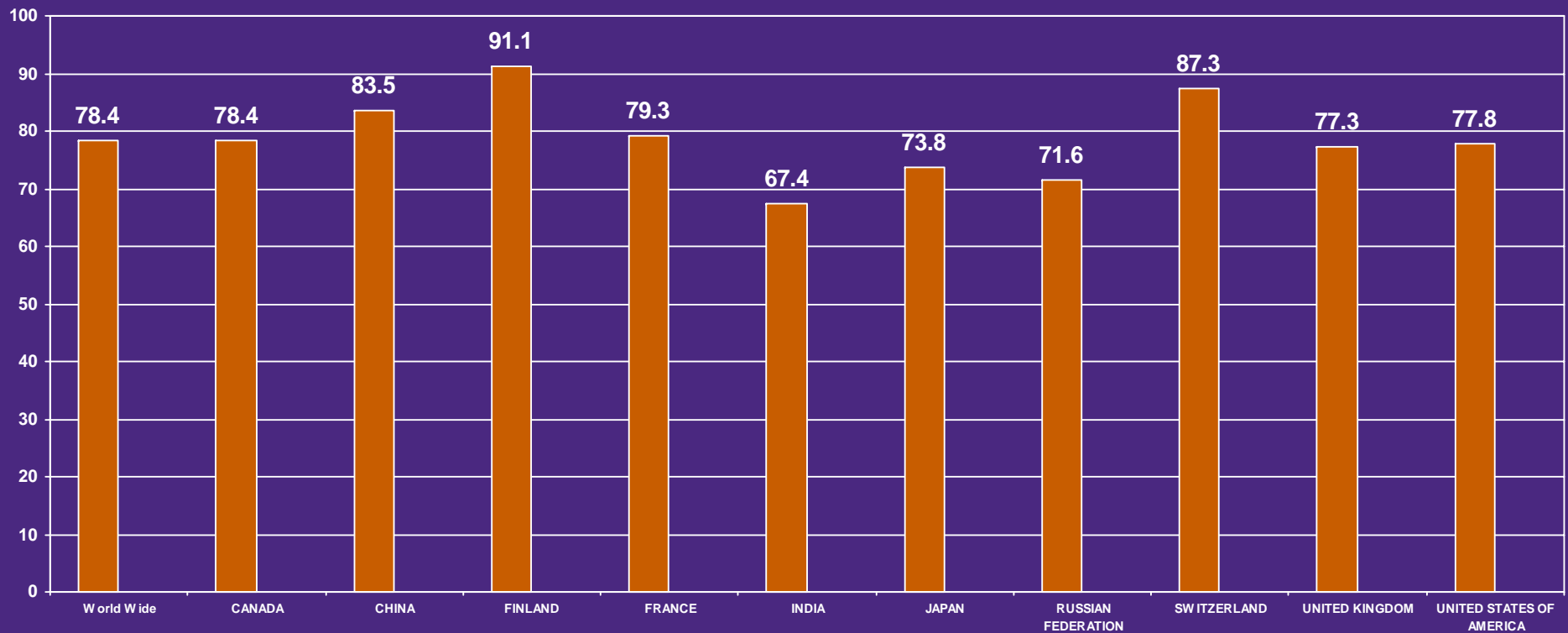


Source: WNA



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Performance of nuclear plants worldwide



Lifetime Unit Capability Factor (until 2005)

Opportunities

Canada



"Nuclear power provides reliable baseload power and has historically been the backbone of Ontario's energy system."

Energy Minister Dwight Duncan



USA

"A secure energy future for America must include more nuclear power."

President George W. Bush

Opportunities

UK

“Back on the agenda with a vengeance”

PM Tony Blair



Finland

Olkiluoto-3



Russia

10 GW of new nuclear by 2020



France

National Debate on new build



China

30 new reactors by 2020

New Entrants



Slovenia
Exploring New Build



Turkey
As many as five plants



North Korea
Proliferation concerns

Iran
Proliferation concerns



Vietnam
Announced intention to build



Slovenia

Venezuela
Considering nuclear

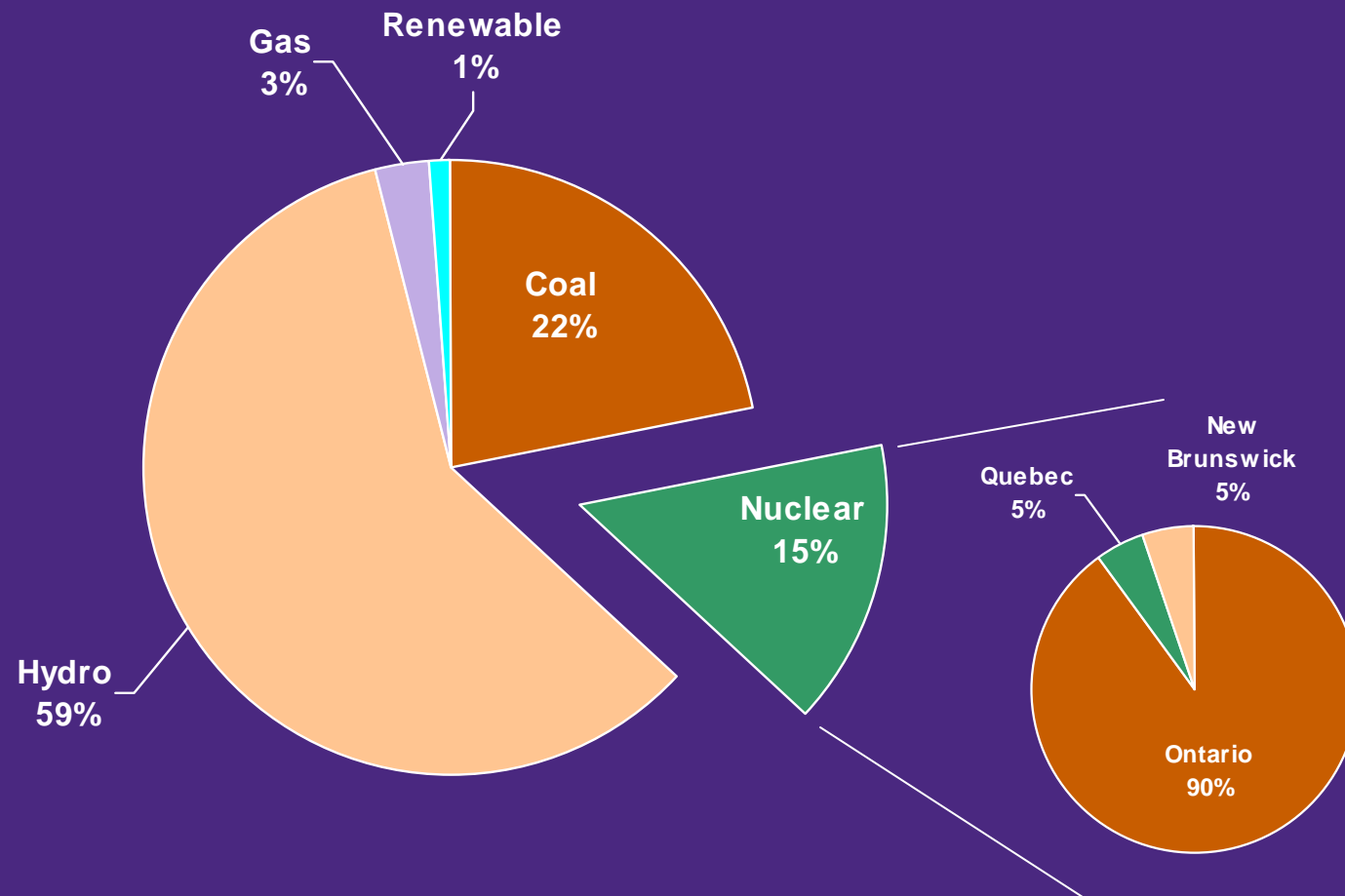


Nigeria
Diversify Energy Mix With Nuclear

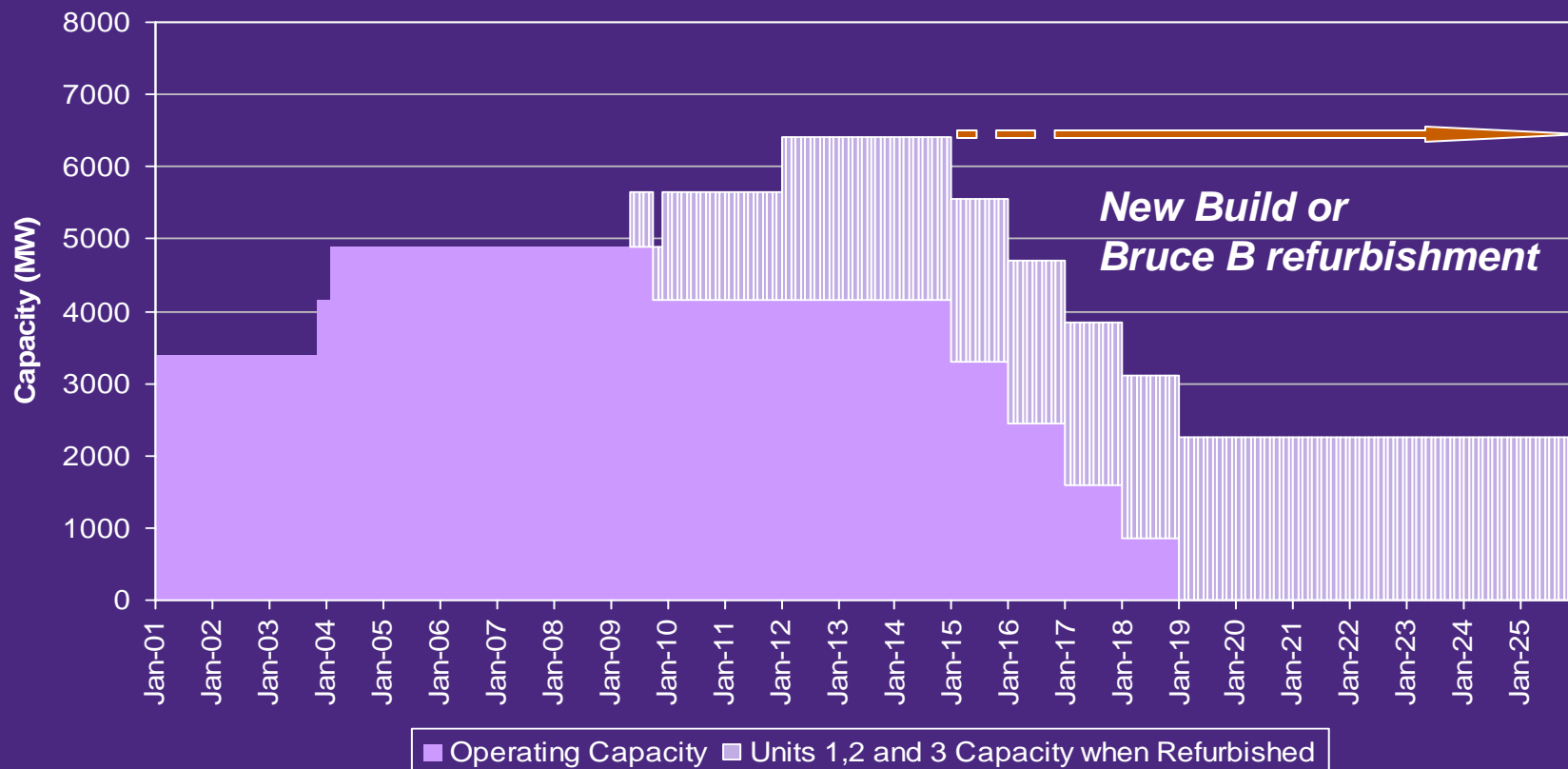


Indonesia
Considering nuclear

Nuclear's Market Share in Canada Today

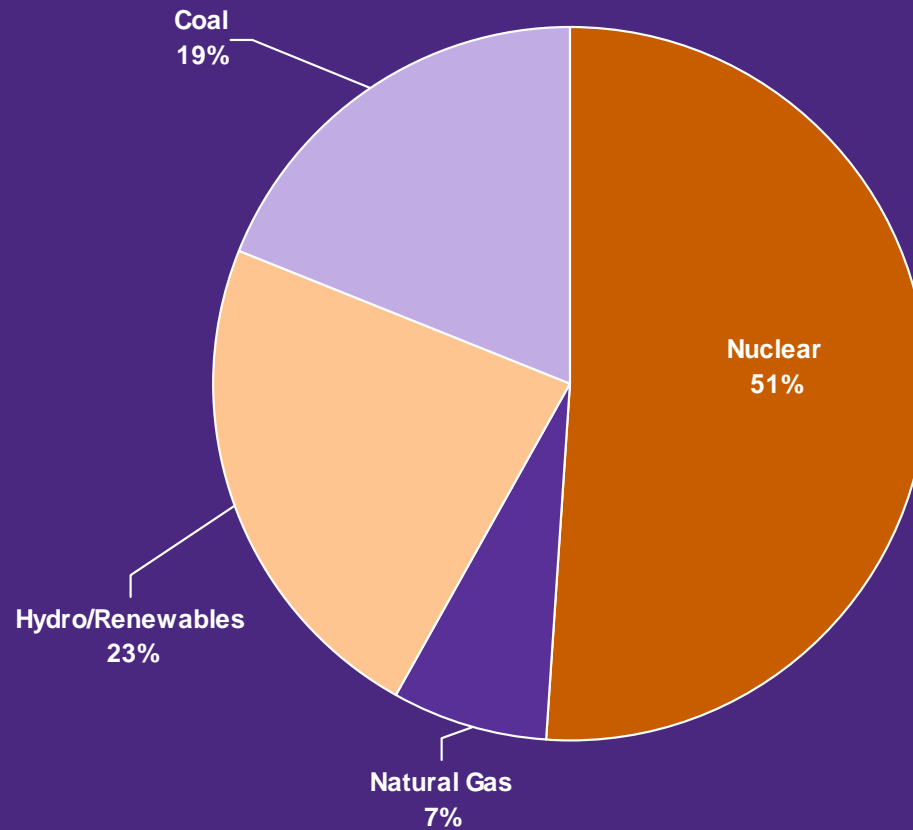


The need to plan ahead

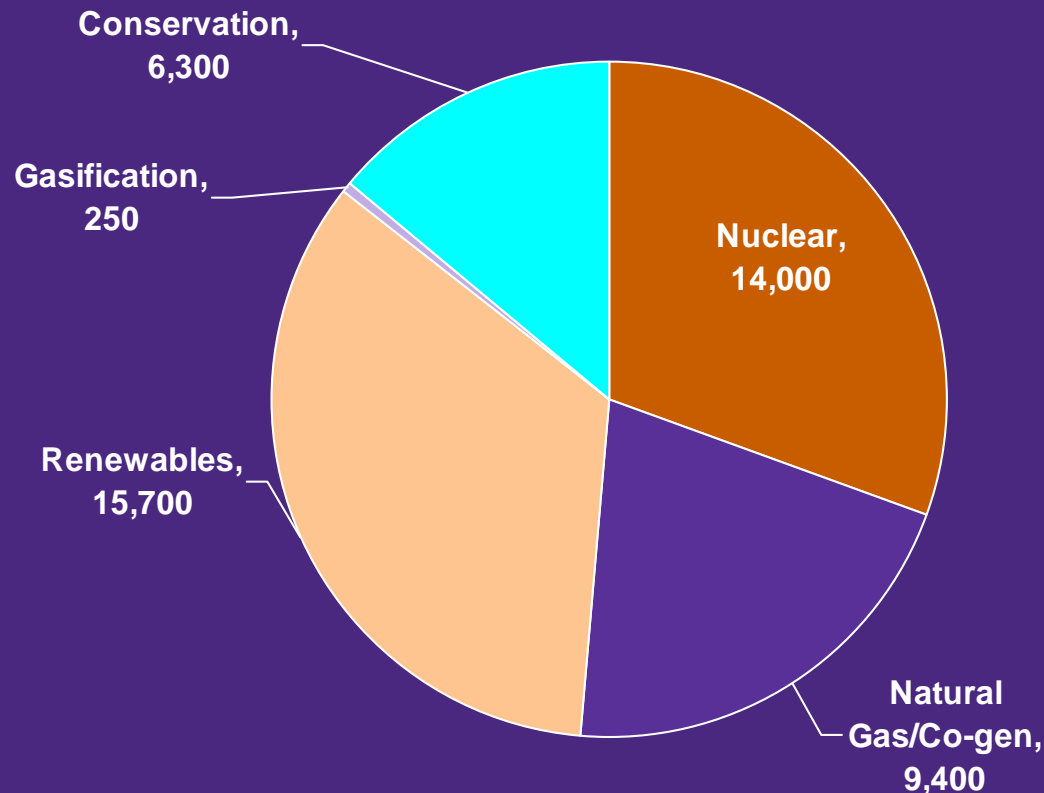


The output profile of the Bruce site is the same as many commercial nuclear facilities throughout the world

Ontario's Energy Supply Mix - 2005



Ontario's Supply Mix – Directive to OPA



- Long-term coal replacement through conservation and renewables.
- Increase in gas to meet growing peak demand.
- Develop hydroelectric generation to meet growing demand.
- Replace nuclear with nuclear.

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Additional Slides



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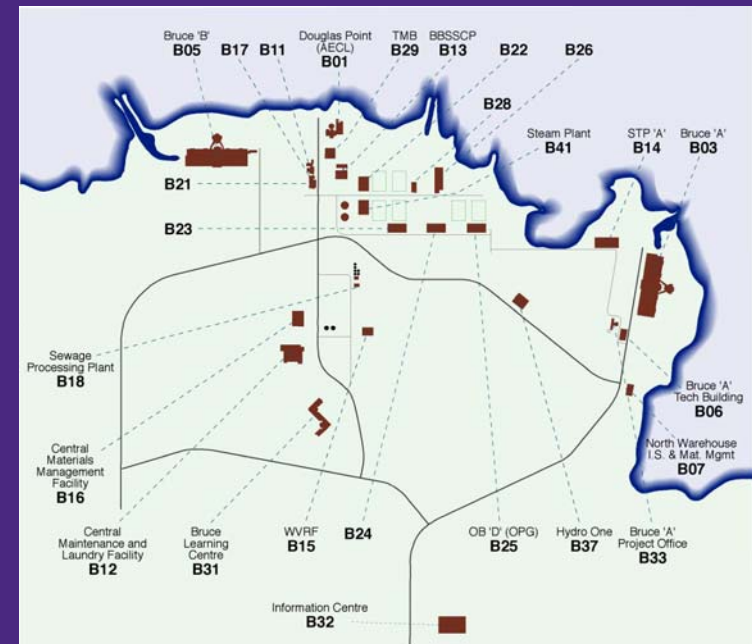
About Bruce Power

- Canada's only private nuclear generator
- Formed in May of 2001
- More than 4,700 MW of capacity from six operating units
- Another 1,500 MW to be added with restart of Units 1 and 2
- Partnership between TransCanada, OMERS, Cemeco, PWU and Society



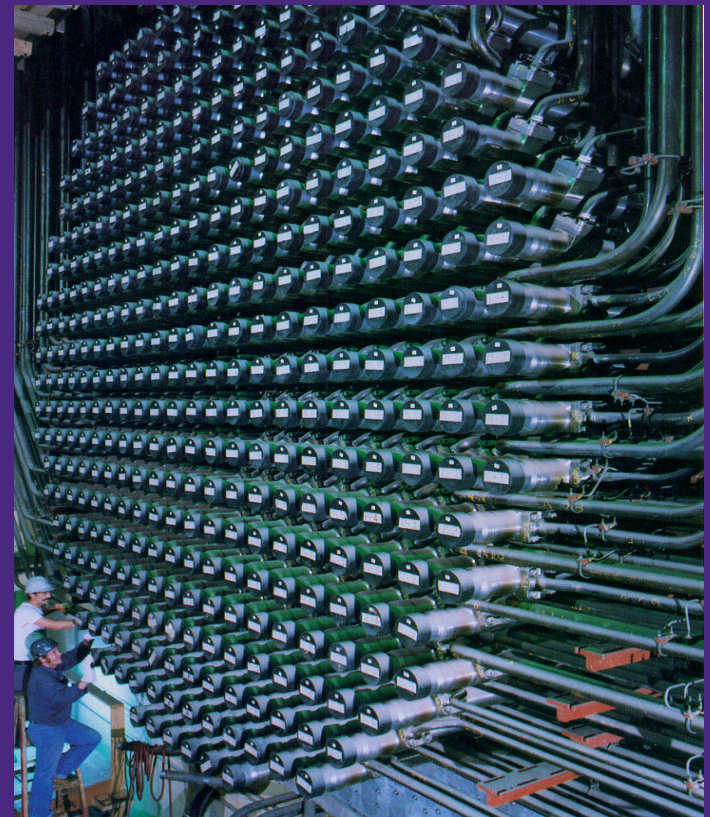
About Bruce Power

- Largest nuclear site in North America
 - Spread over 2,300 acres and has 56 kms of roadway
 - Includes supporting infrastructure, training centre, Visitors' Centre
 - About 3,600 full time employees



Bruce A Restart: Project Overview

- Fuel channel replacement
- Steam generator replacement
- Feeder pipe segment replacement
- Turbine-generator refurbishment
- Balance of plant work



Units 1 and 2 restart: making progress

- Approved Environmental Assessment
- Preparations nearing completion
 - Construction Island complete
 - Reactor mock-up turned over to AECL
 - Bulkhead progress
 - Steam drum inspections underway
 - Crane assembly underway
 - Turbine and electrical inspections
 - Balance of Plant contracts established
- Approximately 1,000 contract staff hired to date
 - 800 on site
- New simulator building underway
- 134 operations staff hired to date



Nuclear- Part of the Solution

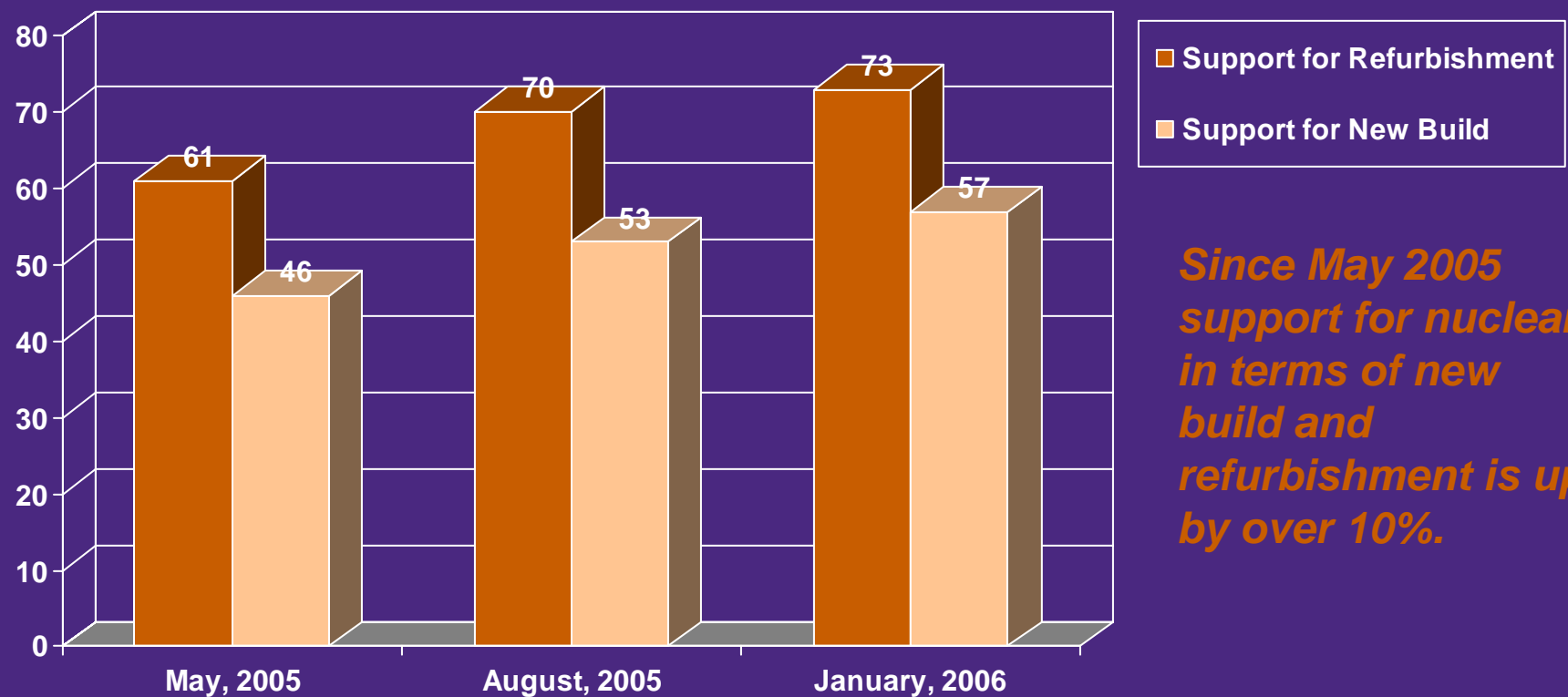
- Nuclear power provides clean, safe, economical electricity.
- Use of nuclear power in Canada has avoided:
 - >1 billion tonnes of carbon dioxide (CO₂) emissions
 - 11 million tonnes of sulphur dioxide
 - 2.5 million tonnes of nitrogen oxides
- Without nuclear plants in Canada, annual CO₂ emissions would increase by 15-20%.
- Nuclear Power accounts for 50% of Ontario's supply and 15% nationally.
- Nuclear Power is safe and operates in a heavily regulated environment both nationally and internationally.
- Nuclear power is financially competitive with all sources of new generation currently under consideration across Canada.

Nuclear: Securing Ontario's Economic Future

- In 2005, produced over 50% of Ontario's power.
- Source of affordable, reliable baseload electricity.
 - Essential for Ontario's manufacturing sector.
- Stabilizing impact on Ontario market prices.
- Refurbishment and new build could attract private sector investment to Ontario and mitigate risk.
- Industry in Canada accounts for 21,000 direct jobs and 10,000 indirect jobs.
 - Given the activity and attrition expected in the industry over the next two decades, there will be a significant demand for thousands of young skilled Ontario workers.

Ontario accounts for approximately 40.0% of Canada's GDP.

Strong Public Support - Ontario



Since May 2005 support for nuclear in terms of new build and refurbishment is up by over 10%.

Source: Canadian Nuclear Association

Planning for the future

- Bruce Power is evaluating new build and refurbishment options for the site.
 - Process has been underway since January, 2004
 - Next step in the process was to file an initial site license application with the CNSC and prepare to conduct an EA.
- Long-term planning is considering the possibility of 4,000 MW of new build.