Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

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Supplementary Information

Presentation from Canadian Coalition for Nuclear Responsibility & Prolet Inc.

In the Matter of the

Ontario Power Generation Inc.

Application for a licence to construct one BWRX-300 reactor at the Darlington New Nuclear Project Site (DNNP)

Commission Public Hearing
Part-2

January 8-10 and 13-14, 2025

Renseignements supplémentaires

Présentation du Regroupement pour la surveillance du nucléaire et Prolet Inc.

À l'égard d'

Ontario Power Generation Inc.

Demande visant à construire 1 réacteur BWRX-300 sur le site du projet de nouvelle centrale nucléaire de Darlington (PNCND)

Audience publique de la Commission
Partie-2

8-10 et 13-14 janvier 2025

Canada

BWRX-300 – a "Small Modular Nuclear Reactor" that is Not Small, Not Modular, and Not Yet Fully Designed

The Darlington New Nuclear Project

The GE-Hitachi BWRX-300 is
a 300 Megawatt Electricity-Producing
Boiling Water Reactor (BWR Version 10)

a report submitted to the

Canadian Nuclear Safety Commission (CNSC)

by the

Canadian Coalition for Nuclear Responsibility (CCNR)

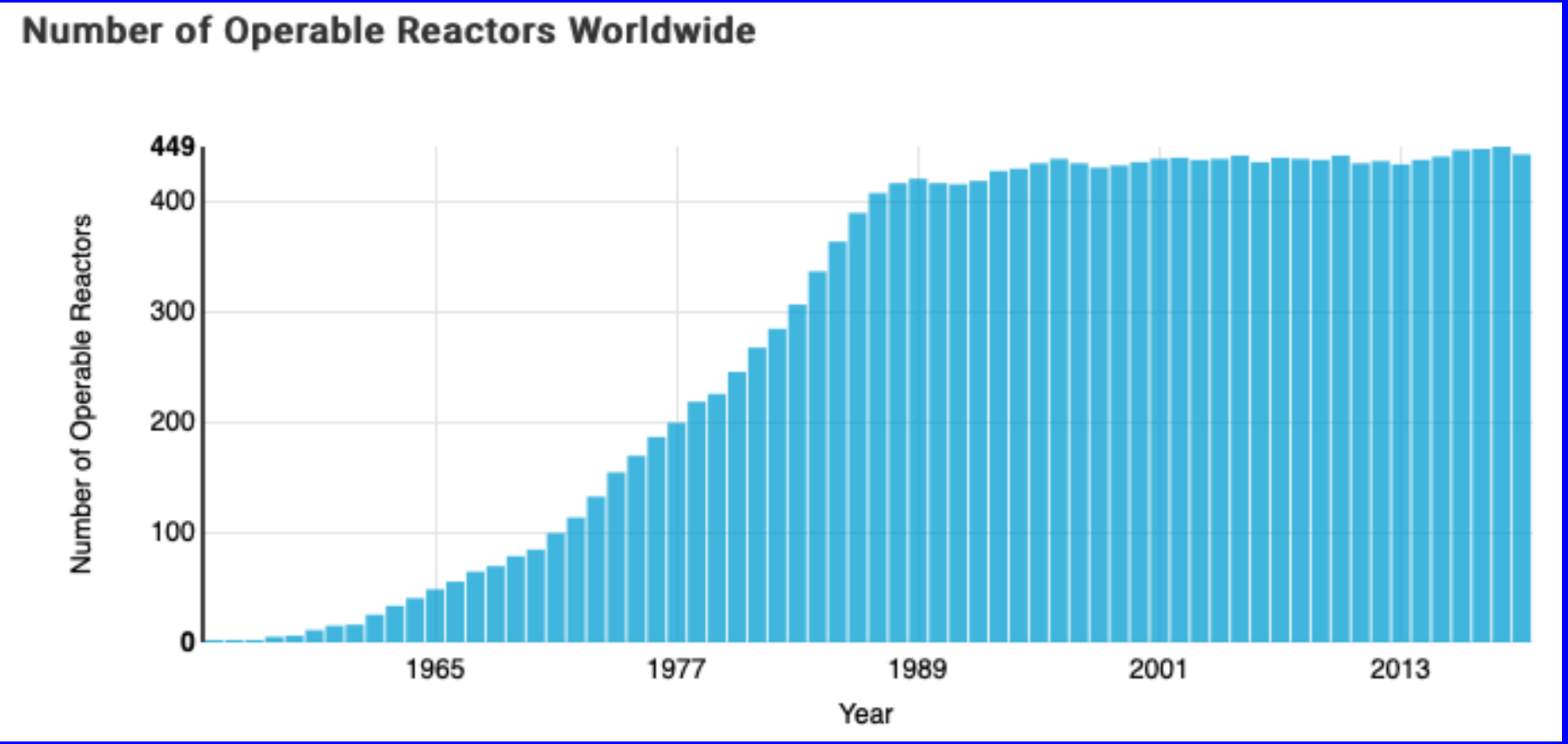
Researchers/Authors:

Gordon Edwards and Sunil Nijhawan

November 2024

World Nuclear Association Data

The nuclear industry has been stagnant for 25 years



1996 – 438 reactors
17% of global electricity
(< 3.3% of global energy)

2019 – 442 reactors
10% of global electricity
(< 2% of global energy)

“The State of Affairs [2019]

“The International Atomic Energy Agency (IAEA), looking ahead to 2050, sees the most optimistic global electricity market share for nuclear as only about 5 percent, down from 10 percent today . . .

“. . . and in the United States and Europe, it steadily declines to between 3 and 5 percent of the market, constituting a potential for market ‘failure’.”

ASME – The American Society of Mechanical Engineers (Nov 2019)

Comparing Key Expansion Periods of Innovative Technologies

Technology and timeframe	Average annual deployment growth (%)	Average annual cost reduction (%)
EV batteries (2010-20)	69	-19
Solar PV modules (2010-20)	24	-18
Wind, onshore (2010-20)	13	-4
Wind, offshore (2010-20)	19	-4
US WWII aircraft (1939-44/1942-45)	75	-13
Ford Model T (1910-20)	34	-9
Gas turbines (1970-80)	18	-2

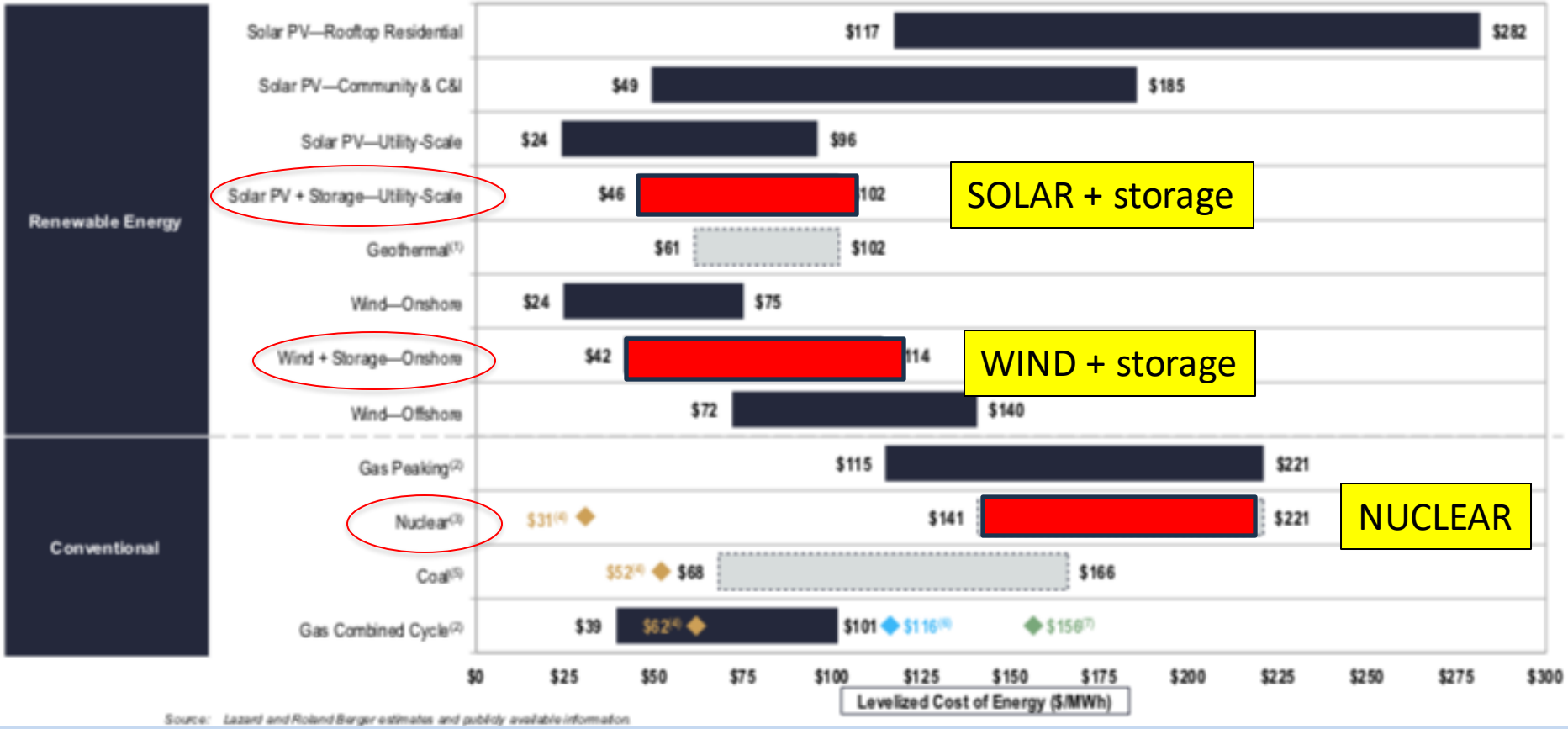
2010-2020

Sources: IEA; Lafond, Greenwald and Farmer (2022); Zeitlin (1995); Abernathy and Wayne (1974); Grubler, Nakicenovic and Victor (1999)
Note: the datasets for US aircraft production in WWII run from 1939 to 1944 for average annual deployment growth and 1942 to 1945 for average annual cost reduction.

Lazard. April 2023

Levelized Cost of Energy Comparison—Unsubsidized Analysis

Selected renewable energy generation technologies are cost-competitive with conventional generation technologies under certain circumstances

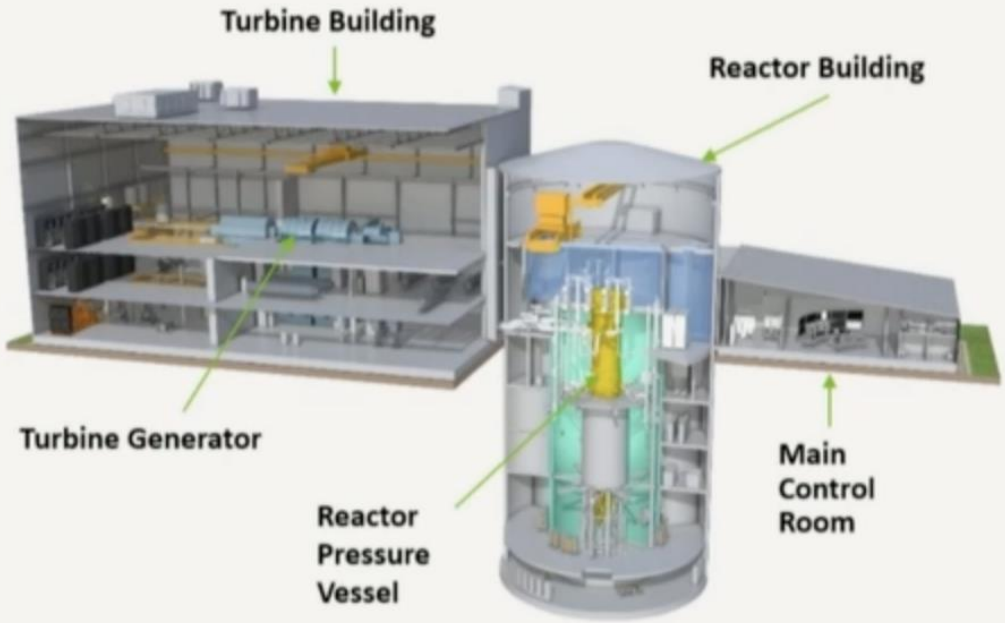


Source: Lazard and Roland Berger estimates and publicly available information

SMALL? 21 stories in height. MODULAR? below ground water filled

Technology Overview

GE Hitachi: BWRX-300



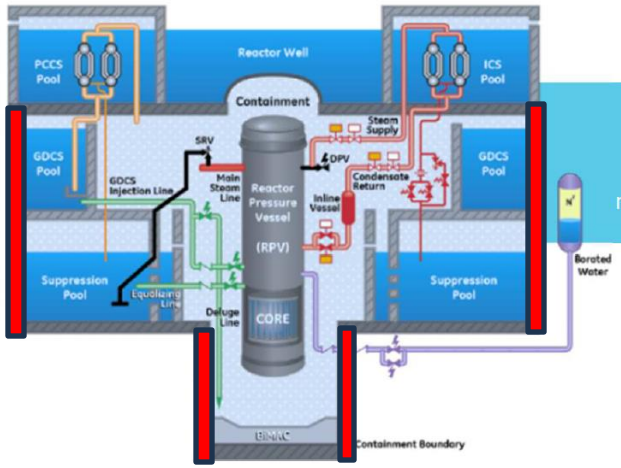
GEH SMR Technologies Canada is the Canadian division of the world-leading provider of reactor technology and nuclear services.

"The BWRX-300 is a 300 MWe water-cooled, natural circulation SMR with passive safety systems that leverages the design and licensing basis of GEH's ESBWR boiling water reactor, certified by the US Nuclear Regulatory Commission." – World Nuclear News 2021

Simplicity drives cost reduction

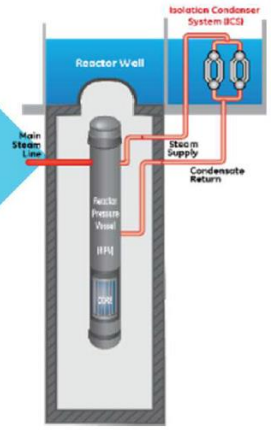
HITACHI

ESBWR



90% volume reduction

BWRX300



Systems/components eliminated:

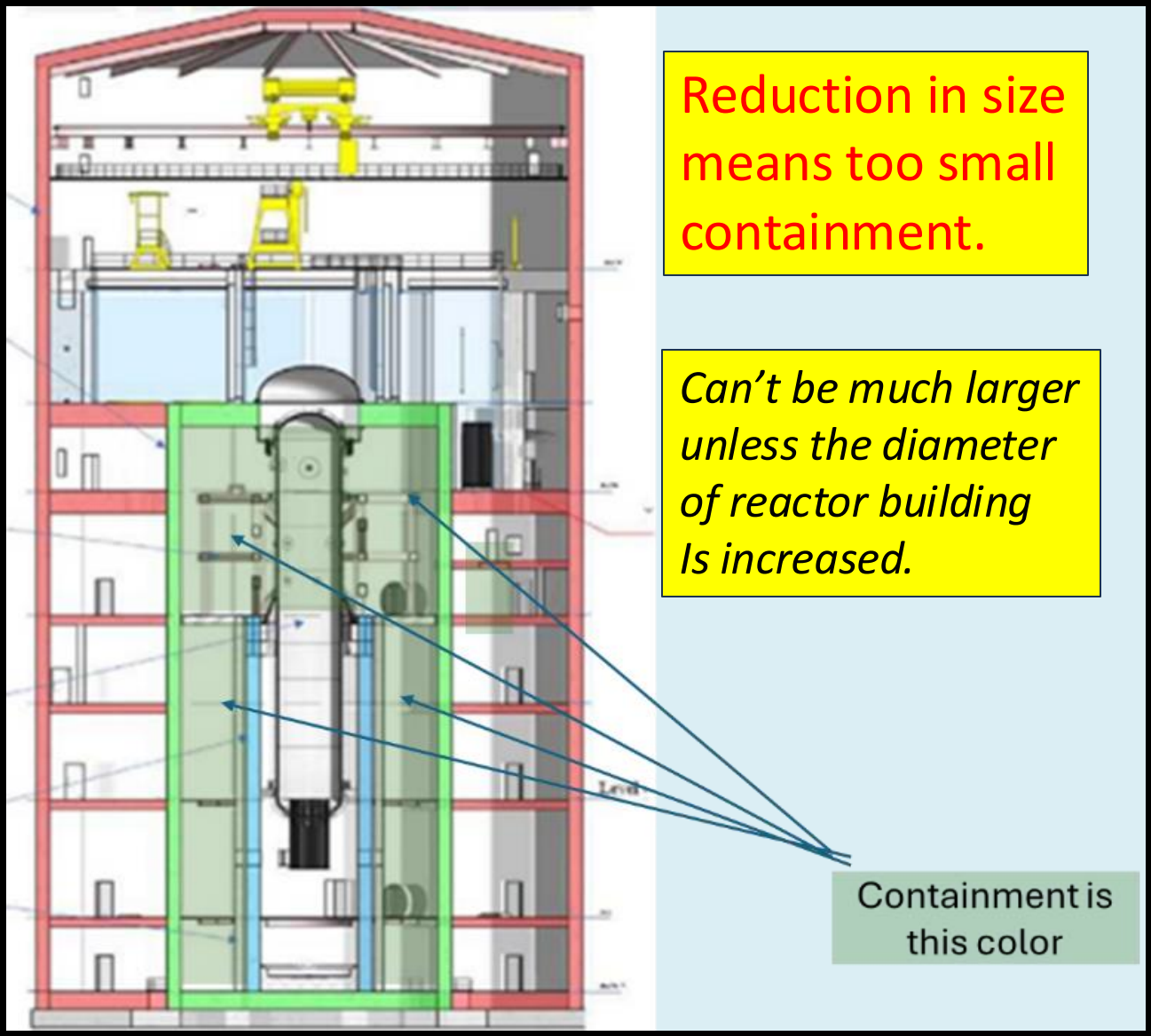
- Suppression Pool
- GDCS Pool
- Safety Relief Valves & Spargers
- Depressurization Valves
- BiMac (core catcher)

Systems/components simplified:

- Passive Containment Cooling (PCCS)
- Containment (use of SC)
- Boron injection
- Security (built into design)
- Turbine
- Generator (air cooled)

>50% building volume reduction/MW
>50% less concrete/MW

Reduction in size is due in part to elimination of safety systems.


Reduction in size means too small containment.
Can't be much larger unless the diameter of reactor building Is increased.
Containment is this color

“The NRC staff will evaluate the regulatory compliance of the **final design** of the RPV isolation and overpressure protection features for the BWRX-300 SMR and the piping rupture locations or break exclusion zone(s) (BEZ) proposed by GEH during **future licensing activities…**”

NRC Summary of Public Meeting January 2024

Recommendations:

- **do not consider granting a licence to construct before the design is complete and certified;**

- **require CNSC staff to publish detailed analyses critically examining the modifications of each ESBWR safety system.**

CCNR, January, 2025

The End

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