Panel discussion on

Advanced Monitoring and Diagnostic Technologies in NPPs (I&C Systems)

International Conference on Opportunities and Challenges for Water Cooled Reactors in the 21st Century

Vienna, Austria, Wednesday, 28 October 2009

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Why Plenary Discussion on Instrumentation and Control (I&C)

- I&C is the fastest changing technology in NPPs
- Digital is the only choice available
- Relevant to NPP modernization and new designs
- Significant challenges in licensing digital I&C
- Ageing NPPs will need more monitoring & diagnostics
- Building into new designs

Scope of I&C:

- Process measurements
- Actuators
- Logic and decision making – digital
- Human-system interface (HSI, HMI, MMI) – Control rooms
- Monitoring and Diagnostic Systems

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Panellists

- Mr. Hash Hashemian, AMS Corporation, USA
- Mr. Kook Hun Kim, Doosan Heavy Industries, Republic of Korea
- Mr. Bela Bechtold, Areva NP GmbH, Germany
- Mr. Jean-Paul Bouard, EdF and IEC SC45A, France
- Mr. Gary Johnson, Department of Nuclear Safety and Security, IAEA
- Mr. Oszvald Glöckler, Department of Nuclear Energy, IAEA

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I&C Issues

- Short opening statements from panellists
- List of I&C related challenges relevant to NPP design, licensing, and operation
- Questions from the audience
- Summary to be published

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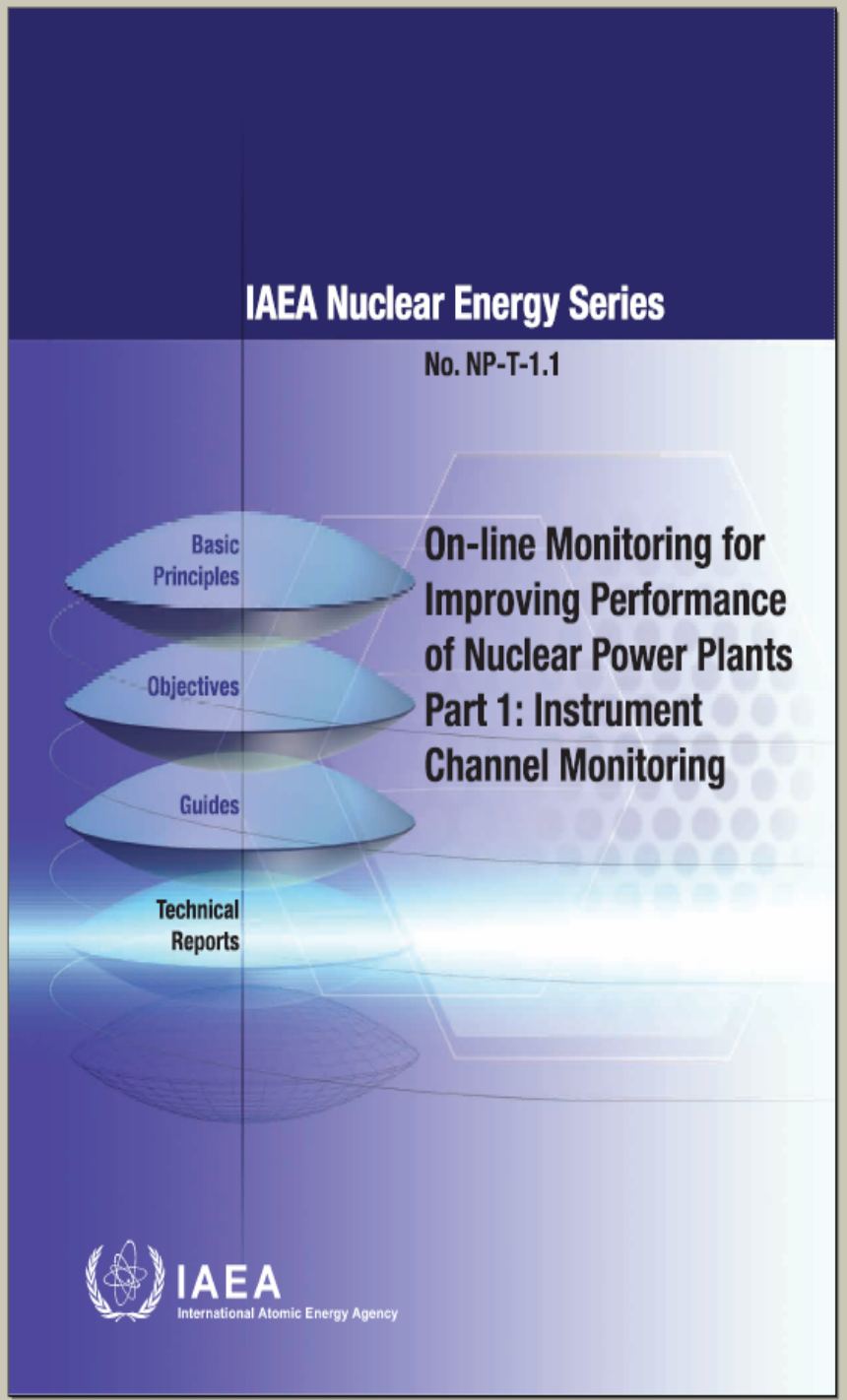
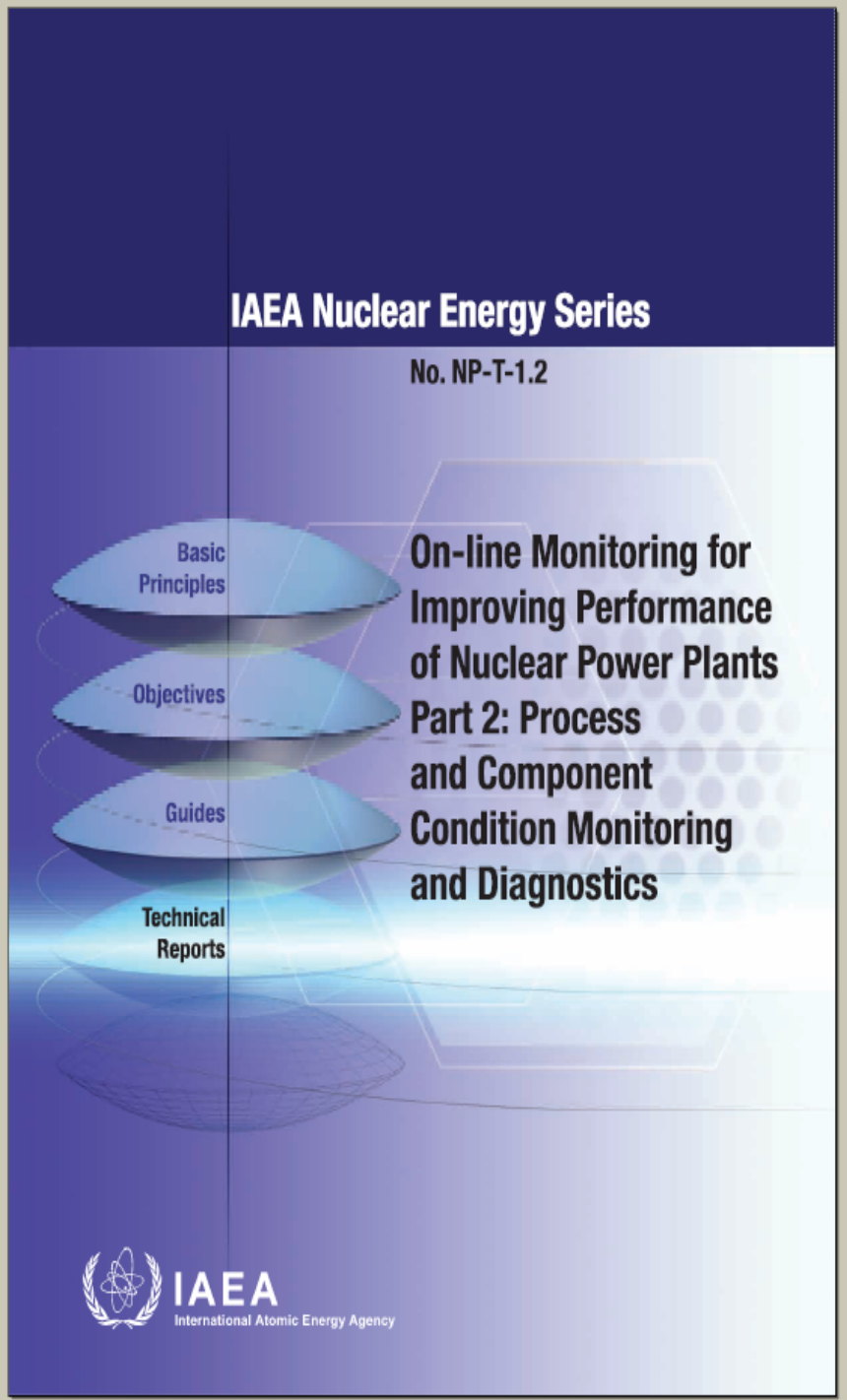
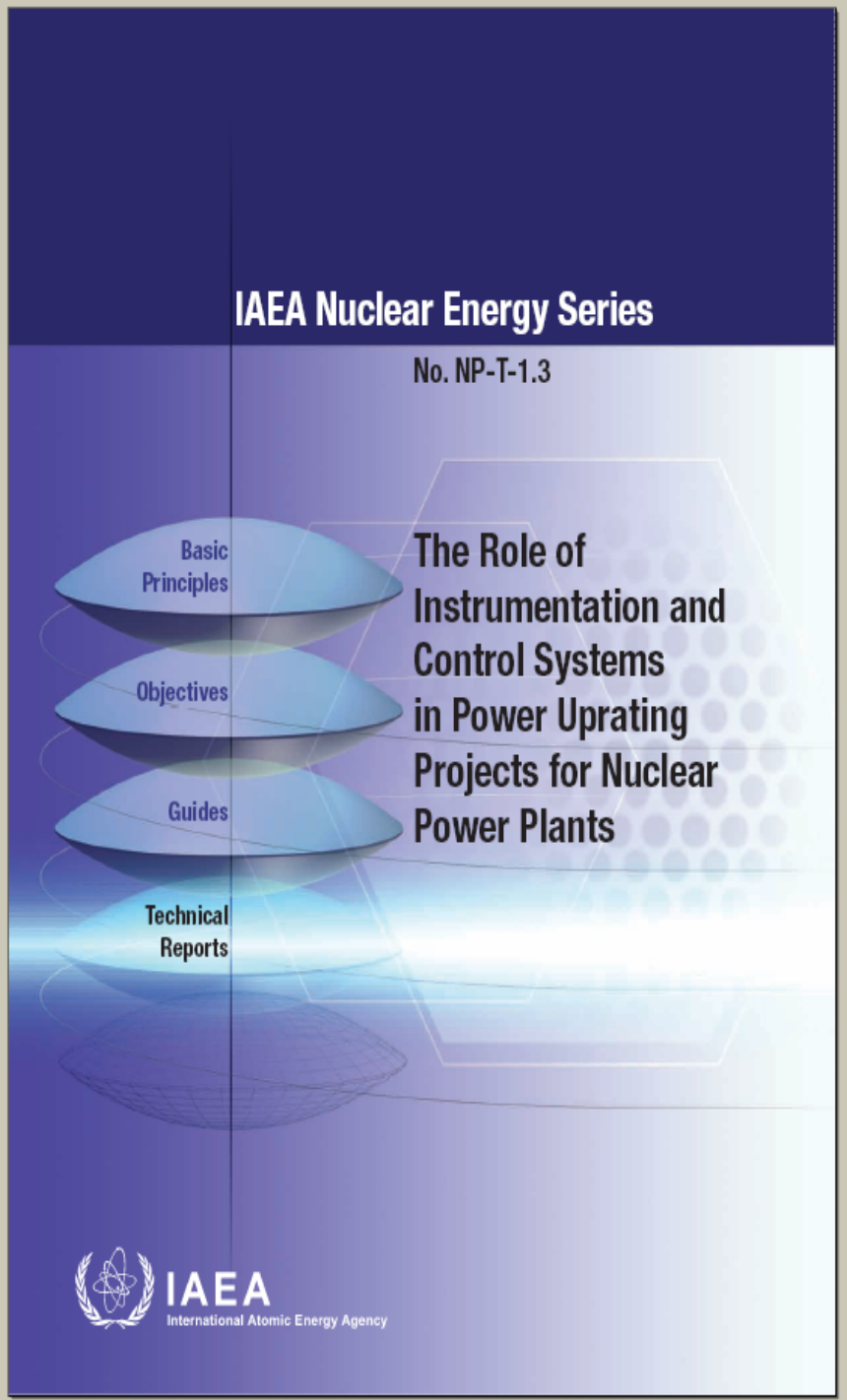
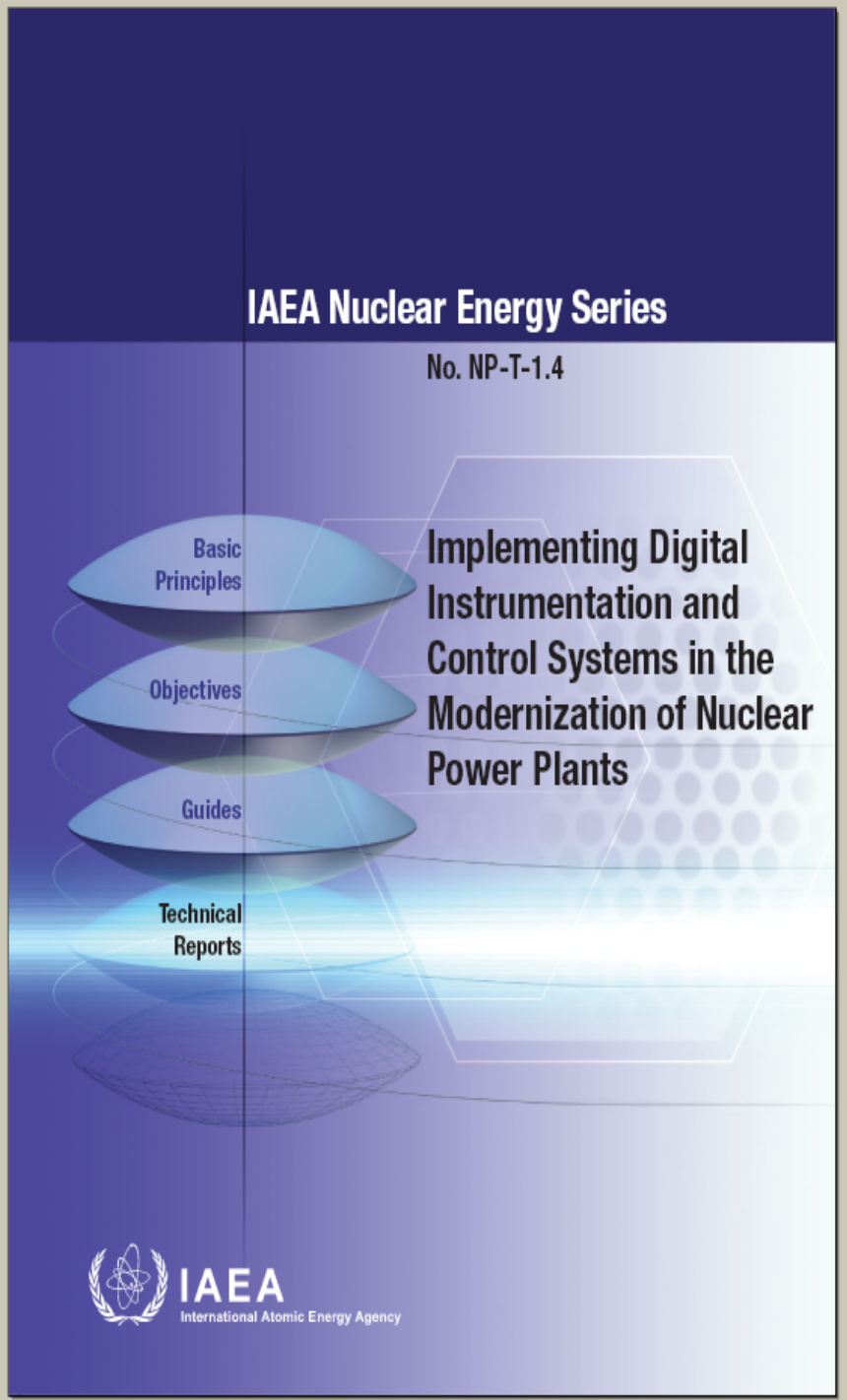
- Licensing digital I&C used in safety systems
- Possible common-cause failures in digital I&C systems for safety
- Cyber security of digital I&C systems
- Use of pre-qualified commercial-off-the-self products in I&C
- New sensing technologies

- Wireless communication in diagnostics and monitoring applications
- Modernization of I&C systems and control rooms
- New I&C systems supporting power uprates and license renewals
- I&C cable ageing and equipment qualification
- Capture and transfer I&C knowledge









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Core Knowledge on Instrumentation and Control Systems in Nuclear Power Plants: A Reference Book

Report prepared within the framework of the Technical Working Group on Nuclear Power Plant Control and Instrumentation

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October 2009

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Results of the Coordinated Research Programme titled

Advanced Surveillance, Diagnostics, and Prognostics Techniques Used for Health Monitoring of Systems, Structures, and Components in Nuclear Power Plants

Report prepared within the framework of the Technical Working Group on Nuclear Power Plant Control and Instrumentation

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December 2010

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(*) Information on nuclear power plants in Taiwan, China can be provided on request.

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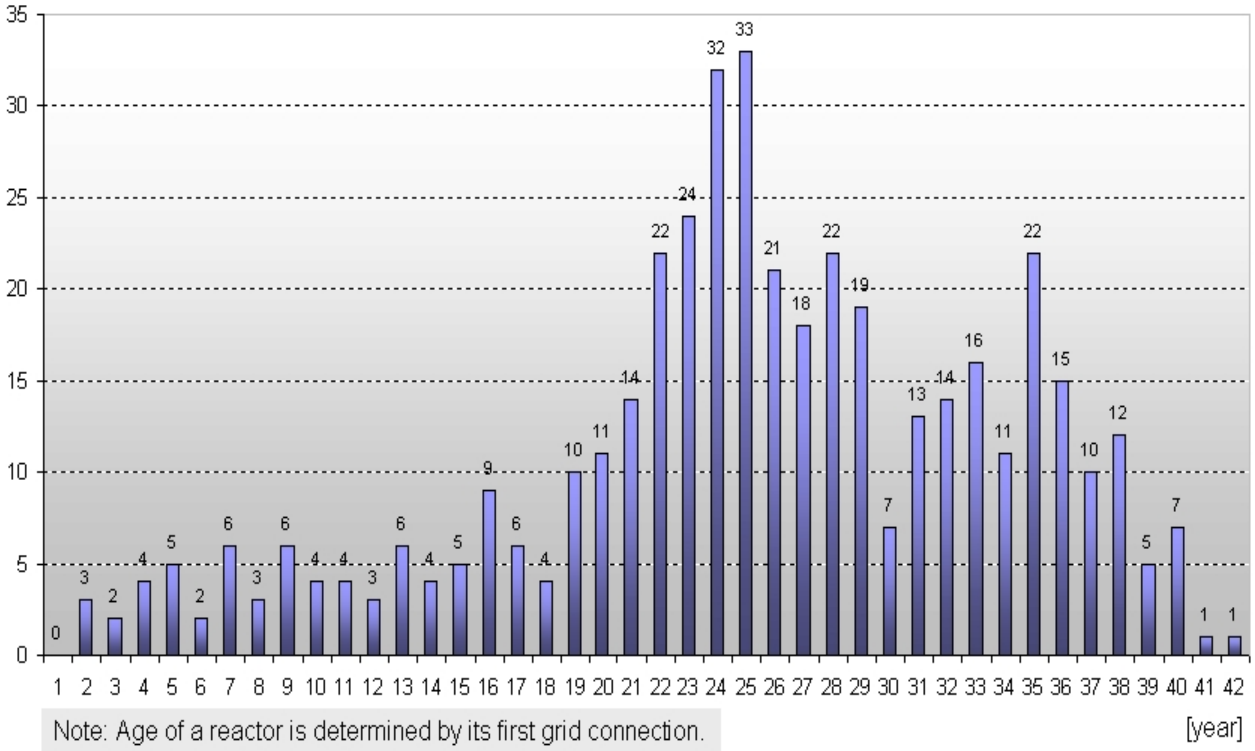
NUCLEAR POWER PLANTS INFORMATION

Number of Operating Reactors by Age

(as of March 2009)



Note: Age of a reactor is determined by its first grid connection.

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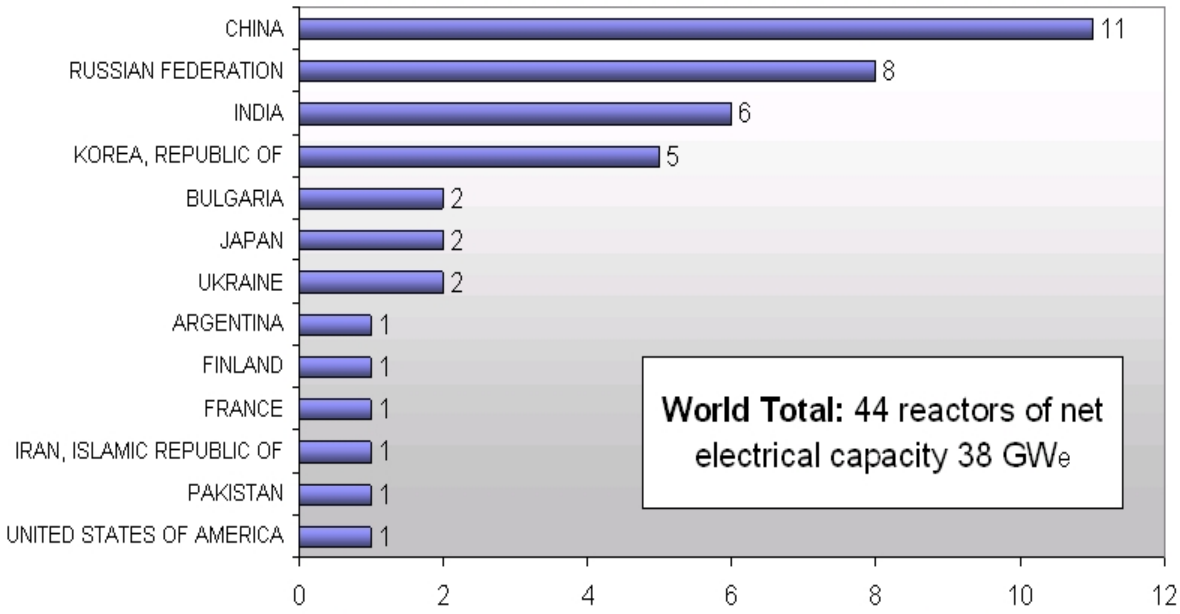
NUCLEAR POWER PLANTS INFORMATION

Number of Reactors under Construction Worldwide



Note: The World Total includes also 2 reactors under construction in Taiwan, China.

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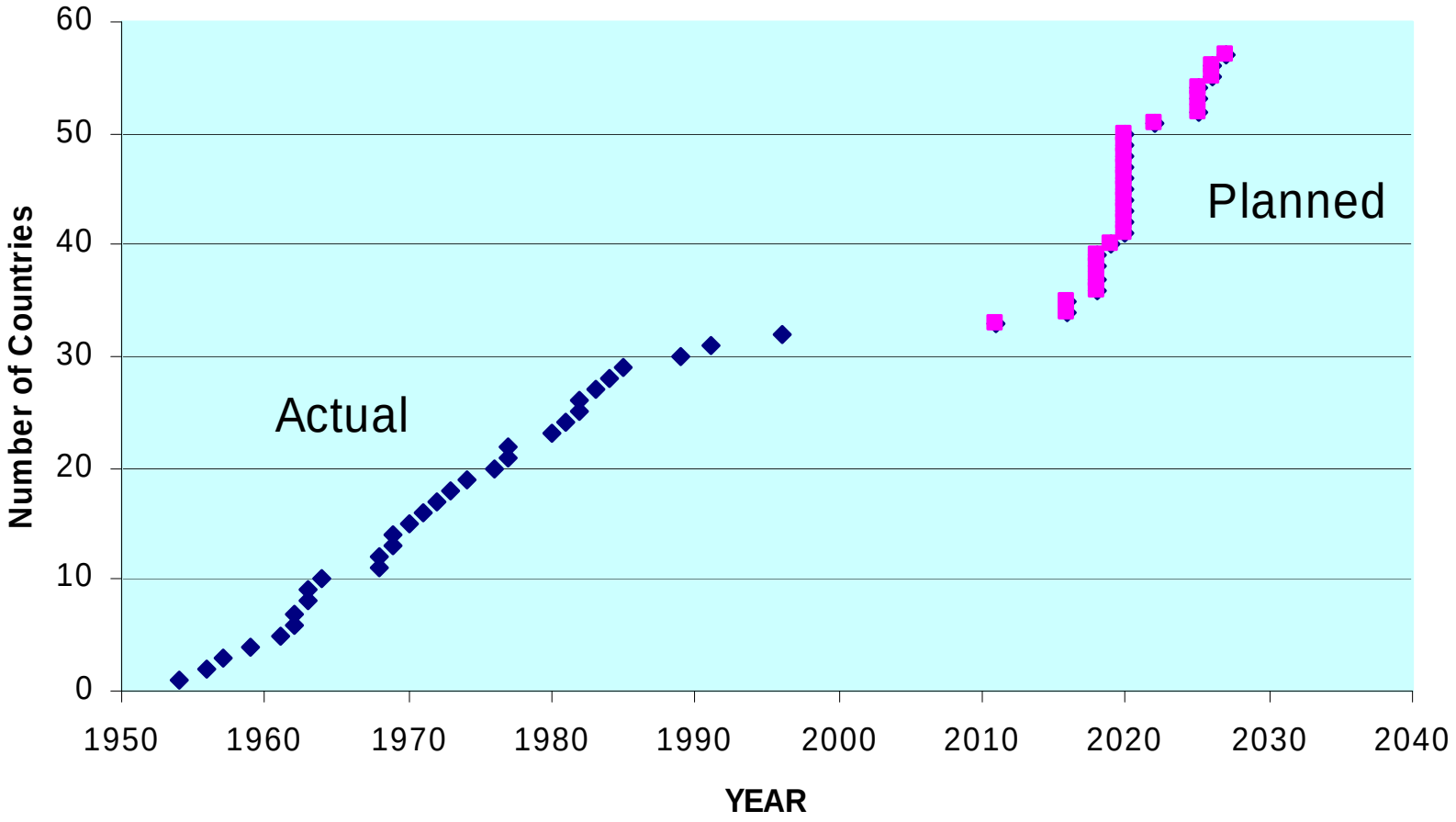
Countries introducing their first NPP



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Thank you

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