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Understanding the Milestones and Roles in Nuclear Power Infrastructure Development

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Understanding the Milestones and Roles in Nuclear Power Infrastructure Development

Marta Ferrari,
Integrated Nuclear Infrastructure Group
Nuclear Energy Department

IAEA Nuclear Energy Policy Management School
Vienna, 13th Nov 2012

Summary

- New comers to nuclear power status after Fukushima
- New comers top issues
- Roles and responsibilities
- Milestone approach
- Action Plan after Fukushima
- International cooperation
- Conclusions

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Countries Looking to Nuclear to Meet Increased Energy Demand

Earth at Night
More information available at:
http://apod.nasa.gov/ap081005.html

stronomy Picture of the Day
2008 October 5
http://apod.nasa.gov/

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Newcomers Post-Fukushima?

- Nuclear power continues to be an option, but public confidence has been shaken
- Some countries have decided to delay decisions regarding nuclear power in order to take the lessons into account
- Many countries are continuing with their plans for their first NPPs, and have said they will incorporate the lessons learned from Fukushima accident

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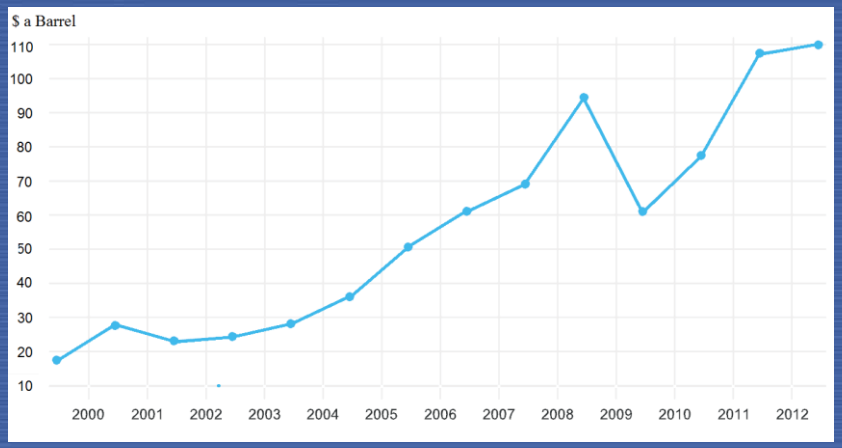
Newcomers Post-Fukushima?

Drivers for consideration of nuclear have not changed:

- Increased demand for energy
- Energy independence
- Volatile fossil fuel prices
- Climate change

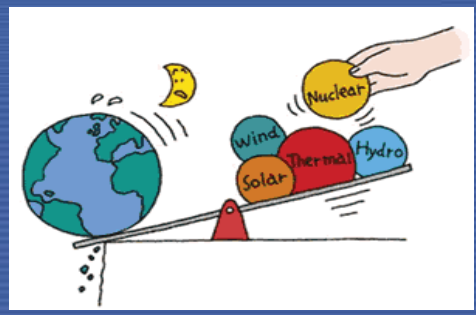


OPEC Oil Basket Price History

http://www.opec.org/opec_web/en/data_graphs/40.htm

Hurricane Sandy

picture from National Post
http://news.nationalpost.com/2012/10/29/hurricane-sandy-strengthens-remains-on-course-to-hit-canada-monday-bringing-7-metre-waves-to-great-lakes/



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Status of Newcomers Post-Fukushima

	2010	2011	**2012**
First nuclear power plant started construction/under construction	1	0	**1**
First nuclear power plant ordered	2	3	**2**
Decided to introduce nuclear power and started preparing the appropriate infrastructure	10	6	**6**
Active preparation for a possible nuclear power programme with no final decision	7	6	**6**

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Newcomers Post-Fukushima
Concrete Steps Forward

UAE, Barakah Unit 1,
Under Construction as of Aug 2012

http://www.iaea.org/newscenter/news/2012/uaenewcomer.html

Belarus, Ostrovets Unit 1, May 2012

http://www.world-nuclear-news.org/NN_Contract_complete_for_nuclear_power_in_Belarus_1907121.html

Bangladesh and Russia NPP Agreement, Nov 2011

http://www.world-nuclear-news.org/NP-Russia_agrees_to_build_Bangladeshi_nuclear-0211114.html

JAPC and Vietnam Agreement to Conduct Feasibility Study of Vietnam's Second NPP project, Sept 2011

http://www.world-nuclear-news.org/NN-JAPC_to_assess_Vietnamese_project-2809114.html

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Newcomers' Top Issues

- How do I start?
- Is there public support?
- Do I have the people?
- Can I find the money?
- What am I going to do with the waste?
- Is it safe? Can I manage if there is an accident?

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How to Start a Nuclear Programme?

The nuclear power option emerges…

- Political leader makes an announcement
- Energy planners identify the option in the mix
- Policy makers see potential benefits

And then what???

King Abdullah of Jordan

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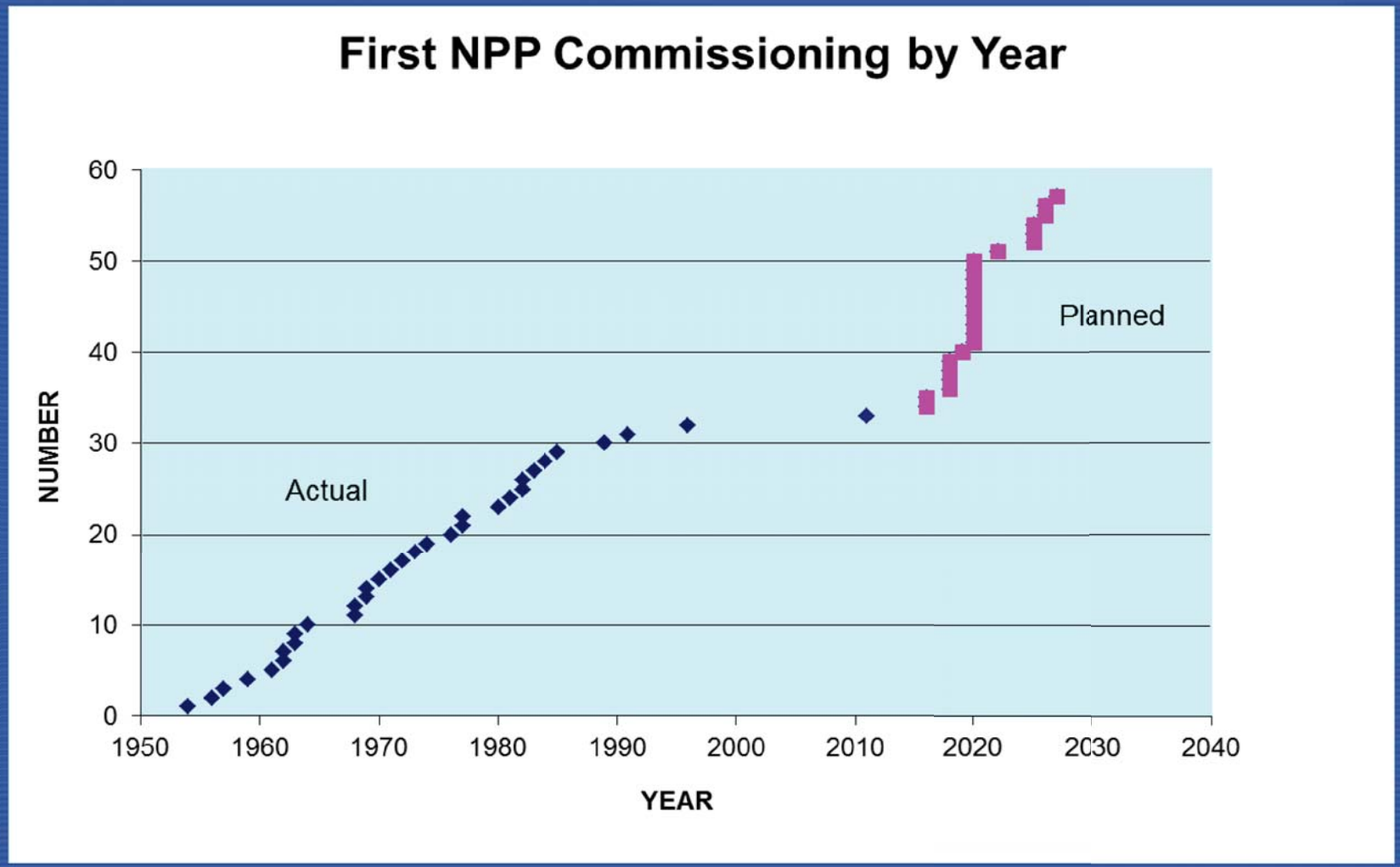
“Newcomers” Facing Different Challenges Than Countries Faced in Previous Decades



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Nuclear Power

- High level of Safety and Security
- Capital intensive investment
- Well-trained human resources
- Control nuclear materials
- Long-term nuclear waste management
- Public perception
- Long-term Government Commitment needed

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NPP Project – Roles and responsabilities

Government-NEPIO

Coordinates

Supervise

Regulatory Authority

Promote

Owner - Operator

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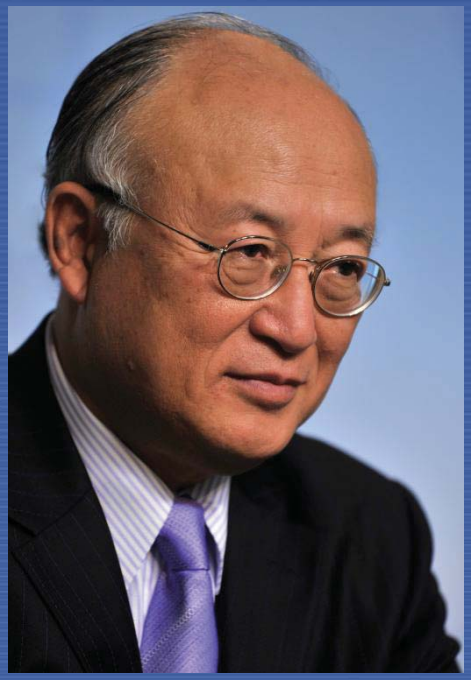
IAEA and Nuclear Power expansion



"The Agency has a key role to play in ensuring that this expansion in nuclear power takes place in an efficient, responsible and sustainable manner."

"Assistance to newcomers, especially those which are most advanced on the road to having operational reactors, will remain a high-priority issue."

Yukiya Amano

IAEA Director General

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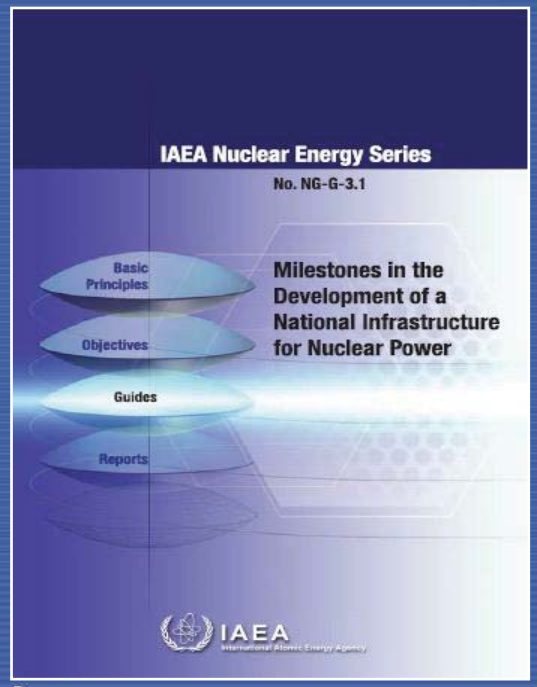
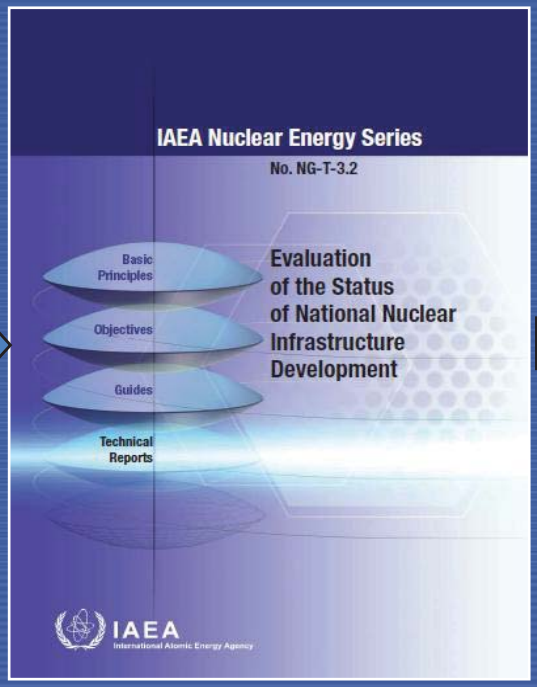
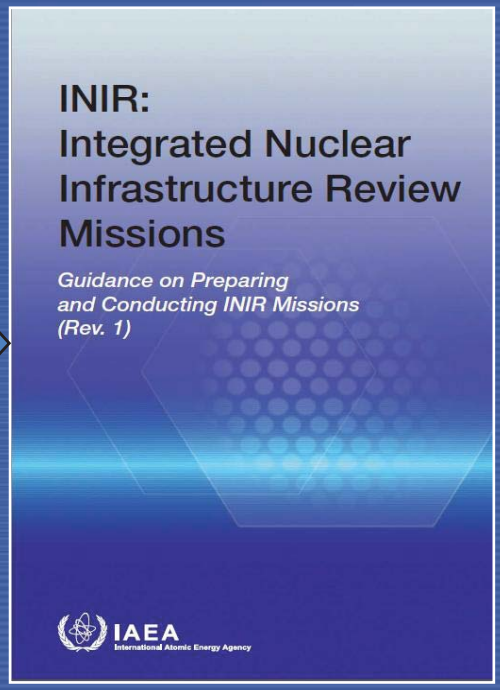
Milestones Approach to launching Nuclear Power

- Based on international experience
- Phased (3 Phases)
- Comprehensive and holistic (19 issues)







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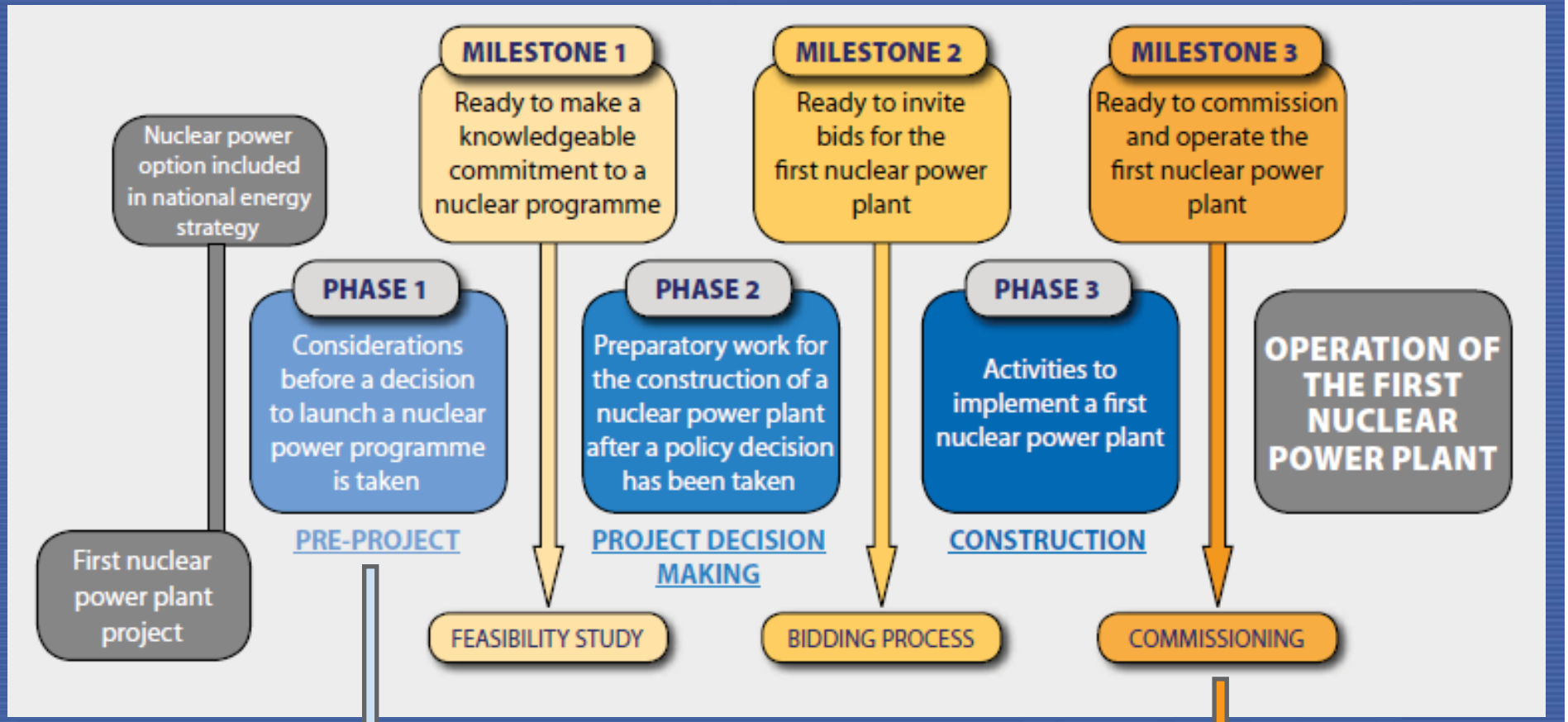
Milestones in the Development of a National Infrastructure for Nuclear Power (NG-G-3.1)



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Milestones in the Development of a National Infrastructure for Nuclear Power (NG-G-3.1)

- National position
- Nuclear safety
- Management
- Funding and financing
- Legislative framework
- Safeguards
- Regulatory framework
- Radiation protection
- Electrical grid
- Human resources development
- Stakeholder involvement
- Site and supporting facilities
- Environmental protection
- Emergency planning
- Security and physical protection
- Nuclear fuel cycle
- Radioactive waste
- Industrial involvement
- Procurement

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What's Important?

- Comprehensive – many stakeholders
- Integrated – coordinated planning
- Government Commitment – essential to long-term sustainability

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Nuclear Power Programme/Projects

NP Programme:

- National view of nuclear power use in the country
- Supporting infrastructure
- Ensuring Long-term commitment, resources, capabilities

NPP Projects:

- Site-specific NPP feasibility, construction, operation

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Project Schedule vs. Infrastructure Development

	Phase 1	Phase 2	Phase 3
1. National position			
2. Nuclear safety			
3. Management			
4. Funding and Financing			
5. Legislative framework			
6. Safeguards			
7. Regulatory framework			
8. Radiation protection			
9. Electrical grid			
10. Human resource development			
11. Stakeholder involvement			
12. Site and supporting facilities			
13. Environmental protection			
14. Emergency planning			
15. Security			
16. Nuclear fuel cycle			

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National Position

The daydreams of cat herders

National Position and Public Support

- Factors for success:
  - Consensus across the political spectrum
  - Translating nuclear power into social values
  - Connecting the technical community to the government and politicians
  - Communicating with the public
- Clear policy at the beginning forms foundation for future decisions

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Management

Belarus NEPIO

- High Level – headed by the Deputy Prime Minister
- Includes all stakeholders
- Meets regularly and monitors action plan

Belarus NEPIO Representatives During the INIR Mission, June 2012

Mr Vladimir Semashko, Belarus Deputy Prime Minister

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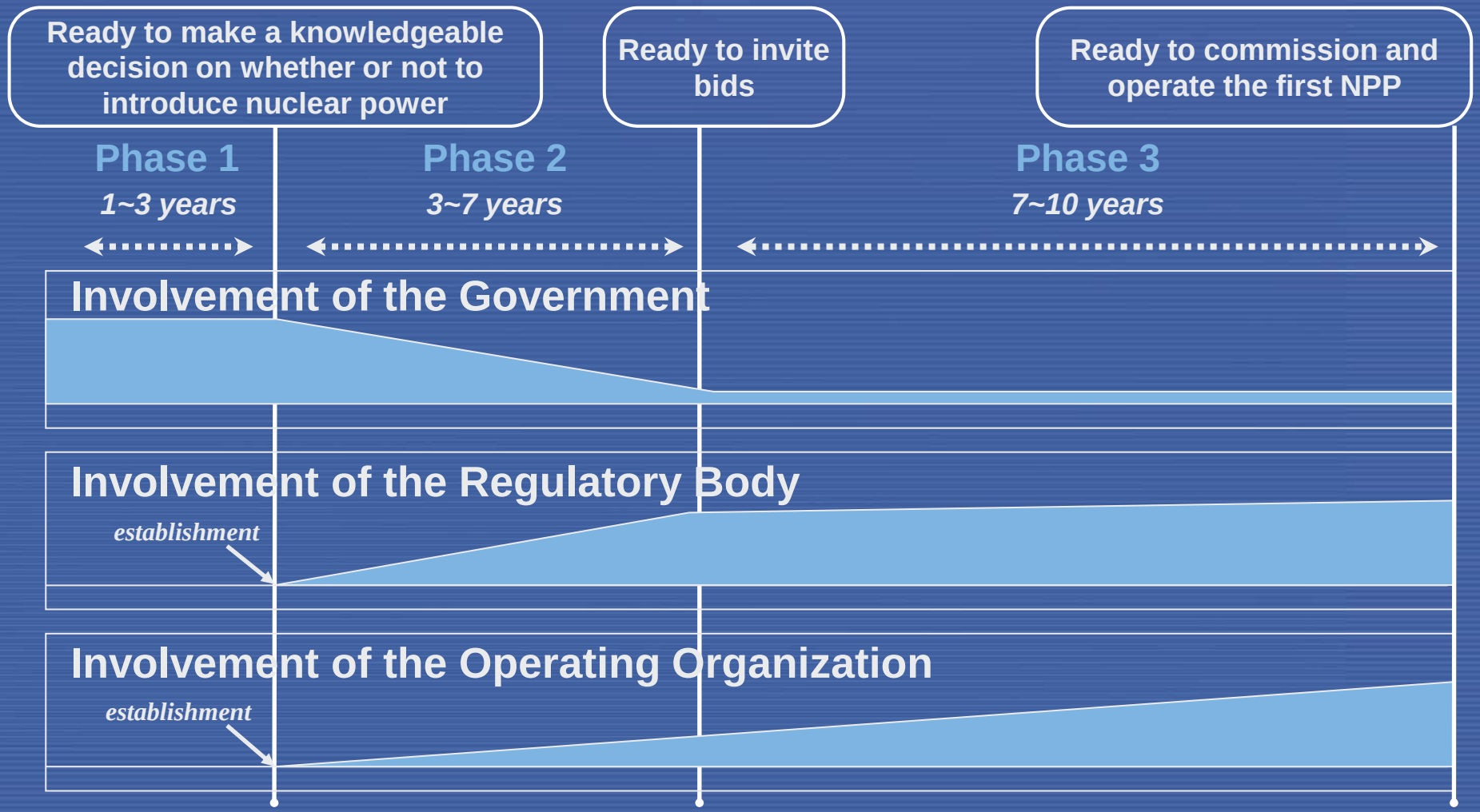
NEPIO = Nuclear Power Implementing Organization

Transition of Leadership in the Project



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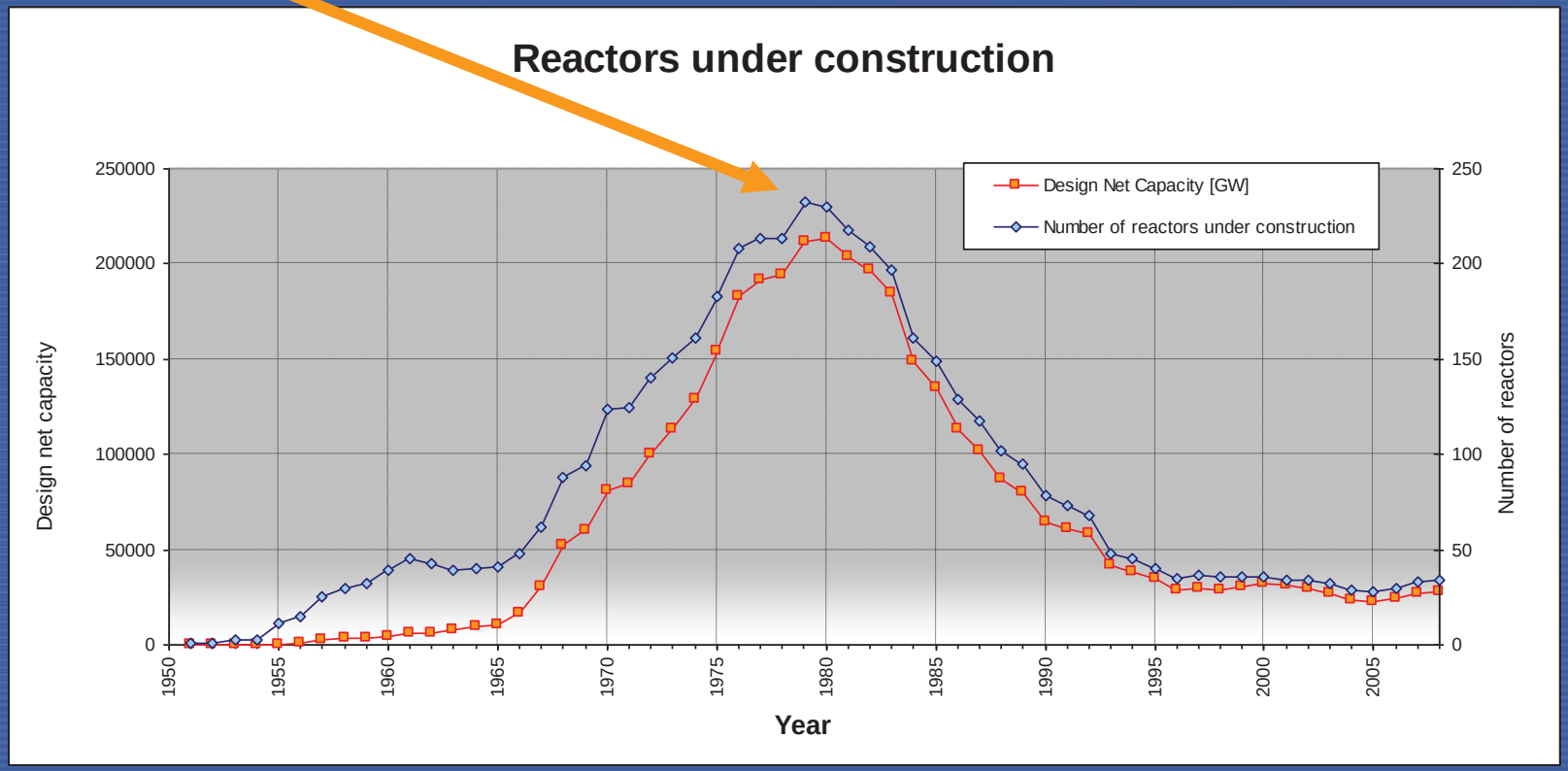
Human Resources-Back to the Future?

How did they manage?



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Human Resource Development

UAE Regulatory Authority Management Team, July 2012

http://www.fanr.gov.ae

Stakeholder Involvement

Social acceptance after Fukushima makes it harder to start

Protests in Jordan against the nuclear power programme organized by a local Greenpeace branch and a coalition called Irhamouna made of residents of the city of Mafraq (Arabic for "Have Mercy on Us"), 2011

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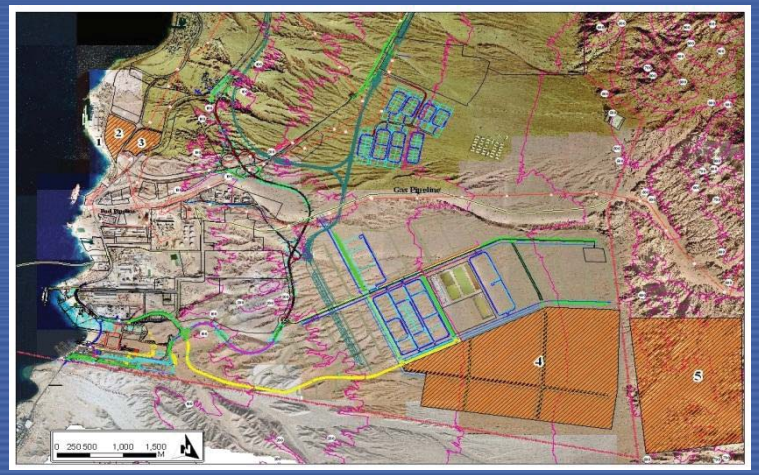
Site and Supporting Facilities

- Survey of potential sites
- Identification of possible sites
- Detailed site characterisation
- Selection of the site



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Electrical Grid

- Single NPP should be < 5-10% of total installed capacity
- Reliability
- Regional Interconnection

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- Procurement

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Action Plan for Nuclear Safety

“Embarking Countries”

IAEA Ministerial Conference on Nuclear Safety

http://www.iaea.org/newscenter/news/2011/confsafety200611.html

IAEA at Fukushima Daiichi site

http://www.france24.com/en/20110601-japan-underestimated-nuclear-plant-tsunami-risk

http://www.iaea.org/newscenter/focus/actionplan/

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Comprehensive Infrastructure Evaluation

How do you know when you are ready?

- Self-evaluation
- Periodic reviews by international experts IAEA offers Integrated Nuclear Infrastructure Review Service (INIR)

INIR mission in Jordan, 2009

http://www.iaea.org/newscenter/news/2009/nuclreadiness.html

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Integrated Nuclear Infrastructure Reviews

- International Expert Review of the Infrastructure Status
- Collaborative effort to identify areas where further actions are needed
- Recommendations and suggestions to assist country in making progress

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Integrated Nuclear Infrastructure Reviews

From August 2009, INIR missions only for Phase 1 and 2

2009	2010	2011	2012	2013
Jordan	Thailand	Bangladesh	Jordan (follow-up)	South Africa
Indonesia		UAE	Belarus	Poland
Vietnam			Vietnam (follow-up)	Nigeria
				Jordan
				Turkey

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Benefits of INIR Mission

"The results of the INIR mission will be useful to us as we progress to strengthen the national nuclear infrastructure"

Mikhail Mikhadiuk,
Deputy Minister, Ministry of Energy, Belarus

"We are open, we are transparent, we are developing a peaceful nuclear programme with the highest international standards. And we are eager to continue in our cooperation with the IAEA and follow its guidance"

Ambassador Hamad Al Kaabi,
UAE´s Permanent Resident Representative to the IAEA

Jan 2011
http://www.iaea.org/newscenter/news/2011/npprogramme.html

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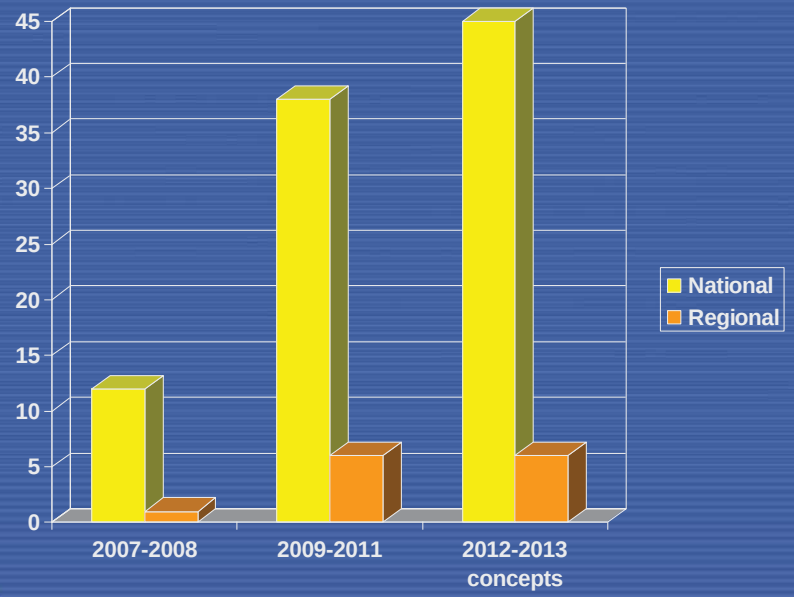
INIR Mission Follow-Up

- National Action Plan to address recommendations and suggestions
- Further Training and expert advice, if needed



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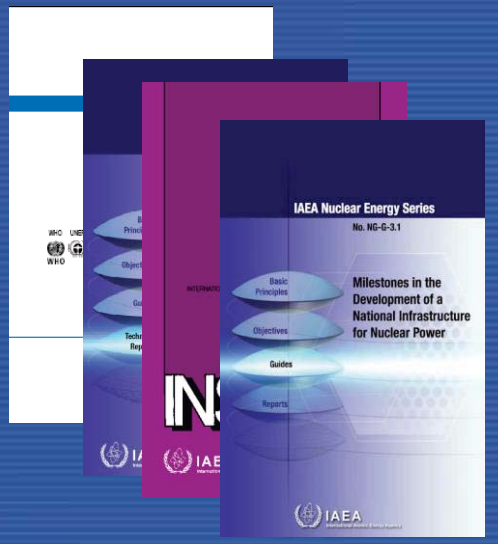
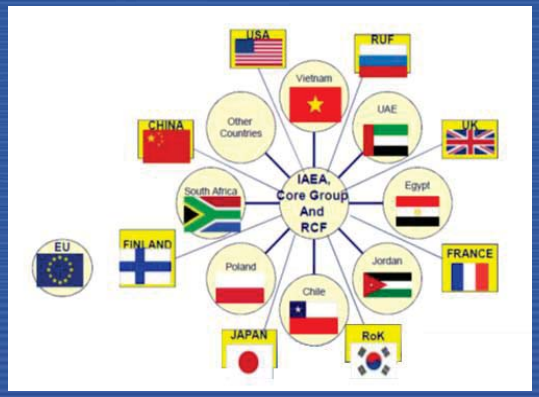
International Cooperation – IAEA's Role

- Standards and Guidance
- Reviews and Services
- Capacity Building
- Knowledge Networks
- Forum for communicating, increasing transparency, sharing lessons learned





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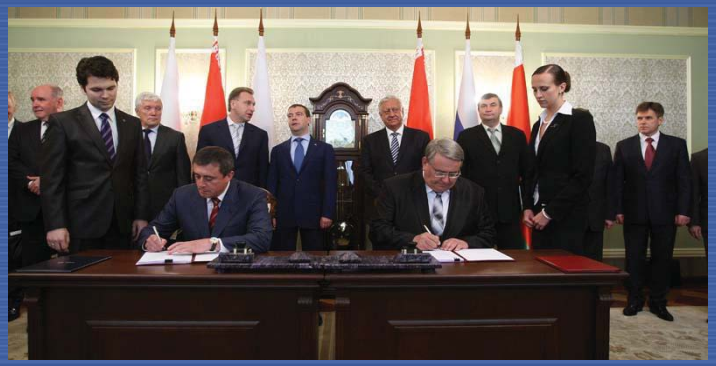
International Cooperation

- Government-to-Government Agreements for transfer of technology
- Bilateral Assistance with the NPP Project
- Bilateral Assistance with infrastructure development
- World Association of Nuclear Operators

  And…don't forget -- international consultants, contractors



Contract Signing Ceremony for Belarus NPP with the Russian Federation , July 2012

http://www.rosatom.ru/en/presscentre/highlights/ee7a3c004c07babea190b3f629e8bf65

Signing Ceremony For the NP Economic Cooperation Agreement Between the UAE and South Korean Consortium, Dec 2009

http://www.thenational.ae/news/uae-news/abu-dhabi-signs-nuclear-power-deal-with-south-korean-group

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Summary – Take Away Points

- Even after Fukushima, some countries continue with plans to start NPP programmes
- Infrastructure involves a wide range of issues and institutions and effective coordination contributes to success
- Having a master schedule gets all players working toward one goal

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Summary – Take Away Points

- Project vs infrastructure timescale
- Nuclear Power Program requires long term commitment from government
- International cooperation – multilateral and bilateral – is available

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Atoms for Peace

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