



Multinational Repository Initiatives

Recent Global Developments

SAPIERR II

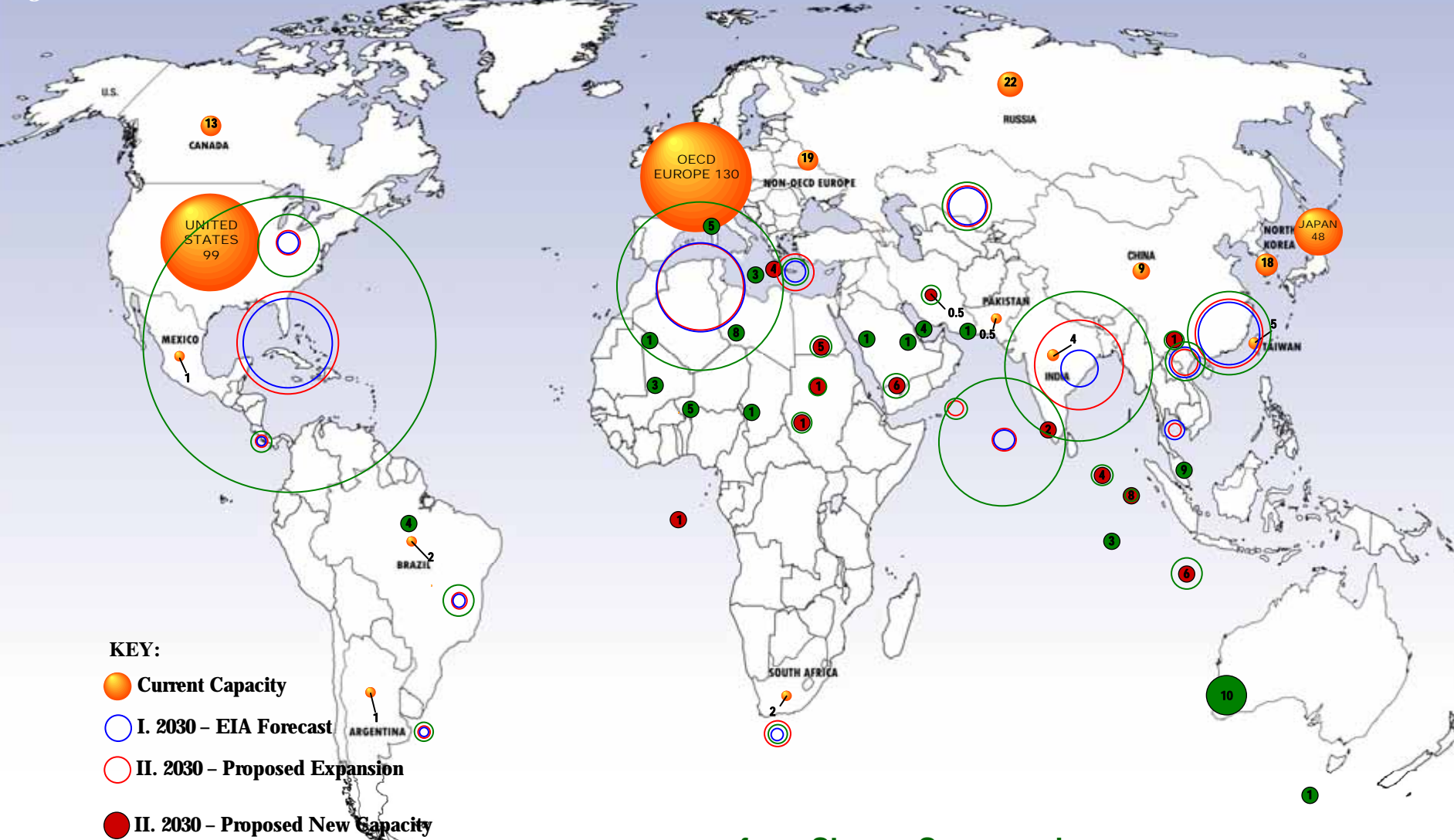
Implementation of European Regional Repositories, Closing Seminar, Brussels, 27 January

Developments

- “Nuclear renaissance” and impacts
- Continued growth in security concerns
- Public and political attitudes
- Status of GNPI and GNEP
- (Progress with SAPIERR)

Reactor Capacities for all Scenarios*

(Gigawatts electric, GWe)



KEY:

- Current Capacity
- I. 2030 - EIA Forecast
- II. 2030 - Proposed Expansion
- II. 2030 - Proposed New Capacity
- IIIb. 2050 - MIT Expansion
- IIIb. 2050 - MIT New Capacity

from Sharon Squassoni
Senior Associate, NPEC

*New nuclear capacities (red, green dots) not necessarily to scale; consult Appendix for data.

Pre-requisites for a Secure, Safe, Global Energy Future

- Security of supply of energy sources
- Low-carbon electricity generation
- → **Extended nuclear power**
 1. Economic nuclear power production
 2. Safe nuclear facilities and materials
 3. Secure nuclear facilities and materials
 4. Safe and secure waste management
 5. Public recognition that items 1-4 are guaranteed!!

Drivers for moving ahead with waste disposal

- May **get stronger** because of:
 - Public & political pressure
 - Need for credibility in new build programmes
 - Waste disposal as a reactor sales incentive
- May **get weaker** because of:
 - Urgent hunger for more energy
 - Recognised need to combat climate change
 - Implications of advanced fuel cycles

Will waste disposal remain “the Achilles Heel” of nuclear power as we try again to increase?

Key Goals in Nuclear Waste Management

- to ensure the **SAFETY** of future generations:
 - a long-recognised safety and environmental goal
- to enhance world **SECURITY** in the short and long term:
 - an urgent challenge today
- to make safe and secure solutions available to **ALL** nuclear nations
 - a pre-requisite for a GLOBAL nuclear future

Planned Operational Dates for Geological Repositories

COUNTRY: DATE	COUNTRY: DATE
Austria: no plans	Belgium: after 2025
Bulgaria: no plans	China: after 2040
Czech Republic: 2065	Finland: 2020
France 2025	Germany: 2030
Hungary: 2047	Italy: open
Japan: 2035	Lithuania: no date
Netherlands: after 2100	Romania 2049
Slovakia: 2037	Slovenia: 2066
Spain: 2035	South Korea: open
Sweden: 2017	Switzerland: 2040
United Kingdom: open	USA: 2018?

Nuclear power in new user countries: “the small print”

- NPPs produce waste that needs expensive storage and geological disposal
- The problem is easier if your fuel supplier takes back the fuel
- But, even then, you will have long-lived wastes
- You need a comprehensive long-term WM strategy and plan
- Your nuclear supplier or the international community can help with this
- The disposal options are: national, multinational and dual track

A credible waste disposal strategy

- The components:
 - availability of the necessary proven technologies
 - An agreed and credible timetable
 - availability of the necessary personnel and funding
 - a siting strategy that that can deliver **at the required time** an **acceptable** location for a repository
- Large nuclear programmes must work on all three components
- A prudent approach for new nuclear countries
 - recognise the technological and financial implications
 - start out on the siting task in a **“dual track”** manner

Regional Repositories

- Europe – SAPIERR as role model
- Arab States
- Asia
- Central/South America
- Africa

Nuclear security : a growing concern

- Diversion of fissile materials separated during civil reprocessing of spent fuel
- Clandestine reprocessing of spent fuel to produce weapons materials
- Disruption of waste storage facilities in acts of terrorism or war
- Diversion of radioactive wastes with the intention of dispersion and contamination

Growing Nuclear Programmes

Growing Security Concerns

- All the security issues affect all programmes
- Possible new entrants
 - Algeria, Australia, Baltic States, Chile, Gulf States, Iran, Italy, Indonesia, Jordan, Malaysia, Nigeria, Peru, Poland, Thailand, Turkey, Vietnam.....
- Most attention is being given to the front-end (e.g. by IAEA, WNA, GNEP, GNPI)
 - Avoid spread of enrichment and reprocessing
 - Provide security of fuel supply for all users
 - What about the spent fuel and radioactive wastes??

➔ Secure Multinational Solutions

How can multinational solutions help?

- **Limited numbers of facilities to be secured**
 - replace disconnected organisations
 - single facility easier to control and monitor
- **Earlier underground disposal for smaller nations**
 - with no realistic repository programmes at present
- **Enhanced engineered and institutional security measures**
 - ensure highest standards of safety & security
 - encourage harmonisation of standards (e.g. EU: 15 NP States)
- **Enhanced levels of international safeguards oversight**
 - simpler surveillance
- **Improved financing arrangements**
 - general economic advantages of sharing well-known
 - less chance of diversion of security funds

Interim Conclusions

- We **neglected waste disposal** during the first “nuclear surge”; we must not neglect it now during the “renaissance”
- Both **safety and security** aspects are both important
- This is a key issue for **existing nuclear nations** wishing to expand their programme; it is equally important for nations **initiating** a nuclear power programme
- New and small nuclear programmes should adopt “**dual track**” disposal strategies (national and multinational)
- Multinational repositories may be the “carrot” that can best **convince new nuclear nations to accept further constraints** on their activities

BUT what about the public/political acceptance???

Public and Political Attitudes

Global developments

C. McCombie, Arius



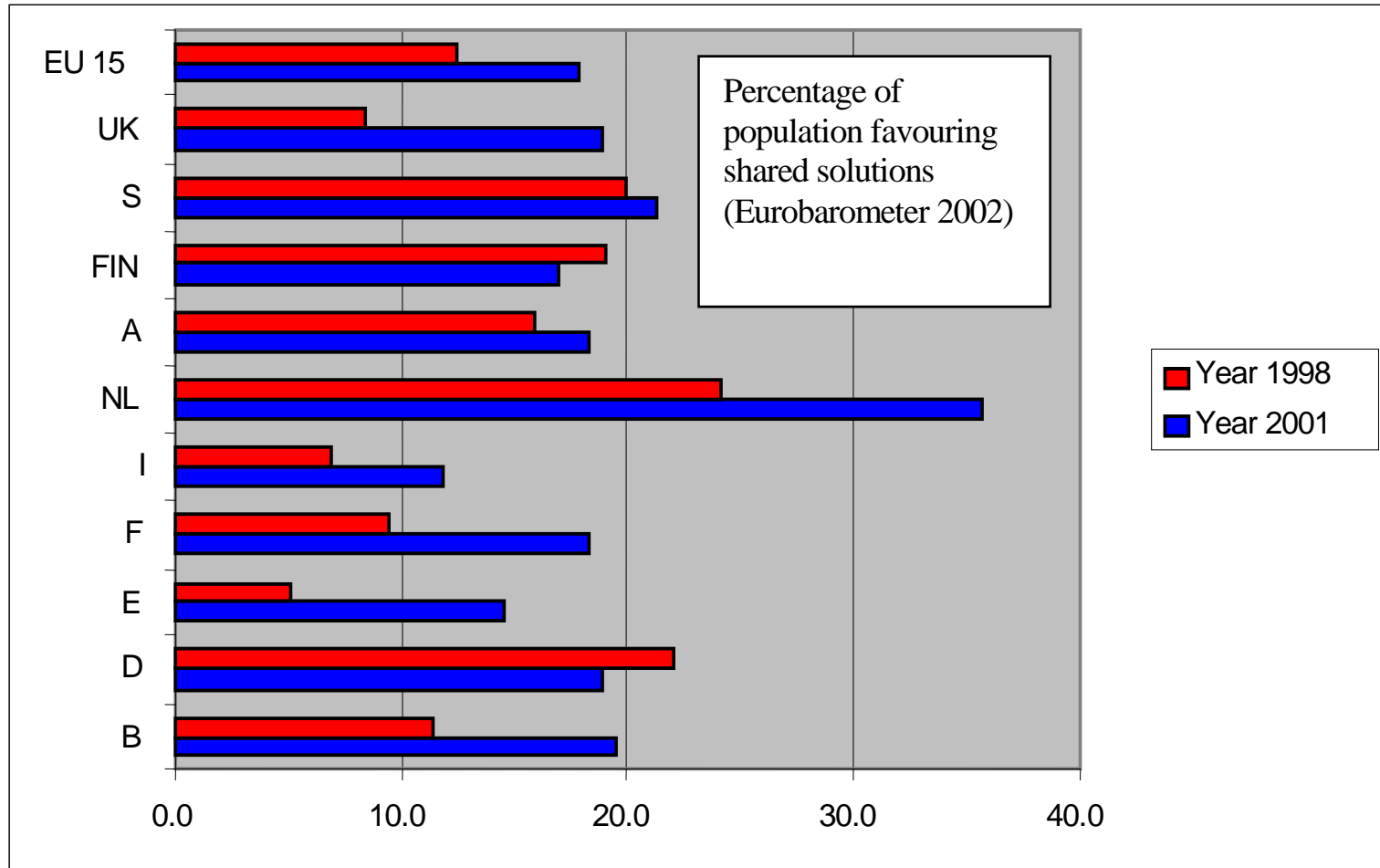
2008 Meetings including discussion on multinational initiatives

- **February: WM08 Tucson, USA**
- **May : AAAS, Cambridge USA**
- **June: IWG-LNCV, Como, Italy**
- **August: WFS, Erice, Italy**
- **September: IHLRWM, Las Vegas, USA**
- **September: IAEA, Generals Conference, Vienna, Austria**
- **October: EURADWASTE, Luxembourg**
- **October: IRPA, Buenos Aires, Argentina**

Support of EC

- **Parliamentary resolution (1998)**
- **Draft Directive on waste management (2002)**
- **SAPIERR I Project (2005)**
- **Suggestion for Joint Undertaking (2004)**
- **SAPIERR II Project (2007-2008)**

Eurobarometer results 1998-2001



BUT question then dropped at request of a member state

German Public Opinion: 2003

- Favouring national solutions: 31%
- Favouring international disposal: 55.6%
- Of which, favouring EU solution: 70%
- Could be in Germany: Yes=No=40%
- Could be in **MY** region: 80% against (whether international or national repository)

IAEA support

- Public statements by the Director General
- Tecdocs on multinational disposal and regional storage
- Establishment of Multinational Approaches Expert Group
- Sponsorship of meetings on international storage and disposal in Russia

Support in the USA

- Representative Jane Harman, D-CA at CFR: “ would support in theory bringing foreign spent nuclear fuel into the US as part of an international effort to prevent countries from pursuing sensitive nuclear technology programs... such a proposal would have a better chance of success if it were a joint effort by several countries.
- Dick Stratford (State Department): Multinational repositories are “inevitable”; he “expects countries to jointly pursue high-level waste disposal”
- “Take back” of spent fuel included (sometimes) in GNEP
- Support from non-proliferation groupings (e.g. at Harvard, NTI)

BUT – huge outcry about possible import of Italian LLW

Director General Luis Echavarri at the NEA 50th Anniversary

- OECD Nuclear Energy Agency Director General Luis Echavarri warned against any attempt to site a multinational repository before a national repository is operating "You have to start by operating repositories in a few countries, so people can see they are safe and it's feasible," and then they will more easily accept multinational repositories.

Interactions between International - National Programmes

- Large programmes largely unaffected
- Dual track programmes integrate concepts
- Active national programmes may fear:
 - forced import requirements
 - reduced political pressure and funding
- Small programmes welcome the concept
- Official stances vary accordingly
- Must national programmes “show the way”?

Multinational Scenarios for Repositories (IAEA)

- Type I – "add-on,,
 - Country with large national programme
 - Weapons State
- Type II – "co-operation"
 - equal partners with small inventories
 - repositories for specialised waste types
- Type III - international or supranational
 - e.g. UN/IAEA



e.g.
GNEP
GNPI



e.g.
SAPIERR

Russian Initiatives

- Earlier fuel take-back from FSU
- Current storage/disposal initiatives
 - Rummyantsev statements; Putin talks
 - 2005/205 Workshops RAS/NAS (Moscow/Vienna)
 - 2005 Rosatom Conference in Moscow
 - Support of IAEA
 - Iran fuel leasing proposals
 - St Petersburg Workshop Sep 2006
 - GNPI

BUT Russian law still forbids import of radioactive waste

Global Nuclear Energy Partnership

- A comprehensive energy strategy introduced in February 2006 to:
 - “Increase U.S. and global energy security”
 - “Encourage clean development around the world and improve the environment”
 - “Reduce the risk of nuclear proliferation”

..and expand the capacity of Yucca Mountain

Global Nuclear Energy Partnership

Fuel Cycle Aspects

- Front End
 - Small scale reactors for developing countries
 - Fuel Services program
- Back End
 - New recycling/reprocessing technologies
 - Take back of spent fuel

GNEP: view from small countries

- Before
 - Choice of NPP supplier
 - Choice of U-enricher and fuel supplier
 - Choice of reprocessor
 - Choice to enter into other parts of fuel cycle
 - Waste disposal is a problem
- After
 - Reduced choices or no choice
 - Waste disposal is **STILL a problem!!**

“Take back” has to be part of the equation

GNEP 2008 Membership

- 25 partners, 3 permanent international nongovernment observers; a nearly equal number of observer countries
- The partners are: Armenia, Bulgaria, Canada, China, Estonia, France, Ghana, Hungary, Italy, Japan, Jordan, Kazakhstan, Republic of Korea, Lithuania, Morocco, Oman, Poland, Romania, the Russian Federation, Senegal, Slovenia, Ukraine, United Kingdom and the United States
- The three permanent international nongovernment observers are: the International Atomic Agency, the Generation IV International Forum and Euratom.

GNEP – non Members

- Sweden
- Finland
- Belgium
- Netherlands
- Switzerland
- Slovakia
- Czech Republic
- Brazil
- South Africa
- Mexico

**i.e. small countries that USE nuclear power,
don't want to give up rights
- and are not subject to big power pressures**

GNEP: Status 2008

- *The Future of the Global Nuclear Energy Partnership, BAS, Aug 14th 2004:*
 - The congressional attitude toward GNEP has become more dour--particularly from key Subcommittee chairs--because of scepticism about costs, proliferation risks, and Energy's shifting plan and poor management record. This scepticism has resulted in significant funding cuts.
- *News Item 26 June 2008:*
 - The US House of Representatives Appropriations Committee has approved an energy and water bill that would cut funding for the Global Nuclear Energy Partnership (GNEP) program to zero

The End

EC Initiatives

Global developments

C. McCombie, Arius



CATT and SAPIERR

- CATT:
 - Co-operation And Technology Transfer on long-term radioactive waste management for Member States with small nuclear programmes 2006-2007
- SAPIERR I:
 - Support Action on a Pilot Initiative for European Regional Repositories 2003-2005
- SAPIERR II:
 - Strategic Action Plan for Implementation of European Regional Repositories 2006-2008

Ingredients for success: shared solution option

- Recognition of a common need
- A number of countries that are openly interested in being potential users of a common facility
- A number of countries (possibly including any or all of the above) that are prepared to consider the possibility of hosting a shared facility

Ingredients for success: add-on option

- Agreement to host a repository by a country that already is internationally trusted (especially by the USA)
- Agreement by a major country with suitable repository sites to allow control – or even operation - of these by a supranational organisation a disposal facility available to all

Ingredients for success: any option!

- Those countries that have opted for a purely national solution must openly support the communal efforts of others in need of shared disposal facilities;
- Commitment by international organisations such as the IAEA and the EC to openly support specific repository projects and to make all efforts to ensure that the facilities are strictly regulated and safeguarded.

IAEA Support

The Economist, October 2003:

"Not all countries have the right geology to store waste underground and, for many countries with small nuclear programmes for electricity generation or for research, the costs of such a facility are prohibitive. Considerable advantages--in cost, safety, security and non-proliferation--would be gained from international co-operation in these stages of the nuclear fuel cycle."

20/20 Vision for the Future DG Report, Feb 2008:

For countries with limited waste or without access to geologically suitable disposal sites, multinational disposal at sites with good geology might be an option. Several studies have identified the potential benefits, in terms of possible economic, nonproliferation, safety and security advantages, of multinational disposal as well as the institutional and political issues standing in the way. The IAEA could help States arrive at a solution that fits their needs.

IAEA Director General Dr. Mohamed ElBaradei