



Association for Multinational
Radioactive Waste Solutions

A short history of shared disposal solutions

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Key Take-Home Messages

- To guarantee global safety and security **ALL** countries with nuclear activities need access to a geological disposal facility
- For economic and other reasons, this is achievable **ONLY** if one or more multinational repositories (MNR) are implemented
- There are large and varied **INCENTIVES** for a country to use – or to provide - an MNR service
- Many countries **GLOBALLY** are interested in the MNR concept
- **EUROPE**, by promoting a **“dual track”** approach can play a pioneering role
- The **ERDO Association** represents the next step!

Development	Comments
International studies Pre-2000	Mostly aimed at reducing safety and security risks by centralising management of fissile materials in regional nuclear fuel centers
Pangea 1998-2002	Commercial model for an Australian MNR showed potentially huge economic benefits, but failed to win political support
Arius 2002 - present	MNR dedicated Association with mix of member organizations. Developed detailed partnering model for shared MNRs. Undertook studies for Europe, MENA regions
SAPIERR I and II 2003-2009	EC funded studies on shared repositories. Covered economic, safety, security, business and public acceptance aspects. Participants from 14 countries. Led to establishment of the ERDO-WG in 2009
EC Waste Directive 2011	Recognition in EU legislation that Member States may make use of a shared European MNR

Development	Comments
IAEA 1996 - 2021	Several TECDOCS on MNR concepts, focused on partnering approach; key 2005 positive Expert Report to IAEA Director General; current INPRO study
South Australia 2016-2018	South Australian Government study to assess advantages of hosting a commercial MNR . Positive conclusions drawn, but challenges to business case and lack of political support led to suspension
IFNEC 2015 - present	Reports and meetings on benefits and challenges of MNR; focus on commercial models ; studies on financing options
ERDO-WG 2009 - 2020	Self-funded Group of Government nominated representatives from 10 European countries studying shared repository concept
ERDO Association 2021 - present	New Association promoting European MNR as part of a dual track repository program; initiated wider multinational cooperation topics; studying siting approaches

Post 2000 MNR Activities

- IAEA
- EC
- IFNEC
- Other studies
- Arius
- ERDO-WG
- ERDO Association

Key IAEA documents addressing multilateral disposal

Joint Convention 1997

Convinced that radioactive waste should, as far as is compatible with the safety of the management of such material, be disposed of in the State in which it was generated, whilst recognizing that, in certain circumstances, safe and efficient management of spent fuel and radioactive waste might be fostered through agreements among Contracting Parties to use facilities in one of them for the benefit of the other Parties, particularly where waste originates from joint projects



Activities on Multinational Approaches European Commission (EC)

- Resolution 1157 (1998) calls on MS to “*study the technical, economic and political feasibility of the creation if international repositories..*”
- 2003-2009 support of SAPIERR Projects – 5 key reports
- Waste Directive 2011 – confirms feasibility of shared facilities “*if agreement has entered into force between the Member State concerned and another Member State or a third country to use a disposal facility in one of them*”.
- 2015 NFRP4 proposal ERDOSA proposal turned down: “*out of scope*” Strategic rather than R&D
- 2016 Request for Proposals H2020 NRFP8:
 - Original text – “*should also consider ... the sharing of facilities building on previous projects, such as SAPIERR*”; later omitted
- 2018 EURAD –Waste management routes in Europe from cradle to grave (ROUTES)
Task 6 – Shared solutions in European countries
- ?? 2021 HORIZON-EURATOM-2021-NRT-01-08; *Develop a strategy for European and internationally-shared treatment and storage facilities*

Activities on Multinational Approaches IFNEC

- Series of Meetings by Reliable Nuclear Fuel Services Working Group (RNFSWG)
- Discussion paper: Comprehensive Fuel Services: Strategies for the Back-End of the Fuel Cycle
- On-going study: Multinational Repository Concept
- Workshop 2018 in Paris on MNR financing
- Session 2019 in Washington on Financial Risks

Activities on Multinational Approaches USDOE, AAAS, NTI, CSIS, WNA

- USDOE
 - Direct support for IAEA INPRO report (2016-2021)
 - Co-sponsor with Jordan on MNR study (2020-2021)
- AAAS (Meetings in Abu Dhabi, Bali, Washington).
 - Multinational Approaches to the Nuclear Fuel cycle (2010)
 - The Back End of the Nuclear Fuel Cycle: An Innovative Storage Concept (2015)
- NTI/CSIS (Meetings in Paris, Taipei, Singapore, etc.)
 - A New Approach to the Fuel cycle (2015)
 - Developing Spent Fuel Strategies project (2015)
- WNA
 - Informative website; Special session at London Meeting

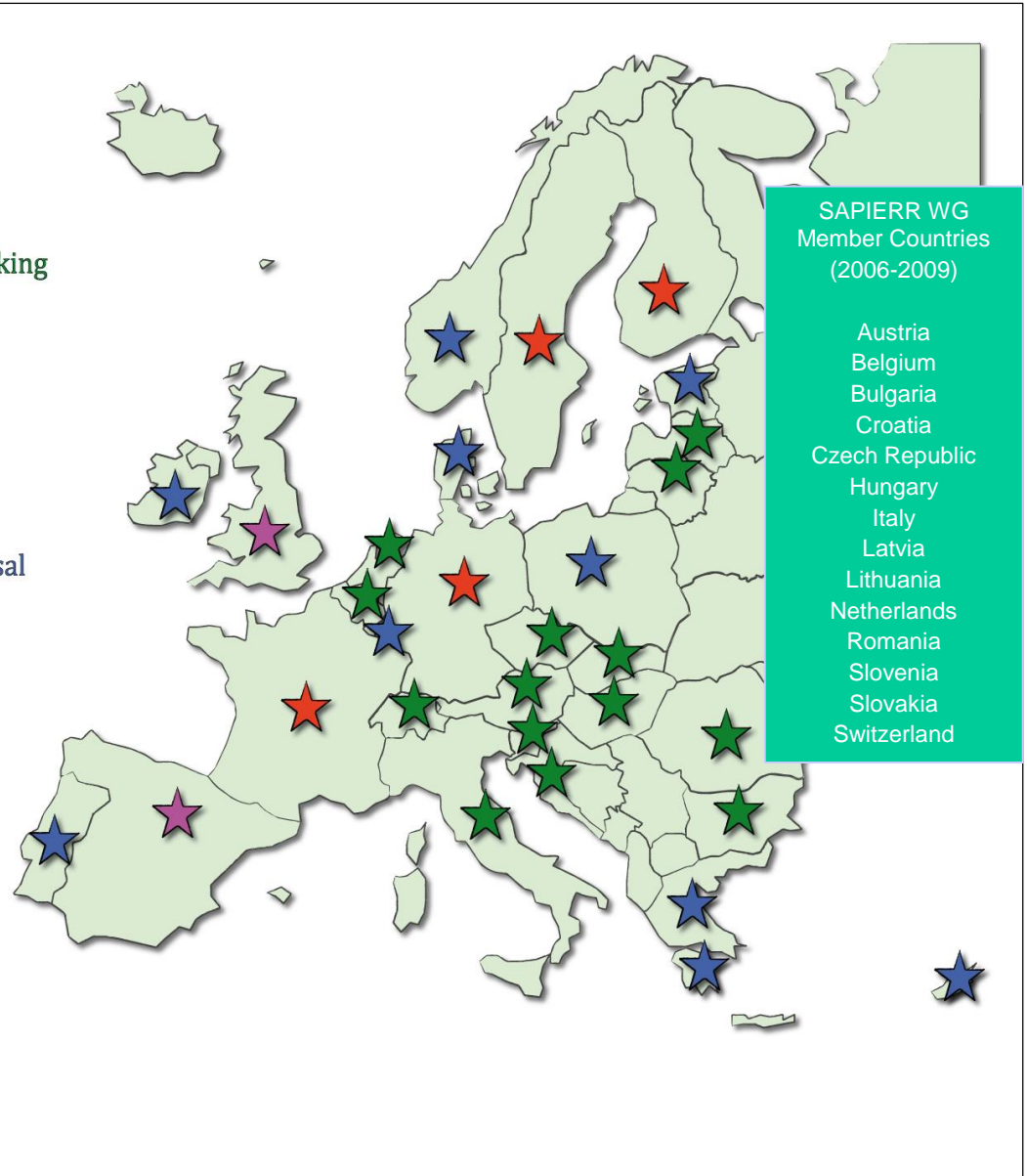
Activities on Multinational Approaches Arius Association (established 2002)

- SAPIERR reports (2005-2008)
 - WP1 – Legal and Business Options
 - WP2 – Responsibilities and Financial Liabilities
 - WP3 – Economic Aspects (including Hosting Benefits)
 - WP4 – Security Aspects
 - WP5 – Public and Political Attitudes
- Advice to IAEA, IFNEC, USDOE, UAE, ROK, etc.
- Co-founder and Secretariat of ERDO-WG

Past and current involvement with ERDO-WG (13)

- ★ The 14 SAPIERR working group members
- ★ National disposal programme only
- ★ No formal official policy
- ★ No NPP but some waste for deep disposal

- Past and current involvement with ERDO-WG
- Austria
 - Bulgaria
 - Croatia
 - Denmark
 - Ireland
 - Italy
 - Lithuania
 - Netherlands
 - Norway
 - Poland
 - Romania
 - Slovakia
 - Slovenia



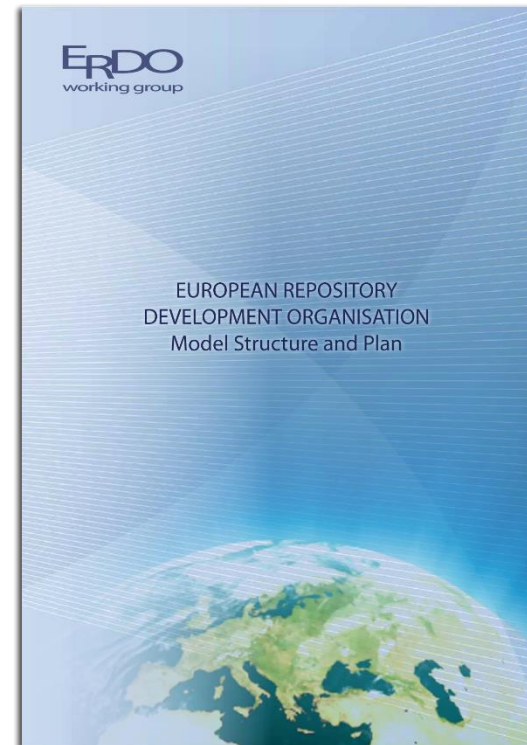
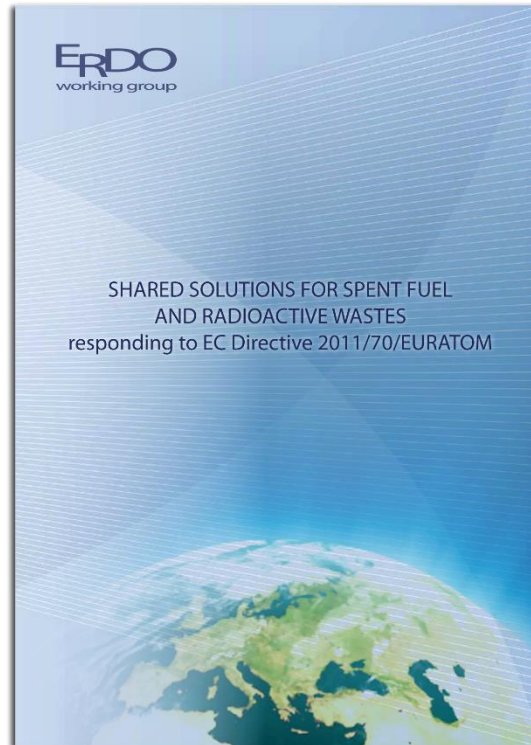
- SAPIERR WG Member Countries (2006-2009)
- Austria
 - Belgium
 - Bulgaria
 - Croatia
 - Czech Republic
 - Hungary
 - Italy
 - Latvia
 - Lithuania
 - Netherlands
 - Romania
 - Slovenia
 - Slovakia
 - Switzerland

Countries in SAPIERR studies (14)

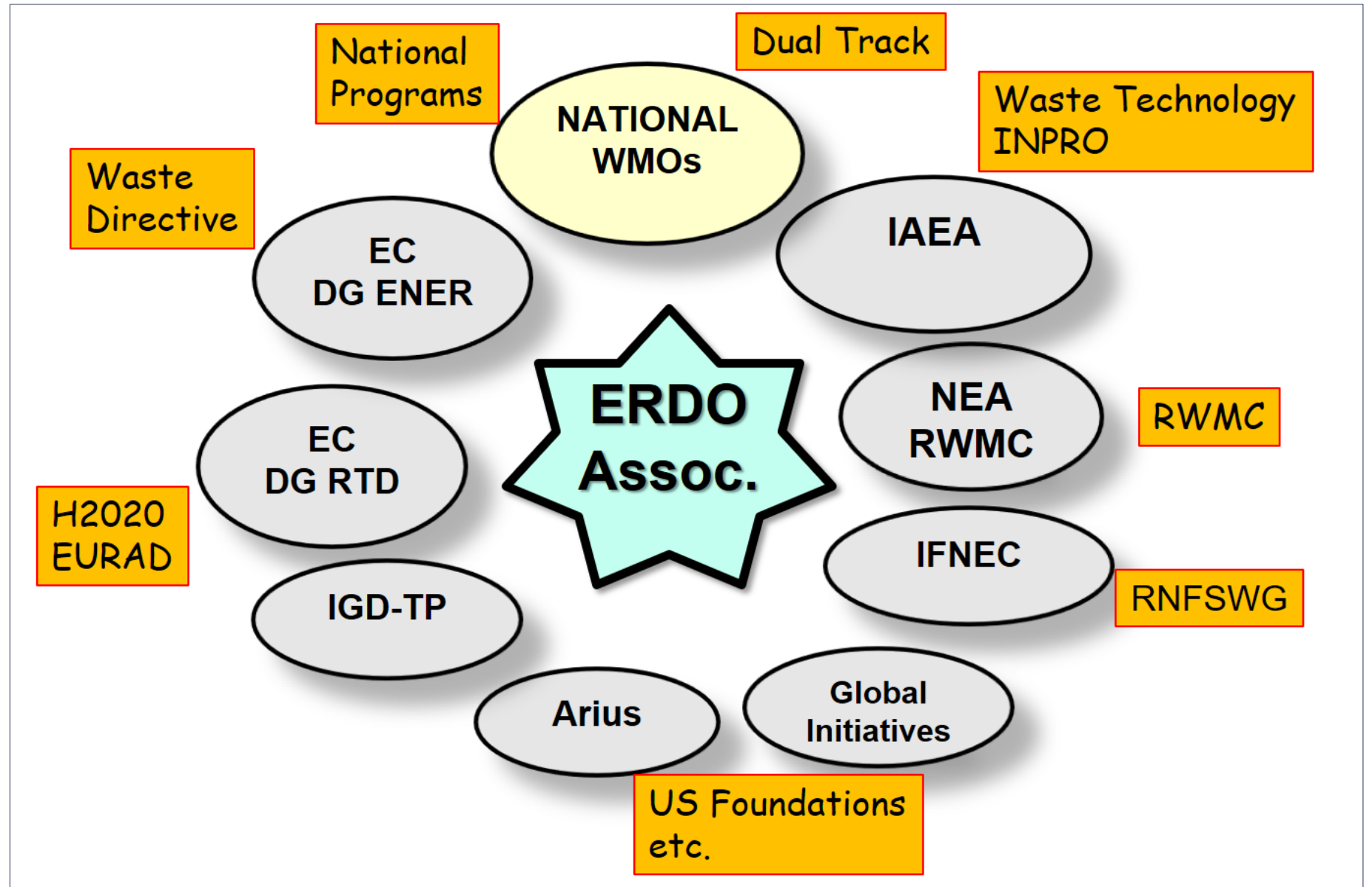


2011: ERDO-WG Submission to Governments of the EU Member States

- ERDO-WG documents (from 2009) – include benefits summaries, organizational forms, financing models
- 7 EU MS are current ERDO-WG Members



Interactions of the new ERDO Association



Dual Track Approach: Reasons for Optimism!

- Growth of nuclear power (energy shortages, climate concerns) – credible disposal strategy needed
- Advent of small modular reactors (SMRs) - “take back” of SF more likely
- Progress with national DGRs (FI, SE, FR) - repositories no longer FOAK
- Increasingly open recognition by countries of the benefits of an MNR
 - International studies have involved dozens of countries
 - EC Waste Directive reports submitted by EU Member States indicate that around half are directly interested in the MNR concept.
 - Including an MNR strategy in a dual track approach can allay concerns of international bodies that an MNR option could lead to countries adopting a ‘wait and see’ attitude to disposal planning.

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