

Regional Cooperation on Spent Fuel
and Radioactive Waste Disposal

Towards a European Regional Geological Repository

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ERDO-WG Mission Statement

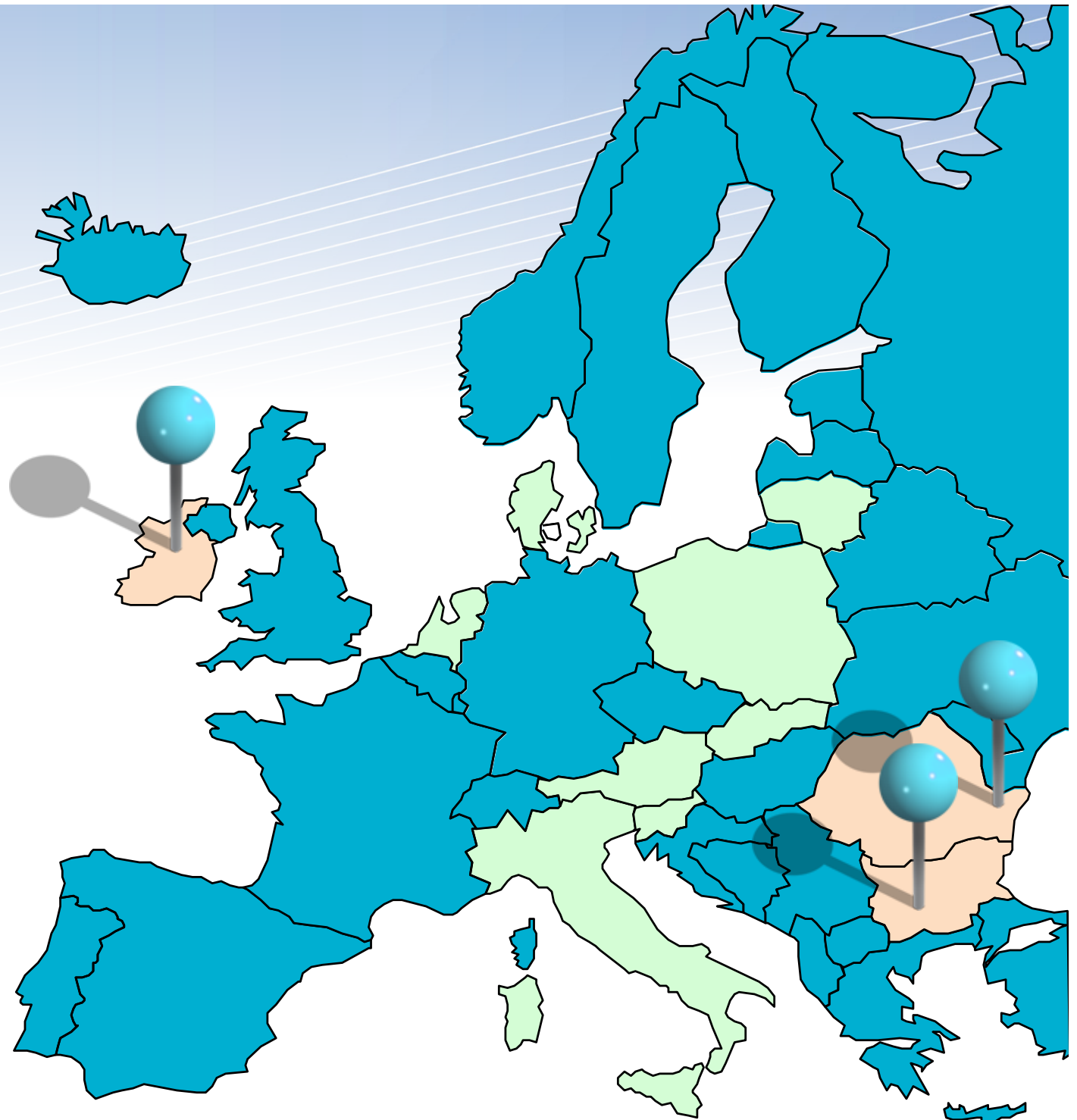
“The ERDO-WG comprises European countries with a potential interest in developing shared radioactive waste management facilities. Our aim is to work together to address the common challenges of safely managing the long-lived radioactive wastes in our countries.

The ERDO-WG will encourage cooperation in all relevant areas; these include maintaining national radioactive waste inventories, dealing with legacy wastes, developing safety cases for disposal facilities, communicating with stakeholders and developing joint projects.

The ultimate objective of the Working Group is to carry out all the necessary groundwork to enable the establishment of a European Repository Development Organisation (ERDO) as a working entity.”

Past and current
involvement with ERDO-WG

- Austria
- Bulgaria
- Denmark
- Ireland
- Italy
- Lithuania
- Netherlands
- Poland
- Romania
- Slovakia
- Slovenia



2002	EPSRR proposal: European Pilot Study for a Regional Repository
2003	SAPIERR 1 Support Action: Pilot Initiative for European Regional Repositories
2004	
2005	
2006	SAPIERR 2 Strategic Action Plan for Implementation of European Regional Repositories
2007	
2008	
2009	ERDO-Working Group: European Repository Development Organisation WG
2010	WG meetings and development of concept
2011	ERDO Submission to EU Members States <ul style="list-style-type: none"> • <i>Shared Solutions for Spent Fuel and Radioactive Wastes: responding to EC Directive 2011/70/EURATOM</i> • <i>Model Structure and Plan</i>
2012	First ERDO-WG meetings on responding to Waste Directive
2013	December: joint meeting with ENEC at EC Luxembourg: <i>Supporting European Member States with smaller or no nuclear power programmes in responding to and reporting on the EC Waste directive</i>

But progress is slow almost everywhere.....

	Sweden	USA	UK	Japan
2002	Site investigations and safety case development at shortlisted sites	Yucca Mountain identified by President Bush as chosen site after c.25 years R&D on the site)	End of previous 20 year cycle of attempts to find a repository site	NUMO begins 'open solicitation process'
2003			CoRWM established	Open solicitation
2004				
2005				
2006			CoRWM recommends geological disposal	
2007				Toyo township advances then retreats
2008			DOE submits License Applications	White Paper: Managing Radioactive Waste Safely
2009	Site selected	Secretary Chu says site is no longer an option	West Cumbria potentially interested	Solicitation still open.....
2010		DOE files to withdraw LA		
2011	License application			
2012	Licensing Process	Court proceedings about NRC review of LA		
2013			West Cumbria withdraws	

Changing attitudes.....

- “.....siting of an international repository will be politically unacceptable (as well as near-impossible to implement) in a democratic state.....” *Head of a European Waste Management Agency, 2004*
- “Some Member States consider that the sharing of facilities for spent fuel and radioactive waste management, including disposal facilities, is a potentially beneficial, safe and cost-effective option when based on an agreement between Member States concerned” *EC Waste Directive, 2011*

Towards a shared European Solution: ERDO-WG, ERDO and ERO



European Council Directive 2011/70/ EURATOM

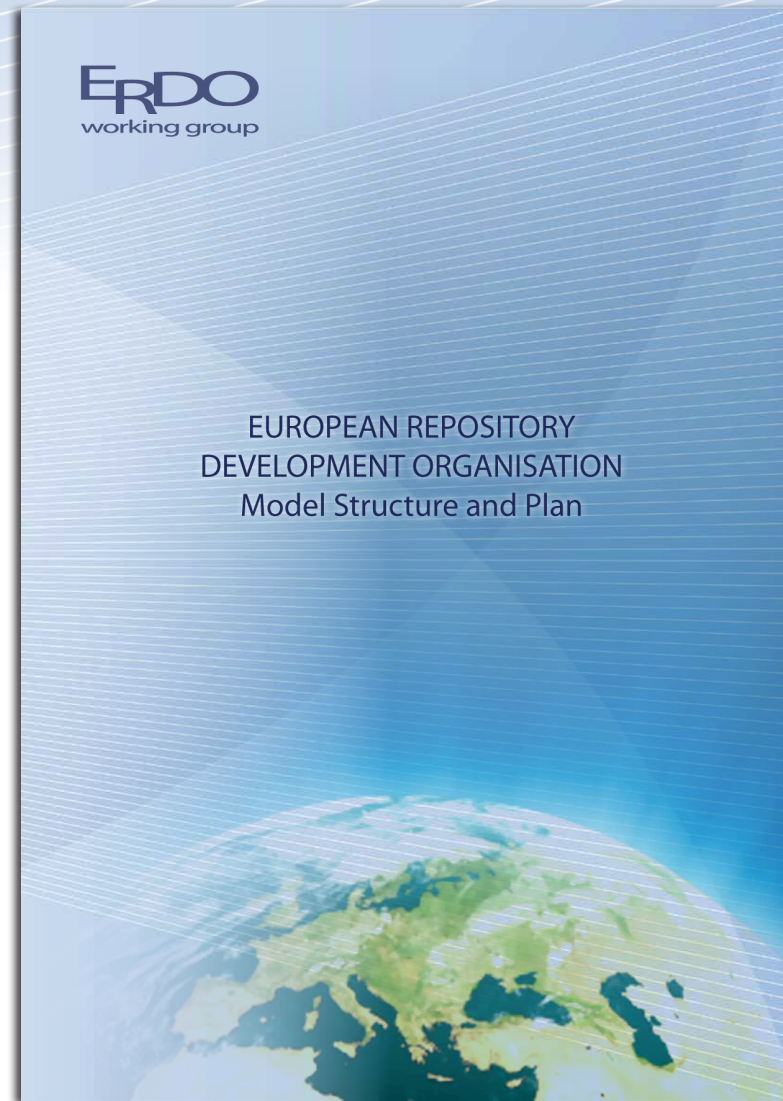
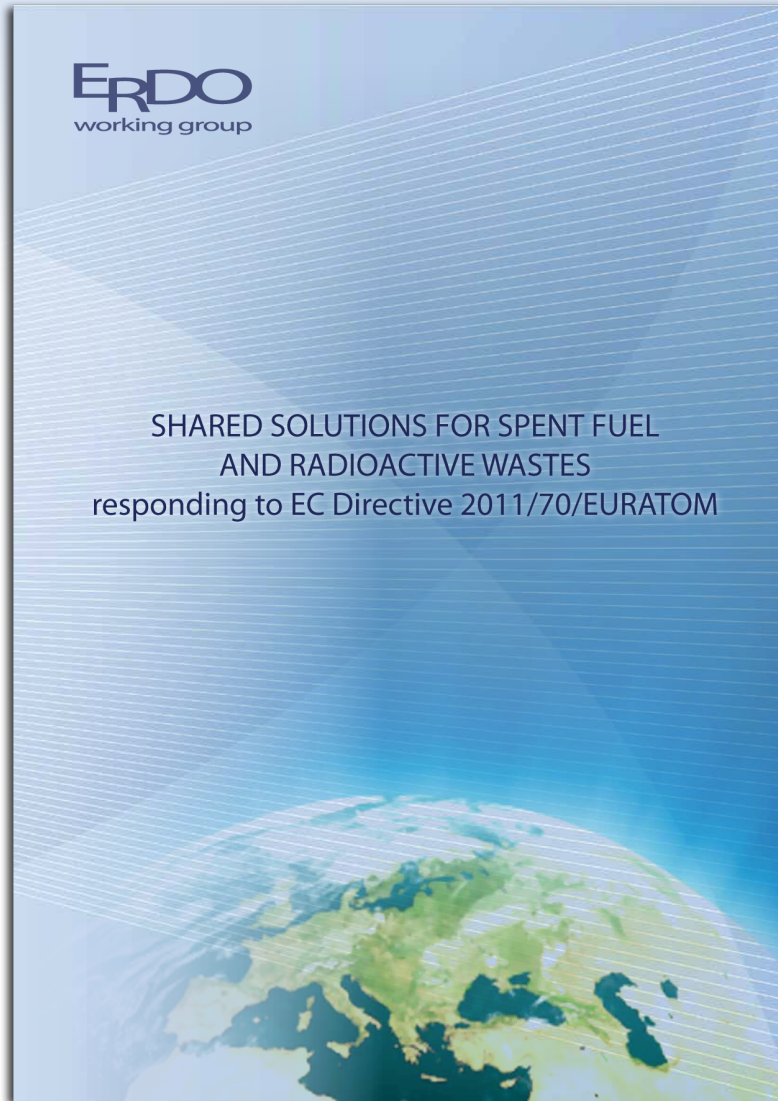
Came into force August 2011: national programmes need to have the necessary laws, regulations and administrative provisions in force within 2 years

- “Member States should establish national programmes ... for the timely implementation of all steps of spent fuel and radioactive waste management from generation to disposal”.
- “Some Member States consider that the sharing of facilities for spent fuel and radioactive waste management, including disposal facilities, is a potentially beneficial, safe and cost-effective option when based on an agreement between Member States concerned”
- “Radioactive waste shall be disposed of in the Member State in which it was generated, unless at the time of shipment an 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”

The EC Directive Schedule

- 23 August 2013:
 - directive transposed (art 15.1)
- 23 August 2015
 - Deadline notification of National Programme (art 15.4)
 - 1st report on Implementation (art 14.1)
 - Subsequent reports every 3 years

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



Proposals in Letters to MSs

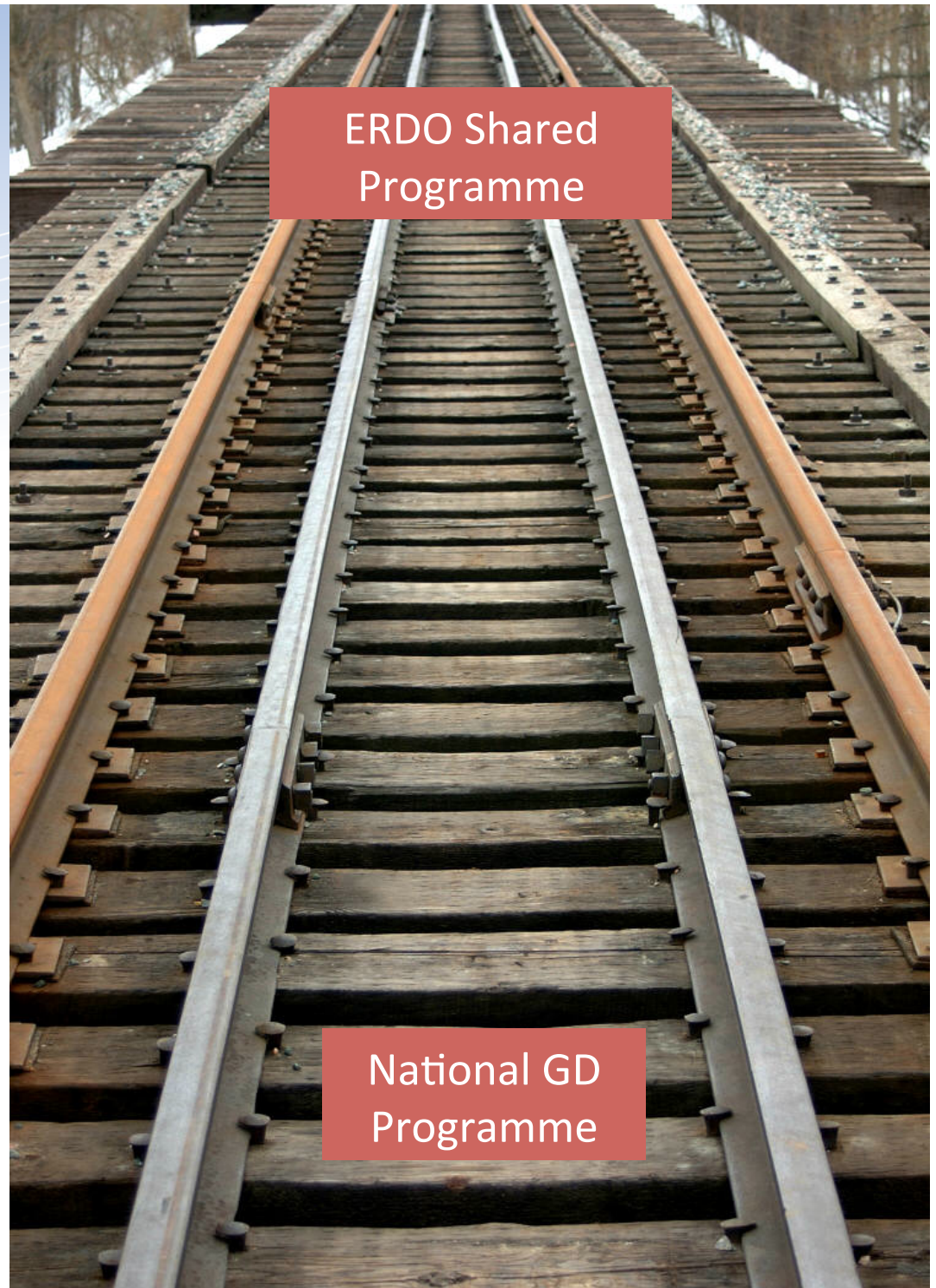
- Agree that a **dual track approach** will be included in the national waste management programme, which must be documented by 2015
- Agree, in principle, that this dual track strategy can be most efficiently implemented by means of the proposed ERDO providing direct support to the national programme that each MS must develop and also developing further concepts and plans for shared multinational facilities
- Nominate one or more members to a drafting group that will be tasked with production of a legal Agreement to be signed by all co-owners of the future ERDO

ERDO Participation

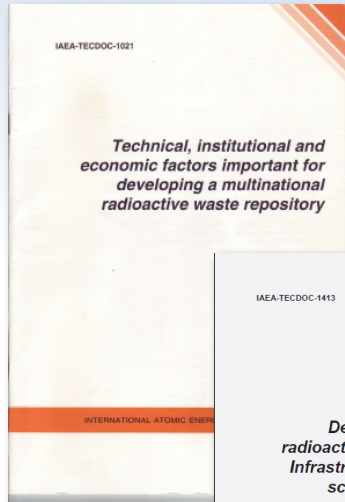
- Participation in ERDO-WG or in a drafting group is not a fixed commitment to join the ERDO
- Participation in the ERDO is not a fixed commitment to join the ERO

The ERDO ‘Dual Track’ Solution

- Participating countries **must** have a national programme to seek a national solution
- Shared staff, teams, facilities, projects... reduces costs
- Membership of ERDO provides prospect of a shared solution
- NP and shared ERDO ‘tracks’ run together, nested within each other



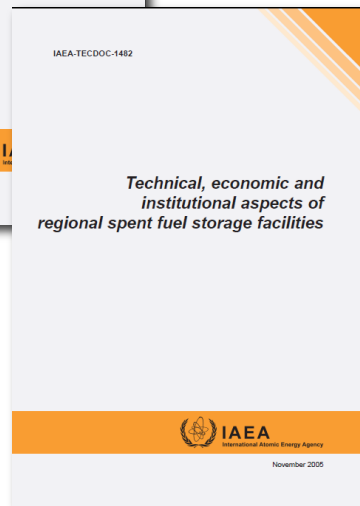
IAEA reports addressing sharing and multinational repositories



1998



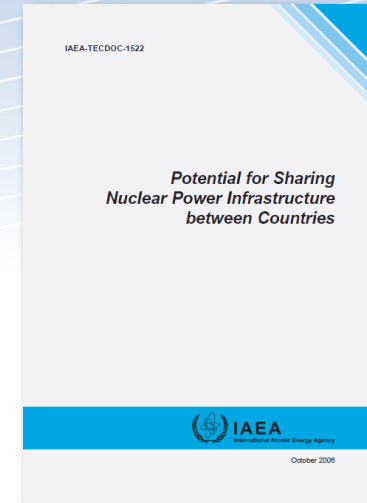
2004



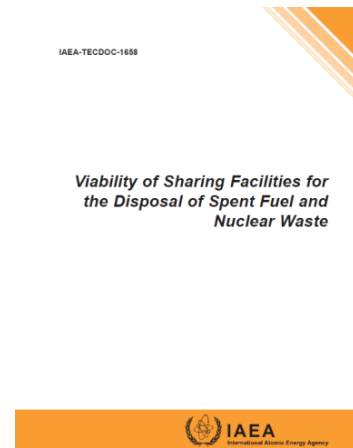
2005



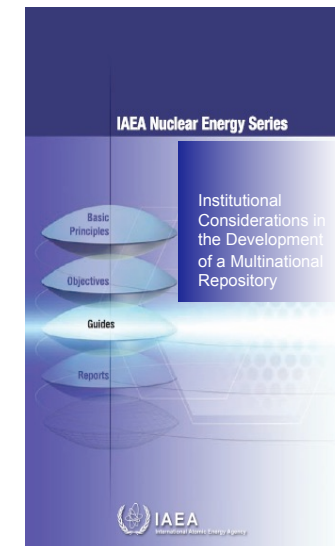
2005



2006



2011



....2013

The Economic Driver: what might it cost, to dispose of wastes in an ERO repository?

	SF tonnes	HLW m3	ILW m3	No. of 'units'	% working capital	Share of 15 years working capital (MEUR)	2006 disposal cost (MEUR)	Total including share capital (MEUR)
Austria	0	0	300	24	0.52	2.5	0.9	3.6
Ireland*	0	0	10	1	0.10	0.5	0.031	0.7
Italy	299	10	4000	536	11.55	55.9	117.2	173.3
Lithuania	2504	0	1500	1372	29.57	143.0	612.0	755.3
Netherlands	0	110	3000	973	20.98	101.5	365.0	466.7
Slovakia	2375	0	2600	1396	30.07	145.5	584.1	729.8
Slovenia	620	0	300	334	7.20	34.8	151.3	186.3
			TOTAL	4636				

*assume nominal 10 m3 ILW

Uses 'Equivalent Waste Units' (EWU) based on space requirements (2 tonnes SF = 0.15 m3 HLW = 12.5 m3 ILW)

Based on SAPIERR 2 disposal cost calculations (2006 figures), with siting and R&D costs removed and transferred to ERDO (to be paid from working capital)

Assumes a 15 year ERDO programme to obtain construction license, with last 5 years at 50 MEUR/a (same as Year 10)

ERDO WG - work programme

Two complementary lines:

1. Moving forward towards the ERDO: the **Roadmap**
2. Addressing common challenges of **European Member States with smaller or no nuclear power programmes**

2011 Roadmap

Pre-cursor Milestones	Month																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
ERDO document circulation in potentially interested countries; information exchange meetings	█	█	█																					
National consultations and meetings between potentially interested countries				█	█	█	█	█																
Agreement in principle of a group of founding Member Countries to establish the ERDO										█	█	█	█											
Agreement on the proposed legal form of the ERDO															█	█	█	█	█					
Selection of the country of domicile of the ERDO																	█	█	█					
Signing of the Articles of Incorporation by the founding Member Countries																				█	█			
Nomination by the Member Countries of individuals to the ERDO Board																							█	
Agree common approach to presenting the ERDO in national responses to the Council Directive																								█

First steps to the ERDO....

- Discussions at Government level in the Netherlands have led to the decision that they are willing to become a Member of a formal ERDO
- Progress in the establishment of the ERDO is important and the hope of the Netherlands is that this will stimulate other countries to take the same step

Waste Directive Support Workshop

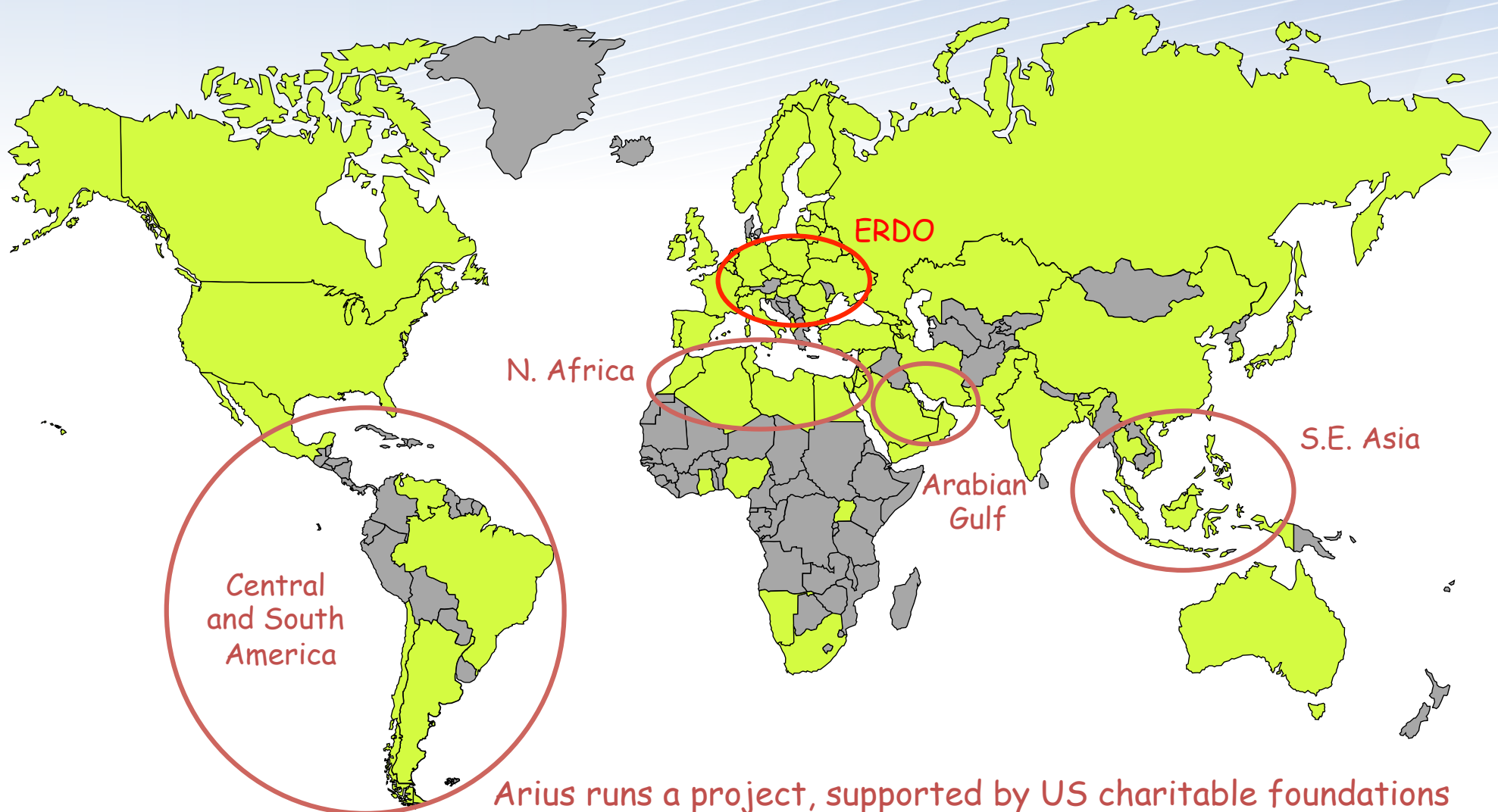
Luxembourg

December 4th – 5th 2013

Supporting European Member States with smaller or no nuclear power programmes in responding to and reporting on the EC Waste directive

Organised by ERDO-WG in collaboration with the European Commission, ENEF-WM, ENSREG, IGD-TP, NewLancer

Existing and potential new nuclear power nations: the ERDO initiative is often used as a model when considering sharing options in other regions



Arius runs a project, supported by US charitable foundations (Hewlett and Sloan Foundations), to explore the potential interest and adaptability of the concept in some of these regions