

Responding to the EU Waste Directive  
December 4<sup>th</sup>/5<sup>th</sup> 2013, Luxembourg

# Regional Cooperation on Spent Fuel and Radioactive Waste Disposal

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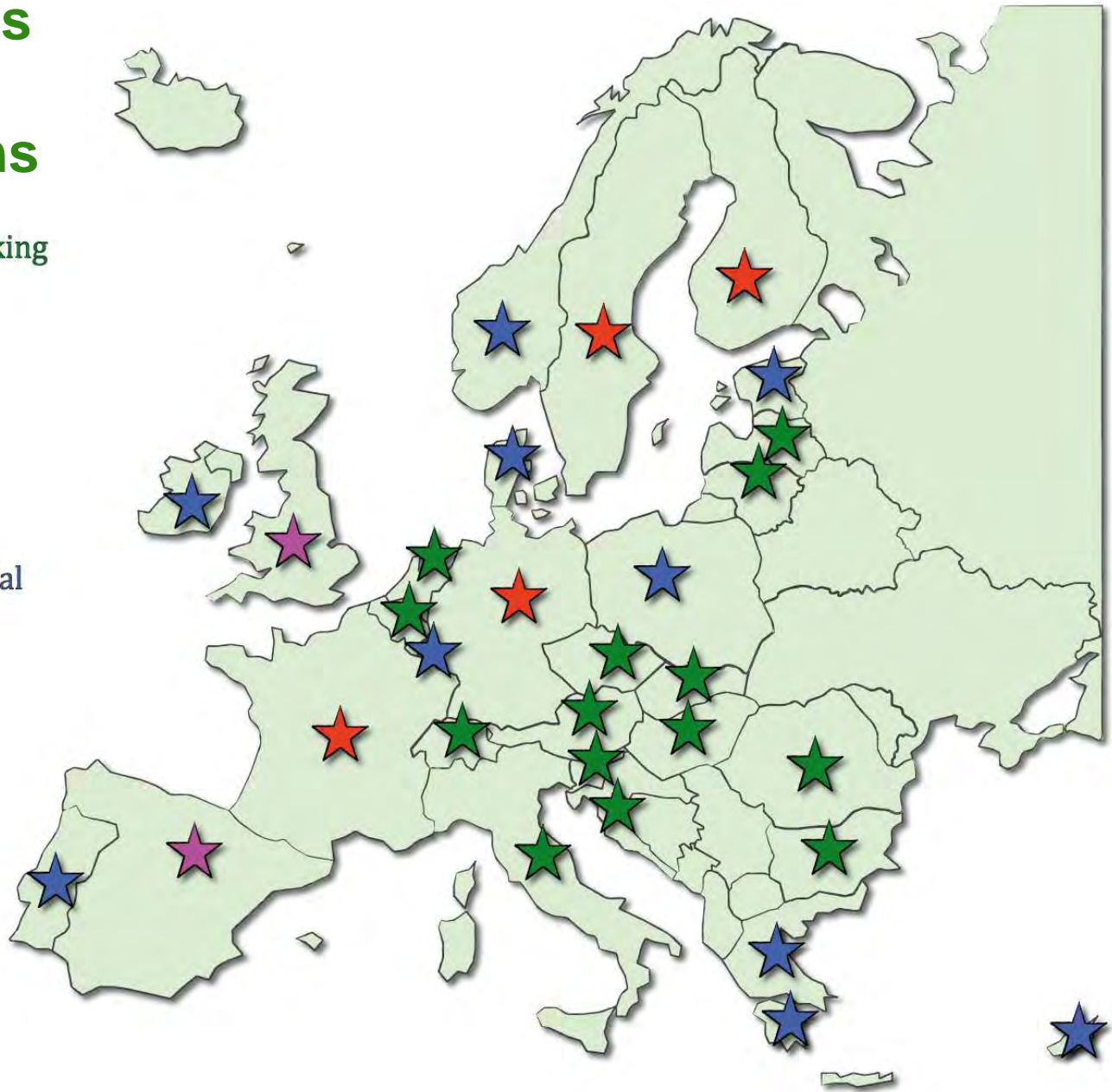
ERDO-WG Secr. and Arius Association

# National Solutions and Potential Regional Solutions

- ★ 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  
Denmark  
Ireland  
Italy  
Lithuania  
Netherlands  
Poland  
Romania  
Slovakia  
Slovenia



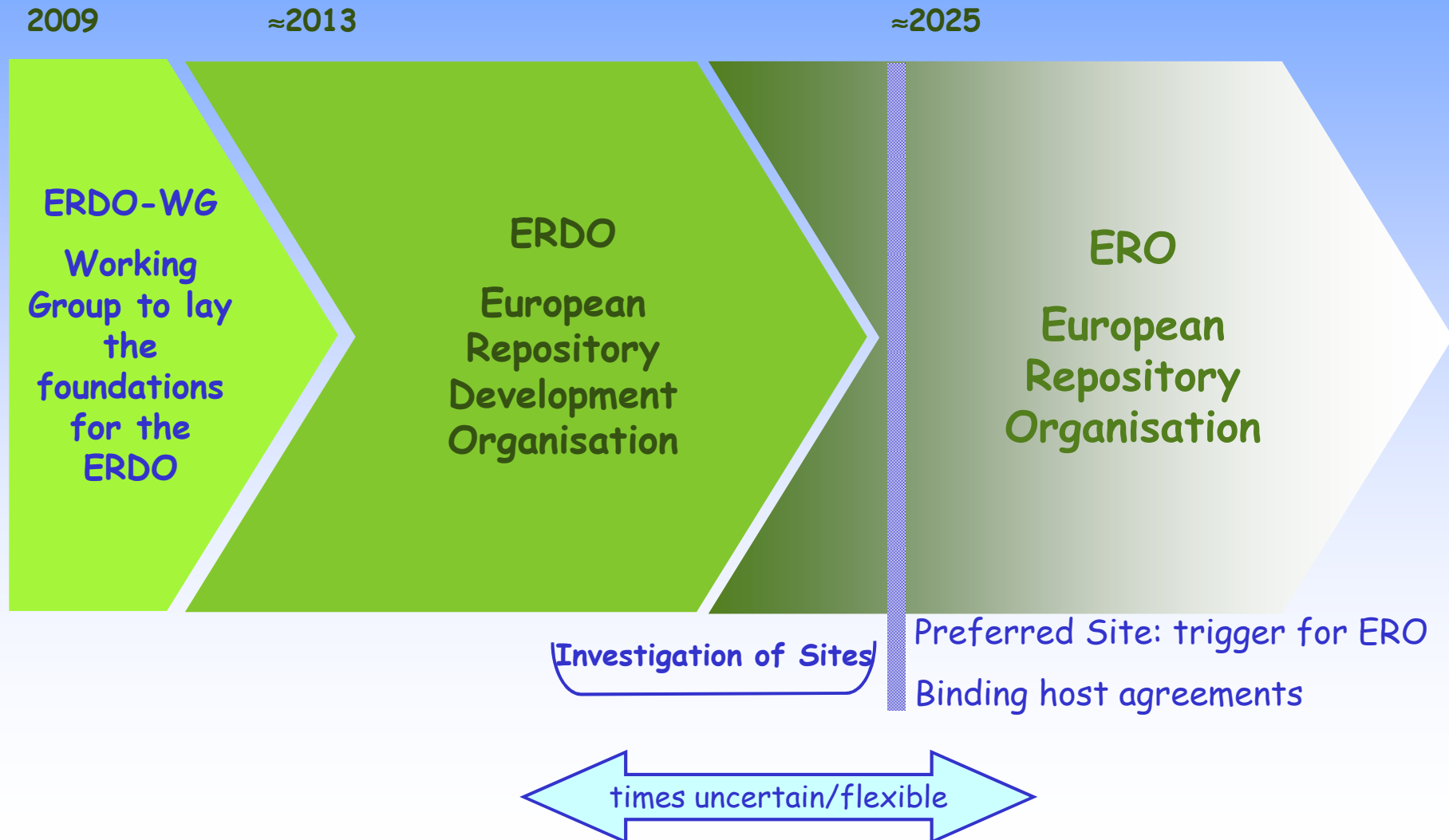
# Justification for Regional Approaches

- ◆ Each MS must have a clear policy and an active programme to implement eventual disposal
- ◆ Inefficient to have 28 separate, dedicated WM organisations and facilities
- ◆ Inefficient (or impossible) to have 28 separate geological disposal facilities - especially the very small amounts of waste from non-NPP Member States
- ◆ But
  - necessary to have national knowledge and expertise
  - appropriate to participate actively in projects aimed at developing and securing disposal mechanisms

# 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 Repository Development Organisation – Working Group

## 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."

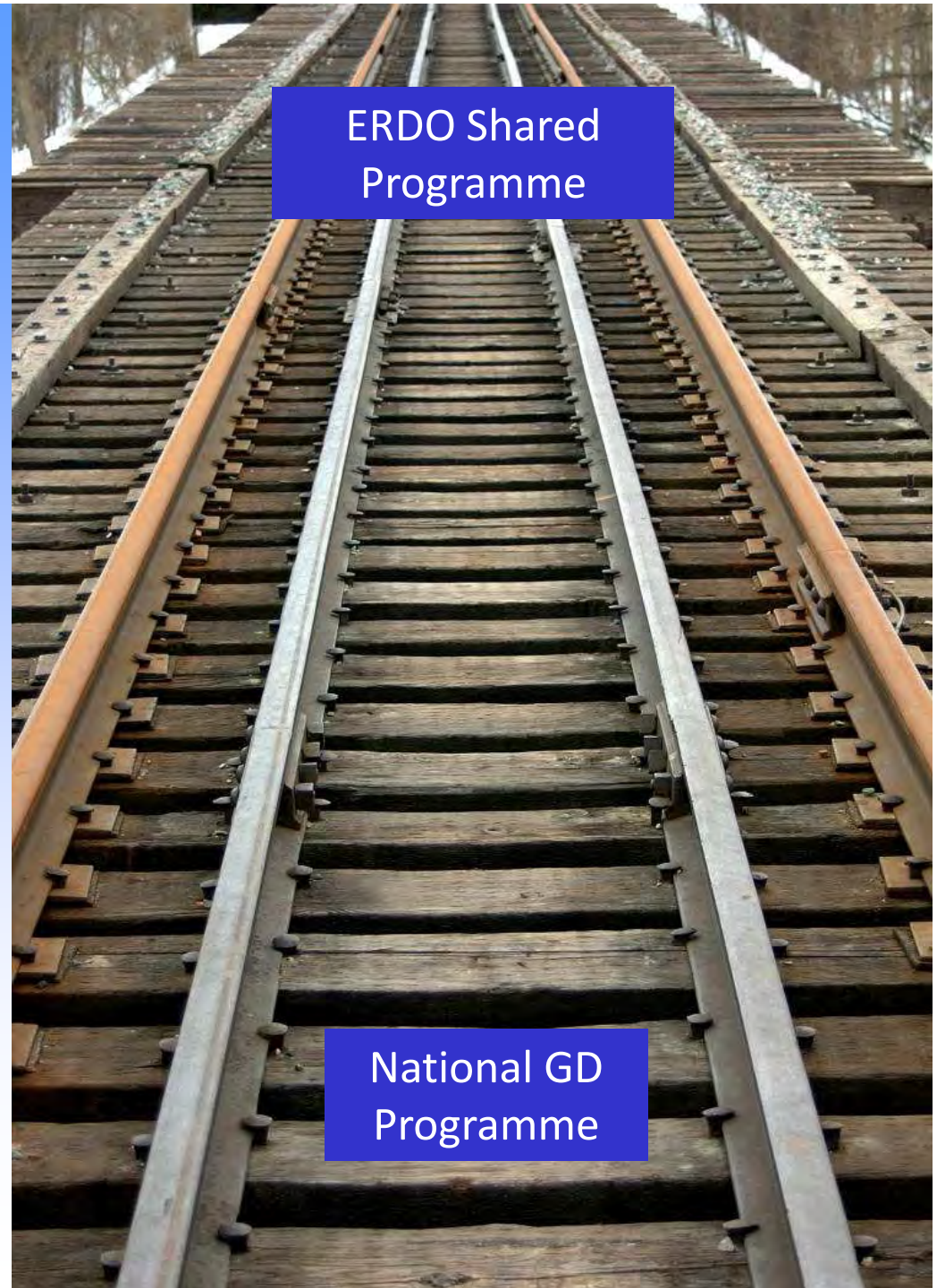
# ERDO-WG AND ERDO

- ◆ Initial Funding of regional initiatives (SAPIERR Projects) through EC FP6
- ◆ After start-up , ERDO-WG is self-financing (as opposed to IGD-TP - can be problematic!)
- ◆ Participation in ERDO-WG is not a fixed commitment to join the ERDO
- ◆ Participation in the ERDO is not a fixed commitment to join the European Repository Organisation, 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





2002	EPSRR proposal: European Pilot Study for a Regional Repository
2003	<b>SAPIERR 1</b> Support Action: Pilot Initiative for European Regional Repositories
2004	
2005	
2006	<b>SAPIERR 2</b> 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"> <li>• <i>Shared Solutions for Spent Fuel and Radioactive Wastes: responding to EC Directive 2011/70/EURATOM</i></li> <li>• <i>Model Structure and Plan</i></li> </ul>
2012	First ERDO-WG meetings on responding to Waste Directive
2013	<b>December:</b> joint meeting with ENEF 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	Site selected	DOE submits License Applications	White Paper: Managing Radioactive Waste Safely	METI-ANRE open meetings
2009		Secretary Chu says site is no longer an option	West Cumbria potentially interested	Solicitation still open.....
2010		DOE files to withdraw LA		
2011				
2012				
2013	Licensing Process	Court proceedings about NRC review of LA	West Cumbria withdraws	

# Articles 14 and 15

- ◆ *Member States shall submit a report to the Commission on the implementation of this Directive for the first time by 23 August 2015, and every 3 years thereafter, taking advantage of the review and reporting under the Joint Convention.*
- ◆ *Member States shall for the first time notify to the Commission the content of their national programme covering all the items provided for in Article 12 as soon as possible, but not later than 23 August 2015.*

# Export out of a MS

- ◆ *Article 4.4. Radioactive waste shall be disposed of in the Member State in which it was generated, unless at the time of shipment an agreement, taking into account the criteria established by the Commission in accordance with Article 16(2) of Directive 2006/117/Euratom, 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.*

# Shipment to a Third Country

- ◆ *(a) the country of destination has concluded an agreement with the Community ... or is a party to the Joint Convention*
- ◆ *(b) the country of destination has radioactive waste management and disposal programmes with objectives representing a high level of safety equivalent to those established by this Directive*
- ◆ *(c) the disposal facility in the country of destination is authorised for the radioactive waste to be shipped, is **operating prior to the shipment**, and is managed in accordance with the requirements set down in the radioactive waste management and disposal programme of that country of destination*



# Art. 12: A national programme

**N.B. All highlighted items could be covered in a shared, regional programme: TO BE DISCUSSED LATER**

- ◆ *(a) the overall objectives of the Member State's national policy in respect of spent fuel and radioactive waste management;*
- ◆ *(b) the significant milestones and clear timeframes for the achievement of those milestones in light of the over-arching objectives of the national programme;*

# Art. 12: A national programme

- ◆ *(c) an inventory of all spent fuel and radioactive waste and estimates for future quantities, ..... in accordance with appropriate classification of the radioactive waste;*
- ◆ *(d) the concepts or plans and technical solutions for spent fuel and radioactive waste management from generation to disposal;*
- ◆ *(e) the concepts or plans for the post-closure period of a disposal facility's lifetime ...*

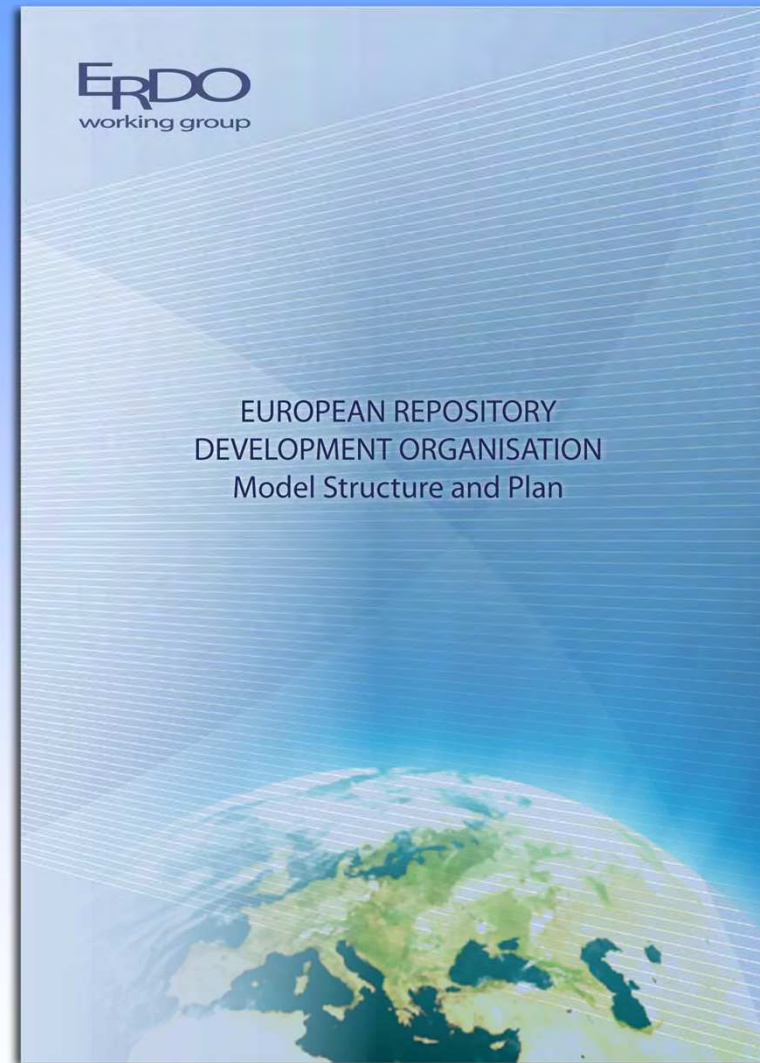
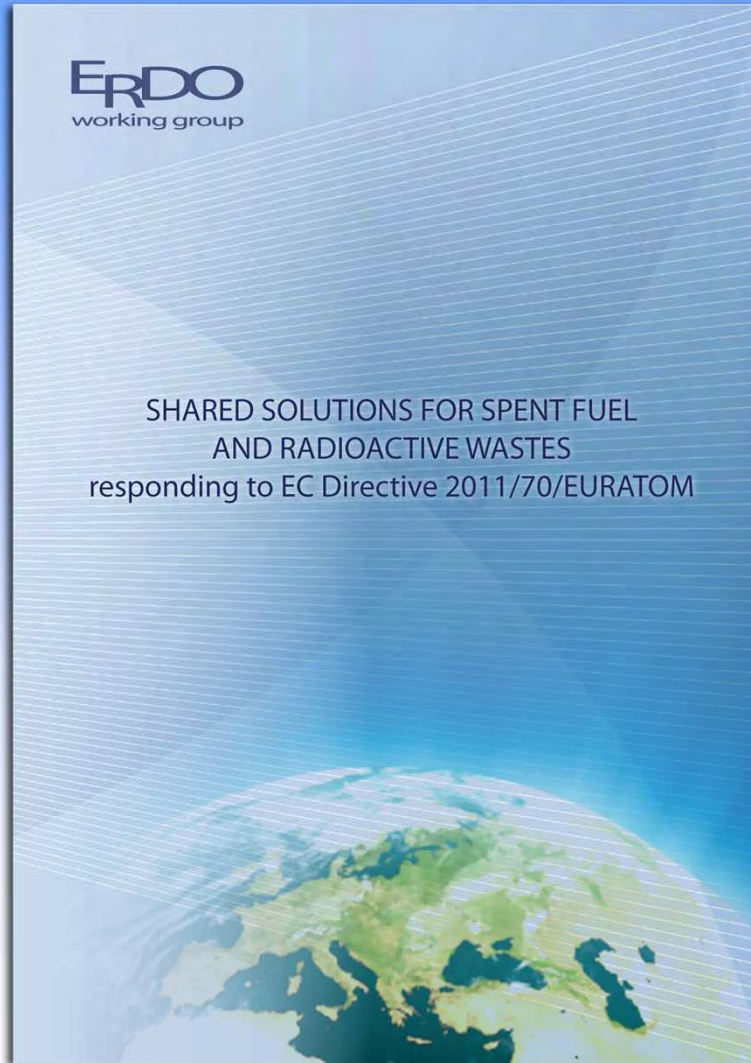
# Art. 12: A national programme

- ◆ *(f) the research, development and demonstration activities that are needed ... waste;*
- ◆ *(g) the responsibility for the implementation of the national programme and the key performance indicators to monitor progress towards implementation;*
- ◆ *(h) an assessment of the national programme costs and the underlying basis and hypotheses for that assessment, which must include a profile over time;*

# Article 12: A national programme

- ◆ *(i) the financing scheme(s) in force;*
- ◆ *(j) a transparency policy or process as referred to in Article 10;*
- ◆ *(k) if any, the agreement(s) concluded with a **Member State** or a third country on management of spent fuel or radioactive waste, including on the use of disposal facilities*

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





# Role & Expectation for NPP MS

◆ By active membership of ERDO-WG, they will:

- help establish political acceptability of transfers of RW for storage & disposal
- support promotion of shared European RWM solutions
- fulfill their dual-track role
- respond to the EC Directive
- possibly identify and justify use of shared interim storage solutions
- attain disposal at a more reasonable cost

# Role & Expectation for non NPP MS

◆ By active membership of ERDO-WG, they will:

- help establish political acceptability of transfers of RW for storage & disposal
  - support promotion of shared European RWM solutions
  - fulfill their dual-track role
  - respond to the EC Directive
  - possibly identify and justify use of shared interim storage solutions
  - attain disposal at a more reasonable cost
- as before
- alongside other non-NPP MS, strengthen the message that ERDO is essential for non-NPP countries too
  - justify the expectation of an eventual disposal solution for long-lived RW from non-NPP MS in an ERDO country
- extra

# 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)

# Conclusions

- ◆ Safe and secure management and disposal of radioactive waste is needed for all EU MS, however large or small
- ◆ The Directive places important requirements on ALL EU Member States
- ◆ Regional disposal facilities remain a legal possibility within the EU
- ◆ The Directive has specific impacts on those EU Member States that support the assessment of the feasibility of shared regional facilities

# Conclusions

- ◆ Most urgent in many cases are the national tasks of
  - allocating responsibilities for decisions related to regional projects
  - defining present and potential future inventories
  - establishing financial mechanisms for supporting the work done in cooperation with their regional partners.



# Conclusions

- ◆ The other requirements on national programmes can be met by technical cooperation in teams working with a regional organisation, e.g.
  - Developing repository designs
  - Agreeing post-closure measures
  - Specifying R&D needs,
  - Producing credible cost estimates for a shared facility.

# Conclusions

- ◆ The issues that need attention and cooperation at the highest political levels are the definition of the milestones towards implementation and the specific responsibilities for this
- ◆ The ERDO-WG can work on proposing viable approaches to accomplishing these tasks in the most cost-efficient manner
- ◆ A formal ERDO with a working programme satisfying all of the EC requirements that are common to the participants could be a powerful mechanism to help small Member States.

# The End – Thank you!