



World
Nuclear
Association

International Co-operation in Waste Management and Decommissioning

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Overview



- Introduction of the World Nuclear Association (WNA)
- Low Level Radioactive Material management: needs and challenges at the international level
- Example opportunities and successes

World Nuclear Association



WNA Roles & Activities



4. Providing Public Information and News
3. Nuclear Fuel Market and Supply Chain
2. Enabling Industry Contacts and Cooperation

1. Representation in Key International Forums

Representation in Key International Forums



International Atomic Energy Agency



Nuclear Energy Agency of the OECD



UN Framework Convention on Climate Change



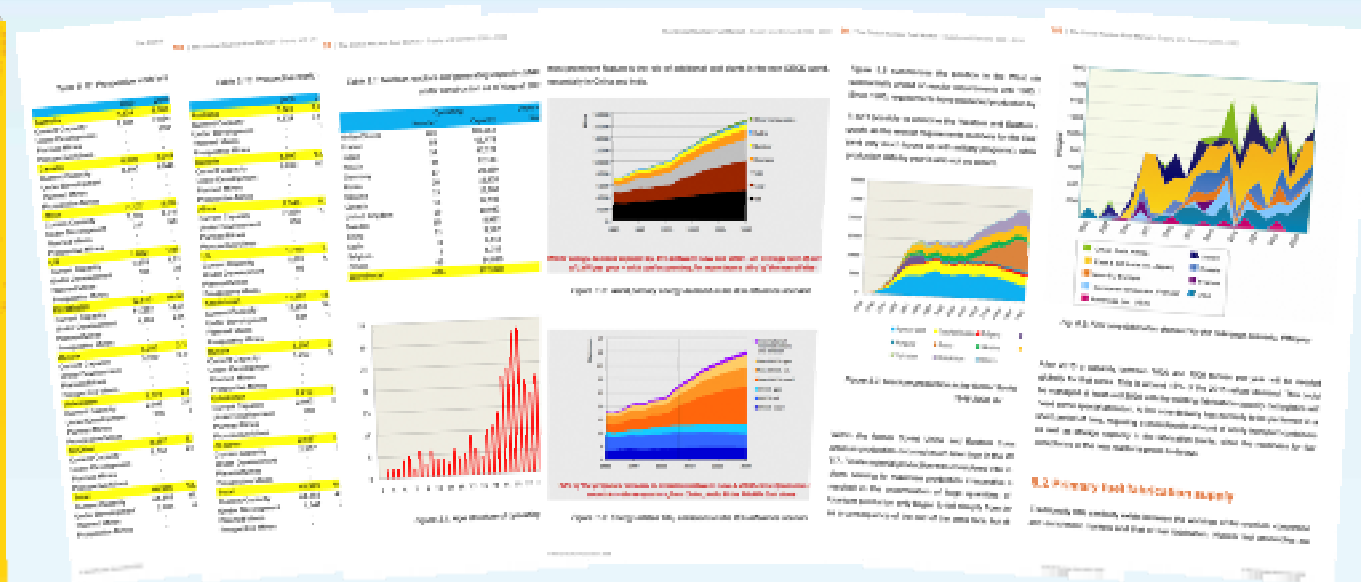
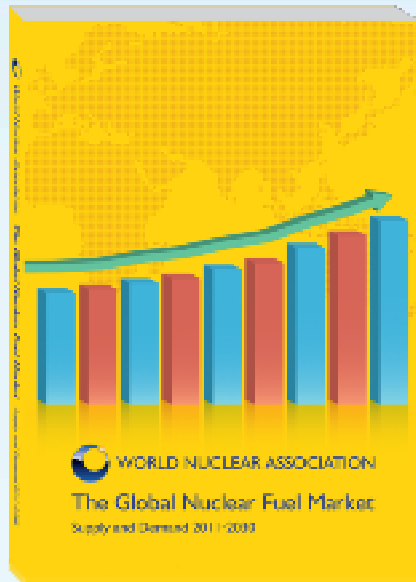
International Commission on Radiological Protection

WNA Roles & Activities



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- A 3D digital rendering of a nuclear power plant. In the foreground, a long, elevated walkway with green railings extends from the left towards the center. Several small, colorful human figures are walking along this path. In the background, the main structures of the power plant are visible, including a large, grey, cylindrical containment dome on the right, and various rectangular buildings and structures in shades of grey and blue. The sky is a clear, light blue gradient.
1. Representation in Key International Forums
 2. Enabling Industry Contacts and Cooperation
 3. Nuclear Fuel Market and Supply Chain
 4. Providing Public Information and News

Nuclear Fuel Market & Supply Chain



- WNA remains the world's expert forum on developments in nuclear fuel and trade
- Biennial market report is an authoritative projection of the global fuel market

Nuclear Fuel Market & Supply Chain



WNA analysis is supporting WNA members as they build complex international supply chains. Focus:

- **Determine market potential for key components**
- **Develop database of leading companies worldwide**
- **Identify “pinch points” in supply**

WNA Roles & Activities



1. Representation in Key International Forums

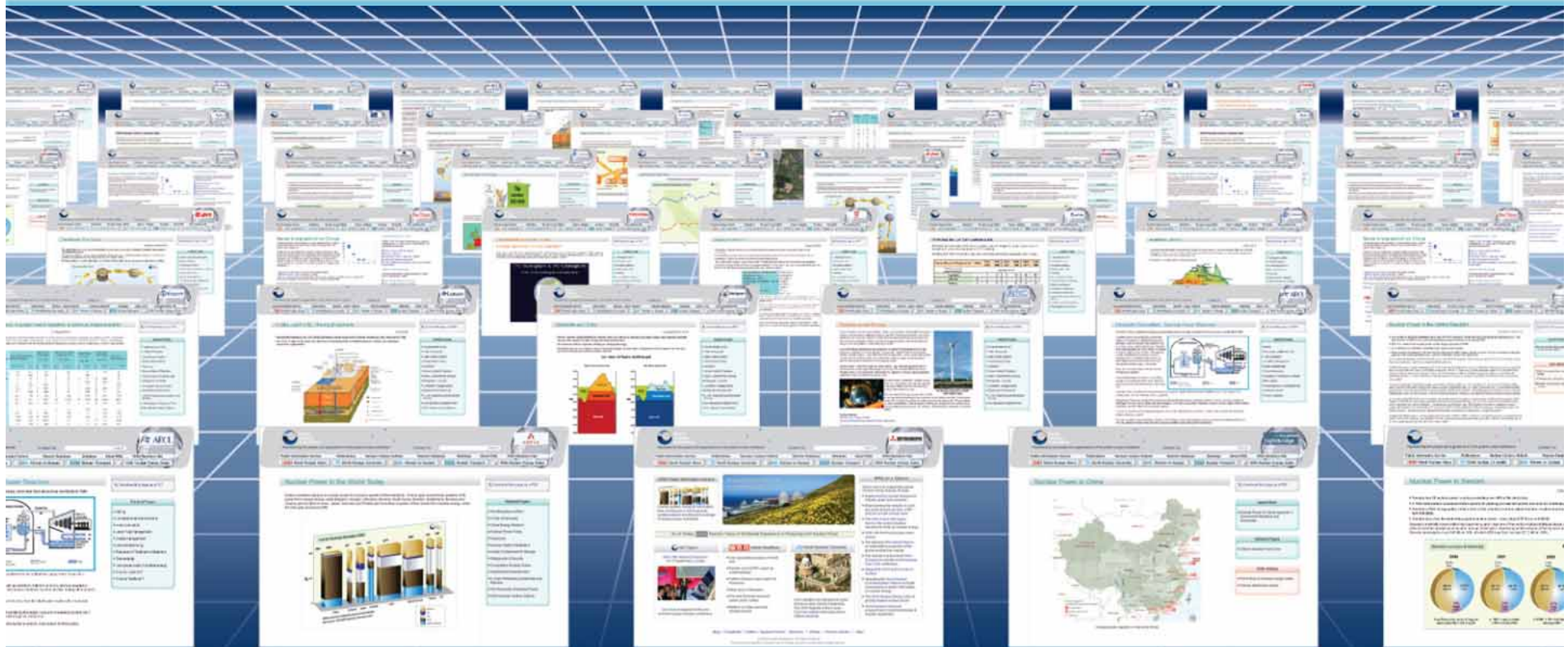
2. Enabling Industry Contacts and Cooperation

3. Nuclear Fuel Market and Supply Chain

4. Providing Public Information and News



Public Information & News



- 200 Information Papers updated regularly
- A 'hit' every 5 seconds round the clock
- Used by the public, policymakers & industry

Public Information & News



- Free online news service
- Timely & concise daily reporting
- Daily distribution: 20,000 and growing

WNA Roles & Activities



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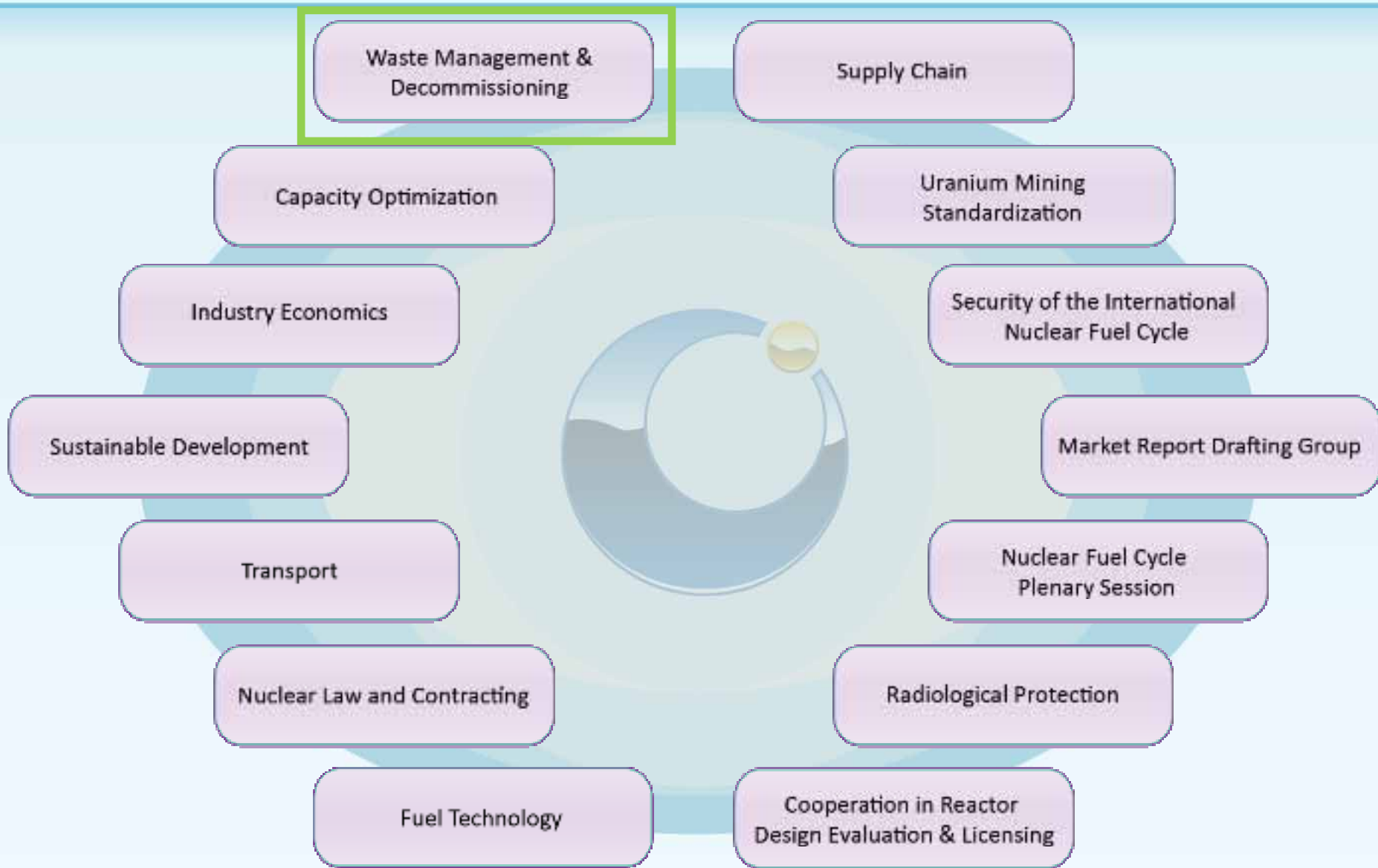


Enabling Industry Contacts & Cooperation



- **Annual WNA Symposium** each September in London (800 nuclear executives)
- **Joint WNA-NEI World Nuclear Fuel Cycle** conference (350-400 experts) Rotates: Europe, Asia, USA
- **WNA Working Groups** meet regularly

Enabling Industry Contacts & Cooperation: WNA Working Groups



Waste Management and Decommissioning WG



Participation

- Nuclear Power Utilities
 - Operation
 - Decommissioning
- Waste Management and Treatment Companies
- Uranium Mining

Participation

- Europe
- North America
- Asia
- Australasia

Current Focus

- Recycling of Low Level Radioactive Material from Nuclear Power Sites

Waste and Decommissioning Working Group



Background:

- Early 2011: Position Paper published

“Towards Greater Efficiency in the Management of Low-Level Radioactive Material that Concurrently Supports Reuse, Recycling and Disposal”

- Early 2012:
Project started to promote the issue of recycling of valuable low level radioactive materials, primarily metals

Position Paper



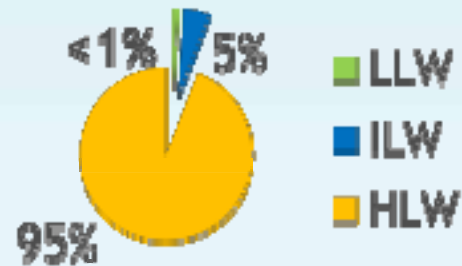
Essential Messages:

- All three options are essential:
 - Reuse, Recycling and Disposal
- All three options have proven technical solutions implemented in countries around the world
- The foundation and fundamental driver of a given option is the industrial business case

Position Paper



Scope



The Material

- Source: not originally radioactive, isolated from nuclear process
- 90% of the volume <math><1\%</math> of the radioactivity
- Established techniques can separate radioactive component

The Process

- Reuse and Recycling is about a **controlled process**, defined specifications on the **input material** and output **products**
- Restricting this case to the notion of 'clearance' falls well short of the complete picture

Position Paper



Unsustainable Inefficiency

- Loss of valuable raw materials
- Disproportionate resource spent on recycling low volume or low value material
- Disproportionate demand for interim storage and potential double-treatment

- **This inefficiency comes at a high price for both industry and society as a whole**

Position Paper



Driving the availability of the route:

- A viable industrial business case built on a sufficient volume of material
- Viability of a reuse/recycling facility:
 - Supply volumes
 - Demand volumes
- Viability of a Disposal Facility
 - Capacity (one key factor in defining unit cost)

Position Paper



Overcoming Barriers to Viability

- Disproportionate emphasis is often put on a series of technical parameters
- Another key success factor:
 - trust and confidence in the business case
 - maintained by responsible operators and regulatory buy-in

Success



Metals – Studsvik

- Metals accepted from around the world and recycled in Sweden
- Large Components (e.g. Steam Generators)
- Radioactive component separated and returned to customer for disposal (volume reduction)
- Remaining material recycled into the conventional metal industry



Success



Metals – Studsvik

Developed domestically in partnership with Ringhalls (Vatenfall) then offered internationally

- Treatment of steam generators from Stade decommissioning NPP in Germany
- Boilers from Berkeley decommissioning NPP in the UK
- Future: Steam Generators Bruce Power in Canada



Success



Energy Solutions – Magnox Ltd.

- Radioactive metal treated and size reduced in the UK – recycled in the USA
- Pond Skips from Hinkley Point A
- Energy Solutions Bear Creek facility, USA
- Metals re-used within the nuclear industry



Success



EdF

Recognised that decommissioning cannot be done effectively without benefitting from internationally shared experience.

- Treatment of resins through co-operation with a German operating plant
- Close links with NDA and Magnox in the UK : development of decommissioning plans for proposed new build at Sizewell and Hinckley Point
- Bringing in knowledge and techniques through subsidiaries
 - UK Robotics company for remote handling tools, though INTRA group

EdF have been recognised internationally for sharing experience gained in decommissioning at the international level

- EPRI Technology Transfer Awards 2011

Opportunity



Metals – Siempelkamp

- Development of techniques and technologies for dealing with contaminated metals
 - Sorting and segregation
 - Decontamination
 - Decay Storage
- Re-use of metals within the industry – self shielding containers for storage, transport or disposal of radioactive waste



Opportunity



Concrete – Japan

- Concrete from NPP buildings is well suited to for recycled aggregate
 - Potential for improved strength, durability and cracking resistance compared to ordinary concrete aggregate
- Cost for reuse in buildings can be competitive with the cost of other options (e.g. roadbed recycling)
- Demonstrated success outside the nuclear industry:
 - Recycled aggregate from dismantled buildings has been used for new construction
 - Potential for aggregate from NPP buildings to meet requirements for new plant buildings



Summary



- Focus of WNA's Working Group on Waste Management and Decommissioning: **achieving greater efficiency in the management of LLRM from Nuclear Sites**
 - Position Paper highlights key issues to be addressed for success
- International collaboration can and has achieved success
- There remains a big opportunity to achieve a sustainable system with concurrent availability of **Reuse, Recycling and Disposal**
- WNA seeks to support the industry in providing a common platform to raise this issue more widely and in a coordinated way



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