

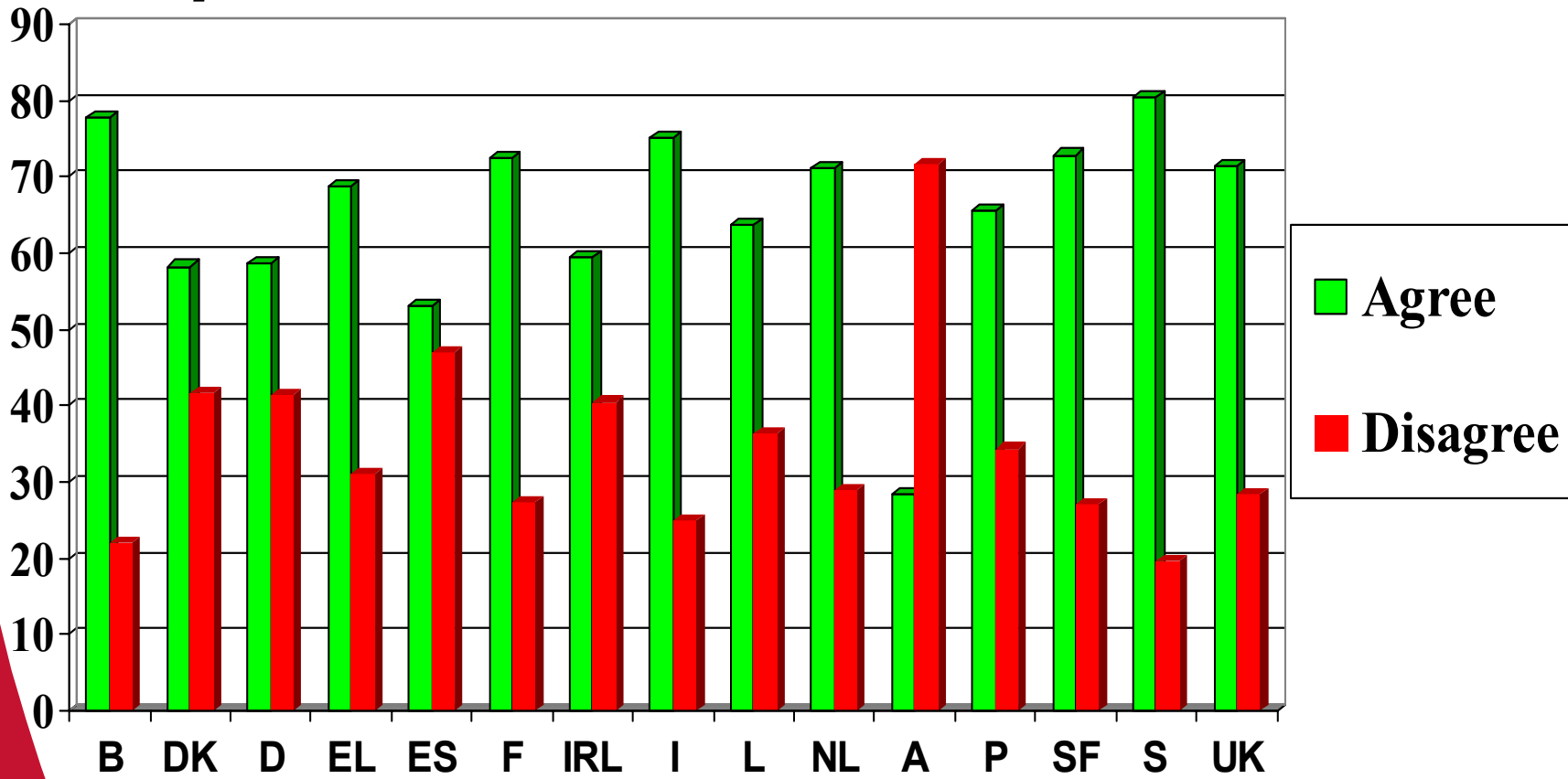
A Global Perspective on the Management of Waste in the Closed Fuel Cycle

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AREVA

WM'04
Tucson, AZ - March 1st, 2004

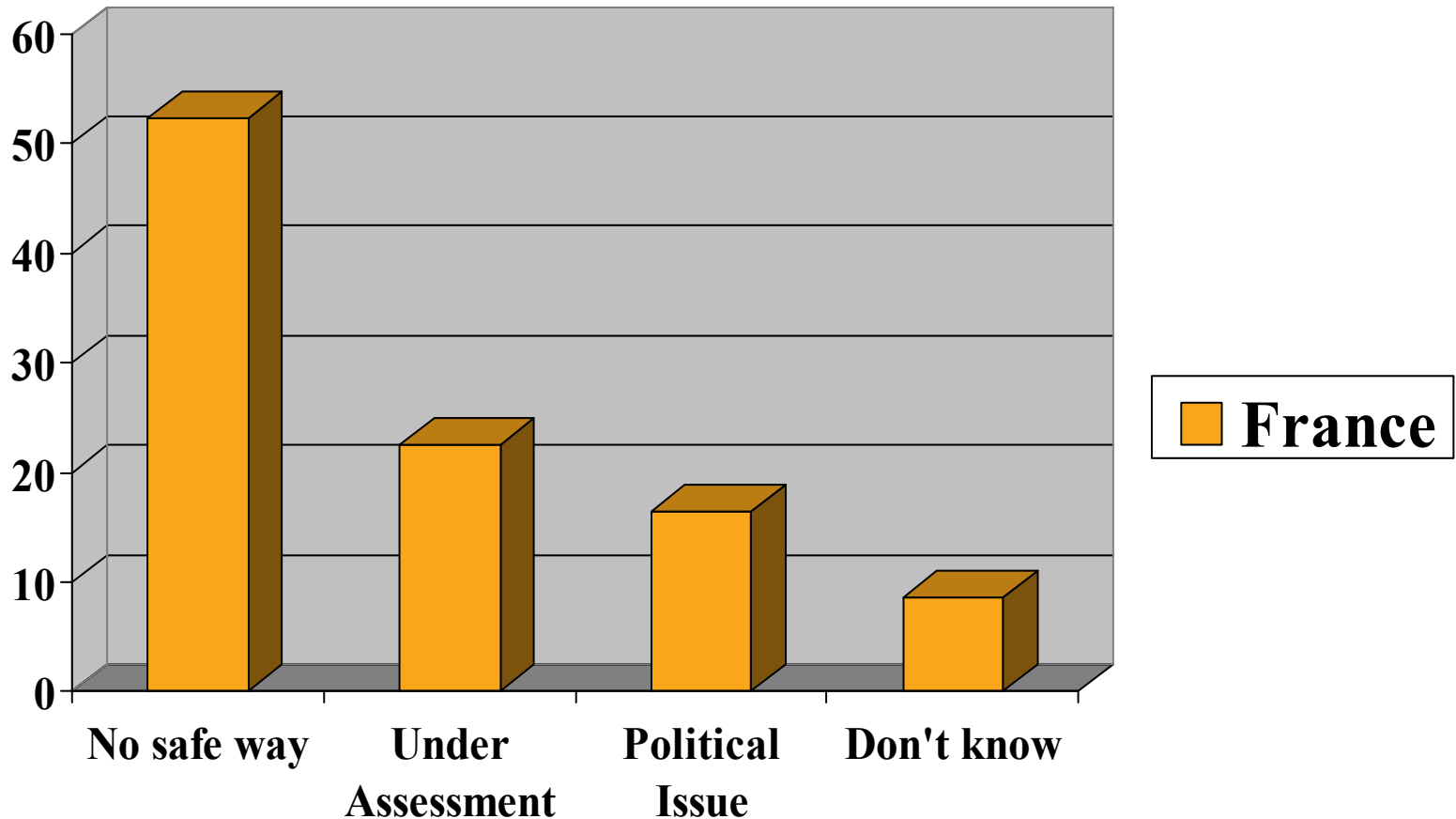
- ▶ **Nuclear industry is alive in the world**
- ▶ **Current NPPs are safe and efficient**
- ▶ **We must prepare now for the next generation**
- ▶ **But... final waste disposal is critical**

► ***If all waste can be safely managed, nuclear power should remain an option***



Source: *EUROBAROMETER of the European Commission*

► Do you think there is a solution regarding HLW disposal ?



Source: EUROBAROMETER of the European Commission

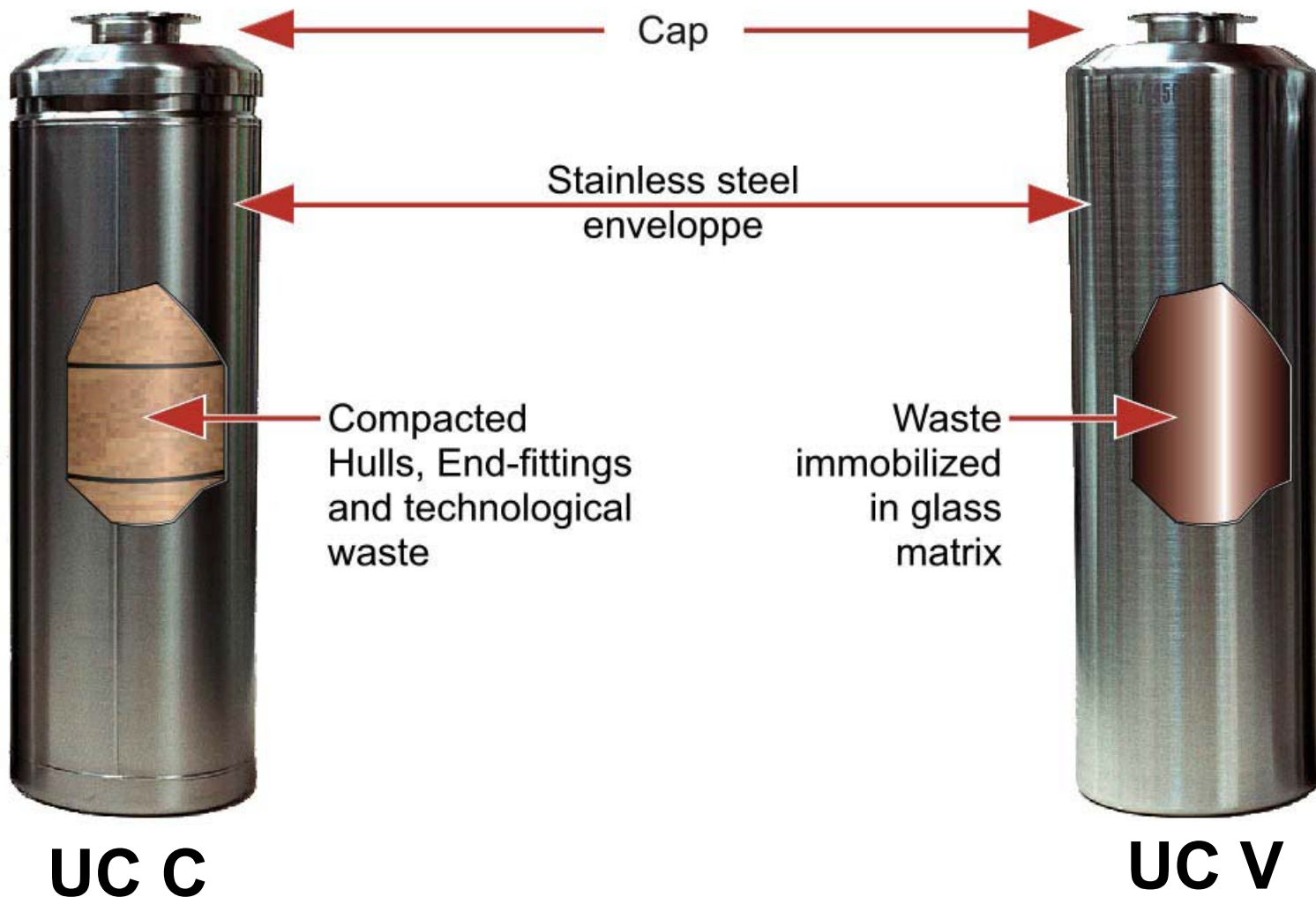
- ▶ **International situation for LLW**
 - ◆ **Operational in many countries**
- ▶ **International situation for IL and HLW**
 - ◆ **Only three approved sites**
- ▶ **Waste disposal: necessary and essential to nuclear energy future**
- ▶ **Geological disposal: a good solution...
...but a difficult and slow process**

- ▶ **Repository space: a scarce resource**
- ▶ **Improved and more flexible time management: an asset**
- ▶ **Technical problems have technical solutions: engineering**
- ▶ **Societal problems have societal solutions: public outreach, acceptance**

Waste conditioning in practice at Cogema La Hague

- ▶ **All waste streams conditioned on line**
- ▶ **Waste sorted in categories for optimized treatment**
- ▶ **Incorporation in matrix and introduction in canisters**
- ▶ **Standardization: Universal Canister**

The Universal Canister



Advantages: handling ease, time management

The La Hague UC-V storage facilities



Advantages: time management, disposal choice not a bottleneck to industry progress

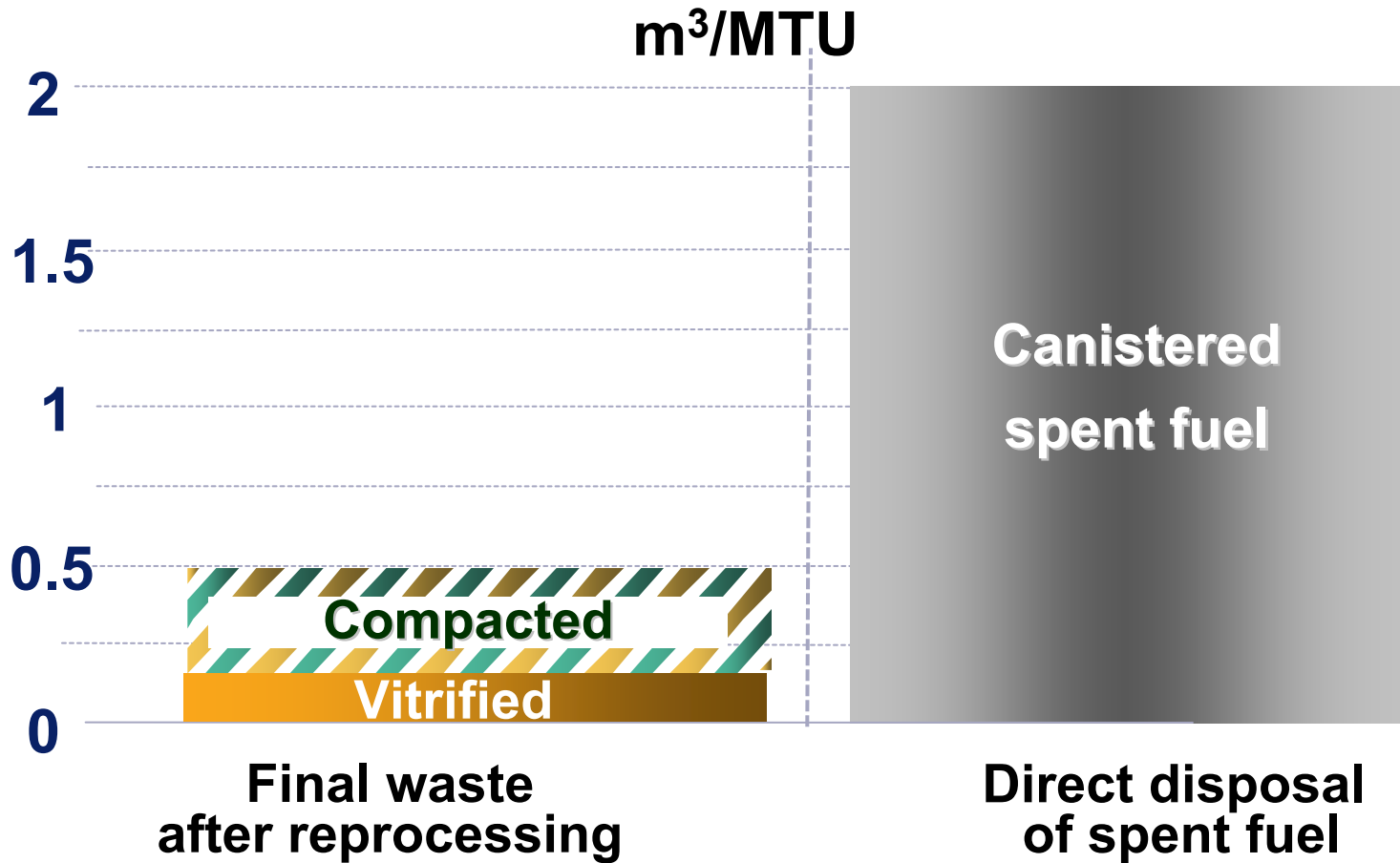
**Borssele,
Netherlands**



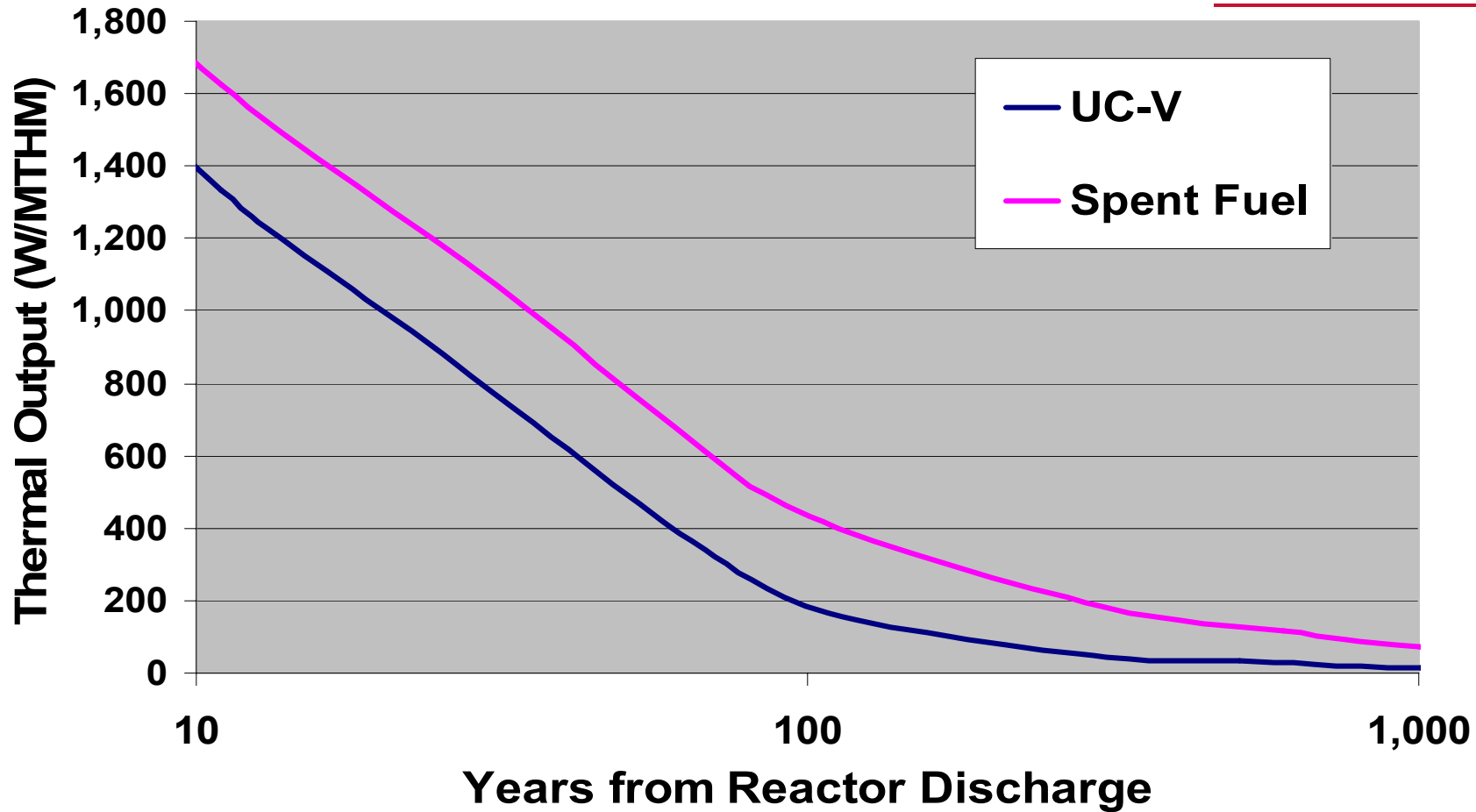
**Rokkasho Mura,
Japan**



Waste Volume reduction

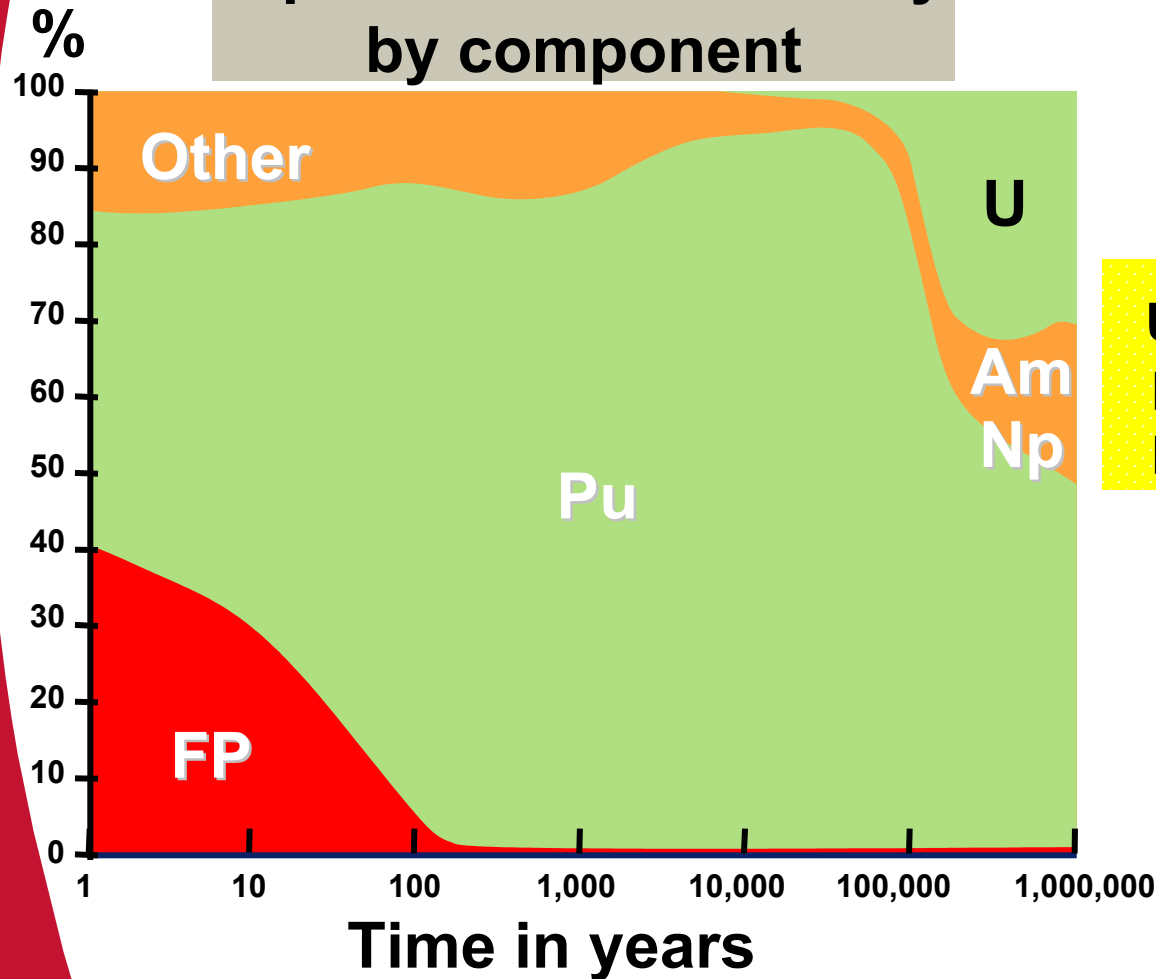


► **Advantages: more flexibility in repository design, larger volume placed in repository**



► **Advantage: increase repository capacity by customized management of key elements**

Spent fuel radiotoxicity by component



U : Uranium
Pu : Plutonium
FP : Fission products

► **Advantage: immobilization in a more stable matrix**

- ▶ **Three waste management methods being researched:**
 - **partition / transmutation (advanced processing): CEA**
 - **(Am, Np, Cm, Cs, I, Tc)**
 - **deep geological disposal: ANDRA**
 - **long term surface storage: CEA & industry**
- ▶ **Decisions in 2006 by the Parliament**

The Construction of an Underground Research Laboratory



► The Bure site – Argileous media

- ▶ **A nuclear waste repository: a prized asset, worth optimizing its actual use**
- ▶ **The closed fuel cycle option: a robust and flexible tool for the long term management of nuclear waste**
- ▶ **Cost impact: not certain, but low on the price of kWh**

- ▶ **The role of our industry is to:**
 - ◆ **offer state of the art industrial solutions at economic conditions and pursue R&D programs**
 - ◆ **obey key criteria: safety, security and protection of the environment**
 - ◆ **provide industrial responses to national and international regulations**
 - ◆ **explain to the public as best as we can**

- ▶ **«Europe cannot dispense with nuclear energy if we wish to fulfill the Kyoto protocol...»**
- ▶ **«...We must face up to the situation, not bury our heads in the sand like an ostrich.»**

Loyala de Palacio
Vice President
of the European Commission