



Sustainable Cycle Solutions

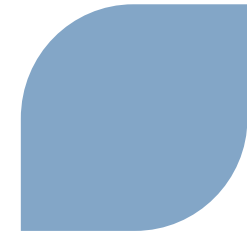
IEA / NEA Nuclear Technology Roadmap Update Stakeholder Engagement Workshop

Session 2a

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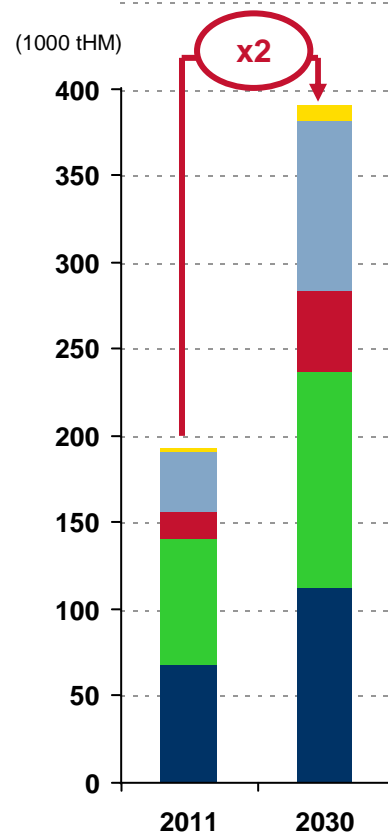




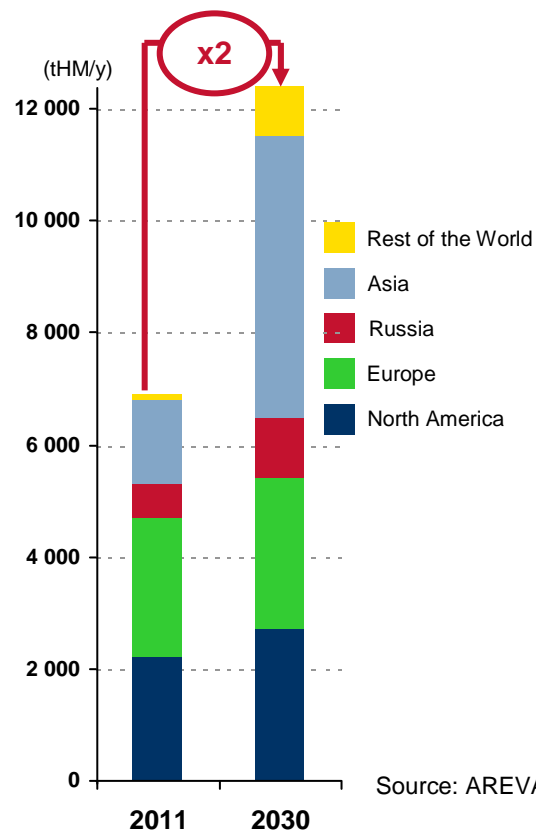
Used Fuel Management Markets

Global nuclear capacity is expected to increase by ~+50% over 2012-30

Used fuel inventories



Annual unloading



Source: AREVA

Main drivers of used fuel management

Risk Reduction

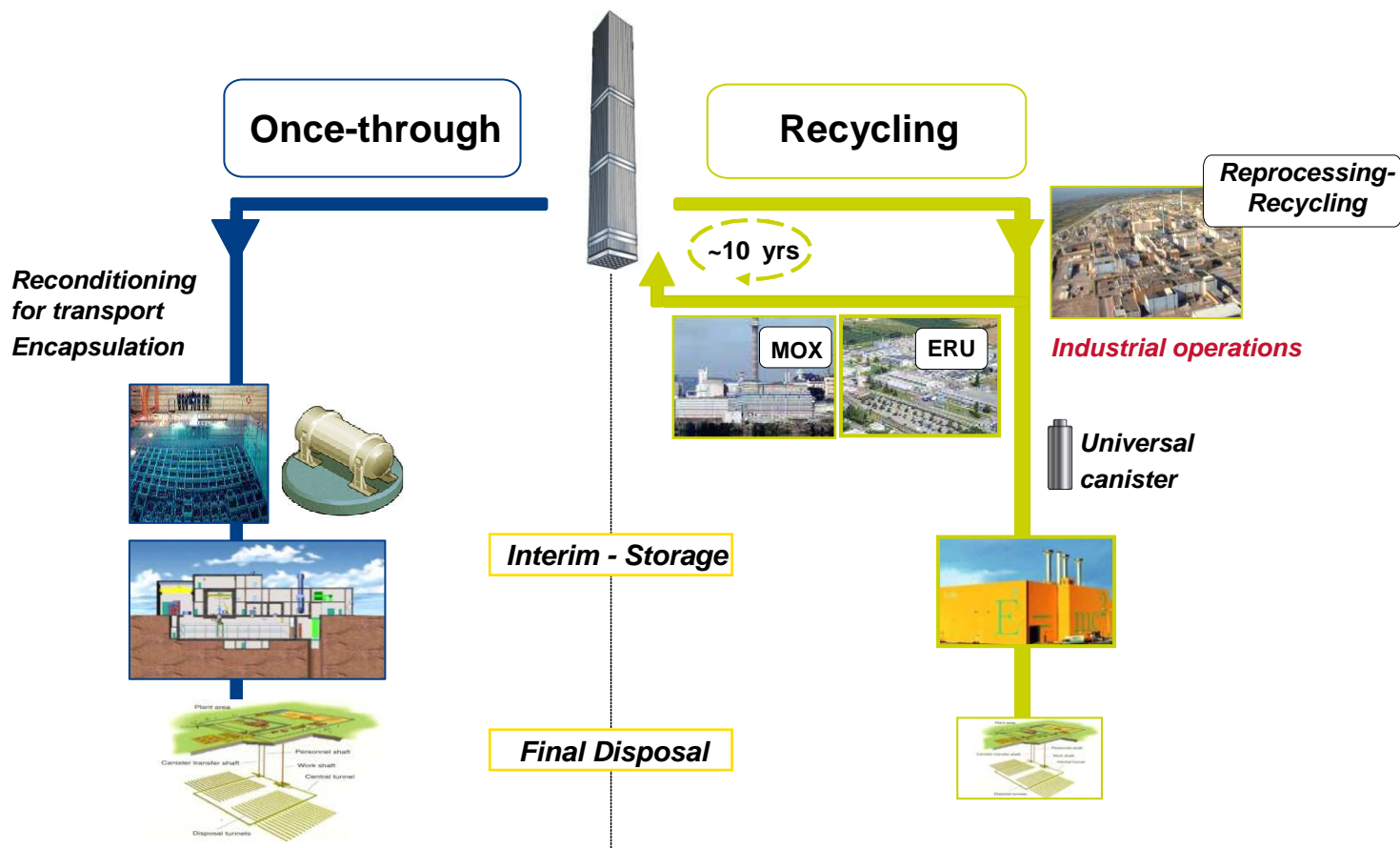
- ▶ Non-proliferation & security
- ▶ Nuclear safety
- ▶ Environmental impact & footprint
- ▶ Public acceptance

Nuclear System Performance

- ▶ Increase energy independence
- ▶ Optimize cost of nuclear electricity
- ▶ Preserve natural resources
- ▶ Minimize waste generated

» Optimizing the fuel cycle will become even more crucial to ensure the sustainable growth of nuclear energy

Choosing between two options for Used Fuel Management

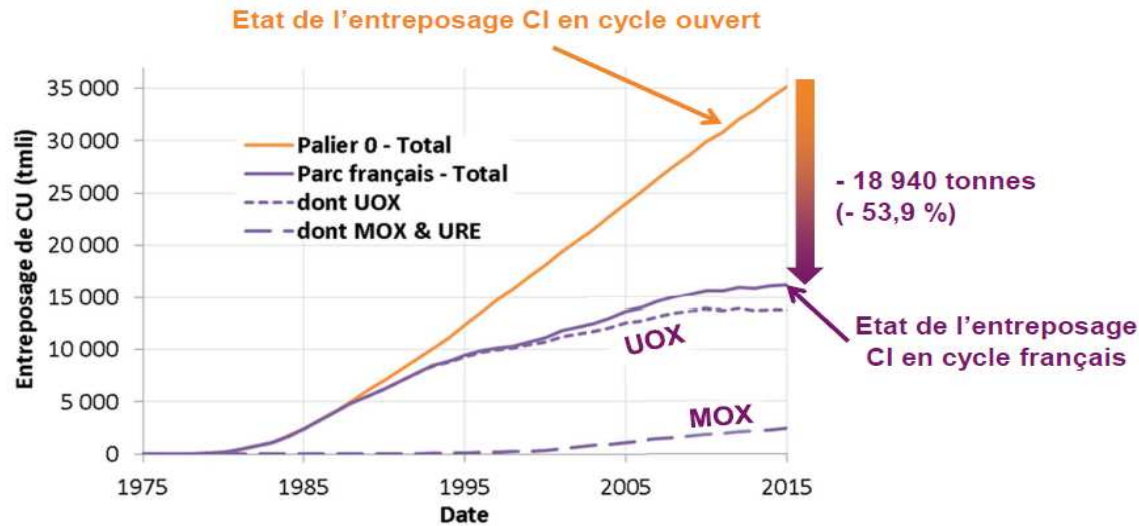
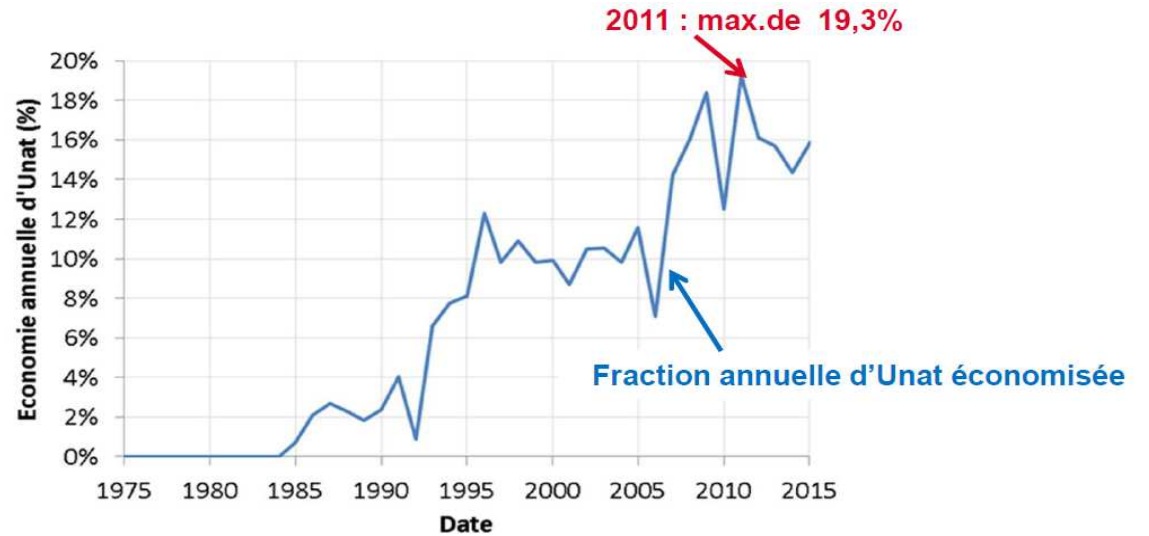


Used fuel economics

- Used fuel management is 6% of nuclear cost.
- According to international studies, cost of both cycle are comparable.

France : historical figures about used fuel recycling

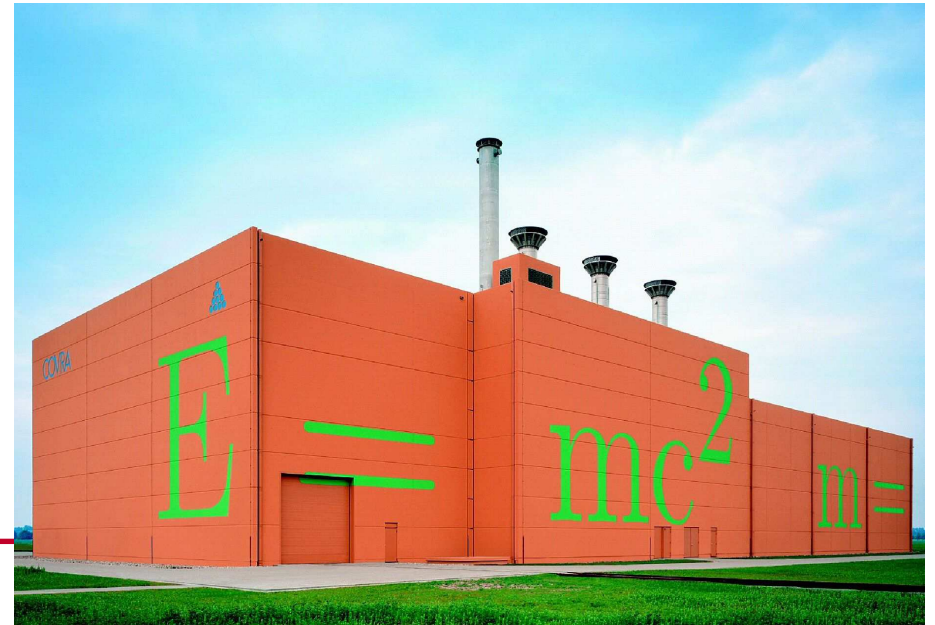
► Annual Natural Uranium Savings (Cumulative total 25 500 tons)



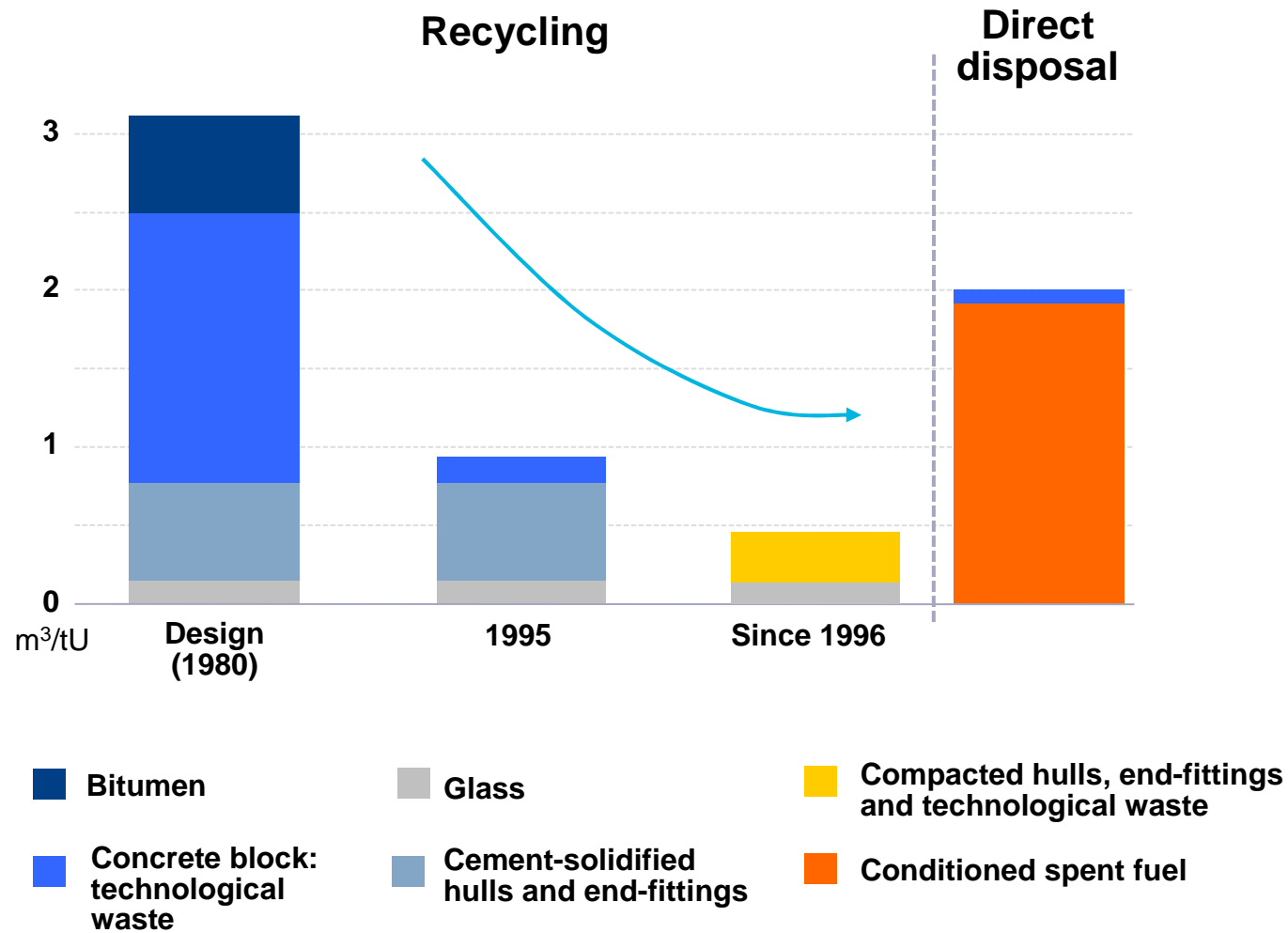
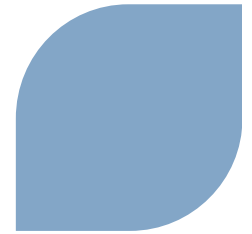
► Used Fuel Interim Storage savings (Cumulative total 18 940 tons)

Vitrified Waste Canister Interim Storage: Dutch Example

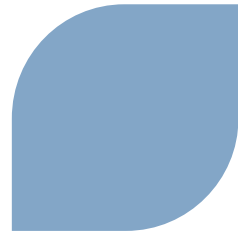
- ▶ **HABOG building opened in 2003**
 - ◆ Dry storage vault for HLW from recycling and other waste
 - ◆ 1.7 m reinforced concrete
 - ◆ Passive cooling system
 - ◆ Licensed for 100 years storage
- ▶ **All waste managed and owned by COVRA**
- ▶ **Design and licensing for 100 year storage thanks to vitrified waste stability and absence of fissile material**
- ▶



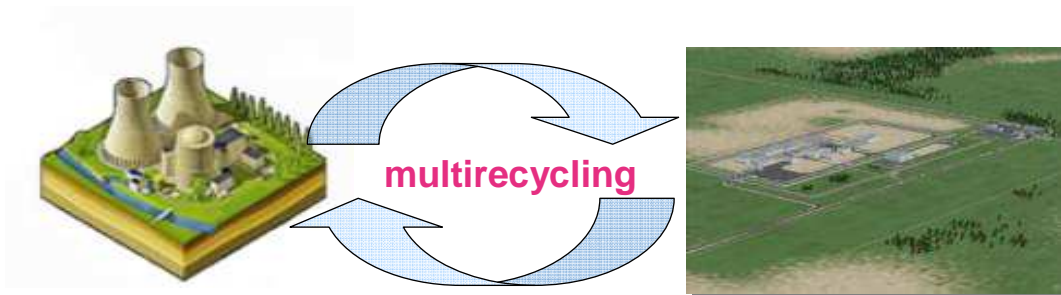
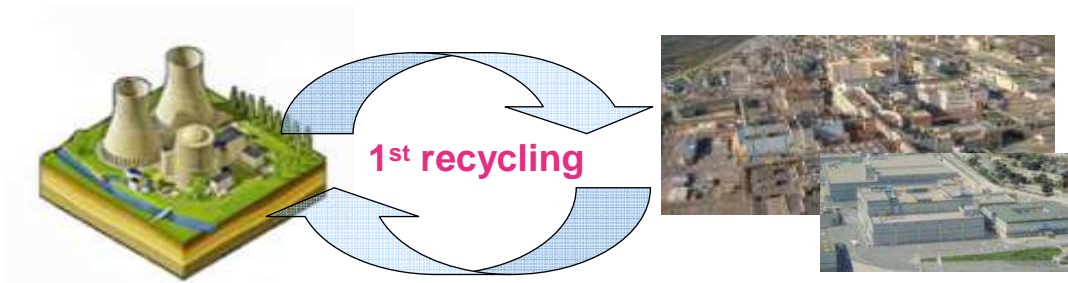
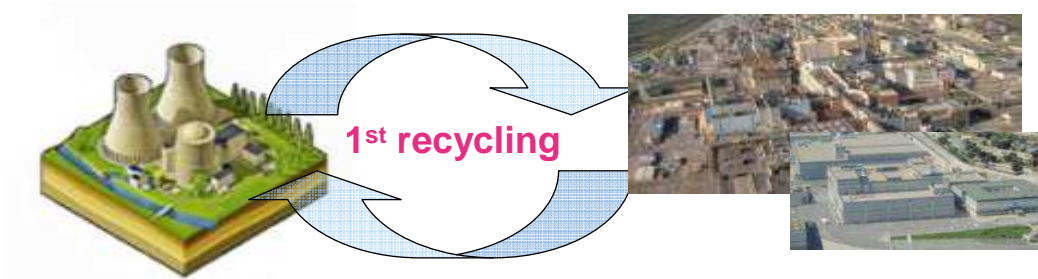
Recycling : A constant and continuous Volume Reduction Over Time



Closed Cycle : from LWRs to FRs



Light Water Reactors



Fast Reactors

