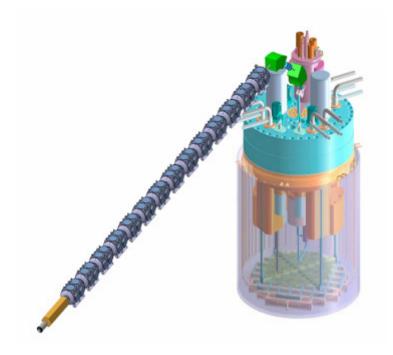


MYRRHA

"Science Towards Sustainability"

Hamid Aït Abderrahim





a pan-European Research Infrastructure Perspective of Implementation in Europe

myrrha@sckcen.be



The Missions of MYRRHA





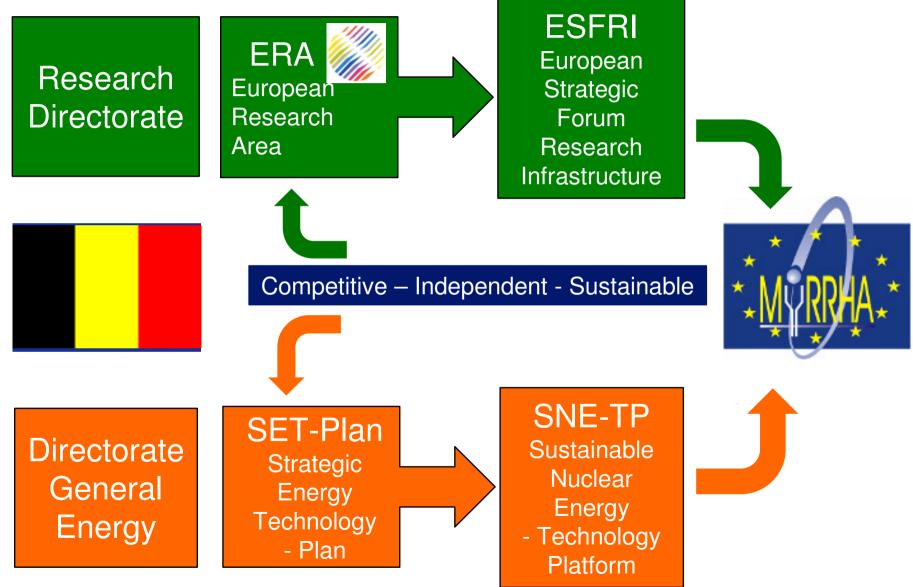


Competitive Economy

Energy Independence Sustainable Society



MYRRHA meets Belgian & European goals



MYRRHA - AccApp09, International Topical Meeting, Vienna, Austria, 4-8 May, 2009



"STS" model

MYRRHA

PUBLIC RESEARCH ORGANIZATION SCIENCE

TECHNOLOGY

SERVICES



CREATION

TRANSFER

UTILIZATION

SHARED

KNOWLEDGE

ienna, Austria, 4-8 May, 2009



Europe is pushing cluster development as the way to economical development



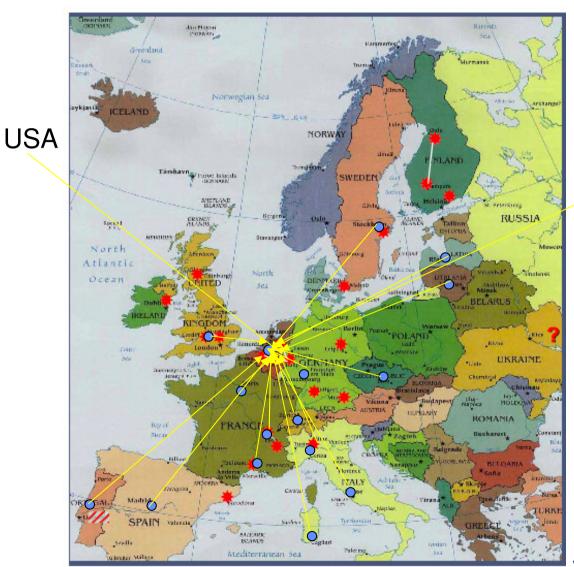
Several regional clusters in Europe are strong sources of High-Tech economical activity (cf. INNOVA)

Clusters are expanding around themselves and collaborate together to form networks of clusters

Vienna, Austria, 4-8 May, 2009



MYRRHA enhances SCK•CEN European Networking



Japan

MYRRHA: a European project, realised together with European centres of expertise and European industrial partners

Vienna, Austria, 4-8 May, 2009



A legacy of "first of a kind projects"

1956

BR1 1st Belgian Reactor 4 MW Graph.Air

1962 BR2

Highest Flux material reactor in Europe

1963

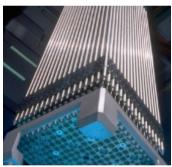
Inventor of MIMAS MOX 1980

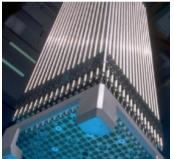
World 1st underground lab for high level waste disposal

2020

World Premiere project for transmutation of nuclear Waste

















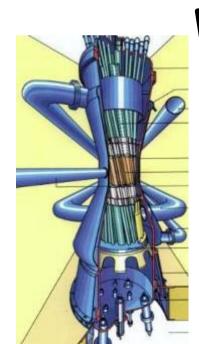
A successor to BR2

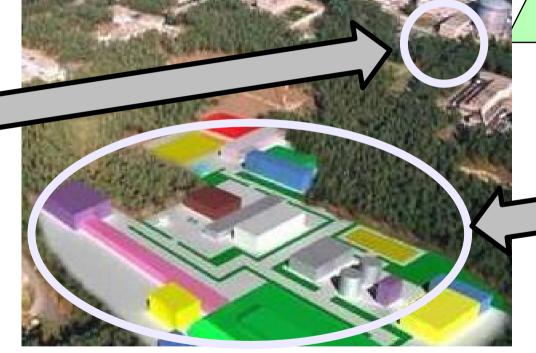


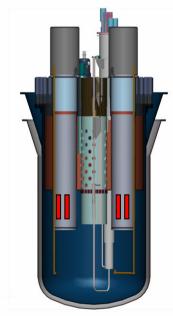
BR2 - Highest Flux material reactor in Europe



World Premiere project for transmutation of nuclear Waste



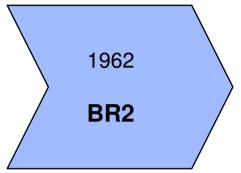






MYRRHA – a fast spectrum testing facility





Fast Neutron Material Testing Reactor (fission) Fuel testing For LWR & GEN II/GEN III

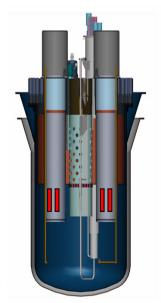
Irradiation Services:

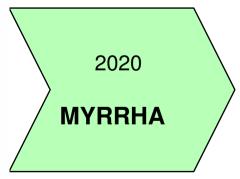
- Medical RI
- Silicium doping
- Others











Very Fast Neutron
Material
Testing Reactor
(fission + fusion)

ADS-Demo + P&T testing

(Partitioning & Transmutation)

Fuel testing For GEN IV

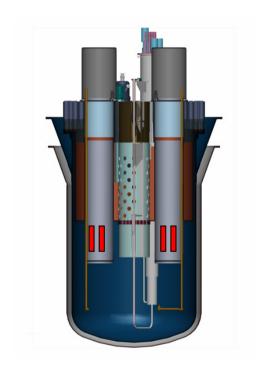
Irradiation Services:

- Medical RI
- Silicium doping
- Others

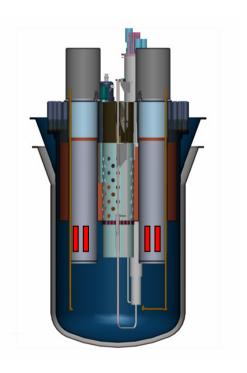
LFR GEN IV Technology demonstration



The MYRRHA concept



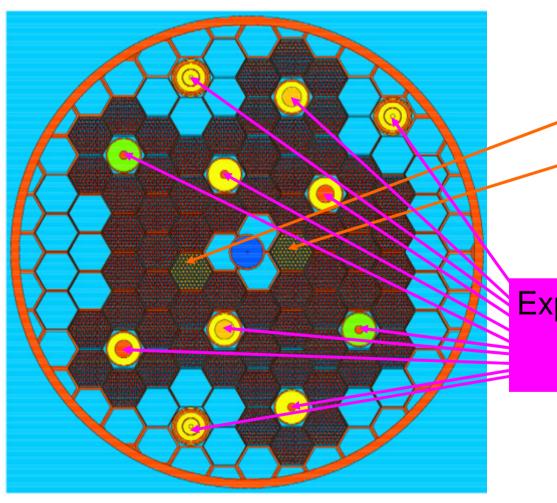
Movie A



Movie B



Flexible experimental facility



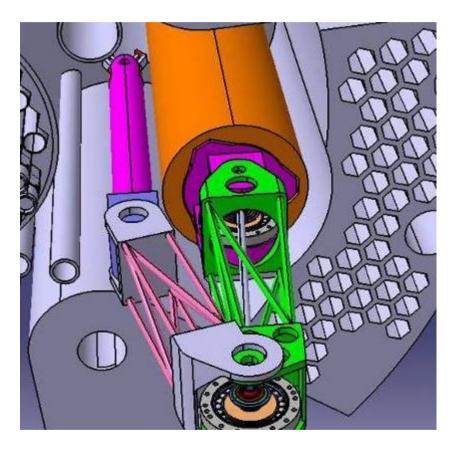
Minor Actinides test assemblies

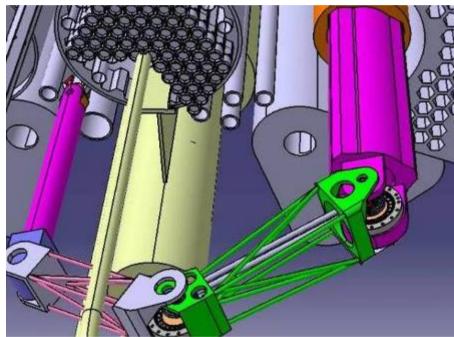
Experimental rigs:

- dedicated contents
- dedicated irradiation



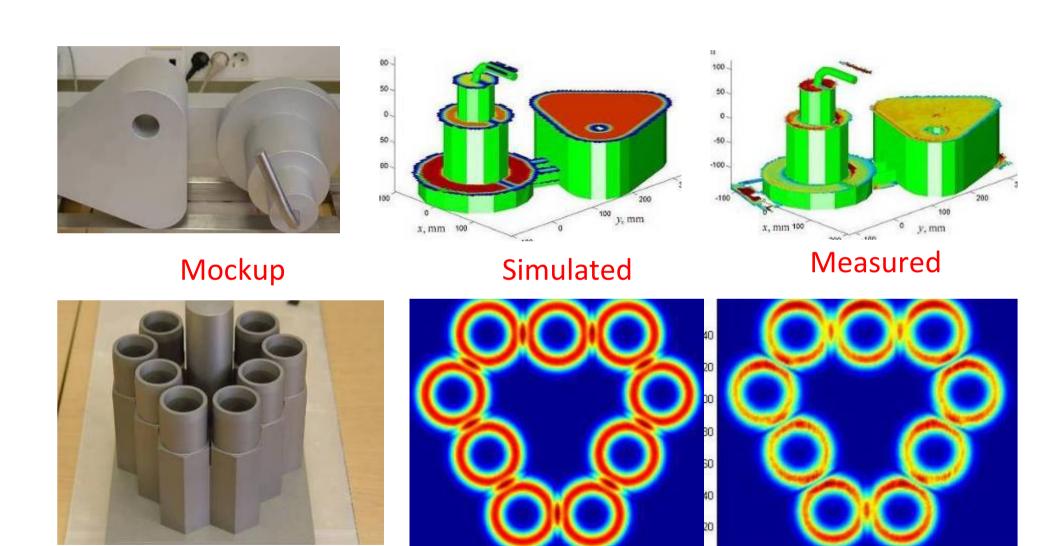
In vessel remote handling







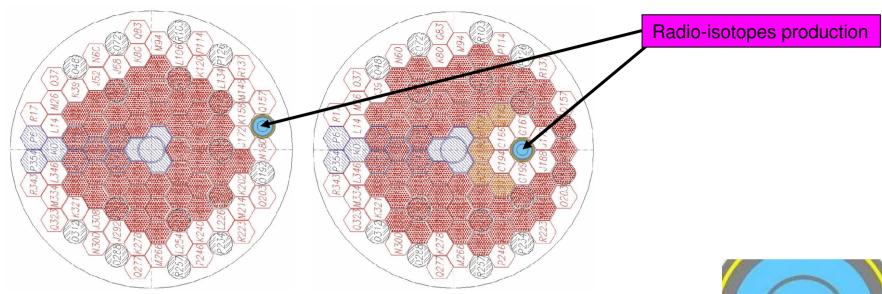
Ultrasonic imaging in PbBi @ 300° C



MYRRHA - AccApp09, International Topical Meeting, Vienna, Austria, 4-8 May, 2009

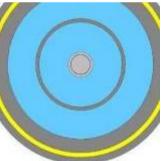


Radio-isotopes production



Ir^{nat} capsule → ¹⁹²Ir

²³⁵U-plates → ⁹⁹Mo







Project schedule

2009-2011

Detailed
Engineering
Design

2012-2013

Techn.specs
Call for
Tenders

& Awards

2014-2016

Construction of components & Civil Works

2017

components assembly on site 2018-2019

Commissioning

















AccApp09, International Topical Meeting, Vienna, Austria, 4-8 May, 2



MYRRHA: Investment budget (in €2009)

INVESTMENT ≈ 960 M€

BUILDING **OPERATION EQUIPMENT ENGINEERING ACCELERATOR** INDIRECT CONT. ACCEL. CONTINGENCY REACTOR **MANAGEMENT CONT. REACTOR** CONTINGENCY SPARE PARTS



Investment blocks (proposed)

INVESTMENT ≈ 960 M€

BUILDING 214 M€

190 M€

Contingency 24 M€ EQUIPMENT 491 M€

ACCELERAT.

143 M€

Cont.Accel. 43 m€

REACTOR

182 M€

Cont.Reactor 87 M€

Spare parts

36 M€

ENGINEERING 255 M€

Indirect

70 M€

Management

128 **M**€

Insurance

5 M€

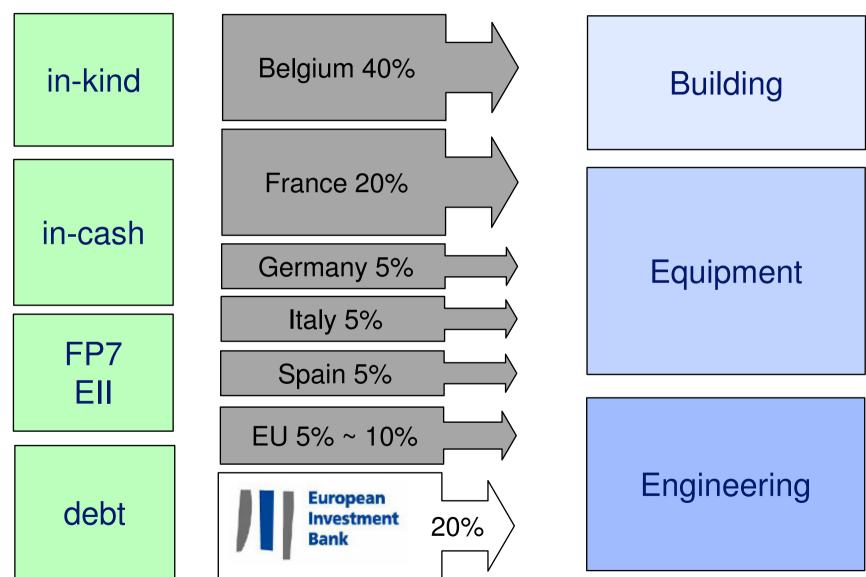
Contingency 52 M€

OPERATION 40 M€

40 M€



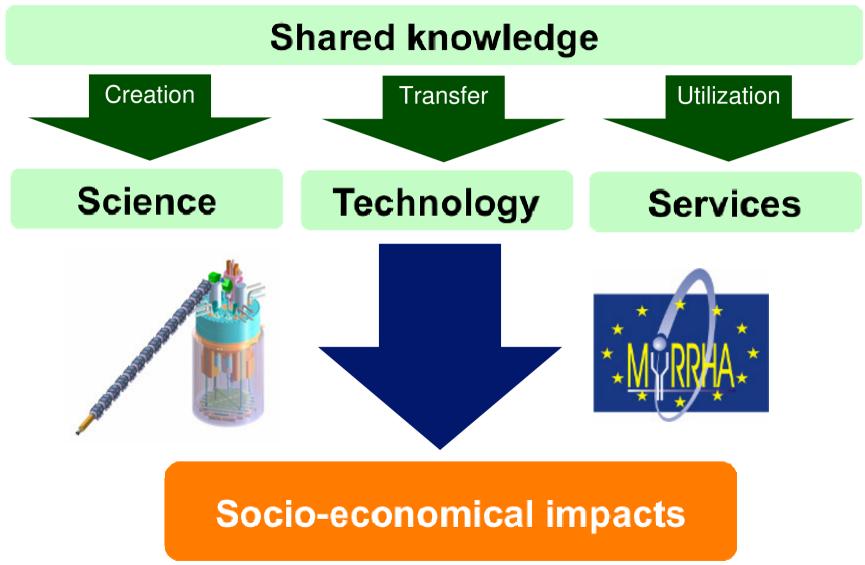
MYRRHA: Source of funds



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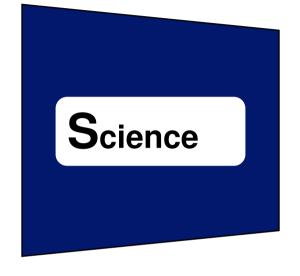


Towards a knowledge-driven economy





MYRRHA "STS" goals and how they fit with cluster development







- Reactor physics
- Material and fuel science
- High energy particle physics
- Life sciences
- Radioprotection

Advanced:

- energy concepts
- nuclear fuels and waste solutions (decommissioning)
- medical applications
- materials and processes
- •sensors, spectroscopy, imaging systems

- Irradiation services
 - Radio-Isotopes
 - NTD-Silicon
 - other industrial apps
- Proton beam use
- Training & Consultancy



When the goals of SCK.CEN and those of de Kempen meet

Regional Development

Regional pact: "Kempen Duurzaam"

Advanced...

- energy concepts
- solutions for nuclear fuel and waste
- medical applications
- materials and processes
- sensors, spectroscopy, imaging systems

MYRRHA

Science towards Sustainability

- Research
- R&D program management and valorisation
- Open innovation

Cluster mgt

- Technology Park
- High Tech Cluster
- Connection to other clusters and regios (ELAt,...)



enna, Austria, 4-8 May, 2009



Conclusions

Socio-economical impacts



Direct jobs 600 FTE Indirect jobs 900 FTE Nuclear Expertise



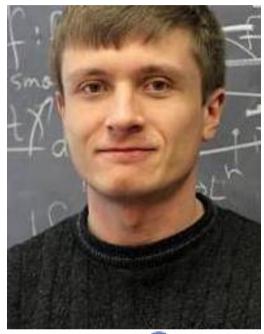
Direct jobs
810 SCK•CEN
150 Visiting
300 Ind. Clus.
Tot. 1260

Sustainable Nuclear Expertise

Economic value
-Clusters
-Spin-offs



Join the project!



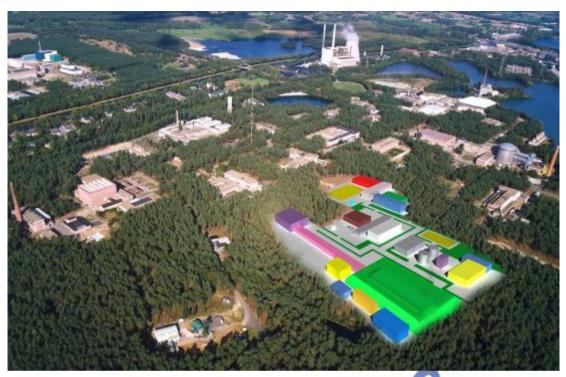






S cience T echnology S ervices S cience T owards S ustainability









Science Towards Sustainability

Will allow the implementation of such RI