MYRRHA
An innovative and unique irradiation research facility

myrrha@sckcen.be

Hamid Aït Abderrahim
SCK•CEN, Deputy Director General / Director of MYRRHA
haitabde@sckcen.be
Overview

- The MYRRHA Project
- The Belgian Approval Process
- MYRRHA in a European and World Context
- Conclusions
MYRRHA Genesis & History

Post BR2
1994

ADONIS
1994-96

Transmutation
1995

Non Energy Applications
1994 RI
1995 H₂

MYRRHA Project (1998-2004)

from 2005

XT-ADS in EUROTRANS

Gen.IV LFR
2002 GIF

current MYRRHA Project (2010)
2001: International Strategic Guidance Committee
2002: International Technical Guidance Committee
2003: Review by Russian Lead Reactor Technology Experts (ISTC#2552p project)
2007: International Assessment Meeting of the Advanced Nuclear Systems Institute
2008: European Commission FP7 Project Central Design Team (CDT) at Mol for MYRRHA detailed design
2009: MYRRHA International Review Team (MIRT) of OECD/NEA on request of Belgian Government (see further)
MYRRHA is an innovative and exciting project and the facility would be unique in the world

MYRRHA could play a role:

- in decisions related to and the development of the technology of the transmutation of nuclear waste
- in the development of advanced nuclear reactors, especially lead-cooled reactors
- as a fast neutron irradiation facility for materials and component testing for fission and fusion reactors
- as serving the needs of accelerator-based scientific communities (radioactive beams, proton therapy, proton-based isotope production, accelerator science, …)
- as a neutron irradiation facility for silicon crystal doping and manufacturing of radioactive isotopes for medical and industrial sources
Accelerator
(600 MeV – 2.5 mA proton)

Reactor
• subcritical mode (50-100 MWth)
• critical mode (~100 MWth)

Spallation source

Multipurpose fast spectrum irradiation facility

Fast neutron source

Lead-Bismuth coolant
### Meeting long term needs of society

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A multipurpose flexible irradiation facility
experiments:  
• nuclear physics  
• condensed matter  
• atomic physics  
• fundamental Interactions  
• life science (production of radioisotopes alpha emitters)
Unique Radioactive Ion Beam applications at ISOL@MYRRHA

HIE-ISOLDE, GANIL, TRIUMF, ORNL, EURISOL, MSU, GSI, RIKEN, FRIB, ...

ISOL@MYRRHA

uniqueness of ISOL@MYRRHA = long term experiments capability = unique research fields

Nuclear Physics
Astrophysics
Atomic Physics
Fundamental Interactions
Condensed Matter
Life Science

Time scale
Day Week Month Year10
The next phase of work: 2010-2014

Minimise technological risks
Secure the licensing
Secure a sound management and investment structure

Accelerator X
Spallation target X
Sub-critical reactor

PDP preliminary dismantling plan
PSAR preliminary safety assessment
EIAR environmental impact assessment

Central Project Team
Owner Consortium Group
Owner Engineering Team

FEED (Front End Engineering Design)
Updated project schedule 2010 - 2024
Detailed budget: balancing costs & revenues

Investment 960 M€
- Building 196 M€
- Equipment 370 M€
- Engineering 202 M€
- Contingencies 192 M€

Operational Budget
- Operational costs 46.6 M€/y
- Organisation reinforcement 14.6 M€/y

Revenues
- Consortium endowment 25.2 M€/y
- Science & Tech. revenues 17.1 M€/y
- Services revenues >18.8 M€/y

2010 - 2023
2024 ~ 2054
Belgian commitment: secured
International consortium: under construction

2nd phase (11 y)
others 576 M€
What is left to do?

today

action plan
2010 - 2014

2015 - 2023
Forging strong partnerships and alliances in Europe and worldwide

- In-cash
- In-kind
  - FP7
  - EII
- Loan

- Belgium: 40%
  - (05.03.2010)
- EU
- Member States
- EU
- ROW
- EIB

- Engineering
- Building
- Equipment

Owners’ Consortium Group:
- Co-sharing investment cost
- Co-sharing exploitation cost
- Privileged access conditions

Alliances:
- Securing revenues from Users’ Group
MYRRHA in ESNII (Europ. Sust. Nucl. Ind. Initiative) & FP7 to reach Sustainable Nuclear Energy Technology Platform (SNETP) goals for GenIV FR

- ASTRID Prototype (SFR)
- CP-ESFR
- ETPP European Demonstration Reactor (LFR) (MYRRHA)
- LEADER
- ALLEGRO experimental reactor (GFR)
- ADRIANA
- GoFastR

Supporting infrastructures, research facilities loops, testing and qualification benches, irradiation facilities incl. fast spectrum facility (MYRRHA) and fuel manufacturing facilities
MYRRHA has strong relations to European and worldwide institutions
The final sprint

preparing to go... already passed!
Belgium is welcoming international participation in the MYRRHA consortium

Membership eligibility for the international MYRRHA consortium is based on a balanced in-cash/in-kind contribution

Until end 2014, our objectives are:

- to collect Letters of Intent for participation in the MYRRHA International Consortium (deadline mid 2011)
- to sign Memoranda of Understanding for collaboration in MYRRHA with international partners (deadline end 2013)
- To finalise the Consortium legal framework (deadline mid 2014)
The reality in 2023!
Thank you!

謝謝
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SCK•CEN
Studiecentrum voor Kernenergie
Centre d'Etude de l'Energie Nucléaire

Stichting van Openbaar Nut
Fondation d'Utilité Publique
Foundation of Public Utility

Registered Office: Avenue Herrmann-Debrouxlaan 40 – BE-1160 BRUSSEL
Operational Office: Boeretang 200 – BE-2400 MOL