TOURR | nuclear research reactors

Towards Optimized Use of Research Reactors in Europe
Project Number: 945 269

DELIVERABLE D 3.2

Model of utilisation and coordination of RR activities

Lead Beneficiary: SCK CEN

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	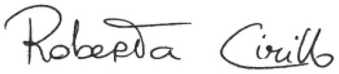	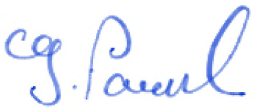

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Version control table

Version number	Date of issue	Author(s)	Brief description of changes made
1.0	16/05/2023	Tom Clarijs	1st draft
2.0	22/05/2023	Tom Clarijs	2nd draft
3.0	5/06/2023	Tom Clarijs	3rd version, taking into account feedback of WP3
4.0	3/07/2023	Tom Clarijs	4th version, Taking into account feedback from the EC project officer
5.0	28/07/2023	Roberta CIRILLO	Review
6.0	8/08/2023	Tom Clarijs	5th version
7.0	28/08/2023	Roberta CIRILLO	Final Review
8.0	28/08/2023	Tom Clarijs	Harmonization of comments and final draft
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EXECUTIVE SUMMARY

This report describes a model of utilization and coordination of Research Reactor (RR) activities. The model is a proposal of adaptation of the already existing DOE (Department Of Energy) Nuclear Science User Facilities (NSUF) model (https://nsuf.inl.gov/), which operates under the principle: no cost to the end-user, competitive proposal processes, no funding to the end-users.

This adaption, to which (for the sake of simplicity) we will refer to as the EU NSUF model is aiming to offer unparalleled research opportunities for nuclear energy researchers via various partner institutions. Via this proposed model, access can be provided to users (at no cost to the researcher) to world-class nuclear research facilities, technical expertise from experienced scientists and engineers, and assistance with experiment design, assembly, safety analysis and examination.

In this report, the proposed model is described and recommendation for its implementation are suggested.

CONTENT

1 INTRODUCTION

The tasks in WP3 entail: Task 3.1 - **Strategy** for optimized use of research reactors in Europe, Task 3.2 - **Tools** for optimized use of research reactors (RR) in Europe platform and Task 3.3 - Refurbishment and construction **support**.

The aim of **task 3.2** is to develop a set of tools to support the implementation of the Strategy for optimized use of RR in Europe. The Strategy for the optimized use of RR in Europe, published as a TOURR deliverable D3.1, is based on the major findings of about 2 years of the TOURR project, involving data input from a questionnaire distributed among RR operators, the subsequent SWOT analysis and two workshops organised during the first 2 years of the project implementation. The gap analysis were performed along 3 main axes which were used as a focus throughout the TOURR project: science and technology, medical applications of radioisotopes produced by RR, and education and training.

The available research reactors in Europe are quite diverse in applications serving science and technology, and each have built up a high level of expertise within a historical background. The result is that the expertise of some applications is accumulated in selected teams which poses a vulnerability in the future to continue some specialised applications, such as (prompt gamma) neutron activation analysis, and nuclear data measurements. A large part of nuclear applications executed in research reactors are performed as 'additional' activities next to the large experiments serving nuclear research. This results in a lack of structural financing, since funding of these activities is highly depending on priorities and availabilities set in (inter)national programmes.

Although alternatives for some applications exist (such as gamma-irradiation), large scale nuclear reactors capable of producing high neutron fluxes remain essential for a broad variety of nuclear research, such as neutron irradiation of material, nuclear fuel research, neutron doping of silicon and actinide transmutation, but also instrument development for new reactor designs (SMR and Generation IV).

In addition, due to the stricter safety and security requirements of nuclear applications (and associated high administrative and financial load) in combination with the ageing of the technical installations (and associated higher costs), there is less interest in niche nuclear applications (such as e.g. geochronology, gemstone coloration).

For the last decades, the overall number of research reactors is declining in Europe related to one or more reasons mentioned above. The model described in this document takes into account the existing conflicts and potential of research vs production synergies which were identified during the course of the project. It also complements the strategy for an optimized use of RR (soon publicly available), and offers options to exploit the current research reactors with a centralized funding scheme.

This document builds further on a draft proposal of the model which was suggested within the TOURR project consortium, and proposes a model how research reactors can be used by competitive processes with no cost to users and no funding to users.
The methodology was largely based on the US NSUF model, and focusses mainly on the use of RR to serve science and technology as well as education and training.

2 DESCRIPTION OF THE EU NSUF MODEL

As described in previous deliverables in the TOURR project, the nuclear research reactor landscape is currently in need of tools to enable the optimization of its activities necessary to support the nuclear industry, the research community and the medical sector. This situation is not unique for research reactors and is seen all across the landscape of nuclear applications, where challenges become more complex in a high demanding environment.

Several projects have been initiated to investigate the possibilities and facilitate the action of providing access to nuclear facilities via a centralized funding mechanisms involving peer review of scientific proposals. For example, the PRISMAP project[1] is enabling access to high purity grade new radionuclides for medicine by offering a single-entry point to research and industry via a wide network of 23 European partners. In this way, production facilities and medical facilities can be accessed via a central point through a system of project applications evaluated on their scientific excellence by a user selection panel.
The OFFERR project[2] is a network providing access to European nuclear science infrastructures via the channelling of financial grants provided by the EURATOM programme. Via their catalogue, listing more than 180 nuclear facilities, access to unique experimental resources are offered via an application procedure involving peer review (expert reviewers plus a review by the Science and Innovation Committee of SNETP).
ENEN2plus project[3], thanks to its extensive mobility program, has already funded more than 300 people in accessing nuclear education and training in the whole world. The project will last for 3 more years and aims at financing about 1000 nuclear talents.

The scope of the TOURR project is aligned to research reactors and could benefit as well of such a funding model with some specific guiding principles of: **no cost to user, competitive proposal processes, no funding to users**.

It is proposed to set up a model of EU Nuclear Science User Facilities (EU NSUF), in analogy with the US NSUF, which was established in 2007 by the US Department of Energy, Office of Nuclear Energy (DOE-NE)[4]. This EU NSUF model is aiming to offer unparalleled research opportunities for nuclear energy researchers via various partner institutions. Users could be provided access (at no cost to the researcher) to world-class nuclear research facilities within Europe, associated technical expertise from experienced scientists and engineers, and assistance with experiment design, assembly, safety analysis and examination.

The EU NSUF could pilot as a proposed model with a small number of partners and could include other facilities over time to create capabilities ranging from neutron, gamma and ion irradiation to post-irradiation examination and beamline capabilities. The aim is to minimize costs by pooling of resources and developing common instrumentation for similar experimental needs, avoiding duplicate efforts. On the other hand, it could enhance scientific competition and thereby fosters scientific excellence.

In this proposed model, access to the EU NSUF facilities could be awarded through two competitive peer-reviewed processes, in analogy to the US NSUF model (for the sake of simplicity, also the terminology proposed is equivalent as US NSUF).

[1] https://www.prismap.eu/
[2] https://snetp.eu/offerr/
[3] https://enen.eu/index.php/portfolio/enen2plus-project/
[4] https://nsuf.inl.gov/

Rapid Turnaround Experiment (RTE)

The Rapid Turnaround Experiment (RTE) award process could offer an opportunity for researchers to perform irradiation effects studies of limited scope on nuclear fuels and materials of interest utilizing EU NSUF facilities. In this way, completion of RTE projects is expected in a short time frame (a few months).

Consolidated Innovative Nuclear Research (CINR)

CINR projects could be based on the execution of a yearly call for full irradiation and/or post-irradiation examination projects requiring significant funding over a longer period of time (up to several years).

3 GOVERNANCE

3.1 Governing board

In order to facilitate an efficient management of this user facility framework, EU NSUF could be led by a rotating governing board. This board would represent the various EU NSUF facilities with a Director, elected by members of the board for a period of e.g. max 3 years. The governing board can be led by lead user facilities with research reactors who have ample experience in using their facilities for multiple purposes aligned with the TOURR project, such as irradiation experiments, education & training and production of radio-isotopes. The facilities awarded with the IAEA ICERR label[5] could be an option.

3.2 Scientific evaluation committee

As a first step of a submission of a proposal of an EU NSUF project, a feasibility review can be performed by the EU NSUF facility addressed by the proposal.

Next, a review of the submitted technical work can be performed by a scientific evaluation committee.

The scientific evaluation committee could consist of experts from multiple EU NSUF facilities, which can be grouped according to their expertise in line with the main topics of the EU NSUF project proposal.

The scientific evaluation committee attributes a score to ensure consistency across the reviews.

Based on the results of the review, the committee can provide a ranked list to the EU NSUF Director. The NSUF Director could consider the committee's ranking, along with other programmatic considerations, in order to make the final award recommendation.

Ideally, this EU NSUF Scientific evaluation committee could set topical research priorities part of an EU NSUF research strategy, taken into account the current and future needs of society as well as the priorities set out in stakeholder structures such as the SNETP, US NSUF and UK NNUF[6].

3.3 Open science and IPR

It is proposed that projects within the EU NSUF are executed in line with the FAIR[7] principles of the European Commission (Findable, Accessible, Interoperable and Re-usable). This means an immediate open access to all scientific publications and responsible research data management. Depending on the technical feasibility of the supporting tools, links can be made to other platforms to facilitate the data exchange, such as the European Open Science Cloud (OESC[8]).

In terms of intellectual property rights, it is proposed that the requesting research institution (and affiliated principal investigator) as well as the used EU NSUF facility become co-owner in equal shares of all raw data, treated data and documentation data developed in the granted EU NSUF project, as long as this poses no conflict with the FAIR principles and open access.

[5] https://www.iaea.org/about/partnerships/international-centres-based-on-research-reactors-icerrs
[6] https://www.nnuf.ac.uk/
[7] https://www.nature.com/articles/sdata201618
[8] https://eosc-portal.eu/

4 SCOPE AND FUNDING

This model proposes to fund proposals which are reviewed and recommended by a EU NSUF scientific evaluation committee. The scientific committee could set topical research priorities in line with the priorities of the European commission.

It is proposed that the EU NSUF only supports activities at, and shipping between, EU NSUF facilities. Researchers (and facilities) from non-EU member states can contribute but are proposed not be eligible for funding.

It is proposed that the EU NSUF does not provide funding to the principal investigator to support salaries, tuition, travel, or other costs typically supported via other funds. Mobility support for individual researchers can be available at the moment via other E&T or research projects, such as e.g. the ENEN2plus[9] project. It is further proposed that applicants need to have a source of R&D funding that will fund all components of the proposed project which are not funded by the EU NSUF. Completion of all NSUF funded work proposed is expected to require no more than a few months from the date of award for RTE projects.

- RTE proposals are proposed to be executed with support up to € 50 000.
- Consolidated Innovative Nuclear Research projects are proposed to be executed with support for more than € 50 000 (e.g. up to € 1 000 000 if the overall budget allows for it).

The proposed amounts are in line with other similar approaches, such as the OFFERR project[10] and the US NSUF programme. EU NSUF projects are proposed to be made accessible to universities, (national and EU) laboratories, industry, and small business researchers.

[9] https://www.enen2plus.eu/
[10] https://snetp.eu/offerr/

5 TYPE OF EXPERIMENTS

5.1 Rapid turnaround experiments (RTE)

As previously described, and aligned with the US NSUF methodology, the Rapid Turnaround Experiment (RTE) award process could offer the possibility for researchers to perform irradiation effects studies of limited scope on nuclear fuels and materials of interest utilizing EU NSUF facilities. It could offer experimenters the opportunity to perform quick analysis of a small number of irradiated samples (neutron, charged particle, nuclear fuel). Samples for Rapid Turnaround Experiments may be supplied by the experimenter or may (in time) become available via an 'EU NSUF sample library'.

Completion of RTE projects is expected within a few months of award. RTE proposals could be awarded multiple times per year, depending on available funding. A proposal for RTE could include up to 3 partner institutions (one for sample preparation, one for irradiation and one for post-irradiation examination).

The proposals could be reviewed and evaluated for scientific merit (40%), technical feasibility (30%), the integration of E&T (15%) and capability of the group (15%).

The scientific merit criterion could include:

- the importance of the scientific or technological need addressed in the proposal
- how innovative and original the proposal is
- the influence that the project might have on the future direction, progress, and thinking within the area of science and technology
- potential education and training opportunities (see 5.3)
- and the likelihood of achieving valuable results

The RTE project proposal would need to demonstrate a logical approach to applying materials characterization to solve a technological problem and/or provide new scientific knowledge as well as a high degree of innovation being substantially different from work being pursued elsewhere.

The technical feasibility criterion provides an assessment of the technical approach and research tasks outlined in the proposal. The proposal could include the appropriateness of the proposed research methods, equipment and approach; the involved risk posed by the approach; and methods to ensure a successful research outcome based on information in relevant literature, and from the knowledge-base of the field.

In addition, the RTE project proposal should identify potential showstoppers and include a project schedule (with a sequence of project tasks, principal milestones, and times for each task). Furthermore, it should indicate the assignment of responsibilities and the required technical expertise available to the applicant in carrying out the project at the EU NSUF partner facility.

The proposed integration of education and training opportunities are described in 5.3.

In a future extent, the group capability criterion could take into consideration the background, past performance, and potential of the principal investigator (PI)[11] as well as the research environment and facilities that would be provided by the PI and co-PIs. Research potential and background would be weighted more heavily for a junior investigator with a more limited track record than an established researcher.

[11] The principal investigator is the person(s) in charge of the scientific research funding. In the case of the proposed EU NSUF model, it would be the lead scientist requesting the funding.

5.2 Consolidated innovative nuclear research projects (CINR)

As proposed in chapter 2, CINR projects could be based on the execution of a yearly call for full irradiation and/or post-irradiation examination projects requiring significant funding over a longer period of time.

The proposals could be reviewed and evaluated for relevance towards the EU NSUF mission, scientific merit, technical feasibility, the integration of E&T, and capability of the group, as proposed in 5.1.

Since these CINR project proposals are likely to be larger in scope and concept, the preparatory aspects could be introduced (and guided) stepwise whenever possible with, for example:

- a letter of intent (initiating the process, preparing the evaluating committee)

- pre-applications (evaluated for feasibility, relevance, technical and scientific merit)

- a preliminary statement of work (which sets out the project scope and aim, which can gradually grow with added details on costs, scheme, activities, deliverables, milestones, requirements and conditions.)

- a final statement of work

- a full application (for final evaluation of feasibility, relevance, technical and scientific merit, as well as final cost estimate and implementation schedule)

In addition, each CINR project proposal would be evaluated in terms of feasibility on cost, schedule, and availability/capability of instruments requested to perform the proposed work. Evaluation criteria similar to RTE project proposals can be taken into account.

After completion of an EU NSUF project, it is proposed that the principal investigator needs to submit a satisfactory completion report for review by the EU NSUF governing board, containing:

- a summary of both the work completed and the data obtained and
- a description of the potential impact to the state-of-knowledge.

5.3 Integration of education and training opportunities

It is proposed that each of the above-mentioned funding channels (RTE or CINR) integrate education and training opportunities in each proposal by e.g.

- integration of thesis or internship opportunities

- link between existing educational programmes or training courses to be developed during the experimental period

- possibility of mentorship and guidance of junior researchers

- possibility of technical visits related to the experimental setup of the research

- possibility of on-the-job training for technical and scientific staff of the RR installation

The evaluation of the **integration of E&T** activities (in the form of training courses)could be based on the quality of the opportunity (e.g. learning outcomes defined in terms of knowledge, skills and competences; description; training topics and schedule; E&T methodology; envisaged target audience; alignment with needs and priorities defined in a European context; etc.).

However, it is proposed that the funding of *individual participation* of these training courses or *mobility of* students, junior researchers or scientific staff should not be covered by the proposed EU NSUF programme. Alternative funding channels exist within the EURATOM research framework, such as the current ongoing ENEN2plus project (https://www.enen2plus.eu/).

5.4 Focus on medical isotopes

With respect to the production of medical radioisotopes, both of the above-mentioned funding channels could contain topics for research in the development of radioisotopes if these would lead to a larger availability of these isotopes for medical (or industrial) purposes. However, despite the commercial character of production, it is to be noted that all activities funded via the EU NSUF framework would lead to outcomes which are made public according to the EU open science/open data policies hence the best approach for these type of proposals would be to search for synergies with ongoing projects and their potential successors, such as the SECURE project (https://enen.eu/index.php/portfolio/secure-project/) and the PRISMAP project (https://www.prismap.eu/).

6 SUPPORTING TOOLS

Several supporting tools would facilitate the realisation of the model of the utilisation and coordination of RR activities. A detailed and up-to-date inventory of all available RR facilities within the EU NSUF network could be a starting point to provide inspiration and feasibility options for researchers. To this respect, the TOURR platform has been realised and can be reached at this address: https://tourr-platform.eu/. This is a browsable **inventory** provides technical information and practical (contact) information for future users. It was created paying attention not to duplicate information which exists in already available databases, such as the IAEA Research Reactor Database (RRDB)[12].

The TOURR platform could be extended as a **coordination platform**, offering not only an inventory but also E&T opportunities related to the research proposals, the submission of research projects and a user guide anticipating on the envisaged process including frequently asked questions.

In addition, once the EU NSUF is up-and-running for several iterative years, an extra database could be added to this platform providing information on available materials/fuels and datasets which was used/irradiated in previous research projects. This could avoid unnecessary duplication of actions and could serve follow-up research where relevant.

In terms of dissemination, all actions related to the funded research projects (outcomes, workshops, E&T activities…), as well as initiatives related to the functioning of the EU NSUF, could be highlighted via the a website with the coordination platform embedded, social media channels and newsletters of interested partners in the initiative.

6.1 Coordination platform (infrastructure database)

The primary role of the coordination platform is to offer a searchable database of RR infrastructures. A pilot platform is developed within this project, demonstrating the feasibility and functioning of elements described in the proposed EU NSUF model. The pilot platform has been published online for beta testing among the project partners and will be offered for a wider community afterwards.

The platform could offer information about the following aspects:

Facility Identification

- Facility name
- Location
- Contact person (to provide assistance with experiment design, assembly, safety analysis and examination)

All these characteristics are already available in the TOURR platform.

Facility characterisation

- Facility instrumentation
- Types of experiments for R&D
- Estimated time to build-up and dismantle experimental setups
- Availability of E&T activities
- Available production of radionuclides
- Safety and security related requirements (including timeline)

Submission in the platform

Example of fields which can be used for the application form:

[12] https://www.iaea.org/resources/databases/research-reactor-database-rrdb

- Title of the proposed experiment
- Principal investigator
- Affiliation
- Phone
- Email
- Preferred facility
- Contact person at facility
- Name
- Affiliation
- Type of experiment
- Goal of the experiment
- Description of work
    - Scientific innovation and originality (scientific merit)
    - Technical feasibility (methods)
    - Quality of the proposing team (capability of the team)
    - Dissemination and exploitation plan
    - Integration of education and training
- Duration of experiment (time schedule)
- Requested setup
- Preferred period of experiment
- Synergy with EU NSUF research priorities

Peer review tools to facilitate the process
The review of the applications could be automated via review software linked in the platform, which are available as 'off-the-shelf' solutions (such as EVALATO[13], Surveymonkey APPLY[14],...).
Criteria which could be included for review are:

- scientific merit (importance, innovation, originality);
- technical feasibility (logic, assessment of the approach, timing, envisaged outcomes, identified risks);
- capability of the group (past performance, potential of principal investigator, background, and other funded resources).

Database of experts (linked with keywords) which could evaluate the proposals via the scientific evaluation committee could be made available via the platform.

Dissemination/communication events and publications related to the research outcomes, or the functioning of the EU NSUF initiative could be indexed and offered via this platform. This is dependent whether or not there is an EU NSUF website in which this coordination platform is embedded.

6.2 User guide

A user guide could facilitate the application process significantly by outlining the whole application procedure (preparation, submission, evaluation, and communication), agreements, primary contacts and frequently asked questions. The realisation of an online tutorial could further facilitate this as well.

[13] https://evalato.com/
[14] https://apply.surveymonkey.com/

6.3 Fuel and materials library

In order to reduce costs, avoid redundancies in irradiation tests, and secure irradiated fuels and materials for future studies as new ideas and instrumentation become available, the EU NSUF could start a Nuclear Fuels and Materials Library (in analogy with the US NSUF platform) that contains quality specimens and samples from past and recent funded research activities. Materials could include samples of steels and other alloys, ceramics, actinides and fission products, as well as pure materials. Once setup and optimized, it can be investigated to link this library with similar initiatives, such as the US NSUF Nuclear Fuels and Materials Library[15].

6.4 Dissemination tools and events

Website
It is proposed that data generated from the work of EU NSUF projects would be made available to the research community. The principal investigator would be responsible for the collection, management, and sharing of the research data through a data management plan. As mentioned before, it is proposed that the research outcomes, including the research data are offered in an open way in line with the FAIR principles.

Furthermore, the EU NSUF website could link to the European Open Science Cloud (OESC) to enable researchers to store, curate and share their data.

Another link which could be made is towards the NEA Data Bank[16], such as the Nuclear Data Services, which offers an international reference centre for nuclear data compilation and dissemination.

The publications and conference proceedings resulting from actions via the EU NSUF projects could be included on this website, as well as short summaries and contact details of ongoing and past projects.

Mailing list & social media
Via the website and related articles of the EU NSUF, a mailing list could be created to send out updates and newsletters to specified target audience, taken into account the GDPR standards in collecting and processing personal data.

Another modern way to disseminate calls and results from the EU NSUF platform is to create social media accounts to inform a larger stakeholder group, such as via LinkedIn.

User workshop/weeks
When installed, a large dissemination potential would be available within this EU NSUF funding programme, since various stakeholders can learn from each-others experience:
- researchers from universities, industry, laboratories on a national and international level
- operators and operational managers of RR facilities
- technical support and maintenance staff of RR facilities
- (academic and other) mentors, students and junior researchers

Therefore, various dissemination and networking events are proposed whenever this concept is further developed, e.g.:

[15] https://nsuf.inl.gov/Page/fuels_materials_library
[16] https://www.oecd-nea.org/jcms/rni_6525/data-bank

- (annual) Events could gather users and operational managers of RR to discuss outcomes and future priorities.

- Via 'Meet the user facility', RR installations could be highlighted in a virtual or physical setting (via presentations, demonstrations and/or a technical visit).

7 INTERNATIONAL COLLABORATION

The EU NSUF could benefit by collaborating with the following projects and user facility networks.

7.1 SNETP (OFFERR)

The overarching objective of the OFFERR project (Grant agreement N°101060008) is to support the SNETP Association to establish an operational scheme facilitating access for R&D experts to key nuclear science infrastructures through the channelling of financial grants provided by the Euratom programme. The goal of the OFFERR project is to facilitate international cooperation in nuclear research between European Union (and EURATOM associate Members) research organizations, universities, companies and their partners through financing trans-national access to key nuclear research infrastructures. The calls for project proposals are open within all disciplines and topics of research, development and innovation that are in line with the strategic research and innovation Agenda (SRIA) of the Sustainable Nuclear Energy Technology Platform (SNETP). Similar to the proposed EU NSUF model, the OFFERR project also uses two distinct application formats (fast track and complex projects).

The main difference with the model proposed in this document, is that the OFFERR project also includes non-research reactor facilities.
https://snetp.eu/offerr/

7.2 NSUF

NSUF is established in 2007 as US Department of Energy, Office of Nuclear Energy (DOE-NE) user facility.
This model operates under the principle mentioned above: **no cost to user, competitive proposal processes, no funding to users**. It currently has 50 user facilities at 19 partner institutions within the United States. Most of the research looks at either understanding the mechanisms of radiation on materials and fuels to address the challenges of the current fleet of reactors or looks at materials and fuels for the next generation. Through peer-reviewed proposal processes, the NSUF provides researchers access to neutron, ion, and gamma irradiations, post-irradiation examination and beamline capabilities at Idaho National Laboratory and a diverse mix of university, national laboratory and industry partner institutions.
https://nsuf.inl.gov/

The model proposed in this document is largely based on NSUF, with some specific suggestions to adapt to the European scenario, European RR fleet and European panorama of potential synergies offered by ongoing projects or already established networks.

7.3 NNUF

The National Nuclear User Facility (NNUF) project is a UK Government investment in the country's nuclear future, providing state-of-the-art experimental facilities for research and development in nuclear science and technology. NNUF was established to support the Government Nuclear Industrial Strategy launched in March 2013, and had substantial additional funding awarded in 2019. There are currently 30 facilities housed in 12 universities, the UK Atomic Energy Authority, the National Nuclear Laboratory and Diamond Light Source, most of them available for external access to undertake work on nuclear materials.
https://www.nnuf.ac.uk/

7.4 ICERR

The IAEA designated International Centre based on Research Reactors (ICERRs) scheme is intended to help IAEA Member States gain timely access to relevant nuclear infrastructure based on research reactors to achieve their capacity building and R&D objectives. Through bilateral arrangements, facilitated by the IAEA, resources and facilities are offered. Within Europe, the Belgian Nuclear Research Centre (SCK CEN), the French Alternative Energies and Atomic Energy Commission (CEA) and the (Romanian) Institute for Nuclear Research Pitesti (RATEN ICN) are designated ICERR centres. With the ICERR label, the IAEA wants to give member states access to the research facilities in order to help them develop their nuclear sciences and technology programs.
https://www.iaea.org/about/partnerships/international-centres-based-on-research-reactors-icerrs

8 CONCLUSIONS

This report describes a proposal for a model of the utilization and coordination of Research Reactor (RR) activities. The model is based on the Nuclear Energy Nuclear Science User Facilities (NSUF) model, which operates under the principle: no cost to the end-user, competitive proposal processes, no funding to the end-users.

The proposed EU NSUF model aims to facilitate access to world-class nuclear research facilities, technical expertise from experienced scientists and engineers, and assistance with experiment design, assembly, safety analysis and examination. Access could be awarded via two competitive peer-reviewed processes such as the Rapid Turnaround Experiments and the Consolidated Innovative Nuclear Research projects.

This proposed model supports the Strategy for optimized use of research reactors in Europe, as published by the TOURR project and focussing on science and technology (including the production of medical radioisotopes) and education and training opportunities. It could support other international initiatives from EU funded projects such as ENEN2plus, SECURE, PRISMAP, OFFERR, and initiatives from the European Commission (SAMIRA), networks such as SNETP, or international organisations such as NEA, US DOE and IAEA.

Next to a proposal for scope and funding, the model is described with a proposal for the governance, the type of experiments which can be considered, the supporting tools and the international framework where it may fit. An online pilot platform is published, supporting the goals of the TOURR project and demonstrating the feasibility and functioning of elements described in the proposed EU NSUF model.