

Nuclear at AFRY

AFRY's Nuclear services



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Overview

AFRY are pioneers in the international nuclear industry. We have been consulting in the sector since the 1950s. AFRY have been involved in delivering nuclear projects since the beginning of the technology across the entirety of the nuclear life cycle.

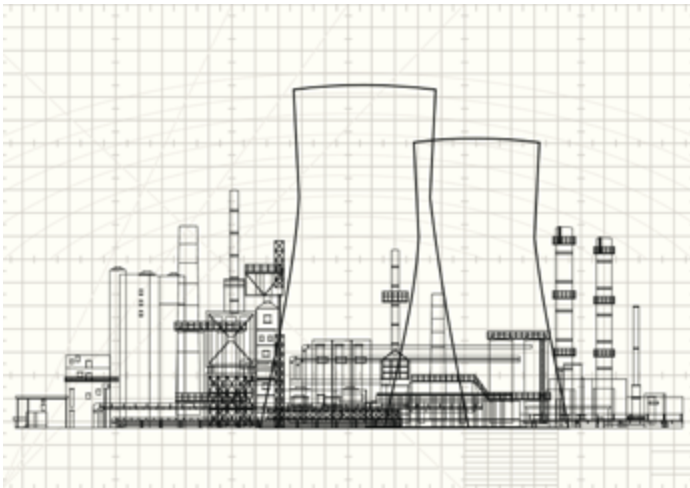
Our experts can support projects covering concept development, feasibility studies, commercial modelling and business case development, through to project development and implementation services. We support all aspects and services relating to nuclear assets, including nuclear safety, technical solutions, economics, nuclear waste management and strategic advice through licensing to construction, operation and decommissioning.

Nuclear energy supplies approximately 10% of global electricity and powers approximately 25% of the EU, making it the second largest low carbon electricity source, globally. Our experts view the shift from a largely fossil based world to a clean energy world as one that will require a mix of all low carbon technologies available. Within the context of global sustainability targets, our AFRY experts take an independent, fact-based approach to identifying and supporting the right path towards a clean energy future. We feel that nuclear energy will play an important role in this transition and with our decades of experience and international pool of experts we are in a strong position to see this vision take shape.

AFRY has experience in all stages of nuclear projects, which are covered in greater detail throughout the brochure, including:

DEVELOPMENT & PRE-CONSTRUCTION

Consulting in strategic, business and organisational development, site screening and services, licensing, concept development and environmental impact assessments.



PROJECT IMPLEMENTATION

Consulting and engineering from comprehensive Owner’s Engineering solutions to specific services in Project Management and Detail Engineering, all the way to our Engineering, Procurement & Construction Management (EPCM).



ASSET OPERATION

Studies and improvement of existing nuclear energy assets, in e.g. safety reliability, availability and maintenance, and asset life extension.



DECOMMISSIONING

Characterising liabilities, development and engineering of innovative solutions, for decommissioning facilities, interim storage and final disposal of radioactive waste.



PRODUCTS & SERVICES

AFRY also offers specialist software and services, such as our Ecolego software, an easy-to-use program used for creating dynamic models and performing deterministic or probabilistic simulations that can evolve over time. Our Remote Digital Twin software that creates an exact replica – a digital twin – of equipment and components allowing it to be used as a virtual testing ground for projects, helping with safety.



Development & Pre-Construction

AFRY has extensive experience in early-stage nuclear projects. We have been involved in establishing the framework and roadmap for nations that are considering nuclear energy as part of their future energy supply. AFRY has helped its clients' projects to take shape by analysing the strategic, commercial, technical and environmental features of a nuclear power plant development in its starting phase.

AFRY is committed to supporting new and emerging technologies, such as Small and Advanced Modular Reactor projects (SMR or AMR). AFRY's experts provide the full suite of technical and commercial services required to develop and deliver technically and economically successful Small and Advanced Modular Reactor projects.

AFRY has evaluated and ranked potential Greenfield and Brownfield sites for nuclear power plants against the multidimensional set of criteria that is needed for a successful project in today's world.

AFRY has carried out feasibility studies, business model analysis, conceptual engineering and fuel studies. AFRY has successfully carried out large scale EIA projects for recent nuclear projects in Europe.

As a project proceeds, AFRY assists its clients with tender documentation and contractor bid evaluations. We also provide support with safety assessment and nuclear, environmental and other licensing and permitting needs.

SERVICES INCLUDE:

- Project strategy & organisation
- Financial modelling
- Due Diligence
- Environmental impact assessments
- Feasibility studies
- Fuel studies
- Reactor technology studies
- Siting studies
- Route map to nuclear
- Concept design and detailed design
- Tendering
- Licensing
- Safety assessments



Implementation

Timely and effective implementation is the most important economic factor facing nuclear plant developers and operators. AFRY’s global network of experts, including nuclear and conventional steam/turbine plant specialists, project managers/planners, commercial and legal staff are available to help turn concepts into reality.

AFRY’s experts can assist in processes such as project supervision, project management, management of engineering, procurement, construction, and commissioning. As well as expertise in mechanical, electrical, I&C and civil engineering. AFRY’s experts use practical experience of real solutions to project challenges to test and develop themselves, ensuring the needs of each and every one of our clients are met.

AFRY’s experts follow up to date safety standards in every aspect and implement best available techniques as well as mature nuclear safety policies. Safety is of paramount importance, and we ensure all work is in accordance with international principles, such as IAEA guidelines, and any local regulations.

AFRY works with clients, vendors, regulators and any other relevant parties to minimise potential for delay to a project, maximising opportunities for on-time (or earlier) acceptance and delivery.



Procurement advisory services can be provided to guide clients through the procurement process for nuclear equipment and services in new build and plant upgrade projects. We ensure that the procured goods and services comply with relevant regulations and fully meet client expectations and fulfill the scope of their project on time and within budget.

Due to AFRY’s broad range of expertise and skillsets, we are able to offer services as an Owners Engineer, where we use our vast network of experts and knowledge to support either an owner or a regulator in a country at all stages of construction of a nuclear power plant. We help to ensure safety, streamline processes to reduce overall costs, and improve on the timescale and quality of the project compared to hiring specific contractors for individual tasks.

In the initial stage of a new build or plant upgrade project, we are able to go one step further than the basic design of defining the design basis, pre-size systems, space requirements and cost estimates by offering our detailed design, using 3D software to define the technical specification across all technical disciplines required: architectural, civil, process & mechanical, electrical, I&C, etc.

AFRY’s Engineering, Procurement and Construction Management (EPCM) services means we can take care of the process from enquiry documentation and arranging bidding to supervising construction and installation through to completion, working closely with our clients so that projects will be controlled in a way that meets all targets as they were detailed.

TYPICAL AREAS OF SUPPORT FROM AFRY’S PROJECT MANAGERS INCLUDE:

- Project planning and management
- Basic design
- Detailed design
- Change management and design control
- Cost management and control
- Risk management
- Quality assurance and control
- Documentation control
- Interface management

Asset Operation

AFRY recognises that during the lifecycle of a nuclear facility, it's continued operation will have to be justified. As well as this, it will be subject to modifications of both the plant itself and the methods of operation whether they are motivated by regulatory, environmental or commercial factors.

AFRY's experience in support of asset operation covers the entire lifecycle, from design to the safety justification of plants operating after the end of their license period. Our experience covers a comprehensive range of facilities, including nuclear plants, research reactors, fuel cycle and waste management facilities.

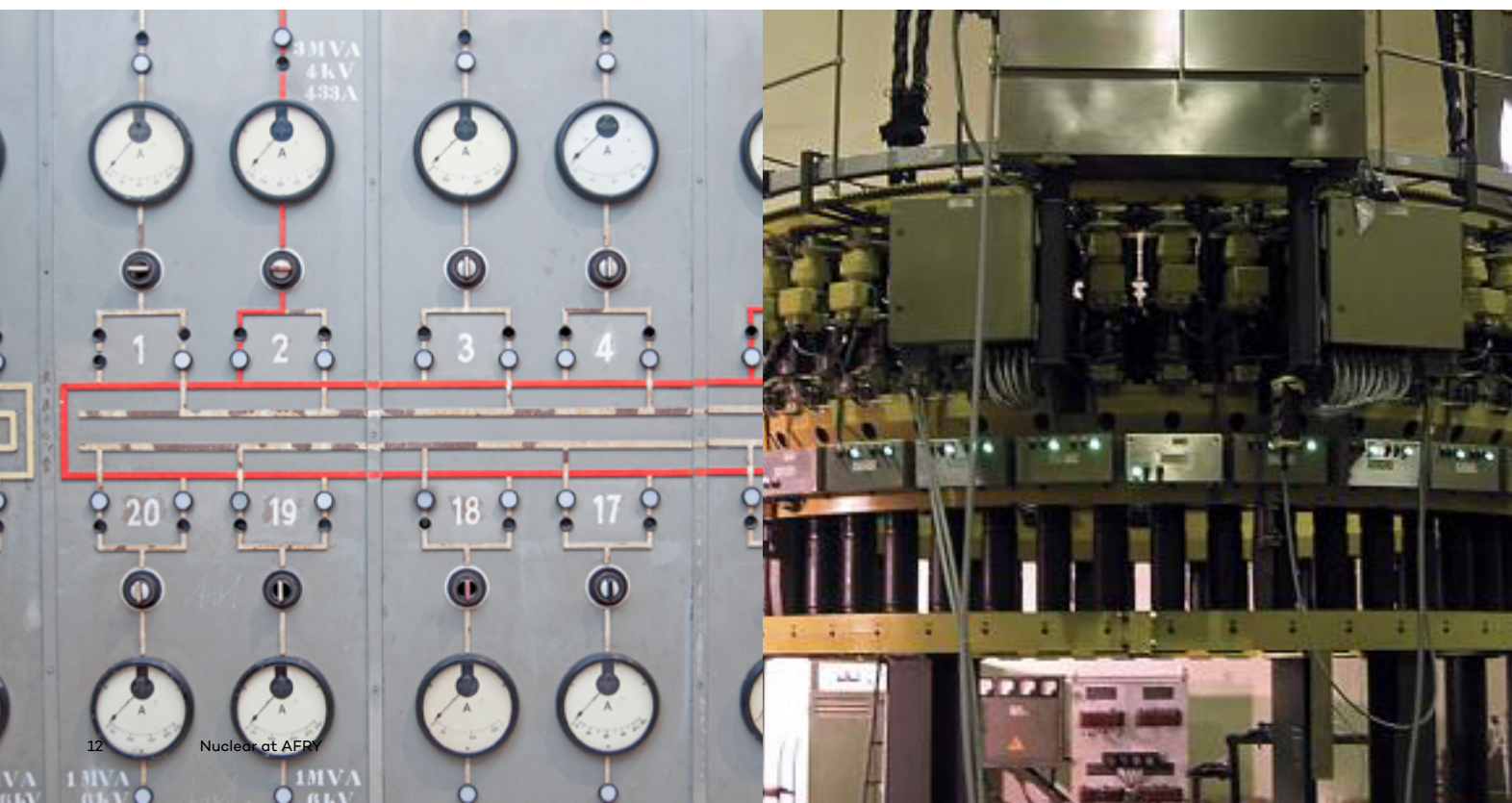
Generally, the designed lifespan of a reactor is around 60 years. We have implemented various techniques to support power upgrades and to optimise plant maintenance and operational management. These techniques have included probabilistic safety assessment and the development of risk management tools. Our design capability utilises the latest 3D CAD packages.

AFRY's experts are able to provide safety cases to substantiate the safety of the plant, activity or modification in question. Using qualitative and quantitative methods to demonstrate that standards have been met and risks are as low as reasonably possible. AFRY can provide this throughout the lifecycle of a facility.



SERVICES INCLUDE:

- Operational optimisation studies
- Engineering and supervision of back-fitting/upgrades
- Power up rate studies
- Core and fuel design
- Alternative fuel studies
- Life extension studies
- Ageing management and maintenance support
- Security of facility studies
- Preparation of safety reviews and assessments
- Safety assessment & licensing support
- Updating operational manuals and safety reports
- Analysis of incidents and safety management
- Waste characterisation & inventory studies



Decommissioning and Waste Management

Our comprehensive understanding of the complex issues associated with decommissioning nuclear facilities has supported the specific challenge of decommissioning redundant nuclear facilities for many years, fully understanding the regulatory and operational requirements for decommissioning works. We are able to offer our clients support in all of their decommissioning tasks from post operational conditions through to Greenfield site.

Our decommissioning experience encompasses nuclear power plants and research reactors, as well as research, fuel cycle, and waste management facilities, undertaking radiation surveys utilising advanced equipment in support of radioactive material release, hazard evaluation and site clearance.

AFRY has experience covering all aspects of deep geological disposal. Geological Disposal Facilities are a current preferred solution to long term radioactive waste storage for many different nations. We have supported national organisations worldwide with the management of radioactive waste via deep geological disposal since the 1980s conducting anything from small case studies to all-encompassing scenario analyses for entire repositories.

In addition to doing scientific work, we support the organisations in the challenging tasks of public relations and licensing. As of today, we have clients located in Belgium, Finland, France, Germany, Japan, Sweden, Saudi Arabia, Turkey and Switzerland. We also offer inventory services such as stakeholder engagement and requirements review, databases, data transfer routines and data analysis and interpretation.

AFRY have broad experience across many aspects of decommissioning and waste management, from performing safety assessments and developing hazard management strategies for Sellafield Ltd to help with their licensing, to providing a full decommissioning plan for the UK Atomic Energy Authority for the decommissioning for Windscale Piles.



OUR SERVICES FOR LONG-TERM STORAGE INCLUDE:

- Definition of features, events and processes and scenario development for geological radioactive waste repositories
- Geological and hydrogeological site characterisation
- Numerical radiological safety analysis for nearfield release, geosphere transport and dose calculation
- Surveys on scientific, socio-economic and legal issues of radioactive waste disposal
- Studies on chemo-toxic waste compatibility
- Safety analyses for deep geological repositories in clay, salt and granite formations
- Numerical modelling of the release and transport of radionuclides and chemical contaminants



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AFRY is a European leader in engineering, design, and advisory services, with a global reach. We accelerate the transition towards a sustainable society.

We are 17,000 devoted experts in infrastructure, industry, energy and digitalisation, creating sustainable solutions for generations to come.

Making Future