



**TECHNIP
ENERGIES**



January 2021

Technip Energies Environmental solutions

Creating added value while preserving the environment



Technip Energies offers environmental and economic solutions

Environmental excellence is ensured by the integration of ISO 14001 requirements into Technip Energies businesses, notably: Tendering / Process-Engineering / Procurement / Construction of onshore and offshore facilities

- Continuous evaluation of the business environmental context, of our risks and opportunities

- Definition of specific objectives and regular communication of the performances obtained.



Agenda

- 01** Decision-making support
- 02** Reduction of direct impacts on the environment
- 03** Proven Performances



01

Decision-making support

Our mission



Technip Energies studies the solutions that will allow our clients to implement an environmental strategy adapted to their projects

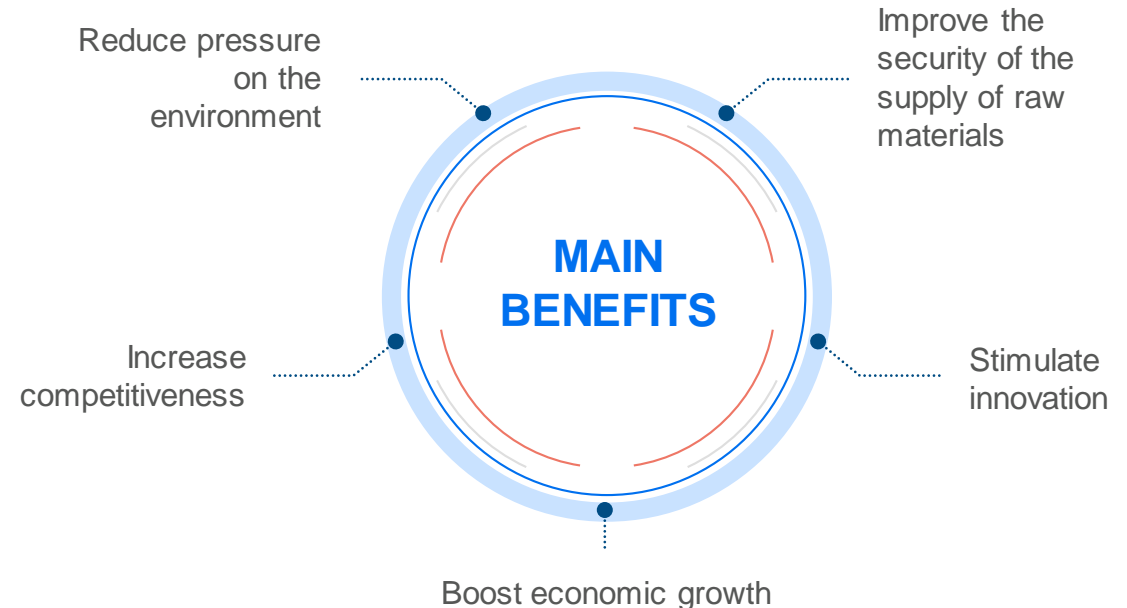
Circular Economy

Increasing resource efficiency use, reducing environmental impact

3 domains and 7 drivers of action applied at different stages of project lifetime

| | | |
|------------------------------------|-----|----------------------------|
| Market solutions | SS | Sustainable supply |
| | ED | Ecodesign |
| | IS | Industrial symbiosis |
| | EF | Economy of functionality |
| Consumers requirements & behaviors | RC | Responsible consumption |
| | PLE | Product lifetime extension |
| Waste management | R | Recycling |

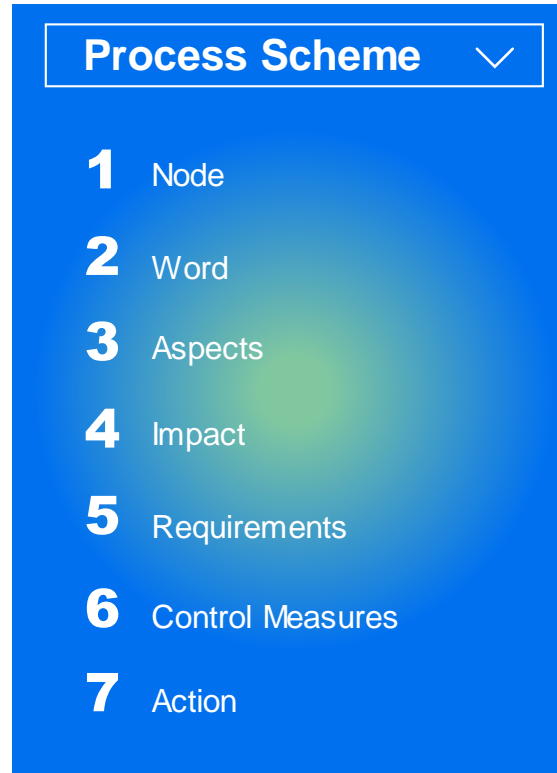
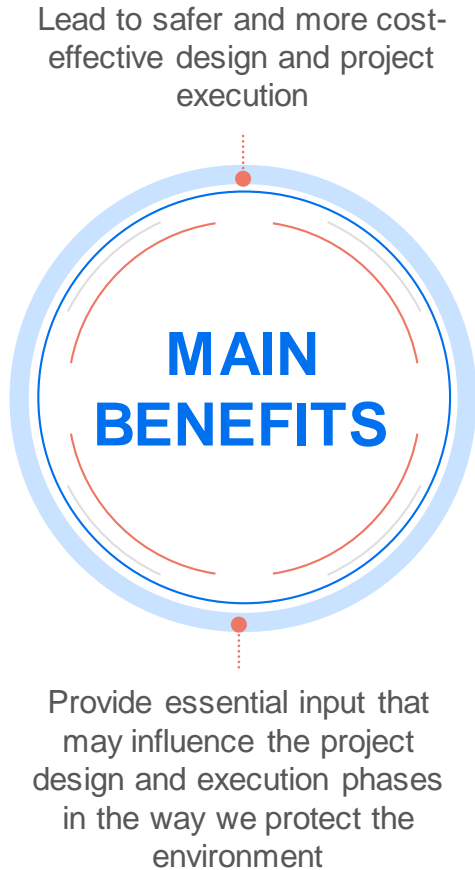
During each project phase, some drivers can shift your business from linear to circular economy



Environmental Aspects Identification, ENVID

A multi-disciplinary analysis of impacts and opportunities

ENVID is applied to all projects executed by Technip Energies



Assess impacts

Impacts on nearby protected species, pre-existing contaminated soil, groundwater consumption in sensitive area

Recommendations to mitigate

Identify opportunities

Reuse water, minimize waste generation, save energy

Propose effective solutions

Inform responsible parties

Inform participants of the aspects under their control and the expected control method

Implement better control measures



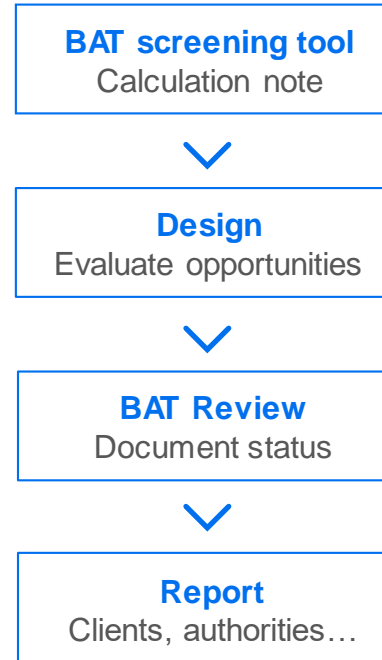
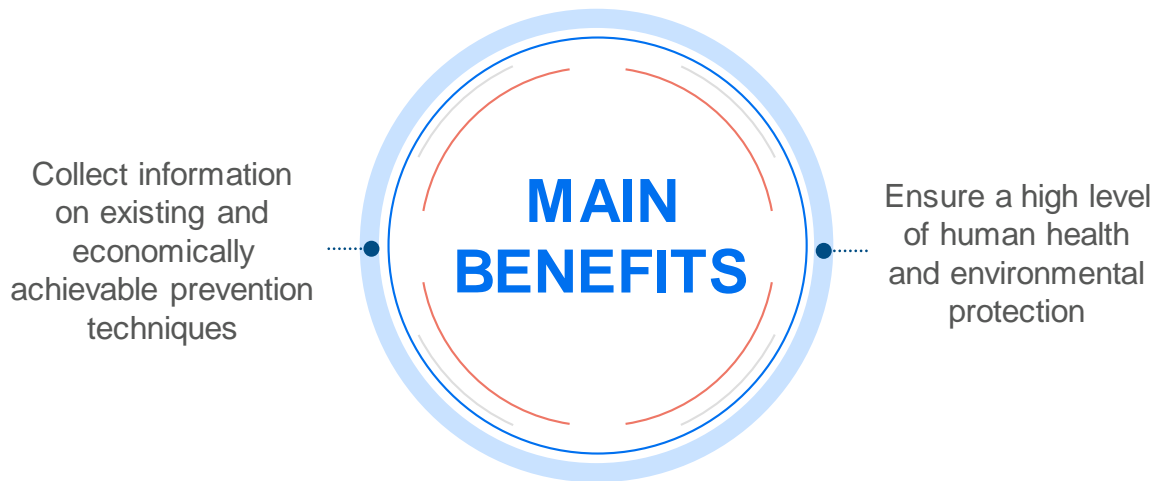
Best Available Techniques (BAT)

Prevention and control of industrial emissions of pollutants

We provide our clients:

- Early identification of best techniques and timely implementation in the design
- Demonstration of compliance to the Industrial Emission Directive (IED) from the European Union as well as improvement of propositions

Best available techniques are applied to all European projects carried out by Technip Energies



Adapted to specific stakeholders in the energy industry

Industrial sectors selected for BAT determination

BAT adapted to each industrial sector have been defined by authorities to include inputs from all stakeholders, governments, industries, NGOs



Life Cycle Assessment (LCA)

Measuring environmental impacts during the life cycle of an equipment/unit/facility

Eco-design study A 4-step methodology

- DEFINE

Assumptions and scope of the study

- INVENTORY

Resource consumption, Pollutant emissions, Economic evaluation

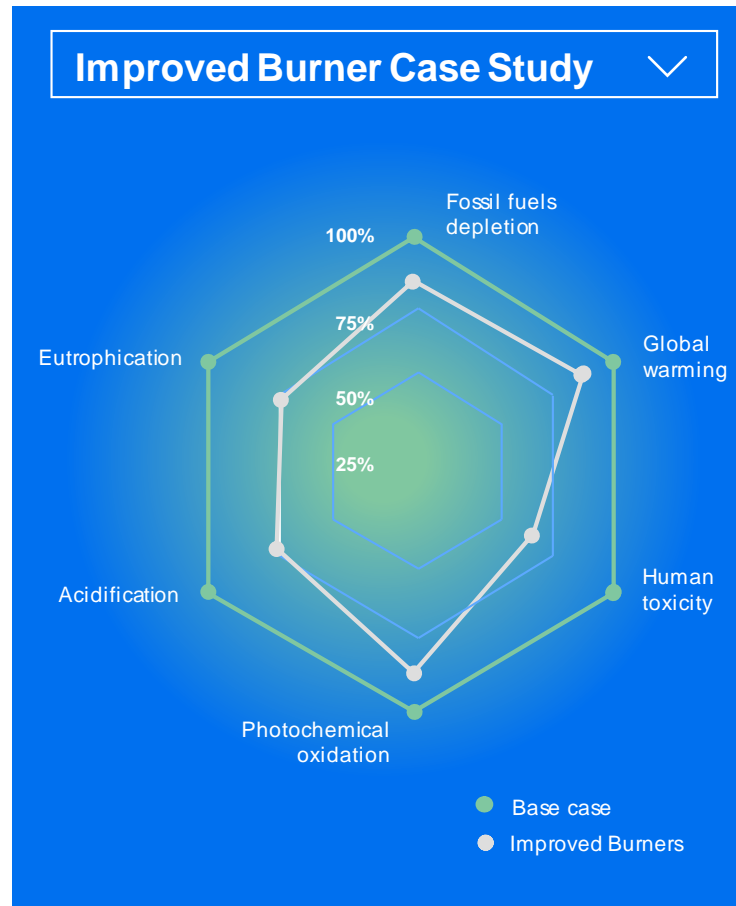
- QUANTIFY

Human toxicity, Respiratory effect, Ozone layer depletion, Photochemical oxidation, Acidification, Eutrophication, Ecotoxicity, Global warming, Mineral extraction, Non-renewable energy

- INTERPRET

Human health, Ecosystem quality, Climate change, Resource depletion

- WAY FORWARD



For each selected option, solutions availability, CAPEX and OPEX, are quantified to support decision making

By implementing an improved burner (very low NOx), impact on human toxicity, eutrophication and acidification is reduced around 25%. For a CAPEX increase of approximately 2%

Plant Operation Services

Smart maintenance, cybersecurity, performance improvement



Downtime reduction



Production improvement



Optimize turnarounds



Maximize integrity & availability



CO₂ emissions reduction



Utilities consumptions diminution

Technip Energies offers a wide range of digital services for operation and maintenance phases.

Experts assist remotely and on premise to optimize:

- Plant performances
- Maintenance
- OPEX

And also support:

- Utilization of assets
- Safety management
- Environmental impacts

SS

ED

IS

EF

RC

PLE

R



02

Reduction of Direct Impacts on the Environment

Our mission



Technip Energies takes into account the environmental requirements specific to the project characteristics and can propose best environmental solutions

Water Preservation

Usage reduction, optimization, treatment and reuse

Technip Energies process teams evaluate and propose water efficiency solutions developed in projects



4 R philosophy

- REDUCE
- REPLACE
- REUSE
- RECYCLE

Consumed and discharged water must be identified. All projects usually implement processes to reduce water consumption and valorize resources recycling.

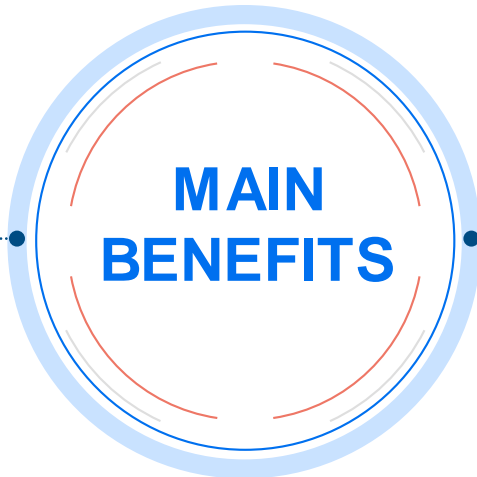


Standardization of Piping Material

Piping classes defining the « standard materials » to be used

90% of piping standardized for Yamal LNG and Coral FLNG

Allow our partners to pool and optimize resources and production means to reduce cost



Improve maintenance and repair on a section of pipe leading to material lifetime increase

For each project, Technip Energies develops the piping classes defining the « standard materials » to be used following several criteria:



- Technical and company requirements
- Materials selection avoiding corrosion and future leakage.
- Mechanical properties
- Capability of vendors production
- Determination of the emission class of connectors, valves and equipment appropriate to the fluid transported

Noise Control Management

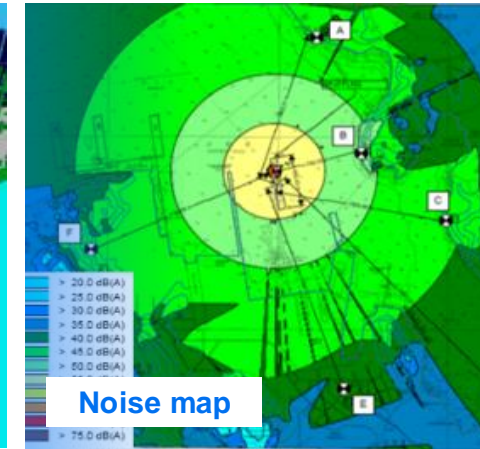
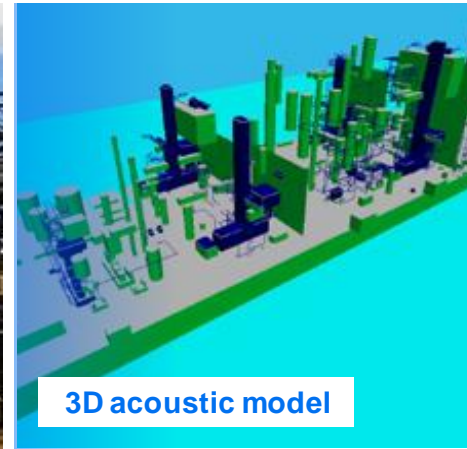
Concept-to-commissioning noise and vibration consultancy

Support projects in strict regulatory contexts (Australia, North Sea & Korea) or in noise-sensitive certification bodies where the challenge is to obtain permitting

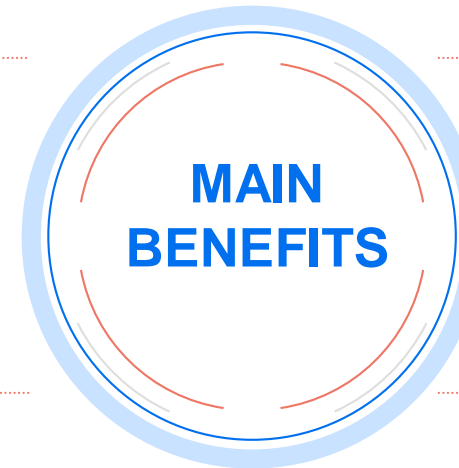
- Equipment noise & vibration specifications
- Environmental noise mapping, workplace noise exposure analysis, acoustic coverage for alarm
- Structure born noise assessment, vibration study
- Noise survey (Factory acceptance test, commissioning, in-site...)



during commissioning, a very noisy activity that can create severe disturbance



Almost all of the projects carried out by Technip Energies are subject to an acoustic risk assessment



Decrease noise impact and linked risks for the neighborhood and the operators

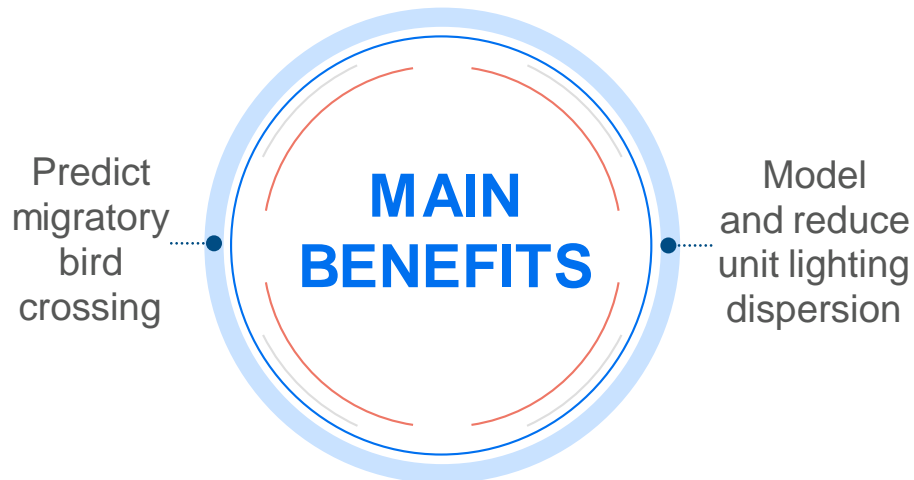
Biodiversity Protection

Impact on fauna and flora

Technip Energies has patented an innovative proactive system, the BirdVIGI™, to predict migratory bird crossings and lower structure lighting.



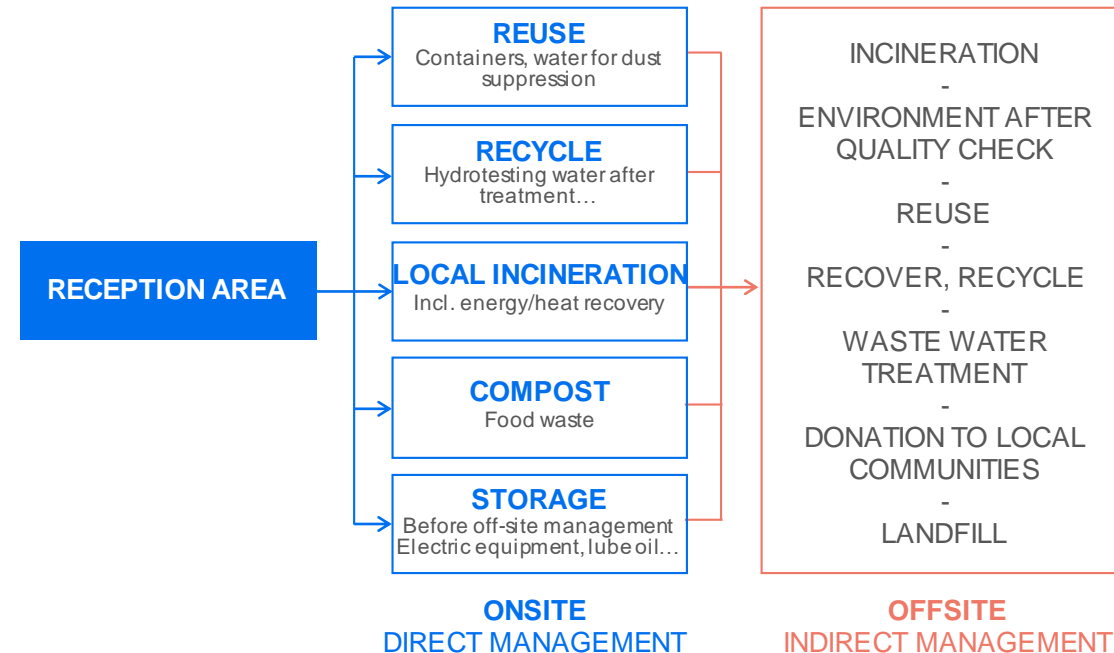
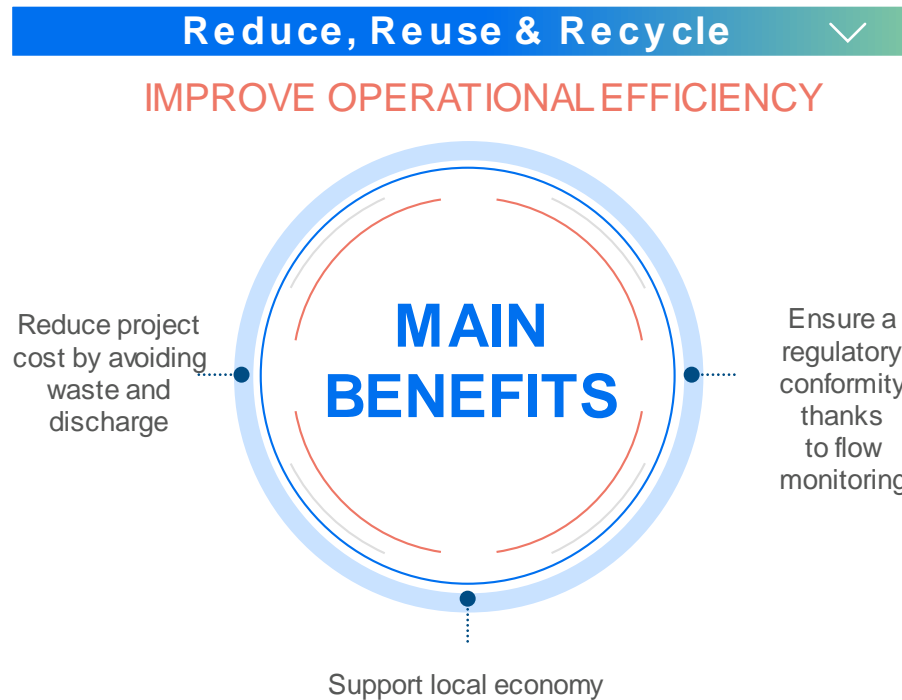
Available for onshore and offshore projects (new and existing) located in migratory corridors



Waste Minimization and Valorization

Reducing the streams; pretreat and optimize recycling channels

Technip Energies develops waste management to reduce the streams at the source, perform pretreatment and optimize recycling channels for local waste contractors.





03

Proven Performances

Our mission



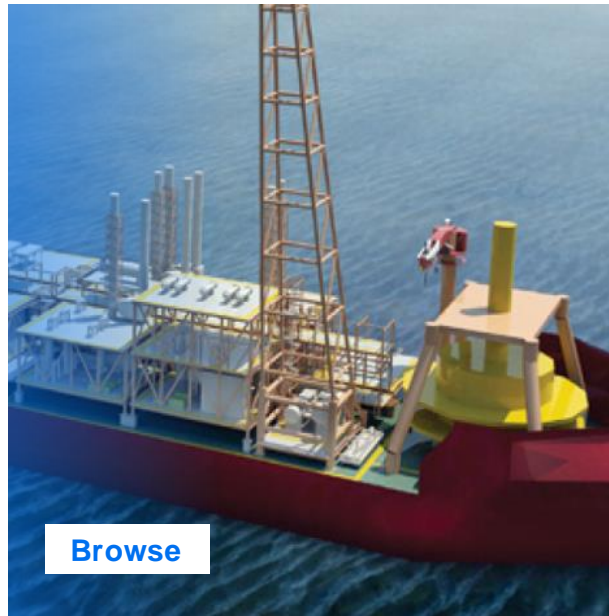
Technip Energies has implemented many project solutions over the years leading to environmental preservation and client satisfaction

Key references



Grangemouth refinery

BAT REVIEW



Browse

ECODESIGN



INEOS (belgium)

BAT REVIEW



Buliisa

ECODESIGN

Key references



NOISE REDUCTION

Noise control management from engineering phase to on-site noise reception



WASTE MANAGEMENT

75% of valorized waste



NOISE REDUCTION

Noise control during steam blowing phases (acoustic silencers)



WASTE MINIMIZATION

Chemically-treated wood pallets have been replaced by heat treatment



Thank you