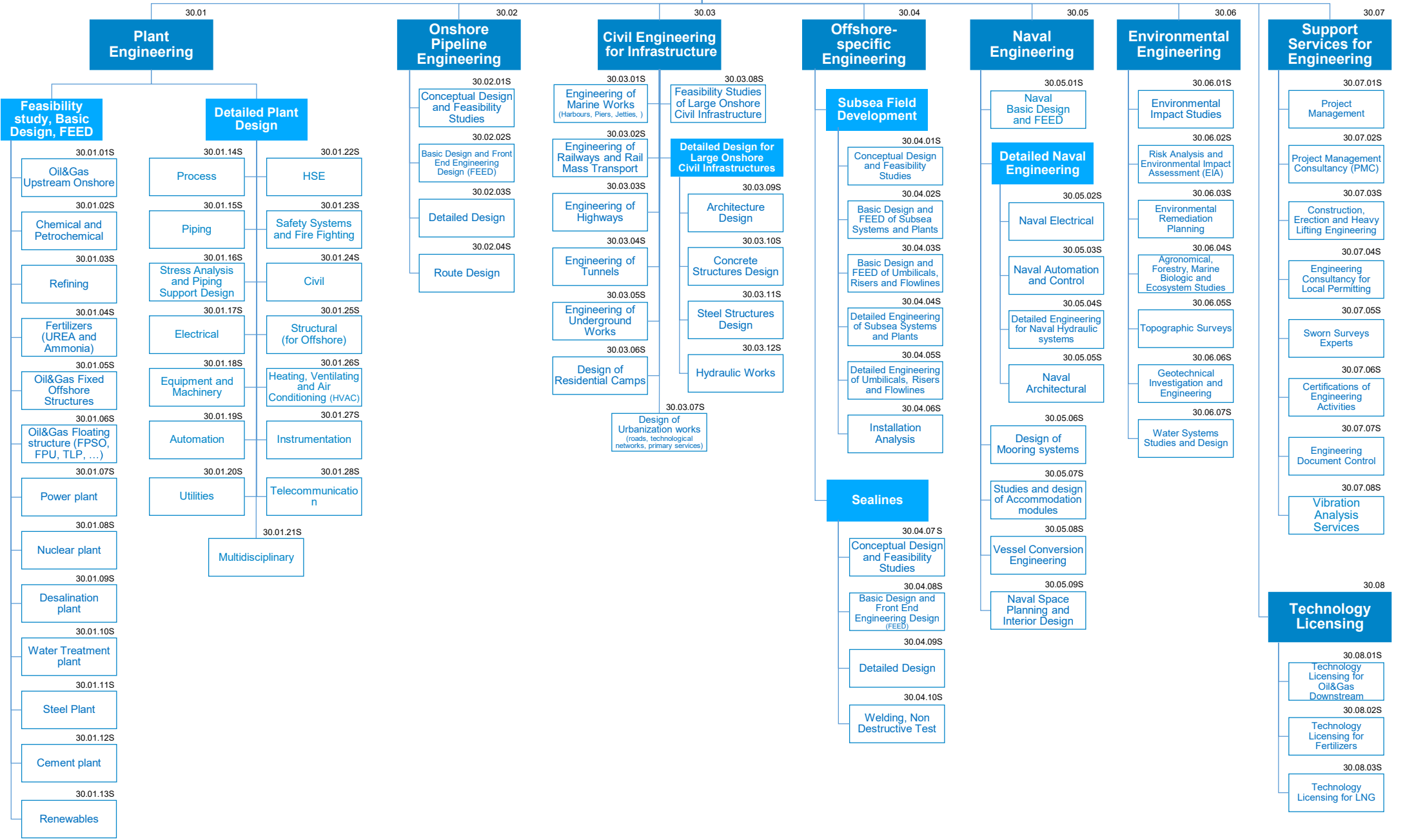


# Engineering Services



# Engineering Services

Engineering Services are sets of activities (interdisciplinary and specialised) that guarantee the definition of the technical solutions to be adopted up to the delivery of a plant - according to the agreed objectives of security, environmental, efficiency quality control, flexibility and reliability.

Engineering is conceptually a pyramid of subsequent details of definitions, that refine the design from different phases of the project, from conceptual to detailed engineering.

Services in this Group of categories can be performed on a lump sum, deliverable, or reimbursable basis and this categorization does not discriminate on the ability of a vendor to deliver according to different contractual models.

## MAIN RATIONALES BEHIND THE STANDARD CATEGORIZATION

On a family level priority has been generally given to the products designed (a plant, a pipeline etc.) and on a category level to the discipline/competence required to design and deliver the project.

### Plant Engineering

- This is where the majority of players belong
- The market for detailed design is typically composed by small companies, (even small engineering boutiques)
- This family includes the engineering activities required to design the following types of plants: Oil&Gas, Refining, Chemical and Petrochemical, Fertilizers (Urea and Ammonia), Fixed Offshore Structures, Floating Structures (FPSO, FPU ...), Power Plants, Nuclear Plants, Desalination plant, Water Treatment plant, Steel Plant, Cement plant and Renewables
- Plant Engineering embraces onshore and offshore plant engineering with the exclusion of specific activities which can be found in the following families (30.02, 30.03 ...)
- The categories in Detailed Design are exhaustive of all the engineering disciplines (civil, chemical, electrical, mechanical etc.)
- Single activities are not detailed because the categories represent a homogenous set of vendors (E.g. Electrical can comprise the following activities: engineering for substation, engineering activity for cathodic protection systems, Calculation and studies); however, in a few cases the specialized activities performed by a smaller set of suppliers have been isolated (30.01.15S Hazop)
- Basic and feed could have been split according to the product/engineering asset they are able to design; but are kept together because generally vendors that are able to deliver feeds can also perform basic designs
- 30.01.13S Renewables includes: Solar, Offshore Wind Farm, Onshore Wind Farm, Geothermal, Biomass, Hydropower, Mini hydro (up to 20 MW), Tidal
- 30.01.21S Multidisciplinary Design includes multiple plant engineering disciplines with an integrated approach: calculations, stress analysis, sizing, budget details
- 30.01.25S Structural Engineering (for offshore) only focuses on offshore specific activities (e.g. platforms) for this reason it differs from Civil Detailed Design (30.01.24S) which is the construction of the civil structures within an onshore site

### Onshore Pipeline Engineering

- All the activities linked to the design of an onshore pipeline - except for the geotechnical and topography surveys which are under Environmental Engineering (30.06) fall under this category
- Onshore and offshore pipelines are separate because they involve very diverse skills and are performed by different companies (for sealines see Offshore-specific Engineering 30.04).

### Civil Engineering for Infrastructure

- This family differentiates from civil Detailed Design (30.1.17S) which focuses only on civil activities which are part of a larger scope of work (e.g. within a petrochemical plant); while Civil Engineering for Infrastructure (30.04) refers to the engineering of a civil infrastructure where the civil works are predominant in the scope of work (tunnels, jetty).

### Offshore-specific Engineering

- This family refers to works that take place during the designing and construction phases of the project, therefore it is different from Operations and Maintenance Engineering, which comprises the activities for the post-construction maintenance of a plant
- 30.04.10S Welding, Non Destructive Tests is not to be confused with Non-destructive Welds (30.07.09S), as it refers to the offshore activity, which encompasses a set of skills and machinery different from the onshore inspection.

### Environmental Engineering

- Companies that fall under this family offer a very specific service, generally focusing either on topographic, geotechnical or Water Systems
- Companies that perform Topographic Surveys (30.06.06S) and Geotechnical Investigation and Engineering (30.06.06S) offer their services to all the industries described in Plant Engineering
- 30.06.07S Water Systems Studies and Design refers to the study of the hydrological structure of a certain area. Not to be confused with Hydraulic Works 30.03.12S, which are related to the design of bridges, dams, canals etc.

### Support Services for Engineering

- This family refers to works happening during the designing and construction phases of the project, therefore it is different from Operations and Maintenance Engineering (Group 37), which comprises the activities for the post-construction operations and maintenance of a plant
- “Construction Erection and Heavy lifting Engineering” activities are the engineering for the erection and lifting of particularly large and complex structures, equipment and machinery; not to be confused with the transport of large size objects, which falls under Group 42 “Logistics”
- Engineering Consultancy for Local Permitting is required in several geographies to satisfy local regulation, e.g. through the consultancy of a locally registered and chartered professional
- Sworn Surveys Experts and Advisors are sworn expert are impartial and independent professionals with a proper qualification, e.g. for evaluating damages to buildings; they can be publicly appointed
- Certifications for Technical Materials cover – for example, ASME stamps – the compliance with international and regional directives and regulations across the world
- Engineering Document Control is a specialist job that – in some cases – may required outsourcing to dedicated professional