



INDUSTRY AND TECHNOLOGY IN OIL&GAS



THE BASQUE COUNTRY HAS ONE OF THE LARGEST CONCENTRATIONS OF INDUSTRY IN EUROPE, AND IS THE AUTONOMOUS COMMUNITY THAT ASSIGNS THE HIGHEST PERCENTAGE OF ITS GDP TO R&D IN SPAIN

GDP PER CAPITA (2016)

€31,805

BASQUE COUNTRY (107%)

€29,525

EU-28 (100%)

INDUSTRIAL GDP (2016)

24%

BASQUE COUNTRY (124%)

19.3%

EU-28

PRODUCTIVITY PER
WORKER

123.3%

BASQUE COUNTRY

100%

EU-28

R+D+I
EXPENDITURE
RELATIVE TO GDP
(2016)




1.82%

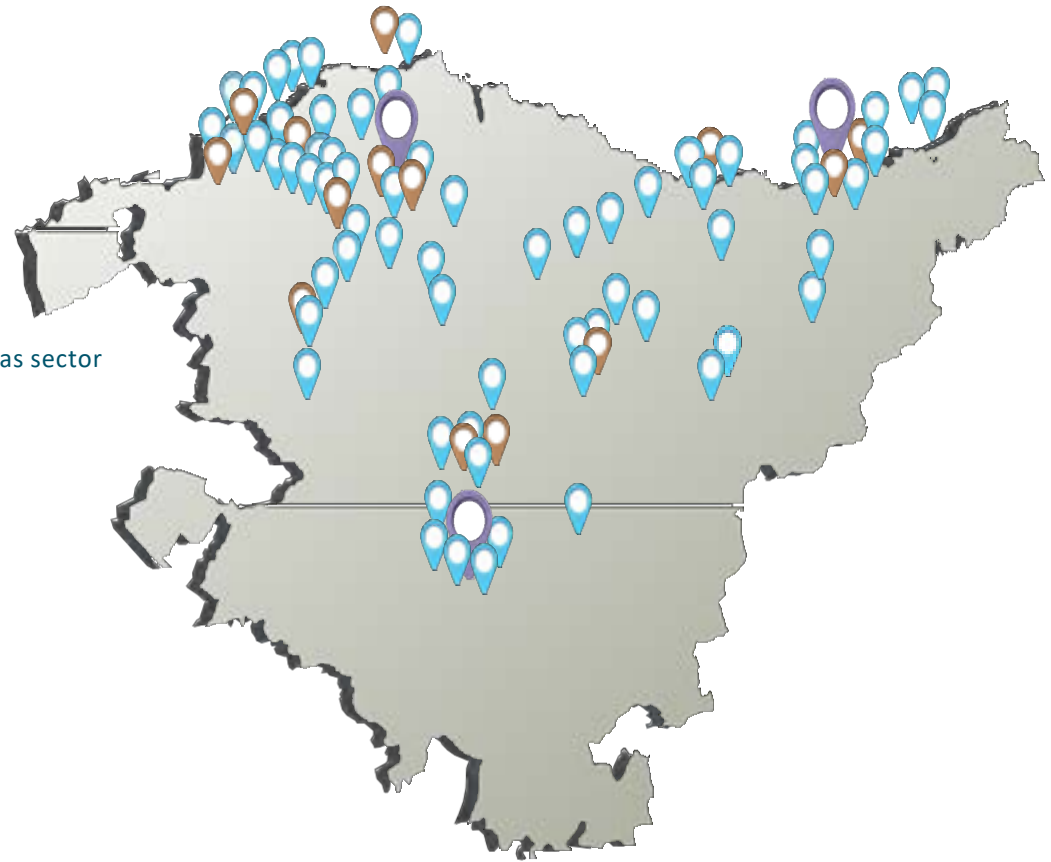
RATIO OF EXPORTS TO
GDP (2017)

32.2%

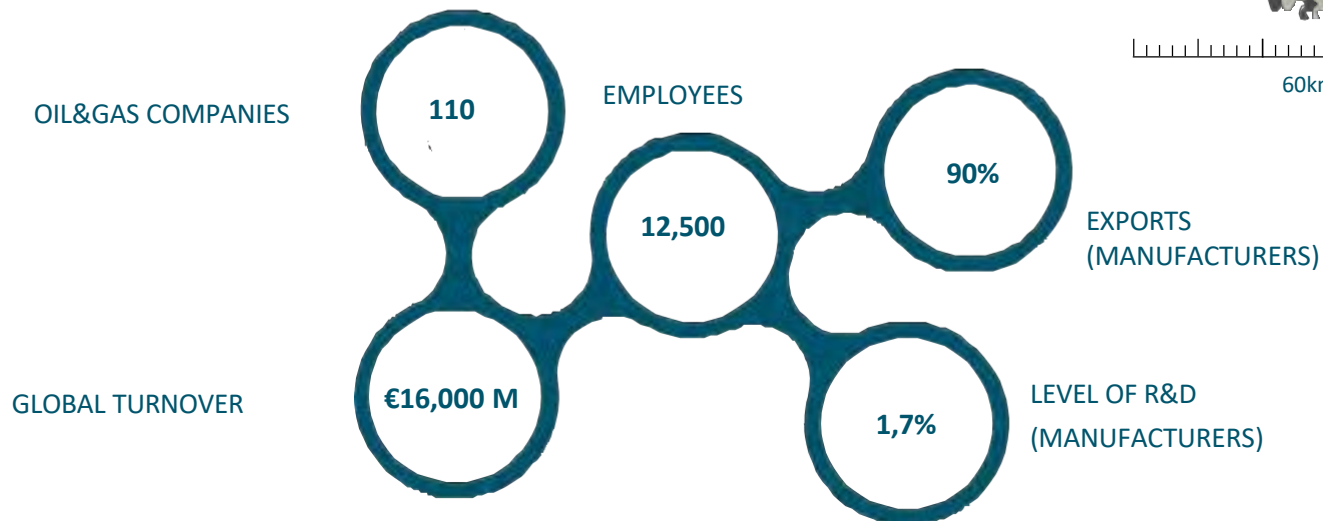


ONE OF THE WORLD'S REGIONS WITH THE HIGHEST CONCENTRATION OF OIL&GAS COMPANIES PER KM²

-  Companies in the Oil&Gas sector
-  Oil&Gas infrastructure
-  Technological parks



KEY DATA RELATED TO OIL&GAS ACTIVITY IN THE BASQUE COUNTRY



Source: Panorama of the Energy Cluster 2016

... with a long tradition in the wind energy sector, making it one of the regions of the world with a highest concentration of companies...

The Basque Country has developed a **powerful industrial fabric in the wind sector** based on the combined effect of global players leadership, such as Iberdrola and Siemens Gamesa Renewable Energy, with an innovative and competitive supply chain.

The Basque Country is home to **100 companies which compete in different levels within the wind energy value chain**, with a clear focus on technology and innovation as key drivers for their competitive advantages.

Key figures of wind power activity in the Basque Country

Companies in wind energy value chain

+100

R&D Employment in the Basque Country

+360

Employment in the Basque Country

+3,800

Global turnover

+€15,700M

+€35M

R&D Investment in the Basque Country

Source: General view of the Basque Energy Cluster 2017

DURING THE TRANSITION PROCESS TOWARDS CLEAN AND RENEWABLE ENERGIES, THE OIL&GAS MARKET WILL BE MAINTAINED IN THE COMING DECADES, AS NEW INVESTMENT PROJECTS ARE FORESEEN

Fossil fuels have been the main source of energy in the 20th century, and will continue to be present in the energy mix in the coming decades. Consumption is expected to be driven by the development of Asian countries.

To meet this demand, the Oil & Gas sector is searching for new fields and reservoirs in aggressive environments, while adapting and improving existing technology for development. These new challenges mean a growing CAPEX, and operations which are ever more efficient. That is why new lines of action are being developed in increasingly demanding environments such as:

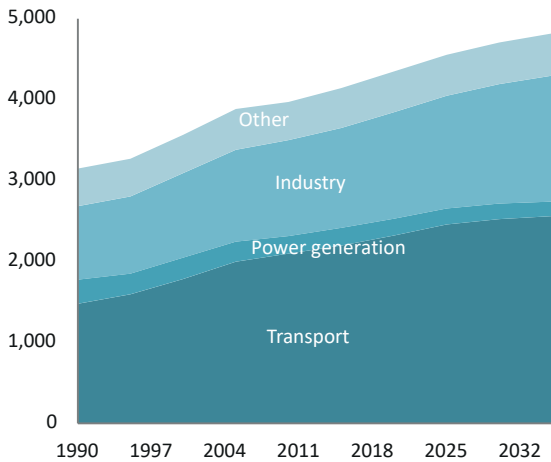
- Research and development of unconventional resources such as: Shale Gas & Shale Oil, CBM (Coal Bed Methane), etc.
- Research and development of offshore fields at ever greater depths (> 3,500 m)
- Exploitation of Oil & Gas resources in environments with extreme conditions

- By 2025, **72% of the existing demand** will be covered with **unconventional deposits and subsea fields**
- In 2017, Independent exploration and production companies in the US **increased capital expenditures by 45%**
- Between 2014-2020, investments in Oil & Gas will total €4,771 Million. **75% of this will be upstream investment**, of which 63% will be onshore and 37% offshore

Likewise, the international energy market is increasingly focusing on cleaner energies such as Natural Gas:

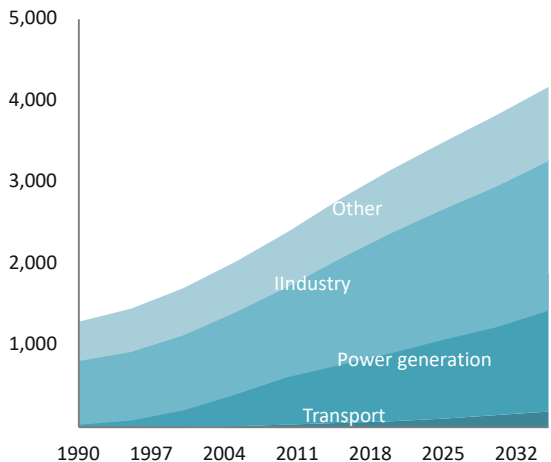
- In the US, natural gas is increasingly used for power generation, manufacturing and transportation
- Japan has announced plans to increase the share of natural gas in its energy generation matrix
- Europe is proceeding with its intention to adopt increasingly cleaner fuels

Oil consumption by sector (1990-2035, Mtoe)



Source: BP 2035 outlook

Natural gas consumption by sector (1990-2035, Mtoe)



Source: BP 2035 outlook

THE INDUSTRIAL AND TECHNOLOGICAL CAPACITY AVAILABLE IN THE BASQUE COUNTRY MEANS IT CAN OFFER SOLUTIONS FOR SYSTEMS AND SPECIFIC REQUIREMENTS (UPSTREAM, MIDSTREAM AND DOWNSTREAM)...

END USERS

- Drilling
- Exploration
- Distribution
- Refineries
- Regasification
- Petrochemicals
- Gas Treatment

ENGINEERING

- Conceptual and basic - FEED
- Detailed engineering
- EPC

TUBULAR SOLUTIONS

- Tubes & Pipes
- SURF
- Flanges
- Fittings
- OCTG Premium solutions

VALVES & VALVE COMPONENTS

- Subsea
- Valves for UP, MID & DOWN STREAM
- Cryogenic
- Marine propulsion systems
- API, ISO, NACE, MS, ASTM valves

OFFSHORE SOLUTIONS

- Moorings lines
- shipbuilding
- Offshore structures

SUBSEA STRUCTURES

- Piles and Anchors
- Hooks, shackles, chains and swivels
- Manifolds, PLEM, PLET

PRESSURE EQUIPMENT

- Reactors
- Vessels and columns
- Heat exchangers
- Boilers
- Gas pipelines and tanks
- Pneumatics and hydraulics
- Gas filters and regulators

ROTATING EQUIPMENT

- Pumps
- Turbines
- Compressors
- Motors, generators and converters
- Machinery maintenance services

IC&E

- Instrumentation
- Controls
- Electrical



UPSTREAM



MIDSTREAM



DOWNSTREAM

... AND HAS EVOLVED STRATEGIES AND PRODUCTS TO FACE THE CHALLENGES OF THE SECTOR

THROUGH

PROJECTS OF GREATER MAGNITUDE, TECHNOLOGICALLY MORE COMPLEX AND WITH INCREASED RISKS, PROVIDING SOLUTIONS

EVOLVING TOWARDS THE PROVISION OF IMPROVED SERVICES AND ENSURING THE UNINTERRUPTED PERFORMANCE OF THE FACILITY

MODULARIZATION OF COMPONENTS AND INCREASING THE ADDED VALUE OF THE OFFER

IMPLEMENTING INTELLIGENT MANUFACTURING SYSTEMS

CONTINUING TRAINING AND DUAL EDUCATION

INTER-COMPANY ALLIANCES

INTEGRATING SUPPLIERS AND SPECIALIST PRODUCT FUNCTIONALITY

JOINT OFFER OF STANDARD MODULES

COMMITMENT TO INDUSTRY 4.0

COLLABORATION AND EXCHANGE OF TECHNOLOGIES BETWEEN COMPANIES OF THE SECTOR

CHALLENGES

- DEEP OFFSHORE DEPOSITS
- CORROSION AND EROSION OF MATERIALS
- RESEARCH AND DEVELOPMENT TECHNOLOGIES FOR NON-CONVENTIONAL OR REMOTE RESOURCES
- MONITORING, SUPERVISION AND REMOTE CONTROL USING SENSORS

STRATEGIES – PRODUCTS - INITIATIVES

- ▶ - DEVELOPMENT OF EQUIPMENT FOR DEEP WATER FIELDS
- ▶ - DEVELOPMENT OF EQUIPMENT TO WORK UNDER EXTREME CONDITIONS
- ▶ - DEVELOPMENT OF DATA ACQUISITION SYSTEMS, CREATION OF MODELS, EQUIPMENT AND INFRASTRUCTURE FOR THE RESEARCH AND DEVELOPMENT OF NON-CONVENTIONAL OR REMOTE SITES
- ▶ - DEVELOPMENT OF SENSING, INSTRUMENTATION, ACQUISITION AND TRANSMISSION OF DATA, AND REMOTE CONTROL TECHNOLOGIES

UPSTREAM



DOWNSTREAM



- DELIVERING TURNKEY PROJECTS
- INTEGRATION OF SUB-ASSEMBLIES
- IMPROVING THE EFFICIENCY OF OPERATIONS

- ▶ - ALLIANCES TO INTEGRATE PRODUCT FUNCTIONALITY
- ▶ - VALUE CHAIN OFFER WITH OWN TECHNOLOGY OF ALL COMPONENTS
- ▶ - SERVICE ASSURANCE

VALUE CHAIN OF THE OIL & GAS SECTOR



Basque companies cover most of products and services of the wind energy value chain



END USERS

ACTIVITY & PRODUCTS

- Exploration & drilling
- Refinery
- Distribution
- Regasification
- Retail sale of hydrocarbons
- Petrochemicals
- Gas treatment

COMPANIES

- BAHÍA BIZKAIA GAS
- GAS NATURAL FENOSA
- EDP NATURGAS
- ENERGÍA
- HIDROCARBUROS DE EUSKADI
- PETRONOR – GRUPO REPSOL



CONSOLIDATED OPERATORS WITH EXTENSIVE EXPERIENCE IN THE DOWNSTREAM SECTOR, MAINLY IN THE REFINING OF OIL AND REGASIFICATION

PROJECTS & CAPACITIES



EXTENDING THE CAPACITY OF THE PETRONOR REFINERY: *PETRONOR*

With a potential production capacity of 12 million t/year, this is the largest refinery in Spain, with exports accounting for just over a third of its production. In April 2012, Petronor completed a capacity expansion process with the inauguration of the Fuel oil Reduction Unit - URF, which reduces the production of fuel oil to the Muskiz complex to zero. This URF plant is the largest industrial investment in Euskadi, amounting to €1,006 million. On the other hand, it is well positioned to face the main ICT trends in the sector. This is demonstrated by its state-of-the-art technologies used in SmartWatch sensors, which, thanks to radiofrequency technologies, detect any possible vapor leakage. The management of this data from a Cloud platform allows to increase energy efficiency by 8%.



EXPLORATION AND PRODUCTION OF HYDROCARBONS: *HIDROCARBUROS DE EUSKADI*

A subsidiary of the Basque Energy Agency - EVE is the Spanish company with the largest number of exploration permits nationwide. It mainly develops its exploratory and production activity in the geological basins of the Ebro (Viura Field) and Basque Cantabrian.



EXTENSION OF THE LIQUID NATURAL GAS REGASIFICATION PLANT WITH THE CONSTRUCTION OF A THIRD STORAGE TANK: The inauguration in 2015 of this third storage tank has allowed *BAHIA DE BIZKAIA GAS* to increase its storage capacity by 50%, reaching 450,000 m³. This strategic move has meant an investment of 130 million euros and reinforces Euskadi's strategic position as the main entry point for Liquefied Natural Gas in the Atlantic Arc. It allows the reception of methane tankers of up to 265,000 cubic meters of capacity, thus supplying Gas Natural to the Basque Country and neighbouring areas and being a very important company in the Midstream of the Oil & Gas sector.

ENGINEERING

ACTIVITY & PRODUCTS

- Conceptual and basic engineering - FEED: Terminals/ Utilities off-sites/ Gas treatment
- Owner's engineering
- Construction engineering of facilities and infrastructure
- Detailed engineering: Gas treatment/ Refinery plants/ Petrochemicals
- Engineering of manufacturing and/or assembly of equipment and systems
- EPC

COMPANIES

- BOSLAN
- IDOM
- LKS
- SARTECH
- SENER



WORLD-CLASS ENGINEERING WORKING ACROSS THE GLOBE, ESPECIALLY IN DOWNSTREAM PROJECTS, MAINTAINING STRATEGIC ALLIANCES WITH INTERNATIONAL PROJECT REFERENCES, TACKLING COMPLEX PROJECTS, UPSTREAM

PROJECTS & CAPACITIES



PROJECT MANAGEMENT CONTRACTOR OF THE EXTENSION OF THE TALARA REFINERY IN PERU - PETROPERU: *IDOM* is undertaking the project to expand and modernize the 95,000 BPD Talara refinery to produce diesel 2 and gasoline with a maximum content of 50 ppm sulfur, process heavy crudes and reduce waste production, increasing efficiency and improving aspects environmental. It is the largest current investment in Latin America.



REPSOL REFINERY IN PUERTOLLANO - REPSOL: *SENER* is augmenting diesel production, therefore, crude distillation unit 1 (U-601) needs to be modified, as well as the off-site facilities and auxiliary services required for the correct operation of the unit. The works of *SENER* work in the P-41 project includes the detailed engineering, procurement management and the management and supervision of the remodelling of the REPSOL PETRÓLEO crude unit 1 in the industrial complex of Puertollano. The objective of the project has been to achieve a reduction in energy consumption, while improving the efficiency of diesel, compatible with the current specifications of petroleum products.



ELECTROMECHANICAL DETAIL ENGINEERING OF SYSTEMS MODIFICATIONS IN THE REPSOL-PETRONOR MUZKIZ REFINERY: *BOSLAN* are undertaking the design, architecture and installations of auxiliary buildings at the REPSOL-PETRONOR refinery in Muskiz. At the same time, they are also supervising and managing the works, as well as document management and IT developments. In addition, Boslan is carrying out the tasks of management, mechanization and coding of warehouses as well as taking charge of the contract management and cost control of the project. In this way, it provides a complete solution in system modifications related to Oil & Gas and its detailed engineering.

TUBULAR SOLUTIONS

ACTIVITY & PRODUCTS

- Tubes & Pipes
- SURF – Subsea Umbilicals, Risers & Flowlines
- Connectors, Flanges, Seams & Joints, Fittings and Supports
- OCTG Premium Solutions

COMPANIES

- EUKALFORGING
- GAINZAFORGE
- GARAY
- HADIMEK
- MATZ-ERREKA
- TUBACEX
- TUBOSREUNIDOS GROUP
- ULMA PIPING



VARIOUS WORLD LEADERS IN TUBULAR SOLUTIONS WITH A DIFFERENTIATED PRODUCT, WELL POSITIONED IN TERMS OF QUALITY, INCORPORATING COMPREHENSIVE SOLUTIONS THROUGH ALLIANCES WITH THE MAIN MARKET PLAYERS

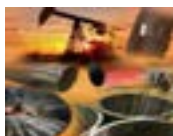
PROJECTS & CAPACITIES



FRAMEWORK CONTRACT FOR THE SUPPLY OF STAINLESS STEEL TUBES WITHOUT WELDING - HENGLI PETROCHEMICAL (DALIAN) REFINERY: TUBACEX has signed a framework agreement with Hengli Petrochemical (Dalian) Refinery Co. Ltd for the supply of tubes in austenitic steels and high nickel alloys for what will be one of the world's largest refineries, which plans to start production in October 2018, with a total volume of 20 Million metric tons per year. The importance of this framework agreement lies in the fact that end-users tend to be interested in purchasing full service solutions directly from TUBACEX Group, even in projects that require the most demanding specifications such as: high grades, strict tolerances or the extremely demanding granulometry.



INTEGRAL SUPPLY OF "NON STANDARD" – ENGINEERED FLANGED JOINTS FOR THE LARGEST GAS PROCESSING PLANT IN SAUDI ARABIA: ULMA PIPING is a world leader in the manufacturing and supply of FORGED STEEL FLANGES, FORGED FITTINGS, LINE BLANKS and OEM Forged components. Out of manufacturing ASME standard products in the last 10 years ULMA Piping has executed several projects for NON STANDARD ENGINEERED FLANGED JOINTS. One of the most renowned ones was developed in 2013-2014 for high pressure gas lines in Saudir Arabia (joints from 36" up to 72", 900 up to 2500 pressure class – maximum pressure 720 bars). The scope of supply covered the design/calculations of the FLANGED JOINTS (Flanges, gaskets, bolts/nuts), the manufacturing and supply of the different components (Flanges produced by ULMA), the hydrotest in order to ensure ZERO LEAKAGES in the joints and the assembly/tightening at site.



MANUFACTURE AND SUPPLY OF SEAMLESS STEEL TUBES AND PIPES FOR THE COMPLETE CYCLE OF OIL & GAS: The TUBOS REUNIDOS GROUP manufactures and supplies Seamless Steel Tubes & Pipes that are used in the complete Oil & Gas cycle from its exploration and extraction (Upstream) to the transportation (Midstream) and processing in chemical, petrochemical and refining plants (Downstream), as well as for Power Generation independently or associated with those processes. With a wide range of products and dimensions from 1/2" up to 26" Outside Diameter (12,7 mm – 660 mm) in carbon, alloys, high alloys, alloys with high nickel content, stainless and duplex steel grades. TUBOS REUNIDOS GROUP offers customized tubular solutions with maximum standards of quality and service that is attested by the multiple certifications including the ASME SECTION III for nuclear uses in its Productos Tubulares plant. It also stands out for the supply of OCTG with semi-premium connections from its plant in the USA (Rotary Drilling Tools - RDT).

VALVES & VALVE COMPONENTS

ACTIVITY & PRODUCTS

- Design and manufacture of valves for Upstream Activity (Subsea, Topside)
- Design and manufacture of valves for Midstream Activity (LNG, Pipelines)
- Design and manufacture of valves for Downstream Activity (Refining, Chemical and petrochemical, fertilizers)
- Design and manufacture of valves for marine propulsion
- Design and manufacture of valves according to international standards (API, ISO, NACE, MS, ASTM)

COMPANIES

- AMPO POYAM VALVES
- GAINZA FORGE
- HADIMEK
- ULMA



ENGINEERING OF VALVES OF HIGH TECHNOLOGICAL VALUE WITH EXTENSIVE EXPERIENCE AND IMPORTANT INTERNATIONAL POSITIONING, OFFERING AD-HOC SOLUTIONS FOR THE LARGEST OIL PRODUCERS OF THE WORLD

PROJECTS & CAPACITIES



SUPPLY OF VALVES FOR PETROCHEMICAL PROCESSES AND PETROLEUM REFINING AS WELL AS PRODUCTION SYSTEMS SUBSEA: AMPO POYAM VALVES stands out in the Upstream, Midstream and Downstream sectors as well as in marine propulsion. In addition, it provides specific solutions for the Subsea sector, related to structures such as Manifolds, PLEM etc. This company complies with the necessary API certifications and offers integral solutions including valves with hydraulic actuators and hydraulic groups.



SUPPLY OF CRIOGENIC VALVES: AMPO POYAM VALVES

In order to offer innovative solutions to meet the new requirements of the Liquefied Natural Gas (LNG) market, the company offers valves that operate at very low temperatures, with Gas Natural being the reference market in the coming years. There are currently hundreds of thousands of valves installed in the global LNG supply chain. AMPO POYAM VALVES is highly specialized and offers a wide range of this type of valve solutions.

OFFSHORE SOLUTIONS

ACTIVITY & PRODUCTS

- Manufacture of mooring lines: anchors & mooring lines
- Manufacture of sheaves for chains
- Manufacture of cargo cranes for shipping and offshore platforms
- Cranes, deck machinery, dredges

COMPANIES

- EUSKALFORGING
- IRIZAR FORGE
- MUGAPE
- NAVACEL
- VICINAY MARINE



GLOBAL LEADER IN THE PROVISION OF MOORING LINES & COMPANIES OFFERING SOLUTIONS TO THE CHALLENGES OF THE OFFSHORE SECTOR

PROJECTS & CAPACITIES



ADHOC MOORING SOLUTIONS FOR OIL & GAS OFF-SHORE PLATFORMS: *VICINAY MARINE* offers anchoring solutions based on the location of the platform. These solutions are designed not just on the workloads of the system, but also taking into account the specific degradation phenomenon associated with the environmental conditions. As a result, it is possible to increase the service life of the lines, the integrity and reliability of the platforms, as well as permit the location of the platforms in new locations that have been inaccessible until now.



MANUFACTURE OF EQUIPMENT FOR OFFSHORE ACTIVITIES WITH THE POSSIBILITY OF MAKE JOINT SHIPMENTS BETWEEN COMPANIES: *NAVACEL* has more than 30 years of experience and is recognized worldwide as a manufacturer of equipment for engineering and infrastructure for Offshore activity, both installation on Ships, FPSO, FSU, FPSO, SV, AHTS, Platforms, etc. and other vessels such as Seismic Vessels, Dredges, etc. CALM Bouy up to 3000t can be directly loaded Ro-Ro. Another division is the manufacturing of Suction Anchors and Anchor Piles that are loaded from the company's dock in the Port of Bilbao. Co-existing with other COMPANIES of the sector in the same Port of Bilbao allows the shipment in the same transport of integrated solutions, for example for a Gas Offshore discharge project, was loaded in NAVACEL a barge with 8 Suction Anchors of 9 m in diameter and 20 m high constructed by NAVACEL and the chains supplied by VICINAY already connected.



MANUFACTURING OF CRITICAL COMPONENTS FOR CRANES IN OFFSHORE MARINE ENVIRONMENTS: *IRIZAR FORGE* manufactures this type of critical components, both floating, submersible and semi-submersible cranes for assembly/disassembly work or support in complex operations of the off-shore movement of loads, as well as FPSO cranes or auxiliary cranes in Oil & Gas extraction structures. High degree of specialization in the manufacture of hooks for cranes, as well as pulleys for relay cables and complete rigs with hook and pulleys. Capacities up to 5,000t to cover solutions for the design, manufacture and testing of safety components of a wide range of cranes in marine environments. Products certified by DNV-GL, LR, ABS, API, BV and others for medium capacities (100t), large (1000t) and very large (5000t) lifting and moving heavy loads



SEAMLESS ROLLED RINGS FOR THE MOST CRITICAL ENVIRONMENTS OF OFFSHORE UPSTREAM ACTIVITY: *EUSKALFORGING* is present in the most critical environments of offshore upstream and downstream activities. As a world leader in the manufacture of seamless rolled rings, it has collaborated with the oil company TOTAL, providing rings for the TLP in the Moho Nord project in the deep waters of the Congo, for which a potential extraction capacity of 100,000 barrels per day has been estimated.



SUBSEA STRUCTURES

ACTIVITY & PRODUCTS

- Piles (Driven, Suction, Anchor)
- Suction Anchor (with Flat Deck, with Domes)
- Single Anchor loading
- Pipeline End Manifolds (PLEM)
- Parts for Buoyancy Systems
- Hooks (Subsea ROV, PLET, Quick)
- Shackles and Chains
- Subsea Swivel

COMPANIES

- IRIZAR FORGE
- NAVACEL
- ULMA
- VICINAY MARINE



COMPANIES THAT PROVIDE STRUCTURAL SOLUTIONS IN THE INCIPIENT WORLD OF SUBSEA

PROJECTS & CAPACITIES



SUPPLY OF SUBSEA EQUIPMENT: *NAVACEL* manufactures for world-leading engineering in the field subsea large complex equipment for oil management and has proven experience in equipment for driving and loading and unloading oil such as Goosenecks, PLEM and PLET, - Pipeline End Manifolds, OLS - Offshore Loading System and SAL - Single Anchor Loading, and its protection and anchoring structure with Piles, Suction Piles, Suction Buckets and Mudmats. The manufacturing and testing is Indoor. The specialty of NAVACEL is heavy or bulky equipment that is loaded directly from its dock in the Port of Bilbao.



MANUFACTURE OF LINE ANCHOR LINE AND STM LINE CONNECTORS FOR FLOATING MARINE SOLUTIONS FOR BOTH OIL & GAS AND RENEWABLE ENERGIES (FLOATING SOLUTIONS): *IRIZAR FORGE* has a high degree of specialization in the manufacture of forged ROV connectors, hooks, swivels, shackles, masterlinks, H-Y links for classic or mixed chain anchoring lines (cables, both steel and synthetic), with MBL capacities of 6000t, even greater depending on the safety factors vs fatigue, useful life and depths. Products Certified specifically for Mooring Accessories by DNV and ABS with R4 materials. The difficulty of maintenance at great depths, makes forged solutions the most durable and safe option for the life-cycle of the site in hostile environments. Forging is the preferred technology for this type of mooring accessories.



DESIGN AND MANUFACTURE OF REMOTE Subsea Mooring Connector (SMC) SYSTEMS: *VICINAY MARINE* offers temporary and permanent connection solutions for remotely operated anchoring lines (ROV friendly). The proprietary design of our Subsea Marine Connectors (SMC) adapts to any type of line and installation strategy. Likewise, VICINAY MARINE designs and manufactures subsea tensioning equipment as it allows for the tensioning and adjustment of the anchoring lines, remotely and efficiently, avoiding the need for expensive equipment on the vessel.



PRESSURE EQUIPMENT

ACTIVITY & PRODUCTS

- Reactors
- Vessels and columns
- Heat exchangers
- Boilers
- Gas pipelines and tanks
- Pneumatics and hydraulics
- Gas filters and regulators

COMPANIES

- GAINZA FORGE
- GLUAL
- HADIMEK
- LOINTEK
- NAVACEL



ESTABLISHED COMPANIES IN THE MANUFACTURE OF ALL KINDS OF PRESSURE EQUIPMENT, FROM BOILERS AND HEAT EXCHANGERS TO LARGE PIPELINES

PROJECTS & CAPACITIES



AWARD OF THE MANUFACTURE OF THE FRACTIONING COLUMN FOR THE RESIDUAL USE UNIT OF THE MIGUEL HIDALGO REFINERY IN TULA - MEXICO: LOINTEK has its workshops in the dock of the estuary, a decisive factor in the awarding of this contract, as exit to the sea is possible for this equipment which is difficult to transport by road. LOINTEK also designs, manufactures and supplies both pressure equipment for process facilities and modular systems in the Oil & Gas sector. It also offers customized solutions for steam generation in the chemical, petrochemical, industrial and energy sectors. The manufacture of boilers is another specialty of this company.



SUPPLY OF SPECIFIC CYLINDERS FOR THE OIL & GAS MARKET: GLUAL supplies specific hydraulic cylinders for Oil & Gas applications, both for Offshore platforms, ship cranes, as well as for deck winches and machinery, Platform lift cylinders, submersible cylinders. All these cylinders are designed to withstand the high sea conditions that demand extreme reliability of their hydraulic systems applications in their support vessels or work on Offshore drilling platforms.



MANUFACTURE OF PRESSURE EQUIPMENT FOR WORLDWIDE LEADING ENGINEERING FIRMS, APPROVED BY ASME (U, U2 AND S STAMPS): NAVACEL specializes in Pressure Vessels of great dimensions and/or with strong thicknesses and with weights from 20t for Steam Accumulators, Heat Exchangers, Product Process, etc. NAVACEL can handle loads of up to 400t with its own bridge cranes and make hydraulic pressure tests of up to 3000t. Shipment is directly from the company's dock in the Port of Bilbao using cranes or Ro-Ro..

ROTATING EQUIPMENT

ACTIVITY & PRODUCTS

- Manufacture of pumps
- Manufacture of Compressors
- Manufacture of Generators
- Design and manufacture of generators
- Design and manufacture of motors
- Design and manufacture of BT and AT rotary converters

COMPANIES

- ABC compresores
- Alconza (Irizar Group)
- Euskal Forging

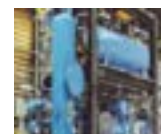


ROTARY EQUIPMENT MANUFACTURERS THAT COLLABORATE CLOSELY WITH ENGINEERING FIRMS, OFFERING AN INTEGRAL SUPPLY, PROVIDING BOTH DESIGN SOLUTIONS AND EQUIPMENT SOLUTIONS

PROJECTS & CAPACITIES



OUTSTANDING POSITION IN THE MARKET OF MARINE PROPULSION ENGINES, GENERATORS AND INDUSTRIAL AND MARINE CONVERTERS: ALCONZA has become an important point of reference in the marine market, being one of the leading manufacturers in the world for total installed power. In relation to the Oil & Gas industry, it stands out in electric propulsion for drilling vessels, drilling platforms, tube laying vessels, LNG transport vessels, production, storage and transport vessels FPSO and AHTS vessel. Its engines and marine generators comply strictly with international standards, regulations and classification societies (DNV-GL, RMRS, BV, RINA, LR, CR, RINA, etc.).



COMPRESSORS ON OIL PLATFORMS: ABC COMPRESSORS manufactures compressors for offshore installations, specifically, it manufactures a special type of compressor for installation on an offshore oil platform that compresses natural gas extracted from oil drilling. The compressed gas feeds a 6MW turbine to supply the electrical consumption of the platform itself. This type of offshore applications is very complex in terms of standards and technical requirements, but also because of the limited availability of space.



WORLD LEADER IN THE MANUFACTURE OF SEAMLESS ROLLED RINGS: EUSKALFORGING is present in a large number of markets within the field of capital goods, offering the capacity to manufacture steel rings up to 10 meters in diameter and 80 tons in weight. EUSKALFORGING offers the highest range and capacity, worldwide, by combining all the production phases required by the customer such as forging, rolling, heat treatment, machining, gear cutting, assembly, packaging and transport of the ring. It stands out in the manufacture of rings for rotary kilns in refineries and other rolling rings for capital goods, having participated in the construction of more than 50 projects throughout the world during the last decade.

Instrumentation, Controls & Electrical – IC&E

ACTIVITY & PRODUCTS

- Custom transformers
- Power transformers
- Disconnectors
- Hydraulic systems
- Monitoring and control equipment
- Protection systems
- Storage of electrical energy
- Sensors
- Control systems: SCADA

COMPANIES

- ABB
- AEG POWER SOLUTIONS
- BOSLAN
- CARLO GAVAZZI
- CEIBER ENERGY
- EREMU
- GLUAL
- INDRA
- INGETEAM
- LANTEGI BATUAK
- MATZ-ERREKA
- SUPRA
- TECUNI
- URIARTE SAFYBOX
- ZIGOR
- ZIV



THE EXTENSIVE EXPERIENCE DEVELOPED DURING YEARS IN SECTORS SUCH AS STEEL, ENERGY OR AUTOMOTIVE, MEANS THAT THESE COMPANIES HAVE THE CAPACITY TO DEVELOP THEIR OWN ELECTRICAL AND CONTROL SYSTEM PRODUCTS, INCORPORATING MORE AND MORE INTELLIGENCE AND FEATURES

PROJECTS & CAPACITIES



SOLUTIONS FOR COVERING THE VOLTAGE DIPS, AVOIDING CUTS IN THE ELECTRIC POWER SUPPLY OF THE HYCO METAL CARBIDES PLANT OF TARRAGONA: **ZIGOR** installs a medium voltage SET DVR, medium voltage cells, a MT 6.6 kW - 400 V transformer, a Booster MT 6.6 kW transformer, and the concrete building that contains them. The system continuously feeds the entire plant and mainly protects the variators of the main medium voltage motors of the production process. An unforeseen stoppage can result in the loss of an entire day to replenishing Hydrogen to the REPSOL refinery to which it supplies hydrocarbons. This refinery takes about 3 days to re-start the whole process, which causes extremely high economic losses, therefore, the return on investment in the SET DVR is less than two years.



ENERGY OPTIMIZATION AND CONTROL SOLUTIONS: **INGETEAM** has a family of programmable automation controllers INGESYSTM IC covers the needs of the automation of processes and machines, through a modular architecture, configurable to the needs of each application and a wide range of tools of programming and libraries of functions, oriented to the Oil & Gas sector. INGETEAM, in its commitment to offer the client a comprehensive solution and fully adapted to their needs, provides, throughout its range of products, 360° CRS service, which offers a full service of assessment, direct technical support, training, and maintenance throughout the life-cycle of its products.

INSTALLATIONS AND O&M

ACTIVITY & PRODUCTS COMPANIES

- Installation of equipment and components
- Operations
- Maintenance of plant equipment

- DOMINION
- ELDU
- ELECINOR
- GLUAL
- INGETEAM
- LKS
- MATZ-ERREKA
- MIESA

- PROTECTION
- SALTOKI
- TECUNI
- TAMOIN



COMPANIES OFFERING SERVICES AND ENGINEERING FOR BOTH ONSHORE AND OFFSHORE ACTIVITIES

PROJECTS & CAPACITIES



ZARAGOZA-TORREJON OIL PIPELINE FOR THE HYDROCARBONS LOGISTICS COMPANY CLH: **ELECINOR** is undertaking the construction project for section II of the Zaragoza-Torrejón pipeline, to increase the transportation capacity and adequate level of supply of petroleum products in the zone (a length of 289 km in its two phases).



MAINTENANCE OF THE INSTRUMENTATION AND CONTROL OF THE MACHINERY OF THE OIL & GAS INDUSTRIAL PROCESSES: **ELDU** performs preventive and corrective maintenance of instrumentation, manufacture of their own temperature probes (-200 C to 1800 C), maintenance of the regulation and control facilities in plant or by remote management. Likewise, they also carry out the verification of measurement and operation of the instrumentation, the maintenance of equipment calibration using their own metrology laboratory, and the distribution of control equipment.



ASSEMBLY AND MAINTENANCE OF PROCESS PLANTS, REFRACTORY ASSEMBLY, CHIMNEYS, INSULATION AND OTHER EQUIPMENT RELATED TO OIL & GAS: **DOMINION** carries out the assembly and maintenance of process plants (pipe, metal structure, equipment, etc.), refractory linings, chimneys, insulation and Fireproofed, including consulting, inspection, demolition, revamping and shut-down works. They also offer all kinds of energy efficiency technologies. In addition, to the design, manufacture, supply and commissioning of industrial gas handling equipment, such as ERM's, and combustion systems. Likewise, the integration within DOMINION of Engineering and Digital capabilities, together with those of Assembly and Maintenance, allow them to offer improvement services in the efficiency of the processes through the Industry 4.0 concept.



DEVELOPMENT AND DETAILED ENGINEERING OF PROJECTS AND MINOR INVESTMENTS IN THE REPSOL-PETRONOR MUZKIZ REFINERY: **LKS** is offering an integral engineering service developing O&M investment projects in the REPSOL-PETRONOR refinery in Muskiz and participates in all its disciplines, process, mechanical equipment, electricity, I & C, geotechnics and civil works). The scope of service includes the design, planning, estimation of resources and budgets. The work is carried out as resident engineering in the refinery, having total autonomy in the access to the document management system of the plant. Our service also gives support to the construction department carrying out construction management tasks.

KNOWLEDGE AGENTS

ACTIVITY & PRODUCTS

RESEARCH AREAS

- Fixing structures and anchoring systems
- Materials with maritime applications and new functional materials for anti-ice structures
- Combustion, chemical processes and energy efficiency in industrial processes
- Advanced materials for sensors, actuators and devices for inspection and measurement
- Geolocation information systems
- Process Engineering: Modelling, Simulation, Optimization, techno economic analysis, industrial safety, HAZOP analysis

DUAL EDUCATION LINES

- **UNIVERSIDAD DEL PAÍS VASCO**, UPV/EHU: IDOM, Sener, Petronor, EDP-Naturgas, Vicinay, Tubacex, Ormazabal, Ingeteam, Projects for GERG-The European Gas Research Group
- **UNIVERSIDAD DE MONDRAGÓN**: Danobatgroup, Petronor, Tubacex

AGENTS OF THE BASQUE SCIENCE, TECHNOLOGY AND INNOVATION NETWORK (RVCTI)

- ABC COMPRESSORS TECHNOLOGY CENTRE AIE
- ASOCIACION IK4 RESEARCH ALLIANCE
- DOMINION INVESTIGACION Y DESARROLLO, S.L
- FUNDACIÓN CIDETEC
- FUNDACION TECNALIA RESEARCH & INNOVATION
- GLUAL INNOVA, A.I.E.
- PETRONOR INNOVACION S.L.
- UNIVERSIDAD DE MONDRAGON
- UNIVERSIDAD DEL PAIS VASCO
- VICINAY MARINE INNOVACION A. I. E.
- TUBACEX INNOVACION A.I.E.
- ZIGOR RESEARCH & DEVELOPMENT, A.I.E.

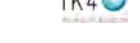
THE BASQUE NETWORK OF SCIENCE, TECHNOLOGY AND INNOVATION (RVCTI) IS A BENCHMARK FOR ITS LEVEL OF PARTICIPATION IN INTERNATIONAL PROJECTS AND FOR THE HIGH INVOLVEMENT WITH THE INDUSTRIAL NETWORK, THROUGH COLLABORATION R&D PROJECTS

PROJECTS & CAPACITIES



HAZITEK

TECHNOLOGIES FOR THE DESIGN, ADVANCED MANUFACTURE AND EVALUATION OF COMPONENTS FOR OFFSHORE ENERGY INSTALLATIONS - HARSH PROJECT: The fundamental objective is the search for solutions to common problems that COMPANIES come up against in the development of their products for energy applications in marine environments. For this purpose, the HARSH consortium has been created, with the aim of designing a versatile offshore laboratory for the evaluation of components in a hostile environment. HARSH LAB is an advanced floating platform laboratory in the marine environment to carry out specific evaluations. The COMPANIES involved in this project are MATZ-ERREKA, VICINAY MARINE, TUBACEX, CREDEBLUG, DITREL, GLUAL, HINE RENOVABLES, NAVACEL, NEM SOLUTIONS, SASYMA and specific innovation centres such as TECNALIA and IK4 (Ikerlan) together with the research division of VICINAY MARINE.



PRODUCTS AND TECHNOLOGIES FOR OIL & GAS SOLUTIONS IN MARINE ENVIRONMENTS - AMBAR PROJECT: The AMBAR consortium was created in 2016, with the aim of making a competitive leap and improving and consolidating the technological and commercial positioning of the Basque COMPANIES in the Oil & Gas sector in marine environments. This consortium is formed by TTI TUBACEX, ERREKA, ACERALAVA TUBACEX and other RVCTI agents such as TECNALIA and IK4 (Ceit and Lortek), MONDRAGON UNIBERTSITATEA and also the participation of the Energy Cluster. All this, in order to generate a supply of high performance and high added value products, optimized for use in exploration and production of oil and gas in non-conventional environments.

PREVENTION OF CORROSION AND MACROFOULING ON MARINE STRUCTURES: The offshore industry with fixed structures such as offshore wind power plants, as well as all those that use sea water in their production processes and cooling systems, has to face serious technical problems -economic as a consequence of aggressive phenomena of fouling and corrosion. In this sense, there is a need to develop environmentally sustainable solutions capable of solving the problem posed. In order to face this challenge, the ITSASERAUPEN Consortium was formed, formed by COMPANIES such as IBERDROLA INGENIERÍA Y CONSTRUCCIÓN, TUBACEX, LOINTEK, KERACOAT, IRURENA and SAIMA, as well as the CIDETEC AND TECNALIA Technological Centers (Aztí), with the objective of validating a demonstrator based in a condenser-heat exchanger representative of those integrated in industrial power generation plants in marine environments that integrate non-stick and anticorrosive surfaces and coatings that prevent and prevent the incrustation of organisms, inorganic products and prevent corrosive phenomena.

ASSOCIATIONS & CERTIFYING ENTITIES

THE COMPANIES OF THE SECTOR BELONG TO FIRST-RATE ASSOCIATIONS AND ARE CERTIFIED BY THE MOST PRESTIGIOUS ENTITIES

ASSOCIATIONS



CERTIFYING ENTITIES



RELEVANT MILESTONES



THE AMERICAN PETROLEUM INSTITUTE (API) CONSIDERS THAT IN THE BASQUE COUNTRY, BUSINESS CAPACITY EXISTS TO COVER ALL THE ASPECTS OF THE VALUE CHAIN IN THE OIL & GAS SECTOR: The North American Lobby considers that in Euskadi there is the entrepreneurial capacity to cover all aspects of the supply chain. Value of the Oil & Gas sector, not only in valves, but in the supply of all the essential components. For this reason, it has placed its focus on Euskadi as the place to set up its European headquarters. API currently only has foreign offices in India and China.

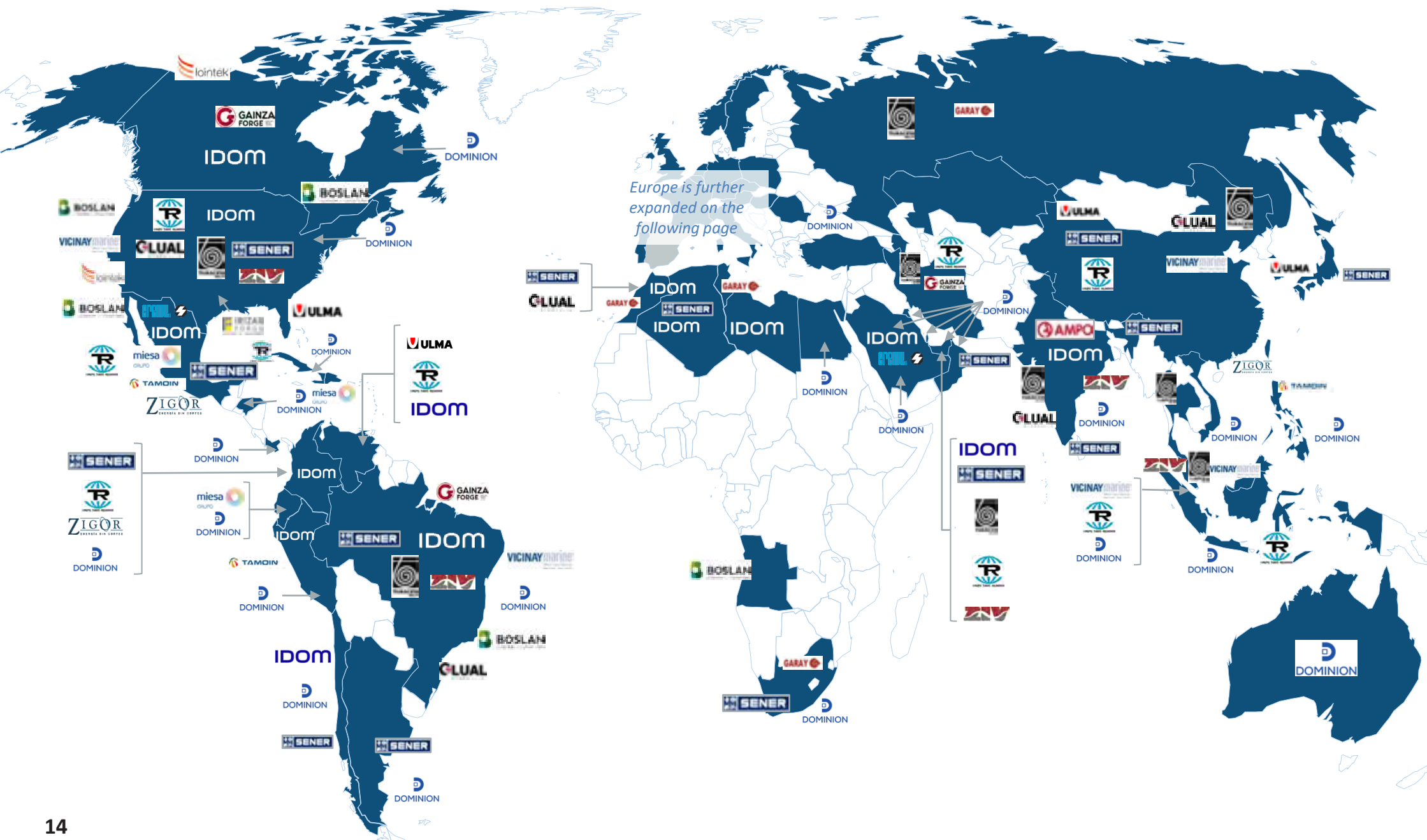


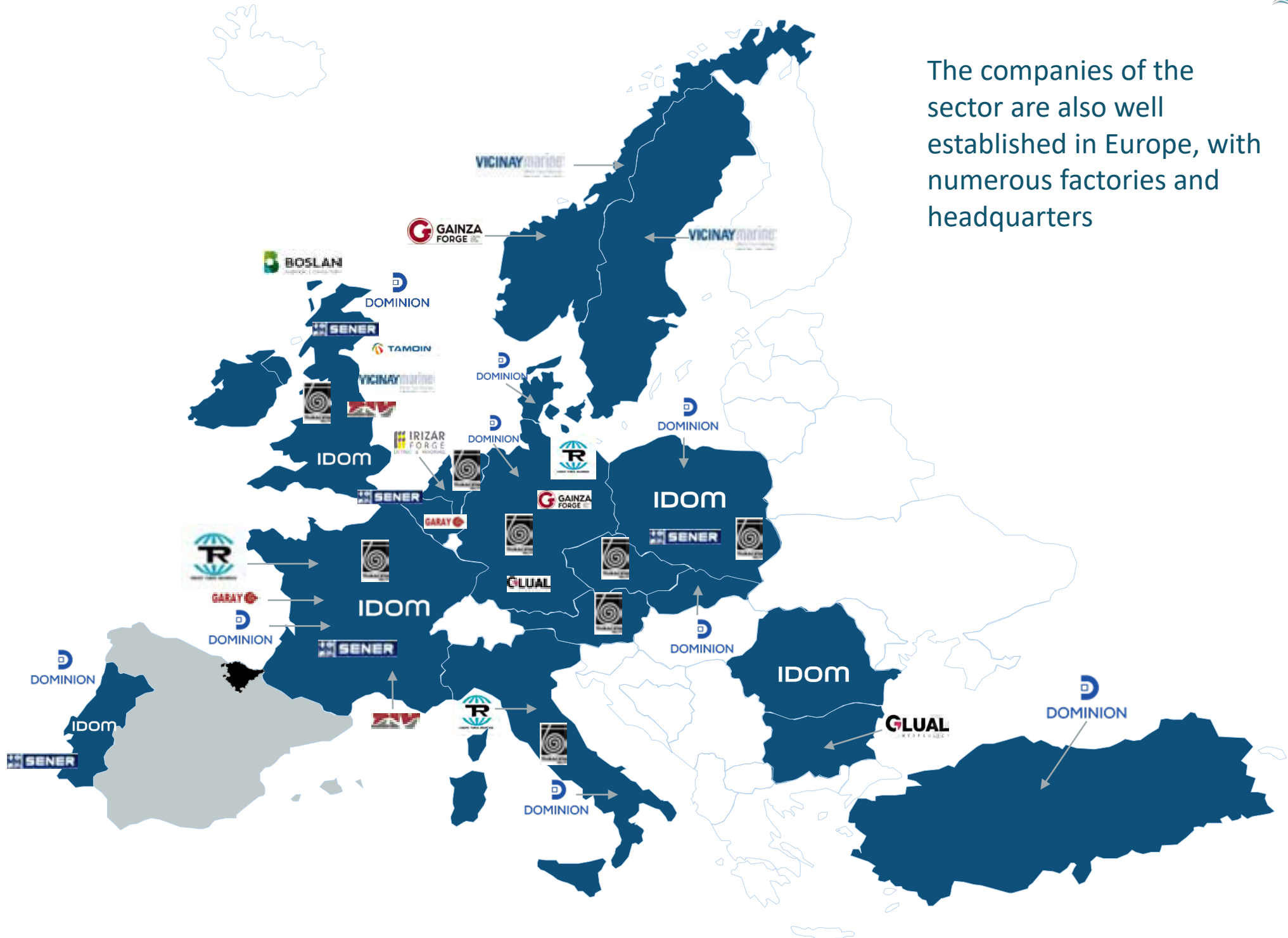
COMPANIES OF THE SECTOR TAKE PART IN COMMITTEES AND ASSOCIATIONS OF PRESTIGE IN THE SECTOR: VICINAY is part of the committee of Lloyds Register and API, as well as IDOM that also forms part of the committee of API and is a member of the prestigious Society of Petroleum Engineers. AMPO in turn, is part of the UPSTREAM refining API committees related to valves. TUBACEX is a member of the API, NACE, ISO and GNMS committees.



TEST LABORATORIES ACCREDITED BY ENAC: TECNALIA has laboratories for a wide range of test methods in accordance with Spanish, European and American regulations (ASTM), focused on the characterization of materials and the evaluation of their behaviour against different corrosion phenomena. Likewise, some of the most relevant tests for the evaluation of materials for applications in the Oil & Gas sector are accredited by large companies (EXXON, REPSOL). (NACE TM 0177, NACE TM 0284, NACE TM 0198, ASTM G129). TUBACEX has laboratories accredited by ENAC in different locations to carry out mechanical tests.

Established international presence, with factories and branch offices across the globe





The companies of the sector are also well established in Europe, with numerous factories and headquarters

DIRECTORY OF COMPANIES



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AEG POWER SOLUTIONS
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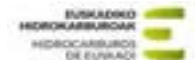
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