ENERGY

Meeting the world's energy demands sustainably

Global energy demand is estimated to grow by more than one third by 2035*. At the same time, the demand for water required for energy production is set to grow by a concurrent 85%. The result: immense stress on the world's already scarce water resources.

Despite their CO2 footprint, hydrocarbon sources will continue to remain important contributors to global energy production. However, renewable energy will need to develop concomitantly, to not only cover a part of the increased energy demand, but also replace the use of fossil fuels over time.

THE CHALLENGES

- Fulfilling the increased demand for energy worldwide
- Meeting the need for safe, cost-effective and sustainable exploration and exploitation of fossil fuels from the marine environment
- Making renewable energy economical and sustainable
- Optimising processes to reduce the usage of non-returned water, offshore and onshore

OUR APPROACH

Innovative, economical and sustainable solutions are required in order to meet the ever-growing energy needs without jeopardising the world's limited resources. We help in providing exactly this.

We achieve this by tapping into our vast pool of knowledge and technology. We work closely with our clients and take full advantage of nearly five decades of our global experience. In doing so, we unlock the right solution for each specific challenge.

OUR SOLUTIONS

Our solutions for the energy sector are based on advanced technologies related to field monitoring, remote sensing, model testing, laboratory analyses, numerical modelling and customised software development. Our technology and our people make our global knowledge directly accessible to you.

THE ULTIMATE GOAL

SAFE AND INCREASED PRODUCTION, REDUCED COSTS, ENHANCED SUSTAINABILITY

OUR EXPERTISE

OIL AND GAS

To ensure safe, sustainable and cost-effective solutions for the design and operation of structures in the marine environment, our services include:

- Metocean data
- forecast of wind, waves, water levels and current
- online monitoring
- physical model testing and Computational Fluid Dynamics (CFD) analysis
- hydrodynamic load and response analysis – fixed and floating structures
- Environmental Impact Assessments (EIAs)
- oil spill modelling and emergency response systems
- ecotoxicology testing

OFFSHORE WIND

For the offshore wind industry, our activities aim at ensuring safe and cost-effective solutions at every step of the process, including the installation phase. In addition to the services we provide for the oil and gas industry, we cover:

- forecasts of Metocean data during installation and operation. This includes online monitoring
- installation and construction scheme optimisation
- scour protection optimisation
- noise impact analysis
- impact on seabed and coast

WAVE AND TIDAL ENERGY

The wave and tidal energy sector is in the transition phase between the development stage and the first large scale production stage. Our key activities (in addition to the services listed above) are related to:

- site and resource assessment
- power generation forecast
- power production, including interaction effects

HYDROPOWER

Hydropower constitutes one of the oldest forms of renewable energy and remains the main source of energy in certain areas of the world. Our key hydropower-related activities are:

- power generation forecast
- hydropower production and optimisation
- reservoir sediment management
- hydraulic structure optimisation
- reservoir water quality
- compliance auditing

POWER PLANTS

Large conventional power plants are often located close to the coast. This facilitates access to fuel being transported by vessels as well as to cooling water from the sea. Especially for the cooling water processes and systems, we undertake the following:

- optimisation of intake/outfall location and design
- hydraulic design conditions
- EIA
- thermal recirculation/dispersion
- water quality assessment
- sedimentation, marine growth and intrusion of seaweed, fish and debris
- transient flow phenomena
- internal flow and pump optimisation
- model testing — CFD analysis

ALTERNATIVE ENERGY

From nuclear and thermal energy to shale oil and gas, our key services relate to:

- environmental impact issues
- reduction of non-reusable water
- optimisation of energy extraction

> “ Global energy demand will grow by **more than 33% by 2035**

CASE STORIES

Since 2008, we have supported Chevron on the Wheatstone LNG Project — one of Australia’s largest resource projects. We provide wide-ranging environmental support, including numerical modelling and expert advice to quantify and reduce the potential impacts to the marine environment. After the EIA approval in 2011, we continued to provide assistance to Chevron during the tendering phase. We now provide our services for the dredging phase.

The European Union aims to develop around 40 GW offshore wind power in order to meet its green energy target by 2020. We support this initiative with innovative and cost-efficient methodologies for EIAs and hydraulic designs specific to offshore wind development. We help overcome challenges such as impacts on seabirds and marine animals, changes to the seabed and coast and the interaction with waves, currents and wind.

We developed a forecast model for hydropower production for the German transmission network operator TenneT TSO GmbH. Our unique forecast comprises hydropower production from numerous German rivers covering an area of almost 200,000 km2. This allowed TenneT to optimally market fluctuating energy production from run-of-river power plants.

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