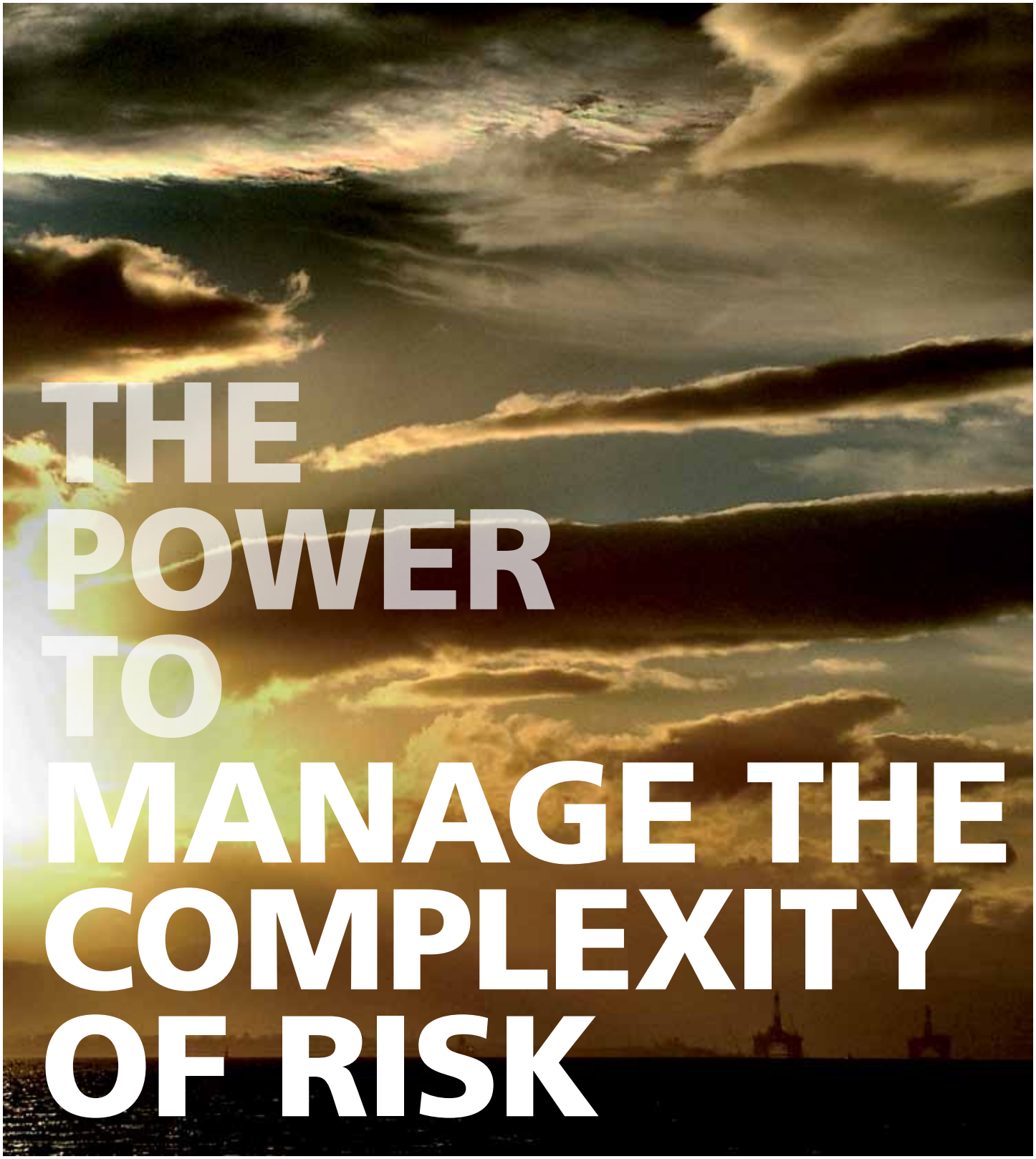
MANAGING RISK

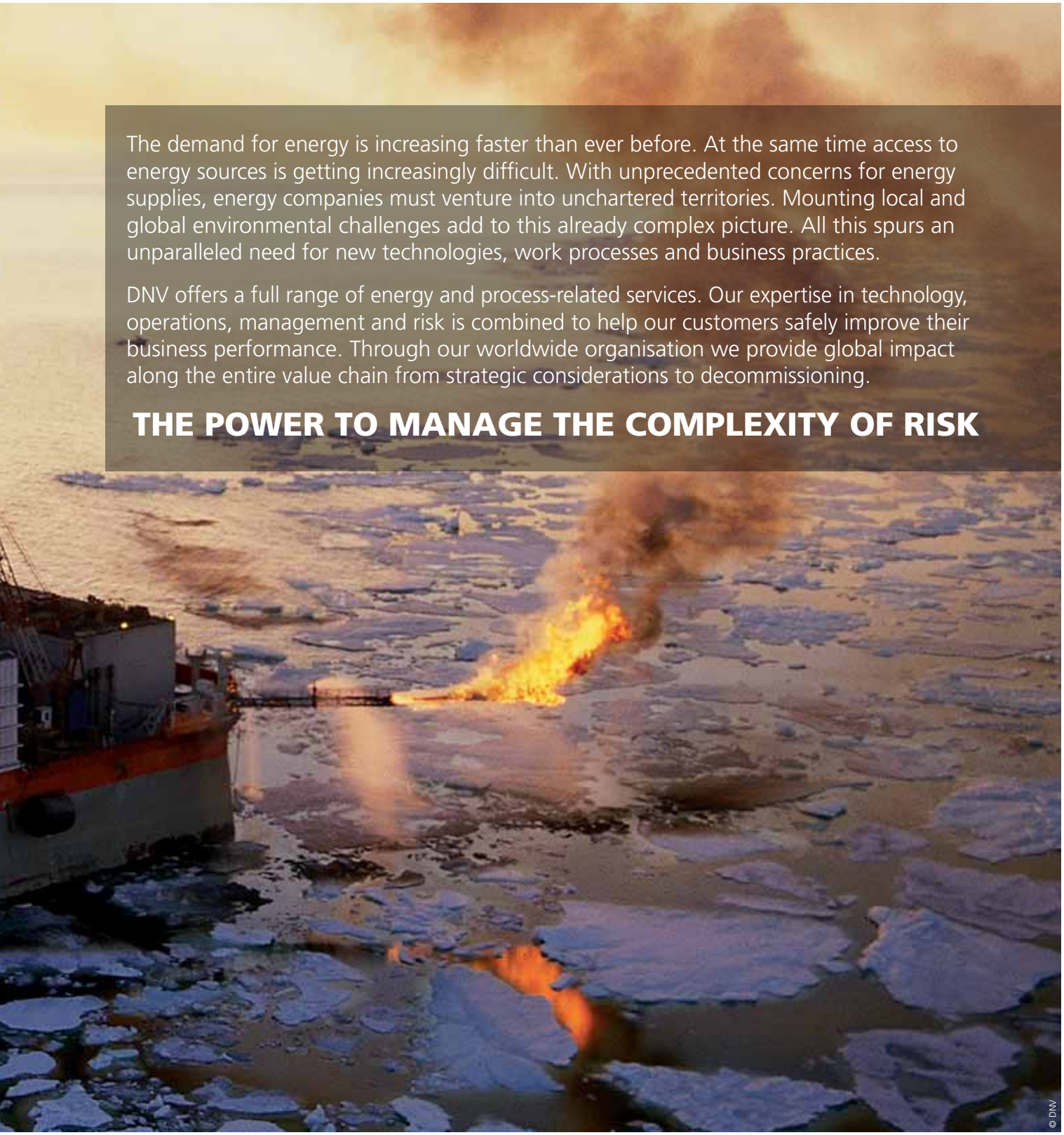
service overview



GLOBAL SERVICES TO THE ENERGY INDUSTRY

- Offshore classification
- Verification
- Technology qualification
- Asset risk management
- Safety, health and environmental risk management
- Enterprise risk management

CONTENTS



The demand for energy is increasing faster than ever before. At the same time access to energy sources is getting increasingly difficult. With unprecedented concerns for energy supplies, energy companies must venture into unchartered territories. Mounting local and global environmental challenges add to this already complex picture. All this spurs an unparalleled need for new technologies, work processes and business practices.

DNV offers a full range of energy and process-related services. Our expertise in technology, operations, management and risk is combined to help our customers safely improve their business performance. Through our worldwide organisation we provide global impact along the entire value chain from strategic considerations to decommissioning.

THE POWER TO MANAGE THE COMPLEXITY OF RISK

THE IMPORTANCE OF A COMPLETE PICTURE BASED ON IN-DEPTH KNOWLEDGE

Complexity, uncertainty and change are prevalent within all business functions. As a consequence, the risk profile of every enterprise constantly changes and evolves. DNV can help identify, understand and manage each of the component risks, as well as the overall aggregate risk, in order to maximise opportunities and avoid or mitigate losses.

By providing world-class methodology and expertise in technology, operations, management and risk identification, assessment and control, we help our customers improve their business performance in a safe and responsible way.

Our service portfolio to the oil, gas and energy industries is based on our global services:

- Offshore classification
- Verification
- Technology qualification
- Asset risk management
- Safety, health and environmental (SHE) risk management
- Enterprise risk management

Our teams of highly qualified professionals deliver cutting-edge solutions along the entire value chain from strategic considerations to decommissioning. We support customers in the following industry sectors:

- Deep and ultra deepwater development
- Mobile offshore units (MOU) and floating offshore installations
- Offshore and onshore pipelines
- Natural gas/LNG
- Refining and petrochemicals
- Cleaner energy and renewables
- Power and transmission
- Arctic operations and technology
- Carbon capture and storage

OFFSHORE CLASSIFICATION

The aim of our classification services is to help owners, authorities and other stakeholders comply with classification rules and requirements. We offer classification for building and operation of MOUs, FPSOs, as well as for the process of converting tankers to production and storage units.

VERIFICATION

Today, operators of oil, gas and energy installations face ever increasing demands for transparency and accountability. DNV provides a transparent, global, risk-based and fully independent approach to verification, certification, quality surveillance and marine warranty. DNV examines if an activity, product or service is in compliance with specified requirements and provides independent verification throughout an asset's entire life cycle.

TECHNOLOGY QUALIFICATION

A fast-growing energy market spurs demand for new technologies; new technologies that need to be proven to demonstrate that the innovation actually works as intended. To develop new solutions and bring them efficiently, safely and credibly to the market, DNV offers a recognised technology qualification process. The process can be purely technical or related to the execution of a project.

ASSET RISK MANAGEMENT

Business unit managers and asset managers constantly look for new opportunities to improve operational results and control the risks associated with their operation. DNV's solutions help operators look forward and manage these opportunities. By applying a range of qualitative and quantitative methods and techniques combined with advanced software tools, operators obtain maximum value from their facilities, equipment and organisation.

SHE RISK MANAGEMENT

Mere compliance with legal requirements for SHE performance is no longer sufficient for forward thinking organisations. DNV's approach tightly links SHE requirements to asset performance. It seeks to achieve significant improvements in SHE performance through enhanced design, asset reliability and focused operational controls. Major opportunities exist for step change in safety performance to meet stakeholder expectations following recent major accidents.

ENTERPRISE RISK MANAGEMENT

Every enterprise has a continually evolving and fluctuating risk profile. DNV assists enterprises to identify, understand and manage each of the component risks, as well as the overall aggregate risk, in order to maximise opportunities and avoid or mitigate losses. In doing so, we apply a range of qualitative and quantitative methods and techniques, in combination with advanced software tools.

Strategy | Feasibility & concept selection | Design | Construction | Installation & commiss-ioning | Operation and life extension | Decommiss-ioning

OFFSHORE CLASSIFICATION

PRE-CONTRACT	Getting things right first time is key in today's hectic business environment. Designing and building offshore drilling or production units is no exception. The earlier errors are detected, the lower the cost of change. DNV's pre-contract services offer valuable insight into key challenges up-front, thus significantly reducing the downside risk in projects.
NEWBUILDING	The newbuilding process comprises design approval of technical documentation and follow up of construction at site. Early design approval lays ground for less building changes and ensures a more efficient production process. Site survey and final testing help ensure compliance with design drawings and corresponding safety and availability requirements.
CERTIFICATION OF MATERIAL AND COMPONENTS	Systems or equipment delivered from around the world require certification to meet class and regulatory requirements before they arrive at the yard or site for subsequent installation and integration. Ensuring that equipment and systems comply with the correct rules and regulations and have the right certificates is key to ensuring that unnecessary delays are avoided.
OFFSHORE UNITS IN OPERATION	Operating MOUs and FPSOs requires zero tolerance to failure. Classification of offshore units in the operation phase implies independent surveys to verify that the governing technical requirements associated with the actual class of the unit are maintained at a satisfactory level. This is achieved through: highly qualified surveyors with extensive knowledge within all relevant disciplines being capable of taking decisions on-site; tailor made in-service inspection programmes; a dedicated rig-coordinator for each unit; adaption to modern maintenance techniques by allowing for and encouraging implementation of alternative survey arrangements; and close integration with owners' integrity management systems.
CONVERSIONS	Major conversions can be challenging and experience shows that efficient conversions are best achieved through class involvement. A good working relationship and efficient communication between Class, yard and designers is essential. DNV's dedicated and experienced project managers/approval engineers and on-site approval helps achieve efficient conversions.
STATUTORY	DNV is authorised by more than 80 flag administrations to carry out statutory certification on their behalf, including SOLAS, MARPOL, Load Line, Certification and Watch keeping), Ballast water management, ISM, and Tonnage and MODU-Code. Our international network of approval centres and more than 300 survey stations in more than 100 countries are essential for our certification activities.

VERIFICATION

RISK BASED VERIFICATION OF FIELD DEVELOPMENTS	Verification contributes to the required assurance towards stakeholders and regulatory authorities that projects are implemented correctly. We provide our customers with the ability to focus their verification effort where the contribution is cost effective by employing a risk based verification approach. Through our independent and competent appraisals of field developments, we examine if they are designed, constructed and installed in accordance with project objectives.
RISK BASED VERIFICATION OF OFFSHORE STRUCTURES, PIPELINES, RISERS AND SUBSEA FACILITIES	DNV's transparent and fully independent approach to verification on pipeline, riser and subsea facilities will help to reduce and manage risk, thereby ensuring successful subsea projects.
RISK BASED VERIFICATION OF PROCESS SYSTEMS	Systems critical to process and safety may also require special attention during the in-service phase. These systems may need to be independently verified to ensure that integrity and/or compliance is continuously maintained.
VERIFICATION AND CERTIFICATION OF PRODUCTS, EQUIPMENT AND FACILITIES	With process systems and/or equipment delivered from around the world, it is necessary to verify them against project and regulatory requirements before they arrive at site for subsequent integration or use. Ensuring that equipment and systems are designed and manufactured according to required specifications is key to ensuring that unnecessary delays are avoided and that the items are used safely. Our verification services also extend to facilities, including gas export and receiving terminals, hydrocarbon refining and petrochemical facilities, and onshore LNG and gas facilities.
MARINE OPERATIONS AND WARRANTY	Accidents or unexpected occurrences during temporary phases involving offshore marine operations can have devastating financial and safety consequences. This fact alone emphasises the importance of a well-defined marine operations verification scope, a recognised technical reference, competence and experience, and quality of service.
WIND ENERGY – PROJECT AND TYPE CERTIFICATION	Due to the size of the investments required for offshore wind farms, third-party verification services are a significant benefit for owners, investors, and insurance providers as a means of reducing risk and protecting investments. A type certificate of the wind turbine is required as a prerequisite. DNV's project certification scheme is consistent with the IEC's project certification scheme for offshore wind projects.

TECHNOLOGY QUALIFICATION

TECHNOLOGY QUALIFICATION MANAGEMENT	New technology should either enable a project to be realised or enhance its value. In either case the operator needs to be confident that the technology will perform as intended. The technology developer needs to build the operator's confidence in the technology, who in turn needs to build the confidence of the other stakeholders in the project before a decision to implement it can be taken. Building this confidence requires a systematic risk-based qualification process which clearly documents the performance of the technology.
FITNESS FOR SERVICE VERIFICATION	Fitness for service verification involves being an observer to the qualification process as well as verifying technical documentation and witness tests to an extent necessary to issue the DNV qualification statements.
QUALIFICATION EXECUTION	Qualification execution comprises the types of work needed to create the various types of information, such as: providing technical expertise in failure mode identification and risk ranking; technical analyses and studies; laboratory testing; development of models for failure mechanisms; development of plans and specifications for analyses and testing; and risk and reliability analyses.
MATERIALS TECHNOLOGY	Many component or system failures experienced in the energy industry are related to material selection or quality issues. DNV therefore offers a broad range of services within materials technology and laboratory testing worldwide.
LABORATORY TESTING	DNV supports the global energy and shipping sectors with state of the art laboratory services, offering a wide range of testing capabilities, combined with strong multi-disciplinary knowledge and experience.
QUALITY FOLLOW-UP	To work safely and reliably, new technology not only needs to be qualified, it also needs to be implemented and operated according to specifications and assumptions for the technology qualification. To ensure this, DNV offers risk based follow-up of technology qualification programmes, quality surveillance and fabrication follow-up, qualification of suppliers (e.g. technical audits) and verification of specifications and procedures.

ASSET RISK MANAGEMENT

ASSESSMENT AND BENCHMARKING OF ASSET OPERATIONS	DNV helps its customers realise the potential of their assets, enabling class-leading performance. Our approach focuses on maximising revenue at optimal cost without compromising the SHE commitment of our customers. We recognise the increasing importance of corporate governance and stakeholder demands.
ASSET OPERATIONS MANAGEMENT	Our asset operations management services are designed to create an organisation that is able to maximise production output whilst at the same time, help manage safety, health and environmental risk within acceptable levels. DNV's services provide assistance in areas critical to the success of process improvement initiatives. Our services range from business process evaluation, through designing new work processes and support systems, to assisting with implementation of agreed and planned solutions.
PRODUCTION OPTIMISATION	Starting a project will influence the company's overall cash flow today, and in the future. DNV analyses how a proposed investment will affect cash flow and decide whether the project adds value to the company. Our approach builds on traditional discounted cash flow (DCF) analysis. We offer strong modelling capabilities in flow assurance, Monte Carlo simulation, investment decision support and failure data analysis and root cause analysis.
MAINTENANCE AND INSPECTION MANAGEMENT	DNV develops a customised maintenance and inspection solution, designed specifically to optimise production through effective maintenance and inspection. A risk-based approach allows for resources to be focused where they are most effective, without compromising the asset's safety and environmental performance. Working together with our customers, we transfer the necessary expertise so that our customers can achieve the best results sooner, smoothly and safely.

SHE RISK MANAGEMENT

RISK BASED DECISION SUPPORT	DNV offers a full range of services to support customers, ranging from early stage hazard identification, consequence assessment, likelihood estimation, through to advanced risk based decision support, and all the steps in between. These services meet compliance needs and go beyond when necessary to help assure appropriate investment and management of hazards protecting staff, the public, the environment, the asset, and corporate reputation.
MANAGEMENT SYSTEMS AND PERFORMANCE MEASURES	Through our management systems and performance measures service we share best practices for SHE management using a globally accepted template (ISRS™) which allow facilities to measure and benchmark their performance. A fully customised oil and gas version is available. Areas for improvement are indicated along with suggested means to achieve the improvement. Prioritised risk profiles are used to identify key processes in the existing management system, so that resources can be refocused on critical processes and control activities. Responsibilities are defined and communicated through policies, expectations, procedures, practices, rules and training programmes, self assessment and audit tools.
ENVIRONMENTAL MODELS AND MANAGEMENT	Our environmental models and management services and tools support best current practices in managing environmental performance and support and emergency response in the event of an incident. These range from managing ecosystem databases, modelling complex oil spill and blowout events, to full environmental management programmes. By understanding the issues from all perspectives and leveraging our considerable industry experience, we help develop effective and sustainable solutions. Our independent position ensures that our guidance and recommendations accurately reflect the true status of an activity or operation.
EMERGENCY PLANNING AND ACCIDENT INVESTIGATION	Emergency planning and accident investigation are two services that address the potential for events and how to respond to minimise the outcomes and how to identify direct and underlying causes of incidents in a structured context, especially large accidents with complex technical and human causes. DNV has developed a novel barrier based accident investigation approach (B–SCAT™) that links root causes to both the management system and local barrier based risk assessments.
HUMAN FACTORS AND SAFETY CULTURE	Human factors and safety culture address the human element in SHE performance, both in terms of factors leading to human errors for specific scenarios and the broader factors defined by the safety culture. The aim of both services is to reduce human errors that contribute to accidents. DNV works closely with customers helping to design processes and work systems that accommodate people issues carefully and systematically, both through the development of positive cultures and through the minimisation of human error.
ADVANCED SIMULATION AND MODELLING	Advanced simulation and modelling addresses difficult consequence simulation issues which are not adequately treated with simpler models. Tools include computational fluid dynamics and finite element structural dynamics. We support our customers with analysis, either as stand-alone services or in an integrated service package covering a variety of issues relating to explosion and fire from deterministic maximum pressures and explosion risk assessment to fully probabilistic predictions.
OPERATIONAL SAFETY	Operational safety is the collection of safety services that supports operational managers achieve and maintain the high levels of safety and mechanical integrity required by regulation and by their own safety and risk processes. DNV develops integrated programmes combining SHE risk management, asset integrity, reliability services and global best practices to achieve major improvements in process safety.

ENTERPRISE RISK MANAGEMENT

CHANGE MANAGEMENT AND PROCESS IMPROVEMENT	Change management and process improvement (CMPI) is about recognising, adapting, stimulating, managing and building support for the inevitable change critical to business survival and continuous improvement. Our risk-based methodologies take into account the company's risk appetite and maximise the benefits of these initiatives. We provide critical input to change management and process improvement initiatives.
ENTERPRISE RISK MANAGEMENT IMPLEMENTATION	Enterprise risk management can help systematically identify, balance and control a company's portfolio of business risks, aligning its risk profile with its risk appetite. With our approach we help ensure that decisions are based on a solid foundation, at the right level, and that the solution secures and develops value. Typical services include: risk management aspects of corporate governance; assessment of the risk picture; management systems design, implementation and measurement; and implementation of EasyRisk Manager.
PROJECT RISK MANAGEMENT	Project risk management (PRM) proactively identifies issues that may influence the success of projects. This greater risk awareness creates confidence for all stakeholders. Using our global industry experience, DNV works with our customers to assess project issues, select and apply appropriate PRM solutions to improve project performance, and provide stakeholder confidence. Typical services include: cost and schedule risk assessments; project risk management implementation; project risk management tools; project risk management training; and implementation of our dedicated risk management tool, EasyRisk Manager.
VALUE CHAIN ASSESSMENT	Assessing the total value and uncertainty – and thus the total risk – of an investment is the main objective of DNV's value chain assessment. Our approach is different from the traditional discounted cash flow approach, which integrates all risks into the discount rate. Instead, we model the uncertainties into cash flow elements, such as costs, availability, schedule, etc. This adds to the understanding of the impact of risk drivers, and offers a better starting point for managing those risks in the investment project that typically follow the investment. Typical services include: net-present value assessments; concept selection; flexibility and robustness of different concepts or investment alternatives; cost-benefit assessment of new technology; and value of new information and real options.
PROJECT DUE DILIGENCE	DNV is recognised as one of the world's leading international providers of project due diligence services to the oil, gas and petrochemical industries. With teams that combine business and technical expertise, we help our customers build a comprehensive understanding of business challenges, and provide independent reports, monitoring and advisory services. We have experience with drilling units, light well intervention vessels, fixed or floating oil/gas production platforms and terminals, LNG export or import terminals, pipelines, subsea developments, a number of different oil and product tankers and LNG carriers, as well as petrochemical plants. We regularly act as an 'independent consultant', 'independent engineer' or 'technical advisor' on behalf of our customers.

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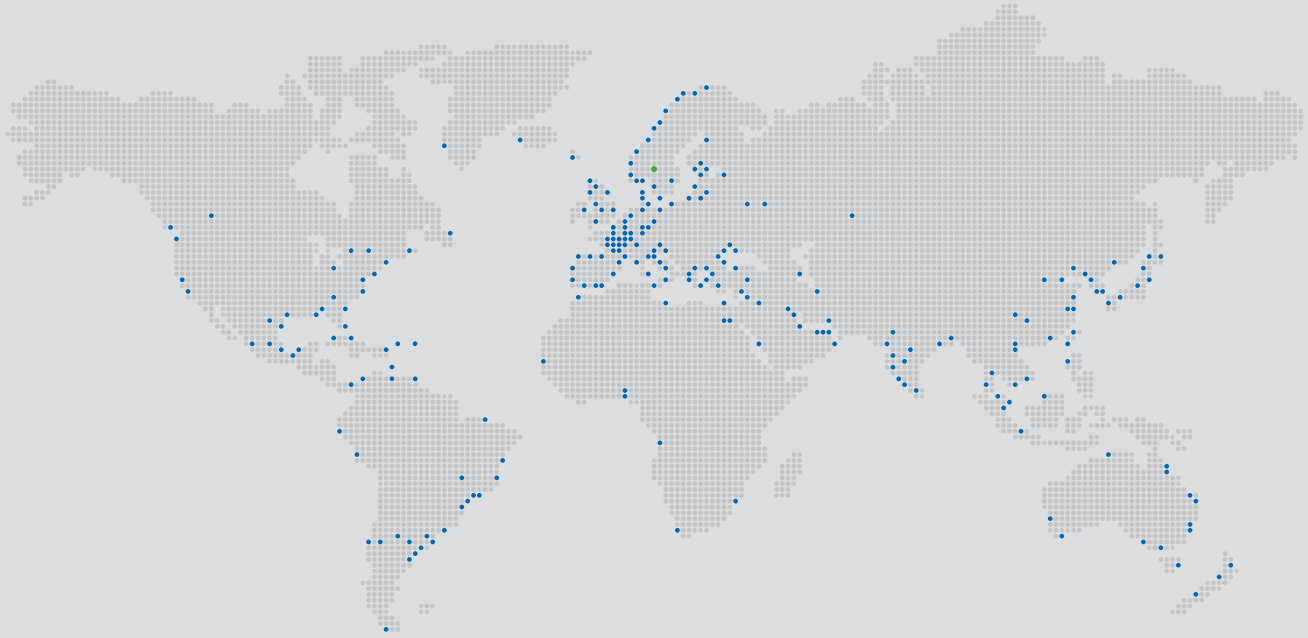
MANAGING RISK

THIS IS DNV

DNV is a global provider of services for managing risk, helping customers to safely and responsibly improve their business performance. Our core competence is to identify. assess and advise on risk management. DNV is an independent foundation with presence in more than 100 countries.



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