CREATING VALUE FROM WELLS
ENHANCING PERFORMANCE AND SAFETY
If oil and gas companies are going to provide the energy that the world needs, they will have to drill a lot of wells. Some of those wells will sorely test the companies’ drilling and completion capabilities. They might lie thousands of metres underwater, and they might stretch thousands of metres underground. In some cases, the sheer number of wells needed to develop a field may prove overwhelming. And even if a company has the techniques to drill longer and deeper wells and the financing to drill wells in greater numbers, it must also be capable of keeping them all safe and in good working order.

The challenge for oil and gas companies is thus clear: Unit well costs have to come down, and well delivery time needs to be made shorter. And above all, well integrity must be safeguarded.

Shell develops its well-engineering staff, leverages its purchasing power across the globe and applies advanced technologies and rigorous controls to meet that challenge. It intends to make its wells more productive and competitive whilst not compromising on safety. And it will do so by being smarter in the ways it goes about drilling, completing and servicing wells.
TABLE OF CONTENTS

PLANNABLE PERFORMANCE

A global approach 4
Shell and its contractors 6
Case study: Reducing non-productive time on a global scale 7
Case study: Learning curves in tight-gas fields 8

TECHNOLOGY & ENGINEERING

Automating the drilling process 10
Controlling drill-string vibrations 12
Performance Optimisation Centres 13
Case study: Reducing cost in northern Louisiana 14
Collaboration to deliver well manufacturing services 15
Eliminating telescopic wells 16
Taking the lead in deepwater drilling – Noble Bully I and II 17
Balancing the pressures 18
Beyond drilling 20
Innovation in unconventional resources 21

PEOPLE MAKE IT HAPPEN

Learning & development 22
Case study: Building capability in Sichuan 23
A GLOBAL APPROACH

Anyone who cares about people and the environment demands the highest standards of process and personal safety from the oil and gas industry. Workers must be protected from injuries, and polluting liquids and gases must be contained. Shell has publicly committed itself to Goal Zero: no harm to people and no leaks to the environment.

At the same time, Shell’s wells must be competitively priced and offer better value than the majority of those of its competitors. Consistent top-quartile performance requires a consistent approach to field-development projects. And to reach even higher levels of performance – to become best in class – a total commitment to continual improvement will be required.

Shell’s wells activities across the globe are managed systematically to achieve these simultaneous goals. Standards are set for health, safety, security and environment (HSSE), engineering, technical assurance, competency and risk management. The required levels of compliance are also specified. A common process guides the way a Shell company selects, plans and executes drilling and well-intervention campaigns. This global well delivery process outlines mandatory requirements for plans, approvals, controls and assurance; these are aligned with other Shell processes and disciplines that are called upon in a field-development project. Shell sets clear performance targets for every drilling or well-intervention campaign and requires regular reports about its performance.

Value creation is an integral part of the process. The activities are structured to challenge the multidisciplinary teams working in a co-operative, creative and constructive spirit. This enables the diversity and experience of the team to be brought to bear in the identification of improvement opportunities as well as HSSE and business risks. Those identified opportunities can be turned into an action plan with clear deliverables tied to individual goals and performance appraisals. The identified risks must be similarly managed.
Shell’s global well delivery process defines the steps needed to ensure the reliable performance and continual improvement of a drilling campaign underlying a field-development project. (DCAF: Discipline Control and Assurance Framework; DWOP: Drill the Well on Paper)
SHELL AND ITS CONTRACTORS

Shell has a strong performance record in drilling, completing and servicing wells. Its wells have been ranked in the top 25% for several years running in the annual benchmarking exercise that Independent Project Analysis (IPA) conducts. But it keeps striving for even better performance with the goal to become best in class. And that means applying improvement techniques, more standardisation of goods and services, more replication of best practices for certain well types, and greater assurance of contractor and staff capabilities as well as process safety. It also makes every Shell driller and well engineer individually responsible for continuous improvement.

Performance management is structured so that it follows a plan-implement-check-review cycle. Along this cycle the resulting performances are benchmarked. The analysis uncovers how much better Shell's performance could be. Once the gaps between the actual and the best performances are understood, plans are drawn to close the gaps so that best-in-class performance can be achieved.

Every year Shell and its key suppliers also agree on the most important areas on which to focus their corporate efforts to improve performance. Joint Business Improvement and Joint Safety Improvement Plans are then drawn up. These plans clearly express the company-to-company alignment that facilitates the spread of best practices in process safety, personal safety and well operations to work sites around the world.

Shell approaches supplier value across a number of different areas. For example Global Framework Agreements (GFAs) provide a key lever to enhance operational delivery and to achieve top-quartile performance in HSSE and operations. A GFA covers the materials and services that Shell requires from a supplier for it to deliver on its business plan. Typically, an agreement includes general and commercial terms, Shell standards, terms for HSSE and technical requirements – including innovations. By utilising GFAs, Shell is able to obtain a competitive price advantage and standardisation on a global scale.
Non-productive time (NPT) caused by preventable tool and equipment failures in offshore well operations typically accounts for 5% of the well delivery time. But it can be as high as 30%. The higher percentage equates to millions of dollars per year that could have been spent on other, productive well operations. So Shell embarked on a programme to drive NPT down.

Using its own root-cause failure analysis and “trouble action teams” that worked closely with equipment vendors, it achieved a steady improvement trend on a global scale.
LEARNING CURVES IN TIGHT-GAS FIELDS

For an organisation to achieve a top performance it has to have the capability to learn – and to transfer the lessons learned quickly and effectively throughout the organisation. Shell’s tight-gas and shale-gas fields provide good examples of how to move a drilling campaign rapidly along a steep learning curve and then replicate – even more rapidly – the gained learnings in drilling campaigns at other locations.

For example, incremental improvements brought down well-delivery times dramatically at the Haynesville shale-gas development onshore Louisiana in the USA. Over the initial three years that Shell was drilling wells there, average drilling time and well costs were cut by about two-thirds. The key improvements that led to such an impressive result have revolved around drill pads; optimised well and completion designs; supply-chain management; low-speed, high-torque downhole motors; 24-hour fracking operations; and better staff training.

A similar improvement in time-to-delivery was evidenced at Pinedale in the US state of Wyoming. The average drilling time fell there by nearly 70% between 2002 and 2011. But what is even more impressive is that the learning accelerated from project to project in North America. It took rig teams at Groundbirch in Canada only three years rather than eight to achieve nearly the same improvement as at Pinedale. And Shell’s know-how has even been exported to rigs operating outside of North America. In fact, Shell rigs drilling a tight-gas field in China have shown the quickest learning so far (see graph).

Well delivery improved over time not only at a specific place but also from place to place, thanks to continual improvements and sharing of best practices.
AUTOMATING THE DRILLING PROCESS

Letting a machine handle the mechanical and hydraulic drudgery of drilling means that people can be kept away from hazardous areas. Shell well engineers can instead devote their time to perfecting and calibrating the algorithms built on best practices, ensuring a consistently high level of performance. Automated rigs also make the success of a large field development less dependent on the local availability of skilled rig personnel. These were the main reasons for Shell to develop the revolutionary SCADAdrill control system. The system, which is being rolled out to locations around the world, provides autonomous drilling and trajectory control. It is designed to use common tools sourced from low-cost suppliers.

The SCADAdrill computer system connects to the existing instruments and controls of a drilling rig. It can thus operate the rig machinery and monitor all aspects of the drilling process. In fact, the monitored parameters serve as the feedback control for the rig machines. In this way the orientation of the borehole is constantly checked as it is being drilled, helping to ensure that the well is drilled efficiently and that it reaches its target.

Although it is capable of working without human supervision, SCADAdrill allows well engineers to monitor the rig remotely. If necessary, control can be taken over from the machine. Experts at Process Optimisation Centres hundreds of kilometres away can thus initiate well interventions. (See page 13)
Existing controls and sensors on rigs serve as interfaces for SCADAdrill, enabling the computerised system to regulate mud pumps and manipulate top drives and hoists.
CONTROLLING DRILL-STRING VIBRATIONS

Modern digitally controlled top-drive motors help to drill wells deeper and through harder rock. But the drill strings are often kilometres long, making it tough to hold the drill bits steady. A major challenge is to keep long drill strings turning at the same rate from top to bottom. A very common problem in this regard is called stick-slip: the drill bit stalls while the top drive motor keeps turning, and — once freed — the bit turns up to five times faster to catch up. As a result, parts of the drill string wind and unwind along the drill string’s entire length – a bit like the rubber band that powers the propeller on some toy planes. These twisting vibrations slow down drilling and can damage equipment.

Shell’s Soft Torque Rotary System (STRS), however, can make even the longest drill strings turn smoothly — making drilling faster and more affordable. The STRS is software that takes information about the drill string, its surface rotary speed and the build-up of torque in the drill string to calculate adjustments to the top-drive motor speed. It then communicates these to the motor’s computer controller. The result is a uniformly turning drill string, eliminating the stick-slip problem. Shell is applying this technology around the globe. By early 2012 it was installed on 50 rigs, enabling up to 40% faster drilling with less equipment damage and saving up to 15% on the cost of a well.

The Soft-Torque Rotary System (STRS) dampens the torsional vibrations travelling up and down the drill string, resulting in a more constant rotary speed at the drill bit.

![Image of a worker at a control panel with a graph showing torque and speed over time. The graph shows the effect of the STRS on reducing vibrations.]
State-of-the-art technology is a key enabler of top drilling performance. But when working on a well, it is equally important to be able to call upon the right people at the right time. Shell supports the decision-makers on the ground with real-time advice from the experts assembled at Performance Optimisation Centres around the globe. These centres also serve to disseminate the continual-improvement lessons learned from after-action reviews around the world.

Shell has equipped these Performance Optimisation Centres with the software tools and satellite communications necessary to monitor well operations remotely and to provide real-time engineering solutions. The latest 3D subsurface modelling software, for example, is used to design wells and plot their trajectories. The centres enable very fast information dissemination, informed decision-making and helpful consultation with appropriate experts at critical moments during a well’s drilling or completion.

**Number of bit runs in Magnolia**

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of Bit Runs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadway (Typical)</td>
<td>7</td>
</tr>
<tr>
<td>Raines (Best Offset)</td>
<td>4</td>
</tr>
<tr>
<td>Crest (STRS)</td>
<td>2</td>
</tr>
</tbody>
</table>

*Number of bit runs dramatically improved when the STRS was used by rigs at the Magnolia shale-gas project in the USA.*
Shell set up a Process Optimisation Centre known as DART (short for the Drilling Automation and Remote Technology) to manage critical aspects of drilling horizontal wells through the shale formations at Magnolia, onshore Louisiana, USA. This centre allows a single off-site team to manage operations on multiple rigs at the same time. Directional drilling, measuring and logging while drilling, and geosteering operations can all be done remotely thanks to Shell’s Rig-in-a-Box data collection and transmission system.

DART demonstrated the following benefits:

- Three times more directional wells can be drilled with no increase in staff numbers.
- With fewer staff needed at the rig sites, the overall exposure to occupational hazards is reduced not only at the site itself but also during the commute back and forth to the rig site.
- A single geologist can handle up to five geosteering operations at the same time.
- The number of geosteering corrections and dog-leg sidetracks is reduced and the well’s horizontal section can be placed in more productive formations.
COLLABORATION TO DELIVER WELL MANUFACTURING SERVICES

The full-scale development of a tight-gas or shale-gas field can require several hundred wells – some projects even have far more than a thousand. To drill them quickly and efficiently, Shell has teamed up in a joint venture with China National Petroleum Corporation to provide integrated services and develop an innovative system for mass producing wells with standard design and components. Besides getting access to the relatively low-cost Chinese drilling equipment market, this move also enables better access to some of the world’s biggest rig manufacturing yards. The system turns the traditional approach to drilling on its head: instead of having one rig that can do many tasks, it is based on multiple mobile rigs, each designed for one specific standardised task.

The rigs themselves would move easily from location to location. And their specialisation means that, say, one type of rig would be used for preparing the top part of a well, another rig for extending the well to the target depth and a third type of rig for completing wells. A computer system would manage the individual machines on the rig and monitor all aspects of the drilling process.

The computer automation will make it possible to perform activities that most current rigs would be incapable of executing. The drill bit, for example, can steer itself through the ground on the basis of real-time data measured by sensors near the bit. No intervention from an experienced driller is needed at the rig site. Instead, the expert would supervise many rigs from a central control room.

In line with practices in other industries, the joint venture has come to the conclusion that operations over large expanses are best organised around regional hubs. Equipment and supplies would be stored at these hubs. Waste would be treated there prior to its disposal. They would also serve as a depot for the rigs. Using the combination of state-of-the-art drilling technologies and a low-cost sourcing strategy for services and equipment, the joint venture is set up to unlock substantial oil and gas resources in a cost-efficient way and on a large scale.

Well-manufacturing system uses centralised logistics (top) and automated truck-mounted rigs (bottom) to drill hundreds of low-cost wells for particular field-development projects.
In 2004 Shell drilled the world’s first “monodiameter well”: a well with a single, fixed internal diameter from top to bottom. It thus demonstrated that the cumbersome downward-tapering geometry of conventional well designs was no longer necessary. In those early days the monodiameter-well technology required a complex tool string and elaborate operating procedures to install an expandable casing system. But in 2011 Shell developed a much simpler method to expand the casing: the Top Anchor and Pull (TAaP) system. The simplified tool string has proved to work in tests and is now being put to trial at onshore and offshore fields in North America.

The advantages of the monodiameter well are many fold: It requires less steel, drilling fluid and cement, thus reducing the environmental footprint and cost of a well. From an operational perspective, it enables a high degree of standardization and the use of a smaller, fit-for-purpose rig. It can also extend the reach of existing wells within partially depleted fields. That last advantage gives Shell the capability to reach stranded reserves with a theoretically unlimited number of casing/liner joints.

A 9-5/8” casing with an expansion cone shows how the casing pipe can be forced outward to fit tightly against the borehole.
Shell has driven a series of innovations in deepwater drilling over a prolonged period. Reducing the environmental impact and cost of drilling in deepwater are constant objectives.

The highly innovative Noble Bully rig design is the result of a concerted development programme in collaboration with leading drilling contractor Noble Corporation. The rigs, which entered service in late 2011 and early 2012, are based on a revolutionary concept: a floating drilling rig with all the attributes and functionality of the latest fifth-generation drillships but with lower capital and operating costs and a reduced environmental footprint.

Working with Noble, we have achieved that. Noble Bully I and II are significantly lighter and shorter than comparable capacity drillships. Locating the pipe storage in the hull of the vessel and having a compact, box-type, multipurpose drilling tower rather than a conventional drilling derrick ensure its stability. The vessels can drill in water depths up to 3,000 metres deep. The vessels also boast the latest electronic engine controls and an advanced dynamic positioning system, which preserves fuel consumption and cost, and helps to reduce carbon dioxide emissions by over 100,000 tonnes per year compared with deepwater drillships with the same capabilities.
Shell’s experience with underbalanced drilling (UBD) and managed-pressure drilling (MPD) sets it apart from the competition.
Conventional, or “overbalanced”, drilling is based on keeping the fluid in the borehole at a pressure higher than that of the fluids in the reservoir. This keeps the oil and gas inside the reservoir during drilling. But the higher pressure slows down the drill bit’s rate of penetration. Moreover, it can damage the rock around the borehole, making it more difficult for the oil and gas to flow into the well when the well is ultimately brought into production.

Underbalanced drilling, in contrast, deliberately keeps the pressure lower in the borehole than in the reservoir. As a result, reservoir fluids flow into the borehole as the borehole is being drilled, and damage to the reservoir rock is avoided. When the well is then brought on-stream, its inflow rate can be up to 800% greater than those of wells drilled in the overbalanced mode. The drill bit’s rate of penetration can also be as much as five times higher than that of conventional operations.

And then there’s managed-pressure drilling, which seeks to optimise both the drilling and the productivity of wells through continual adjustments of the borehole pressure so that it lies in between over- and underbalanced values. In Sichuan, for example, the application of managed-pressure drilling increased the average drilling penetration rate by 40%.

Shell has probably a unique position in the industry in that the majority of its wells are the result of managed or underbalanced drilling. In 2011 more than 80% of Shell’s wells used either underbalanced or managed pressure drilling technologies.

Especially in shale-gas and tight-gas field developments underbalanced drilling adds a lot of value. Hundreds of wells are needed for these kinds of developments, so the per-well time and cost savings add up quickly. In some projects Shell has shortened the average drill time from more than 30 days to just over ten days with underbalanced drilling. Additionally, underbalanced drilling gives engineers valuable reservoir inflow data that can be used to optimise field-development planning.
Drilling a well can be a challenge — especially if it is to be done quickly and cheaply but above all safely. Yet the well operations that follow drilling — completions and interventions — typically make up more than half of a well’s cost. So Shell devotes considerable effort to improving the designs of the tubing and inflow valves of completions. It also continues to develop new technology to give wells a new lease of life.

Shell designs wells for high throughput, taking into account the severe loads that the well may see in its lifetime. It would not be unusual for Shell to complete deepwater wells that are capable of producing at least 35,000 barrels per day. To this end, Shell uses specialised software for predicting well production rates and loads on tubing and casing. It also makes it standard practice to test the capacity of tubular connections to withstand massive loads. The casing and tubing specifications often rely on extraordinary metallurgical alloys, similar to those used in the aerospace industry. In bringing these well designs to reality, Shell keeps breaking the record for the deepest water in which wells are producing oil and gas. In fact, the current record was set by Shell at Perdido in the Gulf of Mexico.

But what if a deepwater well needs fixing? In such a case, a rig would typically be required. But then, for as long as the well intervention lasts, the rig could not be used to drill — a costly sacrifice. In 2007, Shell started working with contractors to develop a capability to do intervention and completion work with ordinary vessels instead of offshore drilling rigs. After some first successes with coiled tubing in 2007 and 2008, Shell surprised the industry in 2009 with a rig-less deepwater intervention. A subsurface valve in a well under 2,673 ft (815 m) of water was replaced using nothing more than an open-water wireline. This had never been done before at such depth.

Since then, Shell has built on that precedent. In 2011, it set a plug with a wireline to kill a well offshore Nigeria at a water depth of 3,788 ft (1155 m). The rig-less intervention was successfully replicated offshore Brazil a few months later — but at an even greater depth. A Shell team completed a well in the Parque das Conchas development using wireline reeled out from a non-dedicated service vessel.
Over the past decade Shell has built up an impressive portfolio of unconventional oil and gas assets. Innovative technologies, such as multistage completions and new methods of hydraulic fracturing, have made these assets economically viable.

Shell has recently introduced another innovative technique into its toolbox: Just-in-Time Slick Water (JiTSW). Initially pumped as thick fluid, it rapidly degrades in a predictable manner to a thin fluid like similar to conventional ‘slick water’. The high initial viscosity can help with placing proppant in difficult to fracture reservoirs, increasing fracture height, or use of larger proppant, leading to more productive wells in many unconventional fields. As it thins, the JiTSW fluid penetrates deep into the rock, enabling more of it to be fractured.

JiTSW can reduce water requirements thereby reducing the environmental impact and logistical challenges posed by water use in fracking – not to mention the operating costs. It also helps to improve safety, reduce the equipment footprint, and air pollution at the well site, since fewer diesel-powered pumping units are required.

### Relative Conductivities of Various Fluid and Proppant Combinations

<table>
<thead>
<tr>
<th>Fluid Combination</th>
<th>Conductivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2% KCl Base Line, 40/70 sand</td>
<td>100%</td>
</tr>
<tr>
<td>Slick Water, 40/70 sand</td>
<td>93%</td>
</tr>
<tr>
<td>Just-in-Time Slick Water, 40/70 sand</td>
<td>77%</td>
</tr>
<tr>
<td>Just-in-Time Slick Water, 30/50 sand (larger proppant)</td>
<td>145%</td>
</tr>
</tbody>
</table>

**Ability to frac with larger proppant** make Just-in-Time Slick Water a fluid of choice in many fracking applications.
The strictest procedures, the best practices and the most rigorous standards are only as effective as the people who implement them. That’s why continuously Shell invests in the development of its staff. And among the 90,000 or so Shell people working in more than 80 countries are approximately 1900 who are working as well engineers, well completion and well-intervention engineers.

Shell offers exciting work opportunities drilling, well intervention and well completions. It has organised a variety of formal learning events to ensure that drillers and well engineers gain the competencies required for their jobs and share the same self-improvement aspirations. Shell believes that staff benefit from the experience gained in different jobs in different countries.

Since 1973 Shell’s well engineers undergo a rigorous three-year training programme consisting of two “rounds” of extensive course work, mandatory exams and on-the-job training. The substantial reference material is now available on an iPad so that trainees can easily consult it – even while at work.

Shell well engineers as well as completions and well-intervention staff have to pass the Round 1 and Round 2 examinations to work unsupervised as a well or completion engineer or as a rig-site supervisor. Some 20% of the candidates do not make the grade. In total they have two attempts. A Round 2 pass is accredited at a Master of Science level by Robert Gordon University in Aberdeen, UK.

To make the training as realistic as possible, Shell’s learning facilities offer simulators, one for drilling scenarios and the other – the first of its kind – for well-interventions scenarios. Like flight simulators, they reproduce the visual and auditory experience of being at the rig site.

Shell’s well operations preoccupy Shell drillers and completion and well-intervention engineers. But they also concern thousands of other people throughout world who live nearby the rigs, flowlines and production centres. Building respectful relationships with such neighbours is fundamental to Shell. That’s why Shell wants to becomes part of the community, sharing a range of benefits.

These include jobs and vocational training as well as contracts for goods and services provided by local suppliers helping the local economy grow. Shell also invests in community programmes. In 2011, Shell spent more than $125 million on voluntary social investments worldwide, focusing on projects linked to road safety, local enterprise development, and securing safe and reliable access to energy.
Fushun and Jinqiu are tight- and shale-gas projects in the Sichuan province of China that Shell is developing in cooperation with China National Petroleum Corporation. The startup of the two projects was remarkable in many ways.

For one thing, the projects had to recruit and train local staff very quickly. The teams increased from only 10 staff in mid 2010 to almost 80 by the end of 2011. And for another, all of the primary contractors were Chinese. To further develop local capabilities, Shell deployed experienced senior drilling supervisors, field superintendants and managed-pressure drilling specialists from North America. Additionally, staff from Changbei – an earlier Chinese field-development project of Shell – were brought in to speed up rig mobilization.

These efforts to develop local staff to Shell’s competency standards and to improve the performance of local contractors accounted for 14% of the budget per well for Jinqiu and 16% of for Fushun. But they were well worth it with the first well being completed a year ahead of schedule.
Forward-looking statements are statements of future expectations that are based on statements of historical fact are, or may be deemed to be, forward-looking statements. Results of operations and businesses of Shell and the Shell Group. All statements other than This publication contains forward looking statements concerning the financial condition, partnerships or company, after exclusion of all third-party interest. shareholding in Woodside Petroleum Ltd.) ownership interest held by Shell in a venture, referred to as "equity-accounted investments". The term "Shell interest" is used for controlled entities”. In this publication, associates and jointly controlled entities are also referred to as "associated companies" or "jointly controlled entities". In this publication, associates and jointly controlled entities are also referred to as "equity-accounted investments". The term "Shell interest" is used for convenience to indicate the direct and/or indirect (for example, through our 23 per cent shareholding in Woodside Petroleum Ltd.) equity interest held by Shell in a venture, partnership or company, after exclusion of all third-party interest. Subsidiaries”, "Shell subsidiaries" and "Shell companies" as used in this publication refer to subsidiaries in general or to those who work for them. These expressions are also used where no useful purpose is served by identifying the particular company or companies. "Subsidiaries", "Shell subsidiaries" and "Shell companies" as used in this publication refer to companies in which Shell either directly or indirectly has control, by having either a majority of the voting rights or the right to exercise a controlling influence. The companies in which Shell has significant influence but not control are referred to as "associated companies" or "associates" and companies in which Shell has joint control are referred to as "jointly controlled entities". In this publication, associates and jointly controlled entities are also referred to as "equity-accounted investments". The term "Shell interest" is used for convenience to indicate the direct and/or indirect (for example, through our 23 per cent shareholding in Woodside Petroleum Ltd.) ownership interest held by Shell in a venture, partnership or company, after exclusion of all third-party interest. This publication contains forward looking statements concerning the financial condition, results of operations and businesses of Shell and the Shell Group. All statements other than statements of historical fact are, or may be deemed to be, forward looking statements. Forward-looking statements are statements of future expectations that are based on management’s current expectations and assumptions and involve known and unknown risks and uncertainties that could cause actual results, performance or events to differ materially from those expressed or implied in these statements. Forward-looking statements include, among other things, statements concerning the potential exposure of Shell and the Shell Group to market risks and statements expressing management’s expectations, beliefs, estimates, forecasts, projections and assumptions. These forward looking statements are identified by their use of terms and phrases such as "anticipate", "believe", "could", "estimate", "expect", "goals", "intend", "may", "objectives", "outlook", "plan", "probably", "project", "risk", "seek", "should", "target", "will" and similar terms and phrases. There are a number of factors that could affect the future operations of Shell and the Shell Group and could cause those results to differ materially from those expressed in the forward looking statements included in this publication, including (without limitation): (a) price fluctuations in crude oil and natural gas, (b) changes in demand for Shell’s products, (c) currency fluctuations, (d) shifting and production results, (e) reserves estimates, (f) loss of market share and industry competition, (g) environmental and physical risks, (h) risks associated with the identification of suitable potential acquisition properties and targets, and successful negotiation and completion of such transactions, (i) the risk of doing business in developing countries and countries subject to international sanctions, (j) legislative, fiscal and regulatory developments including regulatory measures addressing climate change, (k) economic and financial market conditions in various countries and regions, (l) political risks, including the risks of expropriation and renegation of the terms of contracts with governmental entities, delays or advancements in the approval of projects and delays in the reimbursement for shared costs, and (m) changes in trading conditions. All forward looking statements contained in this publication are expressly qualified in their entirety by the cautionary statements contained or referred to in this section. Readers should not place undue reliance on forward looking statements. Additional factors that may affect future results are contained in Shell’s 20F for the year ended 31 December 2011 (available at www.shell.com/investor and www.sec.gov). These factors also should be considered by the reader. Each forward looking statement speaks only as of the date of this publication, October 2012. Neither Shell nor any of its subsidiaries nor the Group undertake any obligation to publicly update or revise any forward looking statement as a result of new information, future events or other information. In light of these risks, results could differ materially from those stated, implied or inferred from the forward looking statements contained in this publication.

Shell may have used certain terms, such as resources, in this publication that the SEC strictly prohibits Shell from including in its filings with the SEC. U.S. investors are urged to consider closely the disclosure in Shell's Form 20F, File No 1-32575, available on the SEC website www.sec.gov. You can also obtain these forms from the SEC by calling 1-800-SEC-0330.