



Sustainability
report **2016**



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Message from our CEO



At Repsol, we are resolutely committed to sustainability. It is essential to generate value today and in the future to society and, therefore, to our company”

–Josu Jon Imaz



About this report¹

The sustainability report describes our performance in 2016. It presents overall indicators of the activities we have carried out in the countries with significant operations where we have a social, environmental or economic impact, and the management of which is under our control.

With the aim of transparency, clarity, traceability and efficiency, we have prepared the sustainability report seeking the spread of Repsol's performance in sustainability to all stakeholders. We have thus published this executive report showing the Company's work with links to other reports and online content that includes the details of our management, our indicators and our best practices in managing the sustainability issues.

This report is completed with an appended document, published on our webpage, which contains all the

key performance indicators for 2016, reported exhaustively according to the recommendations of the Global Reporting Initiative (GRI), version G4, comprehensive option. The reported indicators may include information from previous years that we deemed relevant for understanding information from the current year. The table of GRI contents with the references to the indicators reported in other public reports is included in the appendix of indicators and on our webpage, www.repsol.com.

The figures and indicators in this report have been calculated in accordance with corporate standard that set out the criteria and common methodology to be applied in social, safety and environmental matters. In general, this information includes 100% of the data of companies in which we have a majority holding or operating control. Regarding safety matter, we include data relating to 100% of the employees

of the subsidiary companies where a contract of service is in place. Likewise, energy consumption and emissions figures are subjected to an independent verification that is completed after the preparation of this report. Final values will be available in www.repsol.com.

The calculation of the economic and workforce figures and indicators are disclosed in the Consolidated Management Report.

+ Consolidated Management Report 2016

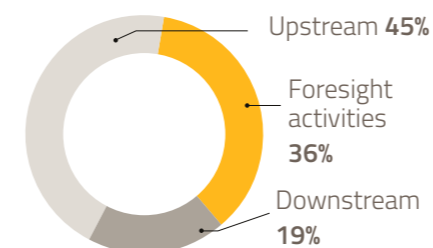
Disclaimer

Translation of a report originally issued in Spanish. In the event of a discrepancy, the Spanish language version prevails.

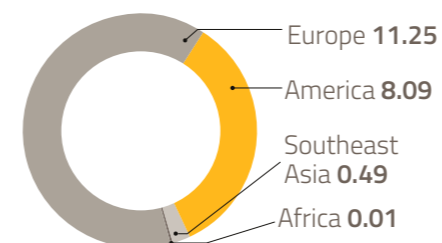
Repsol in figures

11,764 M€
tax paid

78 M€
invested in R&D



19.8 M€
Voluntary social investment



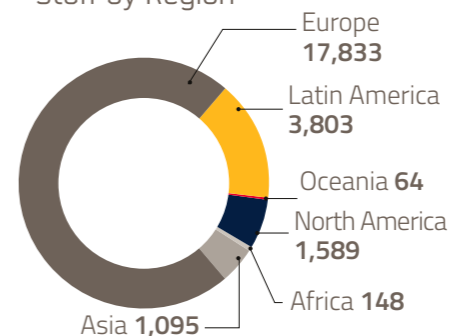
24,532
staff

35%
women

41 h.
training per employee

84
different nationalities

Staff by Region



1.46 TRIR
Total Recordable Incident Rate

256 MGJ
energy consumption

0.31 Mt
CO₂e reduced

10 Mt
reused water

Our activities

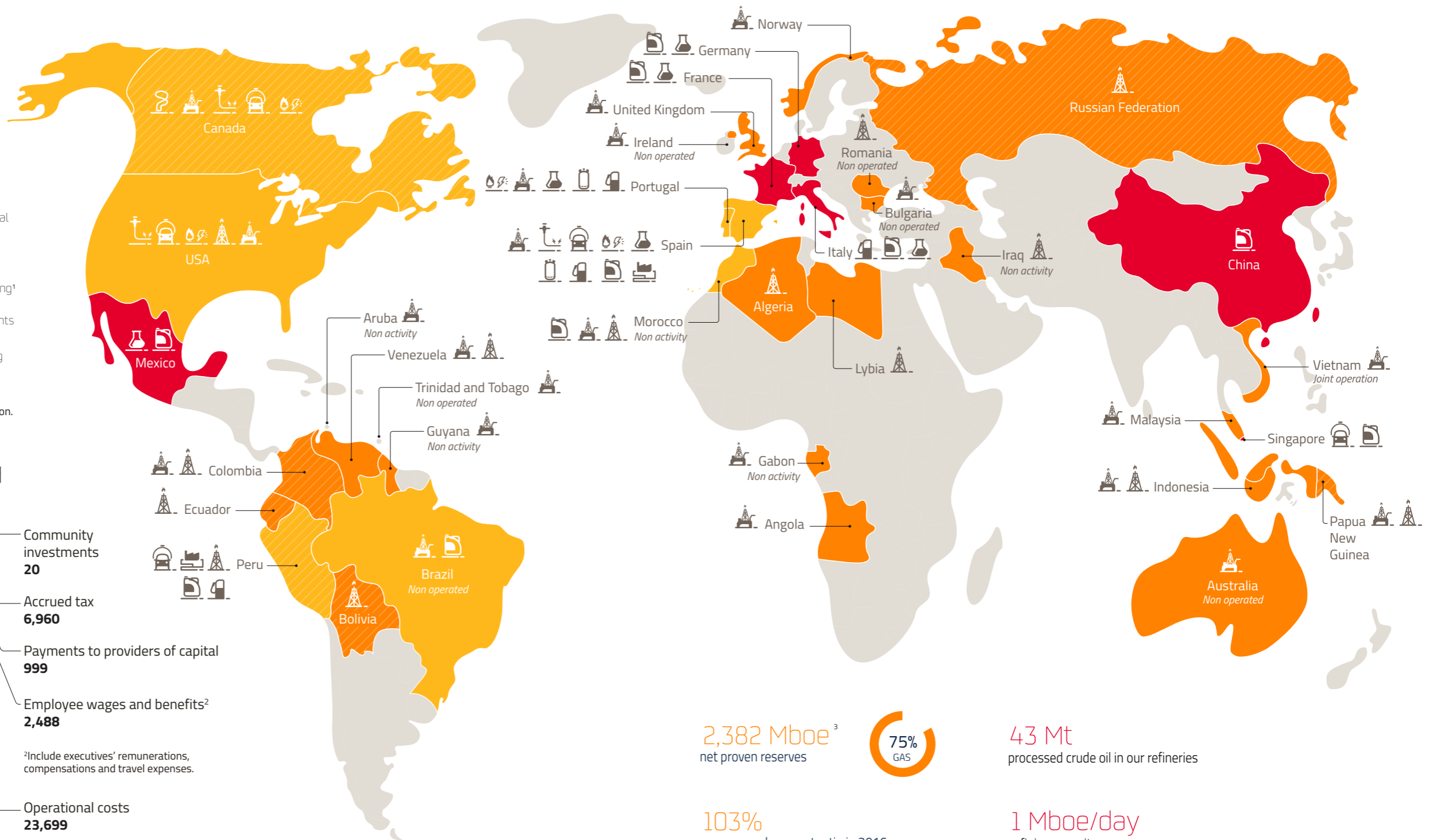
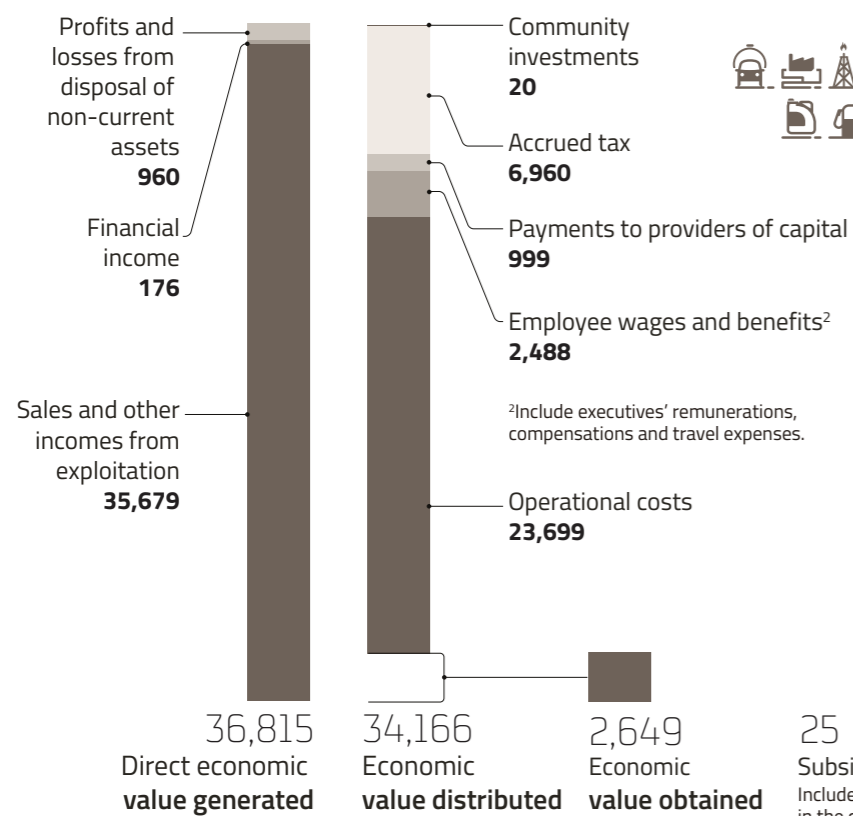
2016 Repsol activities worldwide.



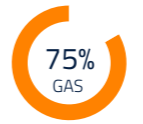
*This includes service stations, direct sales and aviation.

Economic value generated and distributed

Millions of euros



2,382 Mboe³
net proven reserves



43 Mt
processed crude oil in our refineries

103%
reserve replacement ratio in 2016

1 Mboe/day
refining capacity

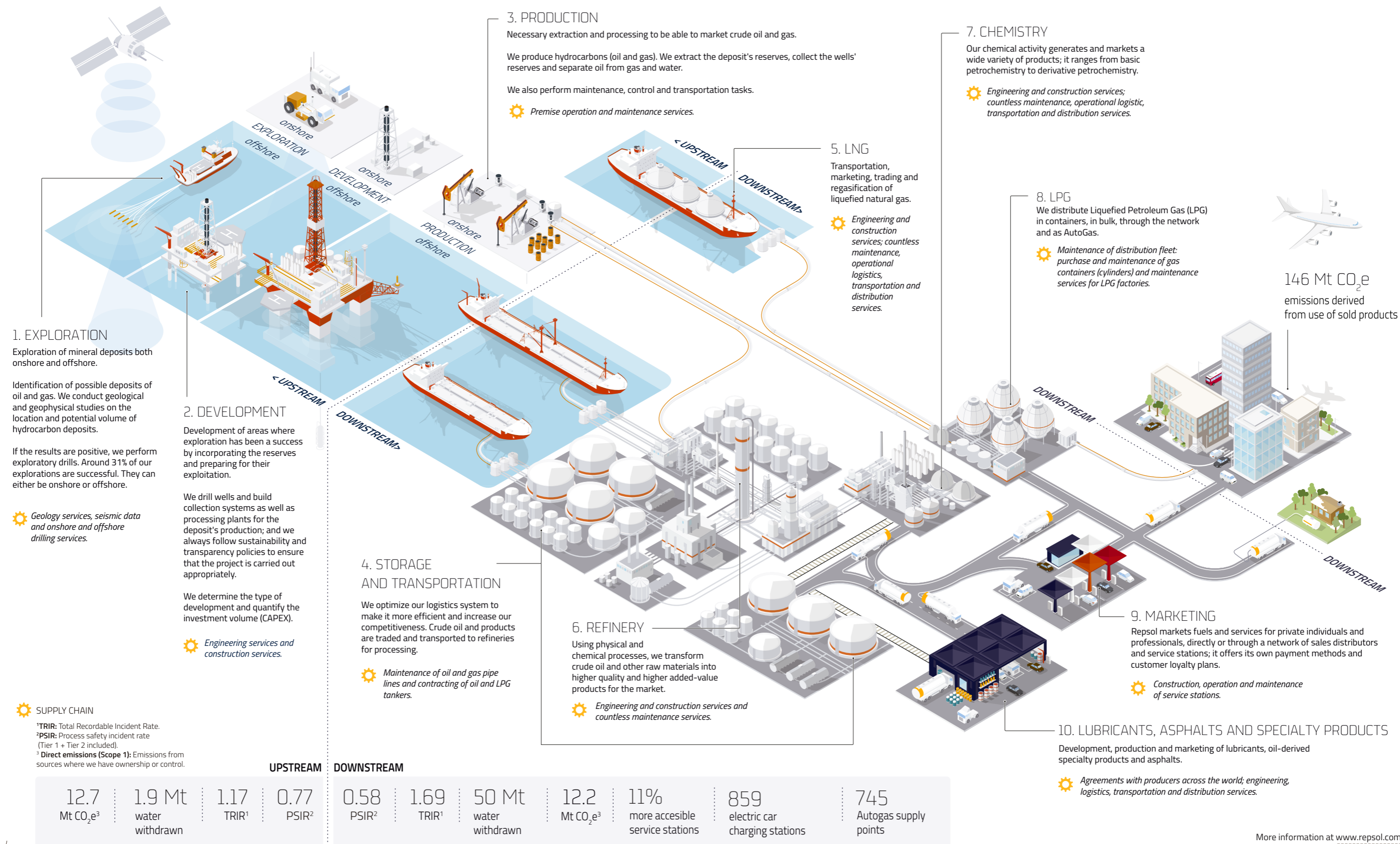
0.7 Mboe/day
Upstream production

4,715
service stations

³boe: barrels of oil equivalent.

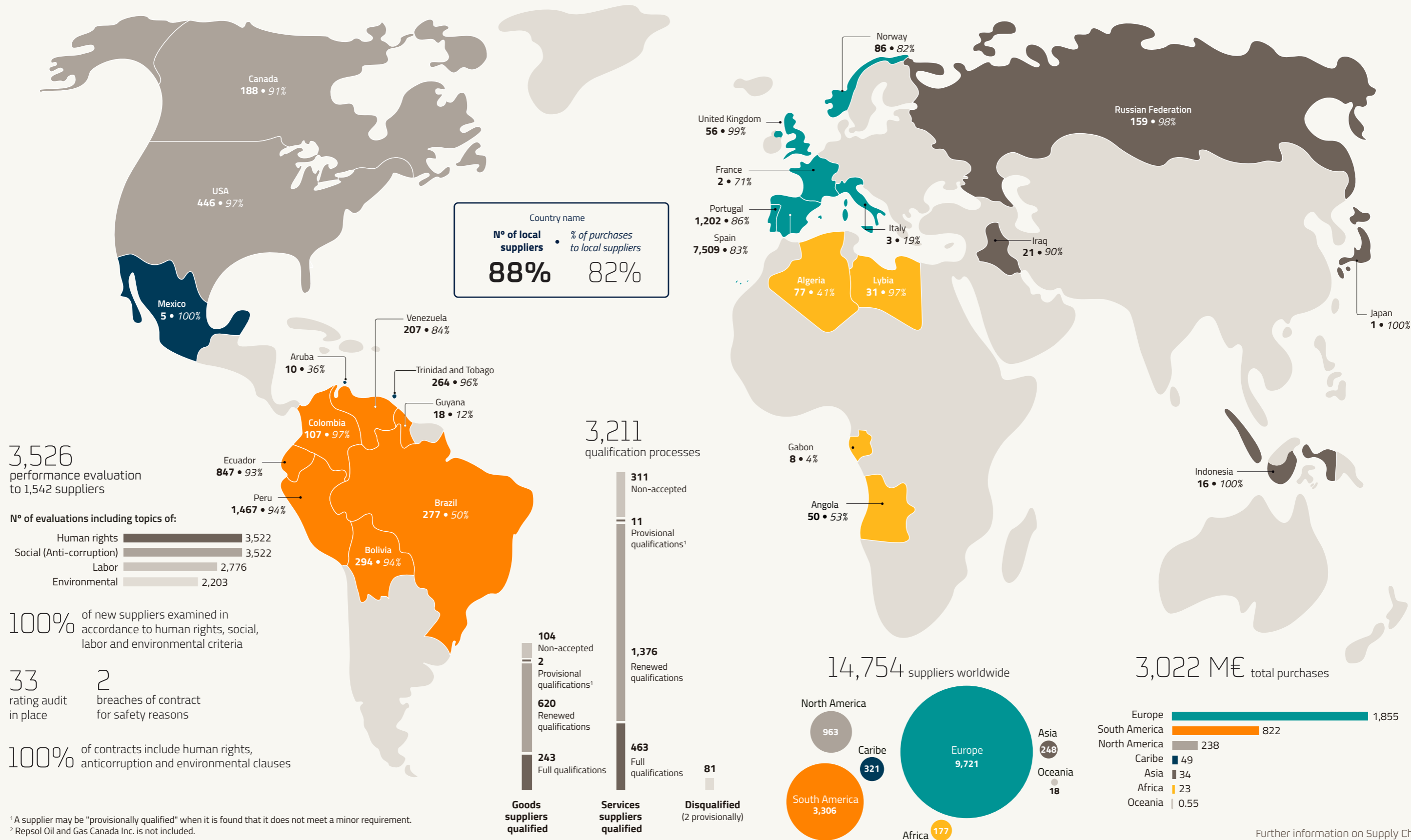
Value chain

Repsol is an integrated energy company that operates across the world in various business areas.



Supply chain

2016 Repsol's purchases and contracting to suppliers and contractors².



¹A supplier may be "provisionally qualified" when it is found that it does not meet a minor requirement.
² Repsol Oil and Gas Canada Inc. is not included.

Further information on Supply Chain

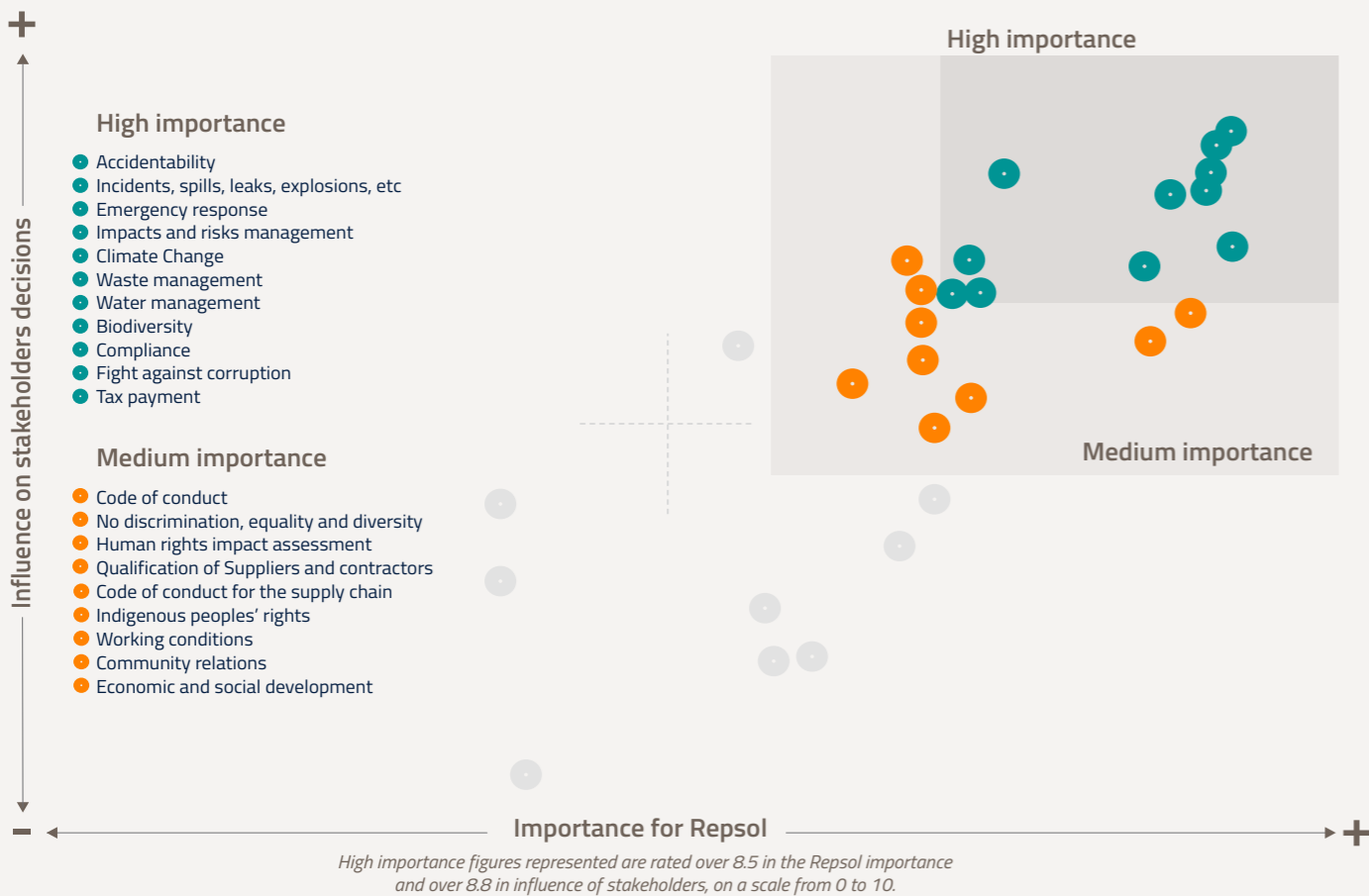
Materiality and stakeholders

In 2016 we developed a materiality study, based on online surveys, in which we identified and prioritized matters of an economic, social and environmental nature considered to be high impact and highly significant for the

different stakeholders whom we consulted: employees, suppliers and contractors, investors, international organizations and civil society representatives.



The following figure shows the materiality study results. The high and medium importance on economic, environmental and social impact identified by us are represented versus the influence of these issues on stakeholders decisions. Thus, these are the material aspects that the report is reporting.



Matters identified by the stakeholders consulted



Employees

They expect us to take the necessary measures to favor participatory dialogue, active listening and ongoing collaboration. For this reason, we inform on sustainability-related matters and the Company's actions in this regard.



Unions

We have channels for communication and dialogue with workers' representatives and the negotiating committees to address topics of interest and reach agreements with regard thereto. We hold meetings through committees and commissions to monitor and guarantee the applicable collective bargaining agreements and pacts of the subsidiaries of the Group.



Suppliers and contractors

They await we share our best practices in order to improve their performance and participate in the bidding processes that will allow us to contract their services. In addition, they request greater clarity in the information that we share on performance evaluations. In 2016, we developed a program for SMEs (Small & Medium Enterprises) called "Responsible Collaborators," designed in conjunction with the Spanish Network of the United Nations Global Compact, to strengthen basic sustainability concepts.



International organizations

They urge companies to implement their recommendations and best practices such as minimizing our environmental impacts, looking for local opportunities through training or employment promotion, and working with other enterprises or organizations. We agree that companies play a relevant role to boost the progress towards the sustainable development.



Investors

They demand us to disclose our social, environmental and governance performance for their decision-making.

We maintain an ongoing communication and dialogue with this collective. Our CEO, Josu Jon Imaz, leads senior leadership roadshows, responding to their demands for information on sustainability issues.



Civil society

They seek for companies to prevent and mitigate environmental and social impacts. Moreover, they expect us to be more proactive and transparent in providing information on their sustainability performance, as well as greater dialogue and collaboration with stakeholders. In addition to the sustainability information we disclose, we attempt to answer all the demands for information and participate in forums, congresses and debates on this subject.

Further information on stakeholders

Governance

Our sustainability model identifies, systematizes and starts up actions which contribute to sustainable development.

In addition, we have the support and involvement of senior management who defines objectives, action plans and practices of the company relative to sustainability.

Sustainability Committee

Board of Directors' specialized committee, responsible for staying abreast of and orienting the Group's policy, objectives, and guidelines in relation to social, environmental and safety matters. In 2016, the committee met three times and examined, discussed and approved proposals on matters within its sphere of competence, including:

- ▶ 2015 Sustainability Report.
- ▶ Report on indicators of the personal, process and environmental accident rates.
- ▶ Case study on circular economy. Approach and plan.
- ▶ Case study on climate change: International Context (COP21); company GHG emissions; emissions-reduction map and plans; and climate change initiatives: Oil & Gas Climate Initiative (OGCI), Climate & Clean Air Coalition (CCAC) and Zero Routine Flaring.

- ▶ Community relations and human rights management global framework.
- ▶ New Code of Ethics and Conduct and new Repsol Ethics and Compliance Channel.
- ▶ 2017 proposed sustainability goals.
- ▶ New internal control and compliance model.
- ▶ The Company's global risk map.

5% of the CEO's annual variable compensation and 10% of his multiyear variable compensation are linked to sustainability goals

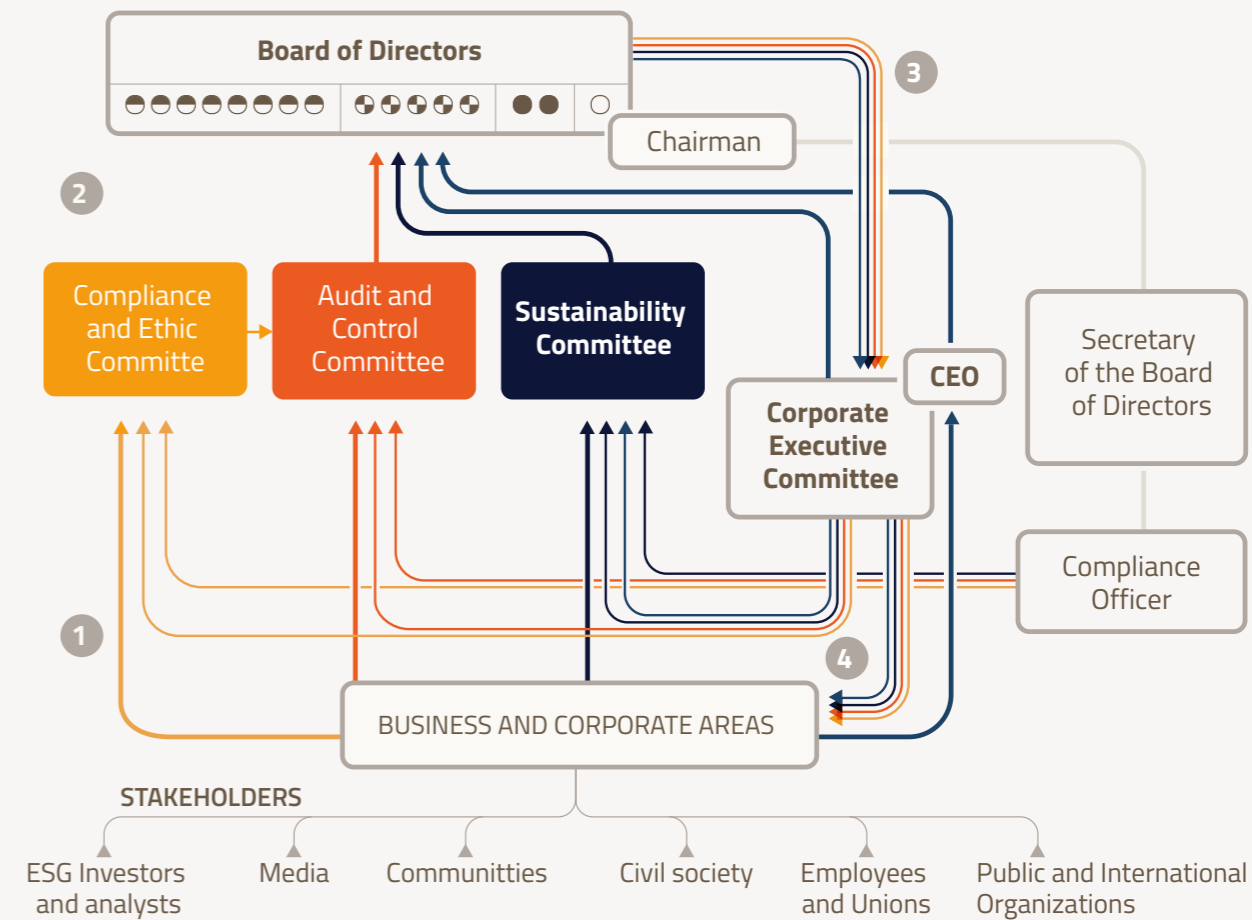
+ Further information on [2016 Annual Corporate Governance Report](#)

Board of Directors

18.75%
of Board of Directors are foreigners

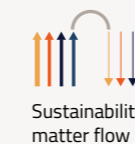
50%
of independent directors

6.25%
of Board of Directors are women



LEYENDA

- Independent
- Proprietary
- Executive
- External



Further information on www.repsol.com

Audit and Control Committee

Board of Directors' specialized committee. Its objective is to support the Board of Directors in its supervision duties, through the periodic review of the financial information process. Its executive controls, the independence of the external auditor, the review of compliance with all the legal provisions and internal regulations applying to the Repsol Group.

In particular, it also has the following functions:

- ▶ To ensure that the Code of Ethics and Conduct is complied with.
- To examine the plans for the codes of ethics and conduct and the amendments thereto. Likewise, to ensure that they are in keeping with regulatory requirements and are appropriate for the Company.

Ethics and Compliance Committee

Senior level deliberative body with autonomous powers of initiative and control. Its function is to manage the system for the monitoring of and compliance with the Repsol Group's Code of Ethics and Conduct. This committee is a multidisciplinary nature. It has a channel, managed by an independent third party, through which any consultation or possible breaches regarding Repsol's Code of Ethics and Conduct may be sent.

Its functions include:

- ▶ Submitting recommendations for safeguarding, implementing and complying with the Code of Ethics and Conduct.
- ▶ Proposing the modifications of and implementations to the Code of Ethics and Conduct that the Committee considers appropriate.

Ethics and compliance

We promote integrity and ethical behavior in all of our actions.

We understand that the code of ethics is inseparable from integrity and good judgment. We take ethical behavior beyond strict compliance with the law; hence, in addition to complying with the letter of the law we also respect the spirit of the law.



Objective 2017:
Training for all employees on the new Code of Ethics and Conduct

New Code of Ethics and Conduct

In 2016, the new Code of Ethics and Conduct took effect, replacing Repsol's Ethics and Conduct Regulation and Talisman's Code of Ethics and Conduct. The main change is the use of more straightforward and readily understandable language, so as to provide guidelines of professional and personal conduct.

In order to properly disseminate the content of the new Code of Ethics and Conduct, we have worked on developing mandatory training actions for all employees, which are to take place throughout 2017.

In 2016, the Ethics and Conduct course was completed by **2,483** employees.

+ Code of Ethics and Conduct at repsol.com

New Ethics and Compliance Channel

In addition, we have a new Ethics and Compliance Channel, available 24 hours a day, 7 days a week, managed by an external provider, which allows employees and any external stakeholder to send, in fully confidentially, queries and information on possible breaches of the Code of Ethics and Conduct and of the Crime Prevention Model.

In 2016, 32 communications have been received through the new Ethics and Compliance Channel.

+ New Ethics and Compliance Channel at Repsol Ethics & Compliance Channel

Compliance Function

We have a global action framework and procedures, allowing us to identify and comply with all of our obligations, both internal and external and in all regulatory spheres.

Nevertheless, we have strengthened our compliance and control mechanisms by appointing a Chief Compliance Officer and creating the new Compliance Processes Department, to strengthen oversight of compliance risks, foster the preventive nature of the compliance function, disseminate a greater compliance culture, and promote the proper management of risks of ethics and conduct.

+ Further information on Annual Corporate Governance Report

People

Evolution and resizing

We try to reconcile the Company's short-, medium- and long-term capacity needs with people's opportunities for development, on the basis of leadership, values and meritocracy.

2016 stood out from the standpoint of people management given that this is a critical element to bring about the Company's integration and transformation.

This process has entailed a responsible and phased-in resizing of our workforce, taking into account the organizational needs of the businesses and countries. Union organizations, with which we have reached important agreements, have taken part in this process. In Spain, the process of incentivized retirement began in

Equal opportunities

We are committed to equal opportunity as an element that sets us apart as an integrated, diverse and inclusive company. To this end, for years we have deployed programs and tools that take into account the diversity of employees, with visible results.

We foster balance between men and women in positions of responsibility and leadership.

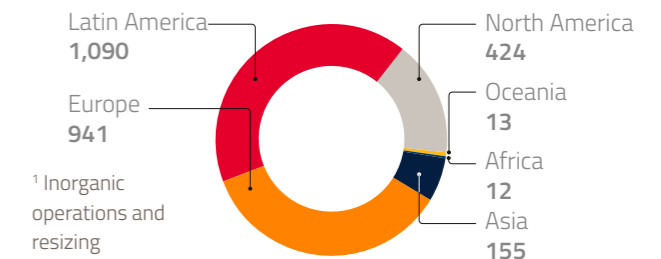
26.7% ↑ **8%** from 2015
women in leadership positions

Regarding work-life balance, we should highlight the programs that allow us to attain flexibility and work-life balance. Telecommuting is one of the most accepted and valued programs by our employees. At Repsol **1,811** people have elected telecommuting.

In addition, we support direct entry into the labor market of people with disabilities, above the legal requirements. This year, we have **586** employees with disabilities, 2.4% of our workforce.

+ Further information on www.repsol.com and Consolidated Management Report 2016

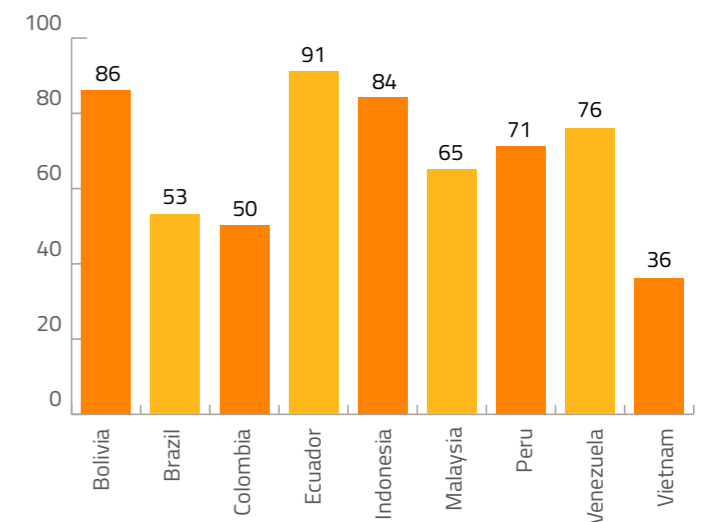
Staff down-sizing by geographical area¹



¹ Inorganic operations and resizing August and is expected to conclude on December 31, 2018. The level of acceptance of the process has allowed us to avoid mandatory retirement at any company, with the exception of Repsol Butano S.A., at which several factories were shuttered as a result of the Company's industrial plan.

Among our management teams there is a significant presence of people originally from the local community, allowing us to be more attuned to the needs of the communities in which we operate to foster development of local employees in countries in which the company has an important presence is key.

Leadership positions occupied by local employees by country [%]



People

Human rights and community relations

We are present in more than 40 countries, and on many occasions, in highly sensitive social, political and cultural contexts. We continue to implement the commitments

assumed in our Community Relations and Human Rights Policy, which is aligned with the United Nations Framework on Business and Human Rights and its guiding principles.

Progress in the community relations and Human Rights management framework

As part of the process of integration with Talisman, we reviewed and strengthened the framework to manage community relations and human rights. We defined the roadmap for developing the capacities of the personnel involved, directly and indirectly, in our

relationship with local communities and in this manner to ensure a systematic approach. For this, we carried out nine training workshops on this framework focusing on risk management, impact management, opportunity management, and participatory dialogue.

Our responsibility: respect and remedy

We use all available means to ensure that our activities and decisions will not have negative consequences on human rights, and we do everything possible to address the damage of any such impacts that do occur.

100%

of our major operations take into consideration development plans, human rights impact assessments, or stakeholder participation for managing the risks and opportunities of our activities

100%

of 8 impacts assessments carried out during 2016 have included social and human rights matters



Further information on [Human Rights](#)

Security and Human Rights

We are members of the Voluntary Principles on Security and Human Rights Initiative, which aims to ensure the security of our operations in sensitive areas and conflict zones through work procedures that guarantee respect for human rights.

90%

of internal security staff received human rights training

Plan to implement the Voluntary Principles of Human Rights

Over this course, we undertook the actions contained in the Plan, which was launched in 2015. In addition, we have carried out a series of internal audits to determine the evolution and the degree of implementation of the plan in Bolivia, Colombia, Ecuador, Peru and Venezuela. To this end, we conducted several interviews with the directors of the business unit, the heads of the contractors of private security, and the heads of the public security forces responsible for the operations.

The scores obtained in these audits have allowed us to classify countries according to the degree of implementation of the plan and to define additional action to continue implementing those principles, which will be evaluated in 2017.

Operational-level grievance mechanisms

Attending to the grievance, concerns and complaints of communities helps us to anticipate and respond potential disagreements that might affect the development of our activities. The nature of these mechanisms is particular and unique for each context.

We have taken part in the Forum on Business and Human Rights held by United Nations, in which we participated on the operational-level grievance mechanism panel, sharing the good practices developed.

Implementation of social indicators

Over this course, we reviewed the social performance indicators and metrics according to the new Community Relations Policy and the Human Rights Policy.

We will focus, in 2017, on monitoring and measuring the evolution of our performance in social risks stemming from the context, in grievance management and in participatory dialogue with the communities.



Further information on [Community Relations](#)

148

human-rights grievances were made through **13** grievance mechanisms in **7** countries. **119** were resolved and 29 are being processed



Best practice

Community Engagement- Papua New Guinea

Thanks to the Community Needs Assessment (CNA) program, we have established an open dialogue to address some of the concerns of the communities.

Through a trust-based, win-win relationship, we have implemented numerous local development projects, including: an organic vegetable farm; the installation of portable-water tanks; the installation of a computer laboratory; as well as the development of plans and the use of financial resources for family sustenance.

Safety

Strengthening foresight











We do not settle for the decrease in our incident rate indicators. Going beyond safety is our challenge. We have established actions to reduce both process accident rates as well as personal accident rates within the company. To this end, we have implemented a long-term safety strategy with two main focuses: reducing the accident

rate indicators and systematically applying a series of anticipatory actions to avoid major industrial accidents. Safety targets weighten between 10 and 15% on the unit targets. These targets have a direct impact on our employees with variable compensation.

Further information on [Safety](#)

10 Basic safety rules

To reduce the personal accident rate, in 2016 we launched these **10 rules** to be applied by employees and contractors. The safety begins with each one of us, and these rules can be the final barrier to avoid an accident.

1  Safe driving	2  Work permits	3  Isolation and lockout	4  Entry to confined space	5  Excavation
6  Mobile Equipment	7  Work at height	8  Lifting operations	9  Dropped objects	10  Prevention of leaks

Visit our virtual training: www.10basicrules.com

SMARt keys: preventive safety program

It is a set of initiatives focused on process safety, which helps us keep risks under control and properly managed. We apply this program in Exploration and Production, Refining, Chemicals and LPG operations, which are

the operations that could lead to large-scale industrial accidents. To manage all the elements that may avoid a process accident and/or to control any such incidents that arise, we focus on three main elements:

1/ 

People. In 2016 we performed several assessments of the safety culture at our facilities, and we implemented various training actions to reduce the accident rate resulting from human factors.

2/ 

Processes. We are strengthening the principle of safety integrated into operations. In 2016, we carried out actions to manage critical processes, which, because of their hazardous nature, must be performed with greater care.

3/ 

Plants. Preventive maintenance and inspection plans; the verification of our safety systems; the improvement of our protection barriers; and the identification of the most critical elements have been the objectives of our actions in 2016.

↓ **25%** from 2015

LTIF 2016: 0.69 - Lost Time Injury Frequency Rate: lost time injuries recorded over the year, per million work hours.

↓ **35%** from 2015

TRIR 2016: 1.46 - Total Recordable Incident Rate: lost work day cases and restricted work day cases recorded over the year, per million work hours.

↓ **36%** from 2015

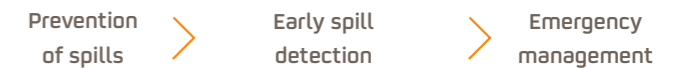
PSIR 2016: 0.65 - Process Safety Incident Rate

Goal 2020:

0 accidents

Prevention of and response to environmental incidents

A robust safety management minimizes the likelihood and consequences of our spills to the environment. We work in three phases:



Relevant facts

This year, regrettably, we had two fatalities at our contractors:

- ▶ At the Sakajemang 3D seismic project (Indonesia), a worker died as a result of injuries sustained after a tree fell on him. After an exhaustive investigation and to avoid a recurrence of this type of accident, improvement actions have been taken to identify risks and training actions and to raise awareness among workers.
- ▶ During the periodic and voluntary inspection work at the LPG facility of a client in Madrid (Spain), a worker died, allegedly as a result of gas inhalation. An investigation has been conducted, and an action plan is being drawn up to adopt measures to ensure that this type of event will not happen again.

In 2016, an oil tanker truck accident provoked a significant spill of fuel in the Peru marketing business area. The amount spilled was 31 tons of 84 octane gasoline, and the driver was slightly injured in the accident. The spill did not affect waterways, and remediation measures were undertaken afterwards.

As a preventive measure, we have activated the campaign named *Plan to Get There Alive – The 10 Steps*, to train and raise awareness among employees regarding transportation safety.

11 oil spills >1bbl reaching the environment

40t oil spilled > 1bbl reaching the environment

Climate change

We actively work on climate change mitigation

Society increasingly requires more energy as the population grows and economies develop. This energy must be supplied in a safe, efficient and sustainable manner, along with a reduction in greenhouse gas emissions (GHG).

At Repsol, we share society's concern over the effect that human activity is having on climate. We recognize that the current trend of greenhouse gas emissions is greater than the required to limit the increase of the average global temperature to no more

than 2°C above preindustrial levels. As signatories of the Paris Pledge for Action, we support the Paris Agreement and we are working to ensure that our company is an active part of the solution to climate change.

Working for a low-emissions future

We work on solutions that allow society to enjoy a sustainable future with low emissions of greenhouse gases.

We promote a greater role of natural gas in the world energy mix. We consider gas as the most efficient solution to promote a structured transition to a future of low emissions.

Moreover, we consider that all energy sources have their importance in the energy mix. Renewable energies have to play a prominent role once their technological maturity allows them to be competitive.

However, the objective consistent on 2°C scenario will only be possible

through technological innovation. This will help us deepen the carbon capture, use and storage, an alternative that emerges as the most plausible to reach the ambition of zero emissions by 2050. To prove its feasibility is therefore a must.

And all this without forgetting the current contribution of energy efficiency, which will be the main driving force behind the reduction of emissions until around mid-century. In this sense, there are already numerous technologies in which our sector has worked in recent years, helping us optimize the design of the processes and the operation of the facilities.

+ Further information on [Climate change](http://www.oilandgasclimateinitiative.com)

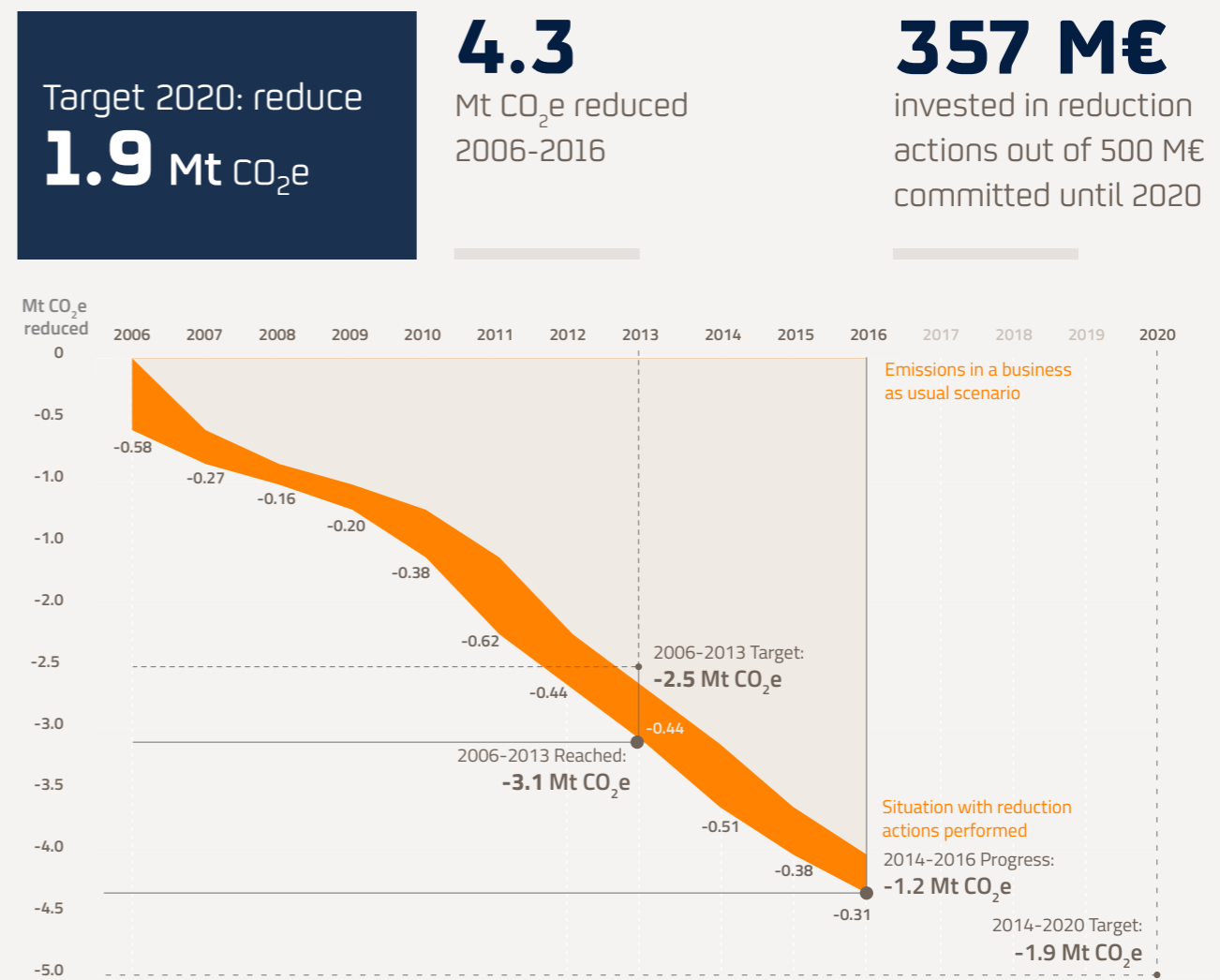
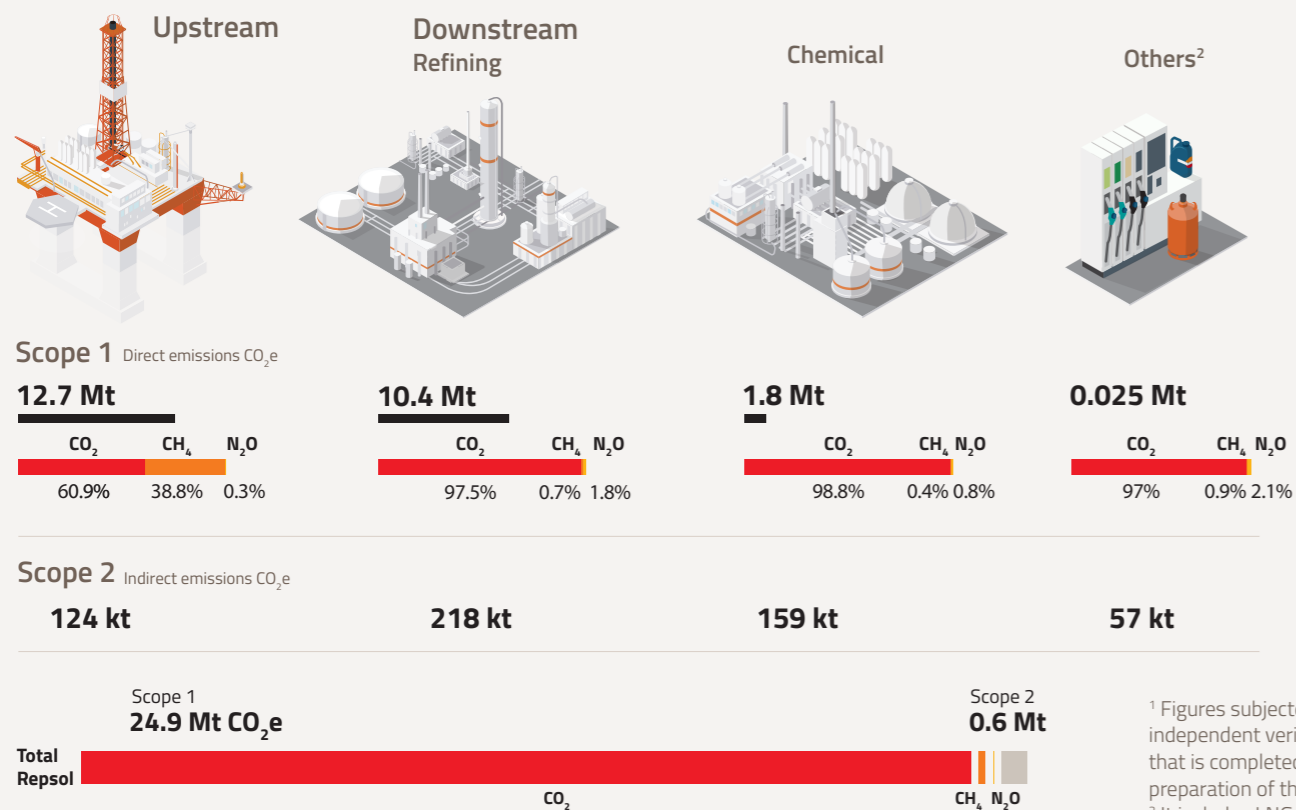


Repsol has been a part of this initiative along with nine other leading sector companies to collaborate on climate action, sharing best practices and technological solutions. In 2016 a fund was created to invest US\$1 billion over 10 years to develop and accelerate the commercial deployment of low-emission technologies.

+ www.oilandgasclimateinitiative.com

Our emissions¹

Scope 1 (Direct emissions). Scope 2 (Indirect emissions associated with purchasing electricity and steam).





Role of gas in reducing emissions

Emissions of CO₂ per energy unit associated to natural gas account for approximately half of those related to coal, not including the performance gap between the technologies associated with these fuels in electricity generation.

In this sense, at Repsol we are well positioned with respect to our competitors. Our Upstream portfolio is evolving towards a higher percentage of gas compared to oil: around 65% of our production and 75% of our reserves are gas.

According to **World Energy Outlook 2016** of the International Energy Agency, 45% of natural gas resources come from so-called unconventional resources. Hence, the growth in gas output between 2014 and 2040 is being driven primarily by the increase of unconventional gas, with a 3.5% yearly increase, compared to 0.8% for conventional.

Natural gas can play a key and immediate role in reducing fossil fuel

emissions, but only if we succeed in mitigating the methane emissions associated with our production.

In this sense, we undertake periodic leak detection and repair campaigns at our gas production facilities and we are researching new opportunities.



We have joined the UN Environment's *Climate & Clean Air Coalition – Oil & Gas Methane Partnership*, to implement methane emission reduction projects in collaboration with other companies, institutions and governments. We seek to eliminate barriers and come up with technical and economically viable solutions.

+ www.ccacoalition.org

Renewable energy

We continuously monitor trends and the latest technologies being developed in renewable energy of. We invest in sustainable mobility and contribute to emissions reductions through the production of and research on biofuels.

Carbon capture, use and storage (CCUS)

This technology will be critical to achieve the objectives of the Paris Agreement, since it is the only one capable of substantially reducing GHG emissions from fossil fuels. These fuels will continue to play a significant role in the future energy mix and CCUS will reduce emissions in sectors such as electric power generation or energy-intensive industries.

This is one of the lines of work in which we are taking part in OGCI, and our action focuses on projects that are economically viable and socially and reputationally acceptable.

Energy efficiency

Although energy efficiency has always been a part of our operations, in recent years we have attempted to take a further step by promoting objectives and plans to reduce the energy and carbon intensity of our operations.

These plans have included projects of energy integration of units, the optimization of steam consumption, modifications to furnaces and boilers, the installation of variable-speed motors and more-efficient dynamic equipment, improvements to insulation, and measures to reduce flared and vented gas.

Moreover, we progressively boost the gradual implementation of energy management systems in our activities, in accordance with the requirements of the ISO 50001 International Standard. We have eight facilities and one multisite business certified under this standard.

Focusing on energy efficiency has not only reduced our GHG emissions, but also brought down our operating costs (given that about 60% of the variable costs of a refinery are energy costs, and this percentage is higher at petrochemical units).

Our energy-efficiency measures include the actions we have performed to reduce emissions from **routine gas flaring**. This not only increases GHG emissions, but also the loss of product or fuel, which is not reused in our processes.

For several years, we have implemented actions to minimize these emissions by recovering this gas and using it as fuel to generate heat or produce electricity.

↓ 372 kt
CO₂e/year through implementing more than 40 flaring reduction actions in the last 10 years



In this year we have joined the World Bank's *Zero Routine Flaring by 2030* initiative, which allows us to collaborate with other companies and institutions to look for the most advanced technologies that minimize the routine gas flaring by 2030.

+ www.worldbank.org

✓ Best Practice

Heat recovery at conversion units in Cartagena

In 2016, as part of our Energy and Carbon plan, our industrial facility in Cartagena (Spain) reduced emissions by modifying the air preheaters of the furnaces of the coker and vacuum units.

This is a technological innovation investment that will allow us to increase heat recovery, reducing the smoke output temperature and increasing the operating efficiency of the furnaces by up to 93%.

Associated energy savings:
5,000 t/y FOE, which entails a reduction of 11,000 t CO₂e/y

Investment: **€3 M**

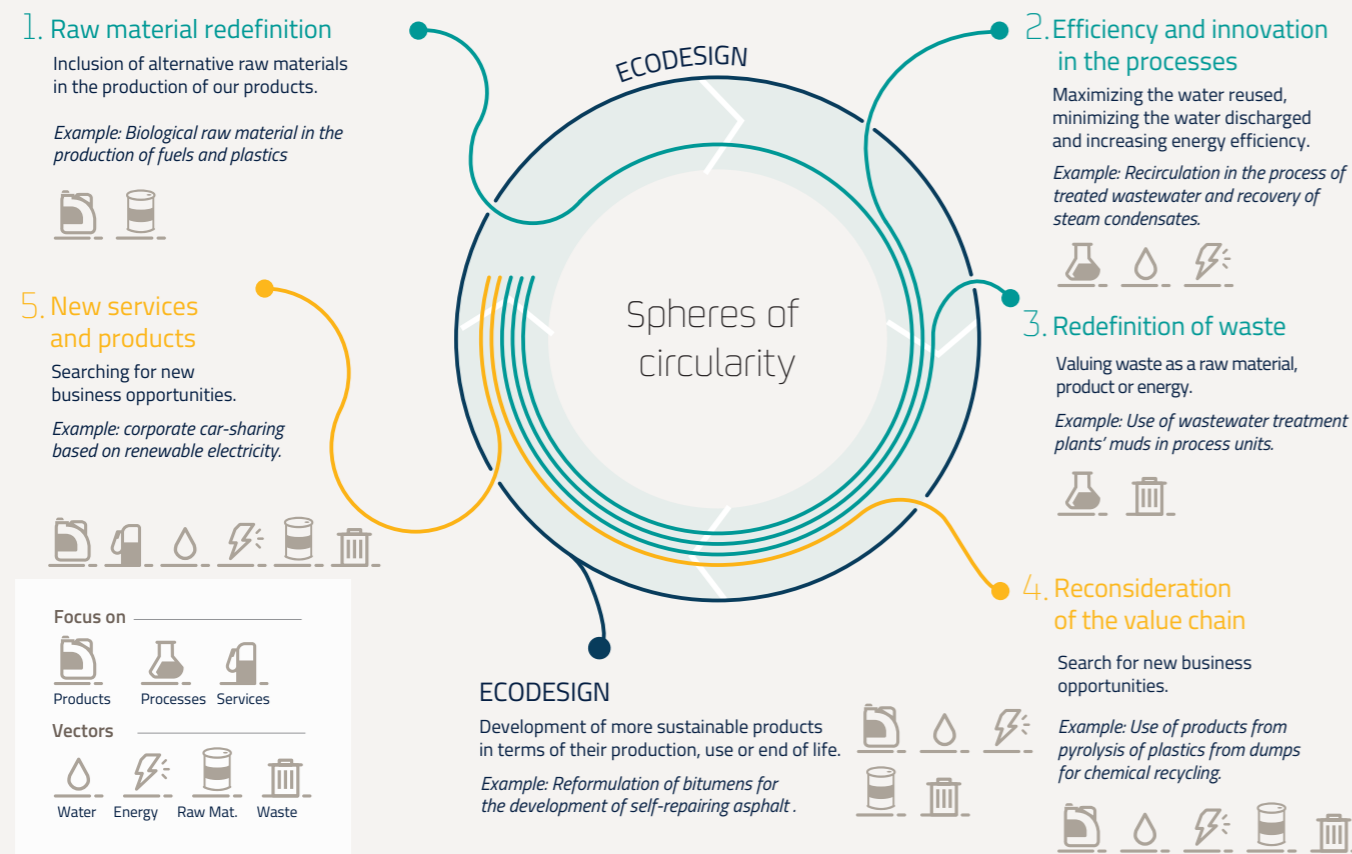
Carbon pricing

All these transformations that must take place in the energy sector, require clear, stable and predictable regulations over time. We believe that a carbon price of global reach, extended to all sectors and worldwide, is a key factor in policies to mitigate climate change with the least cost to society, which encourages innovative technologies compatible with the 2°C scenario. In addition, a carbon price included in the final cost of all products, regardless of where they are produced, gives a clear incentive for the most efficient companies to reduce their emissions.

Resource and impact management

The circular economy, our roadmap

We work on developing our company's strategy relative to circular economy. We apply this new production and consumption model based on "closing the lifecycle" of products, services, waste, materials, water and energy as an alternative to the current linear economy of extracting, manufacturing and eliminating.



We want to have a catalog of circular economy projects according to the following criteria:

- ▶ Supply assurance (sufficient quality and quantity)
- ▶ Technological scalability (from laboratory to pilot plant or to industrial plant)
- ▶ Profitability
- ▶ Crosscutting with other companies
- ▶ Impact on society

Water

We are carrying out a specific water management improvement action plan from 2015 to 2020 for each facility. Thanks to the multidisciplinary work force at each center, we have succeeded in meeting nearly 95% of the defined lines, surpassing the 85% target set forth for 2016.

In addition, in 2016 we undertook studies on the purification of the production water from our Upstream wells in order to be reused for agricultural purposes in the communities.

20% water reused versus withdrawn

↓ 9% from 2015 water withdrawn 52 Mt in 2016

42 Mt water discharged

↓ 36% from 2015 hydrocarbons in water discharged 245 t in 2016

+ Further information on [Water management](#)

Waste

We have reduced waste produced by **15,508 tons**, of the target of 50,000 tons for between 2015 and 2020. In the first two years, we thus reached nearly 50% of the target.

In addition, we implemented 100% of the EPPs (Environmental Performance Practices, company common standards in environmental issues) planned for drilling muds and cuttings management in Upstream.

Likewise, we also developed an extended waste map for the entire company, which includes characterization, current disposal and new options to improve our waste management.

Looking ahead to 2017, we have identified 11 opportunities to value waste, which will be developed by order of priority throughout the year.

+ Further information on [Waste management](#)

✓ Best Practice

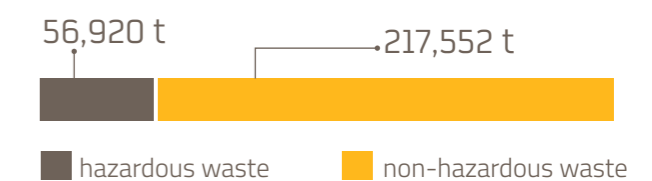
Water use optimization in Puertollano

In 2016, at the Puertollano (Spain) refinery, we conducted a pilot project on optimizing water use at refineries, reviewing in detail the types of water used at each unit, identifying improvements, and proposing recommendations for water use optimization. In addition, following the analysis of the sector best practices, we have proposed actions for further optimization.

From this analysis improvement proposals have emerged and are focused on measures to reduce water consumption, increase water quality, optimize wastewater treatment and promote energy improvements. Moreover, to disseminate the knowledge acquired, we developed a general list of best improvements practices in the use of water and the reduction of the pollutant load of the internal water currents to be analyzed by the remaining refinery centers in Spain and by Chemicals.

Target 2020: reducing **50,000 tons** of waste produced

Waste produced¹



¹In addition, our Upstream operations generated a total of 169,372 tons of drilling muds and cuttings waste.

Resource and impact management

Preserving biodiversity and ecosystem services

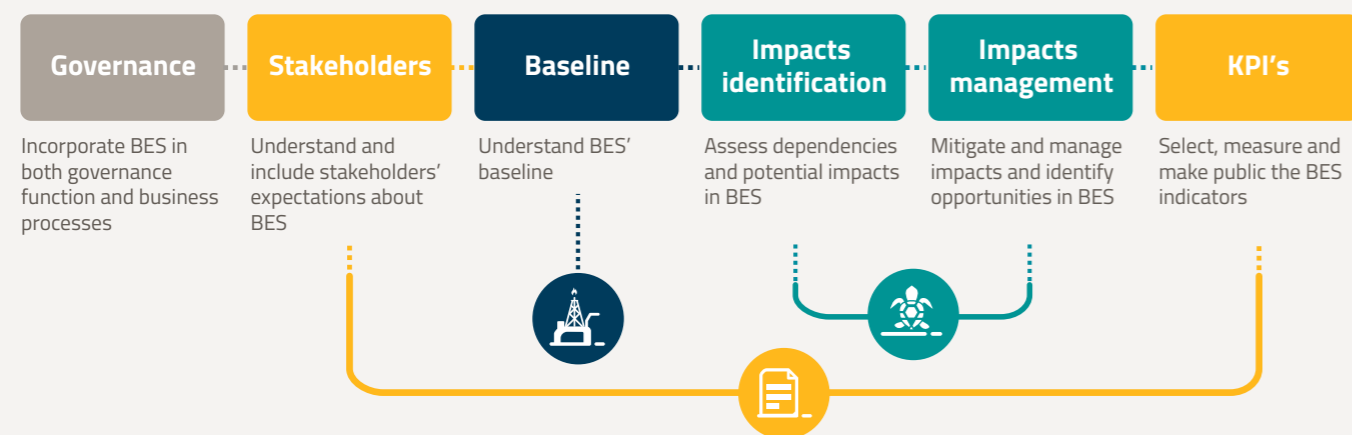
We are committed to mitigate potential impacts on biodiversity and the resources that biodiversity provides (ecosystem services) during the planning and development of

our projects and operations. To this end, we are guided by the United Nations principles on sustainable development.

Moreover, we participate in reference forums like IPIECA, IOGP or the Cross Sector Biodiversity Initiative.

[Further information on Biodiversity](#)

We have been the first oil and gas company to put into practice the IPIECA and IOGP management framework on biodiversity and ecosystem services (BES). This framework is centered on six interrelated management practices:



- Global habitats**: In conjunction with the Smithsonian Institute, we have identified indicators species in the main habitats of the planet.
- Methodology**: We disclosed the methodologies we have used to establish the biodiversity baseline in six offshore operations.
- Repsol Aruba**: In the offshore seismic campaign in Aruba, we worked to mitigate the impact on sea turtles.

MITIGATION HIERARCHY

- ANALYZE IMPACT
- AVOID
- MINIMIZE
- RESTORE
- OFFSET

More information at: [IPIECA](#) and [csbi.org.uk](#)

The benchmark forums on biodiversity management, such as IPIECA or CSBI, propose mitigation hierarchy as a good practice, and at Repsol we work in accordance with this recommendation. The three examples presented above are part of the phases to identify, avoid and minimize impact.

100% assets with risk assessment and management of BES (Repsol Oil and Gas Canada Inc. Not included)

Resource and impact management

Hydraulic fracturing operation

It is the process of creating small cracks or fractures in deeply buried geological formations to allow hydrocarbons, like natural gas, to flow into the wellbore. Hydraulic fracturing is most often used where oil and gas are trapped in "unconventional" source rocks, such as shale. We ensure that this operation is carried out with the best available techniques seeking the minimum impact.

Greenhouse gases (GHG) emissions

Repsol is continually looking for opportunities to improve the efficiency of our unconventional operations, while also reducing methane and other greenhouse gas emissions. At our production sites, we have implemented a directed inspection and maintenance program to detect, measure, prioritize, and repair equipment leaks to reduce methane emissions.

Fracturing fluid

Hydraulic fracturing fluid is comprised of 99.5% water and sand and about 0.5% of other chemicals. The ingredient chemical classifications and concentrations used in our hydraulic fracturing activities are disclosed in the websites <http://fracfocus.ca> and <http://fracfocus.org>.

Temporary installation in the hydraulic fracturing phase

Water management

We evaluate the amount of fresh water used and investigate alternate water sourcing options, including deeper groundwater source identification, wastewater reuse, flowback recycling and treatment technologies.

In 2016, our tool (*) to identify and assess the main risks associated with water management was adapted to include unconventional assets.

The company objective for 2017 is the implementation of the defined Action Plan for these new assets.

Stakeholder engagement

We are committed to open and transparent communication with our stakeholders and the communities where we operate. We work to mitigate the potential impacts that unconventional development may have on communities, such as increased traffic and use of roads, dust and noise.

Groundwater Protection

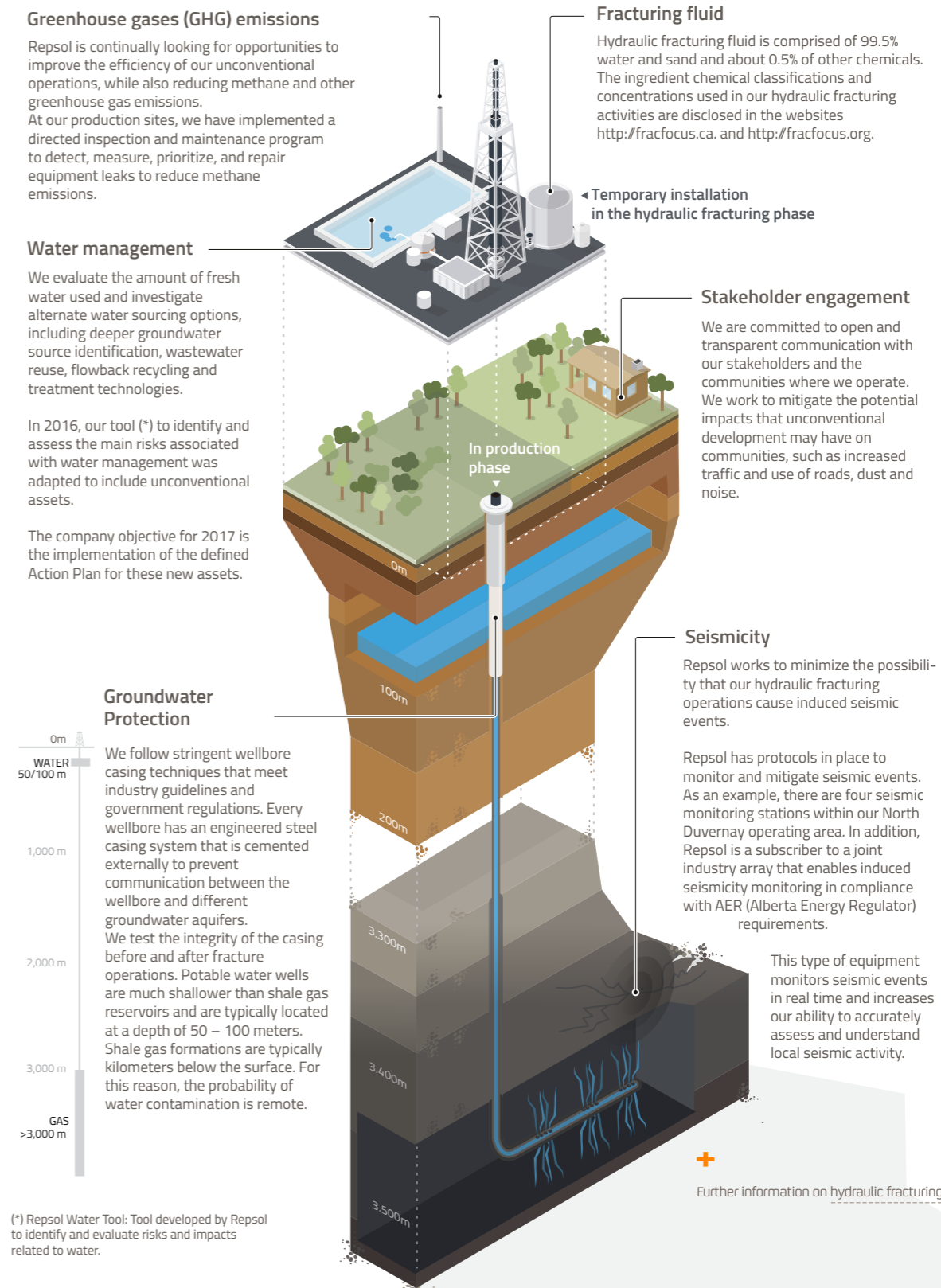
We follow stringent wellbore casing techniques that meet industry guidelines and government regulations. Every wellbore has an engineered steel casing system that is cemented externally to prevent communication between the wellbore and different groundwater aquifers. We test the integrity of the casing before and after fracture operations. Potable water wells are much shallower than shale gas reservoirs and are typically located at a depth of 50 – 100 meters. Shale gas formations are typically kilometers below the surface. For this reason, the probability of water contamination is remote.

Seismicity

Repsol works to minimize the possibility that our hydraulic fracturing operations cause induced seismic events.

Repsol has protocols in place to monitor and mitigate seismic events. As an example, there are four seismic monitoring stations within our North Duvernay operating area. In addition, Repsol is a subscriber to a joint industry array that enables induced seismicity monitoring in compliance with AER (Alberta Energy Regulator) requirements.

This type of equipment monitors seismic events in real time and increases our ability to accurately assess and understand local seismic activity.



(*) Repsol Water Tool: Tool developed by Repsol to identify and evaluate risks and impacts related to water.

[Further information on hydraulic fracturing](#)

