Successful exploration is not a matter of chance, but is the result of appropriate risk management, analysis of unexpected outcomes and optimization of the geological evaluation based on a deep understanding of the earth.

## eni’s vision for a successful exploration

### the strategy

- be an “early mover” in a competitive environment
- anticipate and capture new opportunities
- develop and maintain best-in-class technical skills
- strong focus on R&D and Knowledge Management
- centralized assurance process
- rigorous project management
- exploration portfolio management
- balance risks vs rewards
- time-to-market focus
- prioritization & rapid delineation of projects

### the exploration process

1. **Exploration portfolio management**
2. **Ranking & Budgeting**
3. **New ventures and licenses management**
4. **Exploration project management**
5. **Hydrocarbon resources delivery**
6. **Technical and economic assurance**
7. **Performance monitoring**
eni g&g technologies portfolio

Today’s exploration scenario is characterised by increasing risk and cost, challenging targets, complex geological settings and ultra-deep water environments.

Technical flexibility, integration and the application of appropriate geophysical and geological technologies are fundamental for successful exploration in these challenging physical and economic environments.

eni’s current G&G technology portfolio is the result of continuous investment in Research and Development to develop state-of-the-art techniques & methodologies and deliver leading-edge software, combined with the continuous enhancement of the technical knowledge and insight of our staff.

eni’s explorationists are supported by a wide range of distinctive and proprietary tools which cover all the key technologies required to assess and exploit the potential of both mature basins and frontier areas.

potential methods

eni has developed state-of-the-art tools for crustal structure modeling and inversion & basin reconstruction.

geophysical survey design

Integrated survey design defines the most appropriate geophysical acquisition to maximize G&G value vs. project requirements. Geophysical Survey Design studies are performed internally for all operated seismic acquisition projects using proprietary tools.
seismic imaging

eni depth velocity analysis

e-dva™ is a software platform for anisotropic seismic velocity analysis integrating all the functionalities needed to run a depth imaging project.

The core tools are:

- reflection Tomography, for velocity model updating
- kirchhoff True Amplitude (KTA) Pre-stack Depth migration, for imaging and to provide the migrated gathers used as the input to reflection tomography
- reverse Time Migration (RTM), for imaging and salt model building
- 2D and 3D visualization
- internal database for project management and quality control

e-dva™ reflection tomography is a very flexible grid tomography tool, in particular:

- it has the flexibility and adaptability allowed by the grid, but it can also take into account interpreted horizon to build layers
- it can handle VTI (Vertical Transverse Isotropy) and TTI (Tilted Transverse Isotropy) anisotropy allowing to jointly estimate velocity and anisotropy parameters

The reliability of the estimated velocity model can be enforced by both taking geological constraints (consistency of velocity with geological structures) and well data (sonic logs, VSP, markers) during velocity model updates.
RTM proprietary algorithm is very effective in presence of salt.

Additional proprietary wave equation migration codes:
- PSPI
- Multi one-way PSPI

eni is an eni proprietary software for the estimation of seismic anisotropy from pre-stack data.
- better focusing
- better well-tie

eni common reflection surface stack
eni-crs™ is an exclusive proprietary eni technology and represents a breakthrough in seismic time imaging. eni-crs™ is a very powerful tool to image the subsurface particularly where the quality of seismic data is poor.
geological technologies

eni basin simulation
e-simba™ is the proprietary technology for Basin & Petroleum System Analysis And Modeling.
- basin geometry evolution
- temperature and pressure
- HC generation and expulsion
- migration and trapping
- probabilistic simulations
- charge probability
- exploration risk evaluation

- the prospect ranking is defined by the probabilistic distribution of trapped hydrocarbons
- computation of hydrocarbons volumes, types and quality

- the efficiency of Petroleum System is considered as a Joint Probability that an active source is present in the basin, has generated and expelled hydrocarbons and that the hydrocarbons have migrated into the structure and have been preserved
3D gravity flow
- eni proprietary 3D modeling tool for the forward simulation of high and low density gravity flow deposits (turbidites).
  - bipartite flow modeling calibrated with flume experiments and outcrop analogues
  - prediction and quantification of the vertical/lateral distribution of sedimentary facies
  - simulation of deep current effects on sediment distribution
  - impact of gravity flows and deep currents on submarine infrastructure

3D deepwater meandering channel systems modeling
- estimation of net/gross and reservoir facies distribution through time

structural validation & 3D model building
- eni developed a workflow for the extraction of structural features from seismic volumes, the geometrical validation and the statistical analysis in terms density, distribution, trends

3D forward modelling
- support to exploration with source/reservoir multiple scenarios distribution at basin scale
- prediction of the location, extension, geometry of reservoir bodies at field scale
geosciences laboratories

A strategic value for exploration.
• world-class analytical laboratories established in 1937
• the laboratories provide leading-edge instrumentation and expertise for geochemical, petrophysical, petrographic, mineralogical and diagenetic studies

sandbox - analogue simulator
• proprietary computer-controlled sand box apparatus
• 4D evolution of structurally complex sedimentary basins
• conceptual geological models for poorly known exploration area

eni reservoir efficiency index

e-rei™ is a deterministic approach to reservoir quality prediction based on quantitative petrographic analyses.
• provides reservoir quality maps directly correlated to porosity and permeability
• handles burial and thermal history of the basin

eni 3d pore pressure prediction

3P is a fully 3D pore pressure prediction tool.
• velocity or impedance-based
• handles multiple trends & centroid effects
operations geology
eni real-time operations geology workflow
Thetis is a workflow to support operations geology decisions in real time.
- the collaborative multi-platform interactive environment allows significant operational savings

eni advanced real-time cuttings analysis
arca is an on-site methodology to assess the mineralogy and TOC of drilled formations.
- while-drilling formation evaluation
- operational savings due to real-time decisions

green data center
eni High Performance Computing hub, able to deliver a peak speed of 3 Petaflops and utilized to validate through proprietary software imaging packages all critical well locations.

Innovative infrastructures and cooling systems allow a significative reduction in operating costs and CO₂ emissions.

The center meets the requirements of the most demanding geophysical and geological software.
achievements

Between 2008 and 2012, **eni** has been the world’s most successful major oil company in terms of reserves replacement and finding costs. In 2012, a standout exploration result was achieved, adding 3.6 billion boe of resources, more than 80% operated.

Around 70% of the exploratory wells drilled in the last five years benefited from the application of proprietary G&G technologies, showing the effectiveness of a fit-to-purpose and business-orientated R&D strategy.

**eni**’s recent successes are rooted in a long tradition of giant discoveries started since the foundation in 1953 and confirmed by the recent supergiant gas discovery of Mamba, deep water Mozambique.

A successful exploration is not possible without a constant commitment to the development and strengthening of the relationships with national institutions in the host Countries.

**eni** exploration organizes the “**eni Students Programme**”, an educational campaign on petroleum geology, climatic change and environmental concerns targeted for school students and teachers.

![Graph showing total and commercial finding costs](source: Wood Mackenzie CBT2013 Q1)
the outlook

Eni’s organic growth strategy is based on successful exploration activities, believed to be the main driver of value creation in the company. The diversification of the exploration portfolio is a key factor in order to maintain an outstanding rate of success. Today, Eni manages a highly diversified portfolio in terms of play type, materiality, location.

The global exploration scenario is moving towards an increase in competition among oil companies to secure the most promising acreage, particularly in underexplored basins.

Eni takes up this challenge with a confidence that is grounded in its excellent technical know-how, continuous development, efficient exploration processes and rigorous management.

The past and recent successes demonstrate the effectiveness of Eni’s exploration in converting new opportunities into real value for stakeholders.
**eni’s activities**

**exploration & production**

*eni* explores, develops and produces oil and natural gas mainly in Italy, Norway, North and West Africa, the North Sea, the United States, Latin America, Australia and in high potential areas such as Mozambique, the Caspian Sea, the Middle and Far East, Kenya, Liberia, Vietnam, Cyprus, and Russia. In 2012 hydrocarbon production averaged 1.701 million boe/day. Net proved reserves at December 2012 amounted to 7.17 billion boe.

**gas & power**

*eni* engages in natural gas supply, regasification, transport, trading and marketing, power generation and electricity sales. In 2012 overall sales amounted to 95.32 billion cubic meters of natural gas and 42.58 terawatthours of electricity.

**refining & marketing**

*eni* engages in oil product refining and marketing mainly in Italy and Europe. With the *eni/agip* brand, it is the Italian market leader in the distribution sector. In 2012 retail sales in Europe of refined products totalled 10.87 million tonnes. In the same period, refining throughputs were 30.01 million tons.

**engineering & construction**

*saipem* (42.9% owned by *eni*) is a leader in the provision of engineering, procurement, project management and construction services for the oil & gas industry, with unique capabilities in designing and executing large scale offshore and onshore projects. *saipem* has extensive expertise in operating in conventional and deep offshore as well as in remote areas. Order backlog was €19,739 million at December 31, 2012.

**chemicals**

*versalis* (*eni* 100%) engages in the production and sale of a wide portfolio of chemical products and holds a significant market share in Europe where it has state-of-the-art plants all equipped with innovative technology. Recently *versalis* entered the bio-chemical segment to produce advanced and eco-friendly plastics and rubber. It also boasts an efficient distribution network worldwide. In 2012 production amounted to 6,090 ktonnes.

**trading**

*eni* engages in commodity risk management, supply, shipping and asset backed trading activities. Through the midstream business unit and its wholly-owned subsidiary *eni trading & shipping* (*ets*), *eni* is fully targeting the entire spectrum of energy commodities, such as crudes, refined products, natural gas, power and environmental products. In 2012 *ets* traded more than 600 Mboe of crude and products and more than 100 BCM of gas.

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*Since 2010 *eni* has been communicating with young talents from all over the world in various disciplines. The cover art for this brochure was created by Valentina Russello, a young Italian illustrator. The opera represents the importance of exploration as a promise for the future and success of the society business.*