Italy’s National Energy Strategy: for a more competitive and sustainable energy

A PUBLIC CONSULTATION DOCUMENT

Government of Italy
Ministry of Economic Development
Department of Energy

October 2012
National Energy Strategy: for a more competitive and sustainable energy

Introduction

The national and international scenario in the current period is difficult and uncertain. The economic crisis has affected all of the western economies, and our country is one of the hardest hit. At the same time, the unprecedented development of many regions throughout the world is exerting a growing pressure on the environment and on the prices of raw materials, including energy resources.

A priority for Italy is to resume sustainable growth – sustainable from both the economic and the environmental perspectives. Only in this way will we attain development, employment and the resources to achieve greater equity and reduce our huge public debt. And in order to attain growth, it is vital to increase the competitiveness of our businesses and our economic system.

The energy sector has a fundamental role to play in the growth of the economy and of the country, both as a facilitating factor (having energy at competitive costs, with a limited environmental impact and a high level of quality is a prerequisite for the development of our businesses and for families), and as a growth factor in itself (just think of the potential of the green economy). Achieving a more competitive and sustainable energy is therefore one of the most significant challenges for Italy’s future.

That is why we felt there was a need to draw up a National Energy Strategy that sets out clearly the main goals to be pursued in the coming years, that describes the basic decisions to be taken and establishes the priorities of action – albeit in the knowledge that we are acting in a free market context and with driving forces that cannot be controlled centrally.

This document is, therefore, a basis for the broad public consultation we intend to open in coming weeks with direct and indirect stakeholders in the energy sector. The end result will be a new Energy Strategy for our country.
National Energy Strategy: for a more competitive and sustainable energy

Contents

The key messages – a summary
1. The international and Italian contexts
   1.1. Two “winners” on the global stage
   1.2. Europe’s road to decarbonisation and the single market
   1.3. The starting point of Italy: challenges and opportunities
2. The goals of the new National Energy Strategy
   2.1. The role of energy for growth and the value of an Energy Strategy
   2.2. Four key goals for the sector
3. Priorities of action and expected results
   3.1. Seven priorities for the coming years
   3.2. Expected results by 2020
   3.3. A flexible approach to long/very long-term decarbonisation
4. The priorities of action, in detail
   4.1. Energy efficiency
   4.2. A competitive gas market and the Southern European Hub
   4.3. Sustainable development of renewable energy
   4.4. Developing the electricity market and infrastructure
   4.5. Restructuring the refining sector and the fuel distribution network
   4.6. Sustainable hydrocarbons production in Italy
   4.7. Modernising the system of governance
5. The energy sector as a driver of economic growth
   5.1. Research and development in the energy sector
   5.2. Green-white economy and traditional sectors: expected impact on growth
The key messages – a summary

Background and goals

In difficult and uncertain economic times, all of our country’s efforts must be focused on resuming sustainable growth. This can only happen through a substantial improvement in the competitiveness of the Italian economic system.

Against this background, our energy system can and must play a key role in improving Italian competitiveness. Tackling the main problems facing the sector will entail an important structural reform for the country. To achieve this, we need to address some important challenges:

- Energy prices for businesses and families that are higher than in other European countries (another “spread” that penalises us heavily).
- Security of supply that is by no means optimal at peak loads, especially as regards natural gas, and a high dependence on imported fossil fuels.
- Economic and financial difficulties experienced by a number of operators in the sector.

Recovering competitiveness, however, need not mean a compromise on decisions taken on environmental sustainability, with our signing up to the European 2020 objectives and the Roadmap 2050 for a low-carbon Europe.

In keeping with these needs, the new National Energy Strategy (NES) focuses on four main goals:

1. **Significantly reduce the energy cost gap** for consumers and businesses, by bringing prices and costs in line with European levels. In this sphere, we start from a more critical position for which a greater effort is required: price differentials of over 25% for electricity, for example, have a decisive impact on our businesses’ competitiveness and on families’ budgets.

2. **Achieve and exceed the environmental targets** established by the European Union’s 2020 Climate and Energy Package (known as the ‘20-20-20’ package). All energy policy decisions therefore aim to improve our environmental and decarbonisation standards, which are already among the world’s highest, and to ensure that Italy acts as an example at a global level.

3. **Continue to improve our security of supply**, especially in the gas sector, and reduce dependency on imports. We need, most notably, to improve our ability to respond to critical events (as the February 2012 gas crisis showed us) and reduce our overall energy imports, which currently cost the country about €62 billion annually.

4. **Foster sustainable economic growth** by developing the energy sector. The development of the energy supply chain can and must be a goal in itself in our energy strategy. We need only consider the opportunities, also internationally, that will arise in a sector experiencing continuous growth (an estimated $38,000 billion in global investment by 2035) and the tradition and expertise of our industrial system in many key segments.
Priorities of action and expected results

Over the medium-long term, i.e. up to **2020** (the main timeframe for this document), in order to attain these results the strategy has been broken down into **seven priorities**, each with its specific supporting measures that have already been set in motion or are currently being defined:

1. **Foster Energy Efficiency**, which is expected to exceed the European targets, as the most appropriate means of pursuing all of the aforementioned goals.
2. Promote a **competitive gas market**, integrated with European markets and with prices aligned them, and with the possibility of becoming the main **southern European hub**.
3. **Sustainably develop renewables**, in order to exceed the European targets (“20-20-20”), while at the same time keeping energy bills under control.
4. Develop an **electricity market** fully integrated with the European market; the market should be efficient (with prices competitive with the rest of Europe) and see the gradual integration of renewable power production.
5. **Restructure the refining industry** and the **fuel distribution network**, in order to achieve a more sustainable system with European levels of competitiveness and service quality.
6. **Sustainably raise national hydrocarbons production**, which will bring major economic and employment benefits, while observing the highest international standards in terms of safety and environmental protection.
7. Modernise the **system of governance** of the sector, with the aim of making decision-making processes more effective and more efficient.

Once the proposed strategy has been implemented, it will enable the system to evolve, gradually but significantly, and to surpass the 20-20-20 European targets. The **results expected by 2020** are as follows:

- **The wholesale prices** of all energy sources – electricity, gas and fuels – will be **aligned to European price levels**.
- **Expenditure on energy imports** will be reduced by about €14 billion/year (from the present €62 billion, and by €19 billion with respect to the current trend by 2020). Dependency on foreign supplies will fall from 84% to 67%, thanks to improved energy efficiency, increased production from renewables, lower electricity imports and higher production from national resources. This equals to about 1% in additional GDP and, at current values, is sufficient to restore the balance of trade to surplus, after many years of deficit.
- **€180 billion will be invested** between now and 2020 in the green and the white economies (renewables and energy efficiency) and in traditional sectors (electricity and gas networks, re-gasification plants, storage, hydrocarbon development). These will be private investments, partly supported by incentives, and are expected to generate positive economic returns for the country.
- **Greenhouse gas emissions will fall by about 19%**, exceeding the European targets for Italy, set at 18% below the 2005 emission levels.
- **Renewable energy sources will account for 20%** of gross final consumption (compared to about 10% in 2010). This is equivalent to 23% of primary energy consumption, while **fossil fuel use will fall from 86% to 76%**. Furthermore, it is expected that renewables will become the **primary source in**
the electricity sector, equivalent to, or slightly overtaking, gas to account for about 36-38% of consumption (compared to 23% in 2010).

- Primary consumption will fall by about 24% by 2020 compared to the reference scenario (an estimated 4% below 2010 levels); this exceeds the European objectives of -20%, thanks mainly to energy efficiency measures.

These results will come with benefits in terms of economic growth and employment, whose overall impact is however difficult to quantify. These gains will be produced, primarily, by increased competitiveness in the most electricity- and gas-intensive sectors; savings of resources currently used to import fuels; substantial investments in the energy sector and in the associated supply industries; and a revitalisation of research and innovation in the sector.

As regards the long and very-long term (2030-2050), Italy subscribes to the spirit of the European Roadmap 2050 for a low-carbon economy, which aims to reduce emissions by up to 80%. Recent decades have shown us, however, that it is difficult to predict developments in technology and the markets, especially in the long term. Italy therefore intends to adopt a flexible and efficient long-term strategy to pursue its key low-carbon policy. In this, it will focus on and exploit – especially through research and technological development – any factors that could produce significant changes (for example, a more rapid cost reduction in renewable and storage technologies, in biofuels, or in CO2 capture and storage).

The priorities of action in detail

For each of these priorities and goals, and concrete initiatives to attain them have been established. They can be summarised as follows.

1. Energy efficiency

Energy efficiency is one of the top priorities of the new energy strategy. The centrepiece of these policies is the launch of a wide-ranging programme that will make it possible to outdo European 2020 targets and achieve a position of industrial leadership to capture the strong international growth forecast for the sector. More specifically, the aim is to save a further 20 MTOE of primary energy by 2020, which is equivalent to savings of almost 25% with respect to the European benchmark (thereby exceeding the 20% target). A further aim is to prevent both the emission of about 55 million tonnes of CO2 annually, and of imports of fossil fuels for about €8 billion each year.

The potential of efficiency measures in Italy, many of which have positive economic returns, is considerable. However, there are numerous barriers to adopting them, which are specific to each sphere of application and prevent them from being fully achieved. The efforts to attain the energy savings targets will therefore be designed to overcome the barriers to the adoption of efficiency-enhancing technologies, by rationalising and strengthening instruments and actions dedicated to each segment and sector. Specifically:
National Energy Strategy: for a more competitive and sustainable energy

The key messages – a summary

- **Minimum and legal standards** will be strengthened, especially as regards the construction industry and transport.
- **Tax rebates**, mainly dedicated to home refurbishment, will be extended in time and adjusted to increase their effectiveness and efficiency in terms of cost/benefits.
- **Government and civil service play a lead role for the rest of the economy**; since they cannot use the tax rebate scheme they will be granted direct incentives.
- The **White Certificates** targets and mechanisms will be strengthened. These apply mainly to industrial sectors and services, but are also of importance in the transport and residential sectors. They will play a fundamental role, given the potential of the sphere of intervention and the cost efficiencies that such a market instrument should produce.

In addition to these instruments, a number of **other positive factors will also be decisive**, such as enhancing the energy services company (ESCO) model, monitoring and enforcing the various measures, communications and awareness-raising initiatives (to make the end consumer more active and better informed), improving the system of monitoring and accounting for the results, and supporting **research and innovation**. Another factor that will help attain the energy efficiency objectives is a trend, already evident, for consumption increasingly to shift to electricity. This includes the more widespread use of applications such as heat pumps for heating and cooling, electricity-powered cars and trains, and improvements in the distribution network with the growing use of smart grids.

Lastly, **waste recovery and use** is a major opportunity to pursue sustainable development goals. Rather than dispose waste in landfills, something still widely used today, recycling and, where this is not possible, waste-to-energy generation are the primary objectives in this field.

Taken as a whole, these measures are estimated to reach €15 billion in public support by 2020. This could stimulate **€50-€60 billion of aggregate investment**, with major spin-offs in an industrial sector where the aim is to achieve international leadership, and savings of about €8 billion in annual fuel imports.

2. **A competitive gas market and the Southern European Hub**

The development of a competitive and efficient gas market and the opportunity to become the main southern European hub are two key **elements that will enable Italy to recover competitiveness** and improve its security profile. The underlying choices are based on the need to align Italian prices with those in the main European countries, guarantee the security and diversification of energy sources, and create a liquid and competitive market that is fully integrated with the European market and network. This will enable Italy to become an energy trading hub for the whole of Europe (also offering value-added services) and a transit country for South/South-East sources of supply.

The main objectives are therefore to **reduce the price differential** – which stood at €5.7/MWh in 2011 (-20%) – **with the Northern European markets**, and to **increase the system's safety margin** in emergency situations.

To attain these objectives, the national legislative and regulatory framework and the country's infrastructure will need to develop significantly. The proposed measures include:
National Energy Strategy: for a more competitive and sustainable energy

The key messages – a summary

- Promoting the **full use of the existing transport capacity from Europe to Italy** by rapidly and rigorously implementing the rules laid down at the European level to manage congestion and allocate cross-border capacity. In particular, the initiative encourages the full use of the Transitgas gas pipeline’s capacity.

- Fostering **cooperation between member states’ Regulators, TSOs and Governments** in order to prevent or eliminate tariff or other types of barriers to the full integration of the single gas market.

- **Building strategic import infrastructure.** This can be done with a guaranteed coverage of investment costs from the system itself, the aim being to ensure sufficient import and storage capacity in the medium term, including for spot transactions. These will also benefit from faster procedures for issuing permits and will be selected through public tenders based on transparent cost/benefit criteria for the system. As a result, the improvements in terms of price competitiveness and security of supply will be considerably higher than any costs to the system. In this respect, new infrastructure requirements are expected to be low (a study is currently being conducted to define exactly which additional needs will be created).

- Supporting the **construction of other import infrastructure** not deemed strategic, also by exempting it from third party access, without any guarantee of revenue and public grants (particularly the TAP gas pipeline). These infrastructure facilities can play a key role in diversifying sources and supply routes.

- Promoting the **availability of virtual and physical reverse-flow** capacity towards the markets of Northern and Central Europe, to fully exploit our geographic position as a link between Europe and the Mediterranean.

- Promoting the development of **new storage capacity**, especially for peak delivery requirements.

- Establishing the **regulatory framework for the futures market**. The aim here is the effective development of the Italian gas exchange, an essential pre-requisite for an efficient and fluid market.

- Revising the **arrangements for allocating and accessing storage capacity** in a non-discriminatory manner for all operators.

- The **ownership unbundling of SNAM** (which is now almost complete), to create a strong, independent and stable player that can develop new investments both in Italy and abroad, and guarantee full third-party access.

- Promoting **public tenders for the gas distribution service**, in order to establish a more efficient and less costly system.

3. **Sustainable development of renewable energy**

Renewables are a core element of the Energy Strategy. The basic decisions are: to exceed the European 2020 targets for renewables output, striking a better balance between different energy sources; to achieve economically sustainable development in the sector, with incentive costs aligned to European levels; and to give preference to technologies with greater spin-off potential for the sector and the Italian economy.

In terms of quantitative targets, the intention is for renewables to account for **20% of gross final consumption** by 2020 (compared to the European objective of 17%), or some annual 25 MTOE of final...
National Energy Strategy: for a more competitive and sustainable energy

The key messages – a summary

energy. This target can be broken down as 36-38% of final consumption in the electricity sector, 20% in the heating sector, and 10% in the transport sector.

To achieve these targets, the following measures are proposed:

- **For the electricity sector**, which has already almost achieved the 2020 targets, to continue supporting development by containing system costs and increasing the capacity to govern the volume and the mix. In this regard, the Government recently issued two Ministerial Decrees, allocating a further **€3.5 billion in annual incentives**. This totals to around €12.5 billion per year, with an overall commitment in the course of the 20 years of a further €70 billion in addition to the €170 billion already earmarked. The individual incentives are being reduced as Italy draws closer to the European levels, while still remaining higher than those of other countries. The mix will be shifted towards technologies with a greater knock-on effect in terms of innovation for the sector and the national economy. Particular care will be devoted to waste recovery and use, which is a major opportunity for driving sustainable development.

  In the medium-long term, it is expected that incentives will gradually be reduced (and eventually cease, particularly in the case of photovoltaics), the eventual aim being the full integration with the electricity market and the grid. Attaining grid parity does not entail giving up support policies, but will involve a change of direction towards instruments that do not increase charges to electricity consumers. Thanks to the incentives provided and the expected achievement of grid parity for photovoltaic energy, **an aggregate €50-€60 billion in investment** by 2020 is forecast for renewables, including plant up-grades and renovation.

- **For the heating sector**, the development strategy is based on a series of specific mechanisms for various usage categories. To encourage small-scale renewables installations, the aim is to introduce a "Heating Account" to encourage the most virtuous technologies. This will cover a part of the initial investment costs. The expected cost of the system, once it is fully up and running, is **about €900 million annually**, with coverage coming from gas surcharges. For initiatives on a larger scale, the White Certificates support mechanism, which should lead to a maximising of efficiency and effectiveness, remains in force. Particular care will also be devoted to the potential of district-heating and -cooling, by setting up a guarantee fund. The system of incentives put in place is expected to bring an aggregate €15-€20 billion in investment by 2020, in an industrial sector in which Italy already has a significant presence.

- Turning to the transport sector, biofuel development is the subject of a wide-ranging international debate, in view of doubts regarding the real sustainability of “traditional” biofuels. This is why the European Directive on the matter will be reviewed in 2014. The key decision here is a transition to the second and third generation biofuels, but at the moment these are not able to completely replace traditional sources. It will also be important to carefully evaluate the development prospects for domestically produced bio-methane for transport use.

  Italy has confirmed the 2020 target of 10% for biofuels which, in terms of the costs to the system, could reach about €1 billion annually (extra-cost estimate compared with the use of fossil fuels). At the same time, Italy intends to play an active part in reviewing the European Directive with a view to promoting second and third generation biofuels. The review should leave open the
The key messages – a summary

possibility for a European assessment on whether to postpone the target in the event that more time is needed to adequately develop these technologies.

In the short run, the Government has already adopted a number of “tactical” measures to steer the sector towards second-generation biofuel production (where Italy has reached levels of excellence). These measures are also designed to foster the development of the domestic and EU system throughout the production sector.

4. Developing the electricity market and infrastructure

The Italian electricity market is undergoing far-reaching changes. The strategy being pursued in this industry has three main objectives: to align electricity prices and costs to European standards; to ensure Italy’s full integration with the European market; and to maintain and develop a free market fully integrated with energy produced from renewable sources, gradually removing all distortions and absorbing current surplus production capacity.

To eliminate the cost differential, in addition to the initiatives described for aligning gas prices and incentives for renewables at the European level, the Government will:

- Develop the electricity grid, to reduce congestions and bottlenecks between market zones and constraints on the full exploitation of the most efficient production capacity.
- Limit market inefficiencies and distortions. More specifically, the “other system charges” in electricity bills (other than the A3 component), which account for about 4% of the cost of electricity, will be carefully reviewed. This task has already begun, with a revision of the CIP6 incentives [incentives approved by the former Interministerial Price Committee – CIP] and the measures to speed up the nuclear decommissioning process. A further reduction of the system’s inefficiencies also appears to be possible by driving forwards a greater rationalisation of the electricity distribution system.
- Review the special conditions granted to specific categories of users. The present system places some categories, particularly energy-intensive small and medium-sized businesses, at a disadvantage.

To seize the opportunities deriving from European integration, it will be necessary to harmonise our current system and ensure that all future policy decisions converge with the European rules. The following, in particular, will require careful strategic attention:

- Drawing up European grid and market governance codes, particularly new guidelines for allocating transport capacity and managing cross-border congestion, including with Switzerland.
- Harmonising operating procedures to encourage efficient market coupling. Of these, the question of whether or not to keep the Single National Price (SNP), which is one element that sets Italy apart from the other European markets, is particularly important.
- Increasing cross-border interconnection capacity.

We expect that integration with the Single Market will provide a major opportunity for the Italian generation pool – particularly if the measures to align gas costs take full effect – to be able to export
more (or import less) energy, and provide dispatching services to the European markets. This would ease the problem of the system’s generation overcapacity.

To integrate the country’s growing distributed renewable generation capacity to the best effect, it will be necessary to address both the issues caused by overproduction and those related to the security of the system in a market where the thermoelectric stock is gradually being "crowded out". In particular, potential overproduction at the local or national level will be managed as follows:

- Pre-emptively, with effects on new plant, by identifying critical areas, restricting the power that can be incentivised in those areas and adopting specific prescriptive measures in terms of service delivery.
- In the short-term, by rationalising interruptions in imports and/or in renewable production, in the event of overflows.
- In the medium term, upgrading the transport and distribution lines between different areas.
- In the long-term, faced with an ever-increasing rise in distributed renewable production, by boosting the development of advanced distribution control systems (smart grids) and storage capacity, by greater recourse to pumped storage systems and the adoption of battery systems.

With regard to guaranteeing the adequacy and security of the service, against a background of poor production programmability and rapid production changes:

- In the present situation of overcapacity, the network operator will be able to guarantee continuity with existing mechanisms for the remuneration of services (in particular, the Dispatching Services Market). In this context, as already mentioned, exporting dispatching services for the interconnected European electricity grids also appears to be an opportunity.
- In the medium-long term, a well-calibrated and stable capacity remuneration mechanism might become appropriate to guarantee the necessary reserve margins. In the event that the overcapacity situation is resolved, this mechanism will be based on auctions designed to minimise the total costs of the system. It will also need to be brought into line with the European guidelines currently being drawn up.

5. Restructuring the refining sector and the fuel distribution network

Refining and fuel distribution are sectors of huge importance to Italy, and are currently undergoing major changes and difficulties. The objectives of the National Energy Strategy for these areas are to accompany the refining industry towards a gradual restructuring and modernisation, and to keep oil product prices down while improving the quality of the distribution service for consumers.

With regard to restructuring the refining sector, the following measures have already been introduced or are envisaged:

- Recognition of the strategic character of refineries and large storage facilities, and the introduction of simplified procedures for the reconversion of refining plants.
- Promotion of a restructuring plan for the sector, with investment to rationalise and modernise production cycles and steer the sector towards higher quality products.
National Energy Strategy: for a more competitive and sustainable energy

The key messages – a summary

- **Introduction of a "Green Label"** within the EU to align the environmental standards and competitive conditions of non-EU production.
- Adoption, by the end of the year, of a Legislative Decree to enact the European Directive imposing an obligation on Member States to maintain minimum stocks of crude oil and/or petroleum products, and to create a central stockholding entity. This will also entail creating a logistics exchange platform, to create a market for oil products storage capacity.

As regards fuel distribution, measures are planned to:

- Increase the level of liberalisation in this sector by, for example, increasing self-service fuel supply methods, removing constraints on non-oil activities, and improving communication and price transparency.
- Rationalise the fuel network and fuel distribution contracts. This will be done, for example, by implementing measures to: close down incompatible fuel stations; gradually introduce new types of contract for managing distribution facilities and supply arrangements; enable operators to redeem their facility; and provide incentives to encourage the wider use of natural gas for vehicles.
- Establish a wholesale fuel market, with the enactment of the minimum oil stocks Directive.

6. Sustainable development of domestic hydrocarbons production

Italy is heavily dependent on fossil fuel imports, with a negative energy trade balance of €62 billion p.a.. At the same time, the country has substantial gas and oil reserves, the largest in Europe after the Nordic countries. We are therefore duty bound to exploit these resources, given the benefits they offer in terms of employment and economic growth.

That said, we realise the potential environmental impact. It will be essential, therefore, to show the greatest possible care to prevent any potential negative repercussions (while noting that in this sector Italy has one of the best records of any country in the world as far as accidents are concerned). The Government does not intend to develop projects in sensitive areas offshore or on land; nor, and in particular, does it intend to pursue shale gas extraction.

As for its objectives, the proposal is to increase output by 2020, to return essentially to the levels of the 1990s. We expect to produce a further 24 million boe/year (barrels of oil equivalent) of gas, and 57 of additional oil, increasing their contribution to the total energy demand from ~7% to ~14%. This will make it possible to mobilise investments of about €15 billion and create 25,000 new jobs, with an annual saving in energy expenditure of about €5 billion.

To attain the goals described, it will be necessary to enact legislation or regulations which guarantee compliance with the highest international safety and environmental protection standards and simplify the bureaucratic procedures for issuing permits. Schemes to support the industrial sector and encourage the further development of technological “hubs” will also be needed. The new legislative and regulatory provisions will be specifically designed to:

- Strengthen the safety measures governing operations, particularly by implementing offshore safety measures envisaged by the proposed European Directive.
National Energy Strategy: for a more competitive and sustainable energy

The key messages – a summary

- **Bring the procedures for issuing permits into line with European standards**, particularly those envisaged by the European Parliament’s recent proposal. This could be achieved e.g. by adopting a model for issuing one single permit for both exploration and production, and setting a deadline for local authorities to submit an expression of interest or an opinion.

- **Develop the spin-offs on the local economy and on employment.** Part of the increased revenue from extracting hydrocarbons will therefore be used to develop infrastructure and employment projects in the areas where the production sites are established and in neighbouring regions, as the recent "Liberalisation" decree law envisages.

- **Develop production**, particularly of natural gas – **notwithstanding the offshore protection restrictions** in the (recently up-dated) Environment Code – while keeping safety margins at levels equal to or higher than those of other EU countries and maintaining the current security and environmental and landscape protection constraints.

- Lastly, and of great importance: Accompany new legislative and regulatory provisions with initiatives to **boost the technological/industrial hubs** in Emilia-Romagna, Lombardy, Abruzzo, Basilicata and Sicily.

7. The modernisation of the system of governance in the sector

To implement this Energy Strategy it will be essential to **strengthen and coordinate** Italy’s participation throughout – but especially in the advanced stages of – international decision-making processes (especially within Europe); improve and simplify horizontal coordination at the national level; and better **coordinate the work of central, regional and local government**. More specifically:

- As regards the formation of European legislation, the intention is to enhance the quality and incisiveness of the **national Governments’ participation** in drafting community laws; strengthen consultation with national stakeholders in order to establish consolidated national positions on the items on the agenda; and improve coordination with **representatives in the European Parliament**.

- At the national level, it is considered important to strengthen forms of early consultation and **prior agreement** around objectives and instruments and thus **reduce, wherever possible, the need for consultation on secondary legislation**.

- With regard to relations between central, regional and local government, a change in the Italian Constitution is deemed necessary. The Government recently submitted a bill on this matter, the aim of which is to give the central Government powers in energy matters where infrastructure facilities of national importance are concerned. Moreover, **local government involvement** in decisions relating to energy installations will be strengthened, by instituting "public debate" to collect and disseminate information. Finally, forms of prior **coordination with the Regions** in order to reduce uncertainties, disputes and litigation will be introduced.

- Turning to **permits**, the following factors are deemed important: identifying the strategic infrastructure to be defined through the National Energy Strategy and which will have simplified administrative procedures; and reducing the official formalities for issuing permits by overcoming Regional governments’ inertia in reaching and expressing agreement (as envisaged by the Development Decree).

Drafting, agreeing and approving the **National Energy Strategy** is a first step towards greater transparency and improved the effectiveness of the governance mechanisms.
Research and development in the energy sector

Within the framework of the Government's new position in respect of energy policy, the priorities allocated to renewable energy sources, efficient energy-use and the sustainable use of fossil fuels will all require research and the development of state-of-the-art technologies.

Italy has important establishments of international excellence in specific fields. An analysis of the aggregate input (investment) and output (scientific and patent production) indicators reveals that research and innovation in the field of energy is being held back. This can mainly be explained by the lack of a clear-cut policy establishing research priorities, the limited resources for research and innovation, and the high level of fragmentation of the parties involved and the areas of research.

The key decisions that will guide research and development decisions in the energy field are intended to overcome the critical areas set out above.

- From the point of view of development priorities, and bearing in mind the European programmes (Strategic Energy Technology (SET) Plan), the following are considered to be of priority interest to Italy:
  - Research into innovative renewable technologies, particularly those in which, as a country, we already start off in a strong position. For example, in concentrated solar power and second-generation biofuels.
  - Research into smart grids, also to facilitate distributed generation, and into storage systems, also in relation to sustainable transport and mobility.
  - Research into energy efficiency materials and solutions, and their technological transfer.
  - The development of projects on CO₂ capture and sequestration methods, mainly from the perspective of Italy's participation in the European action programme around this technology, and possible technological transfer initiatives in non-EU areas.

- In terms of available resources, it will be important to support research and development promoted by private and public sector stakeholders. The amount of resources available under competitive conditions and for use in creating partnerships between universities and research establishments should be increased. This is being done, for example, through the tax reliefs and benefits recently introduced by the "Development" Decree, the Revolving Fund (Kyoto), the Fund for System Research in the Electricity Sector, and the Fund for Technological and Industrial Development in the field of renewable energy sources and energy efficiency.

From the point of view of organising public intervention, it will be necessary to supersede the present segmentation of measures entrusted to various entities and ministries (as initiated by the recent Stability Law). A reorganisation of the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) is also planned, with the aim of focusing its activities and organisational structure on priority research fields for the National Energy Strategy, and to rationalise potential overlaps with other public agencies.
1. The international and Italian contexts

1.1 Two “winners” on the global stage

The current international situation is both difficult and uncertain. The global economy is slowing down and predicting how future energy scenarios will develop is a complex exercise. However, there are a number of global trends that will most likely affect the development of the energy sector in the long term. In analysing the international situation, this document draws on analyses by some of the most eminent international research and analysis institutions in the energy sector (e.g. the International Energy Agency (IEA), the Energy Information Administration (EIA), and British Petroleum (BP)).

This said, the global scenario over the next 20-25 years is expected to show the following trends:

- The world’s demand for energy is forecast to grow (by 50% by 2035), but to highly different degrees from one region to another. Growth will be almost flat in the industrialised countries but will rise sharply in developing nations, which in 20 years time will account for over 60% of global demand.

- At the same time, the world is becoming increasingly energy-efficient. Energy intensity (energy consumed per unit of GDP) looks set to decrease by 2% annually over the next 20 years, and so at a faster pace than the 1-1.5% seen in recent decades. One reason for this is the gradual increase in the price levels (and their volatility) of many resources (energy and other), a factor that, in keeping with market forces, is driving the adoption of innovative efficiency improvement solutions.

Unprecedented economic development, in terms of its scale and rapid pace, in many regions of the world has exerted strong pressure on raw material prices in recent decades (this applies to energy, but also to water and agricultural products). As a result, solutions to replace or reduce consumption, which previously were relatively too costly, are growing in appeal.

- Of the various energy sources, gas and renewables are showing increasing expansion, to the detriment first and foremost of oil, which will lose ground significantly, while coal and nuclear will essentially retain their current market share.
  
  o **Oil** is gradually losing relative importance (from nearly 50% of primary energy in the 1970s to just over 30% at present and between 25 and 30% in 2030), but its consumption in absolute terms is expected to grow. Indeed, development projections seem somewhat alarming: new oil fields are increasingly costly to exploit, while an increase in the share produced by the OPEC countries and National Oil Companies is expected, as is a shift in the demand-supply balance towards “difficult” price scenarios. Some technological methods could improve this outlook – for example, the development of unconventional sources (tight oil/shale oil, oil sands), or a reduction in demand for oil in the transport sector (biofuels, electric vehicles). But these technologies are unlikely to have a radical impact within the next 20 years.

  o **Coal** is expected to fall sharply in importance in the OECD countries, a development that will be offset by the growth in, most notably, China and India, particularly over the next 10 years.
Thanks to the ample reserves available, demand and supply will be more balanced than is the case for oil.

**FIGURE 1**

**Gas and renewables are the energy sources showing increasing growth, while oil will lose market share**

Percentage of total world primary energy

- **Nuclear power** is expected to grow only in non-OECD countries (and in China, Korea, India and Russia in particular). In the West no significant developments are expected (especially in Europe), for two reasons: the high economic cost/risk profile and fears over the safety of the current technology. These fears will lead to a re-assessment of the safety margins of plants currently operating or under construction, and to a renewed effort by Western countries in the areas of research, the reduction in and safer treatment of waste, and international cooperation for the safe use of nuclear for civil purposes.

- **Renewable** sources are expected to see the greatest growth, in terms of both relative and absolute value. This growth will be led by a foreseeable increase in environmental awareness, but also and above all by the expected reduction in technology costs over the next 20 years. This will make it possible to bring many renewable sources into competition, on an equal footing, with the traditional fossil fuel technologies, even considering the effects of (directly or indirectly) taxing CO₂ emissions.

This development will also provide an important industrial opportunity. Global investment is expected to increase from an aggregate $2,100 billion, from 2011 to 2020, to $3,800 billion in the following decade, representing around 60% of investment in electricity generation.
National Energy Strategy: for a more competitive and sustainable energy

The international and Italian contexts

Notwithstanding this growth, renewables’ contribution to total primary energy will remain relatively limited (between 15% and 18% by 2035) compared with traditional fossil fuels (oil, gas and coal will account overall for 75%).

FIGURE 2

In the next 20 years a marked reduction in renewable technology costs is expected
Investment costs, $2010 per kW, average European values

![Graph showing expected reduction in renewable technology costs](source)

FIGURE 3

The outlook for renewables development will translate into a global market of notable dimensions
Aggregate investment in renewables, trillion dollars, 2010-2035

![Bar chart showing investment in renewables](source)
As regards gas, global demand is expected to rise significantly, from 3,000 billion cubic metres at present to over 5,000 in 2035 (the "golden age of gas" mentioned by the IEA). This increase will be driven by consumption in Asia, especially for electricity generation, but also for industrial and civil uses. Supply will rise in tandem, with increasing geographical diversification and the growing importance of the liquefied natural gas (LNG) market.

"Unconventional" gas (shale gas, tight gas and coalbed methane) will also play a leading role. In twenty years time these sources are expected to account for 25 to 30% of global production (and from 50% to 65% of absolute growth in volumes from now until 2035). This is in spite of the fact that the development of these technologies in many countries will depend on whether the geographical reserves identified thus far can actually be exploited and solutions to the environmental problems can be found. To date, the effects of the "unconventional gas revolution" have been seen primarily in the United States, which have rapidly become self-sufficient and seen prices tumble: in 2011, the average price on the US market (Henry Hub) was €7-8/MWh, compared to €22-23/MWh in Europe and €28 on the Italian spot market (PSV).

The situation of gas in Europe is somewhat unusual. This is the only large region in the world where production is expected to fall (even with optimistic assumptions as to the development of unconventional gas). It is the region where the lowest increase in consumption is expected, as a result of limited economic growth, energy efficiency policies and the substitution effect of renewables. This will in any case lead to a need for an increase in imports of between 100 and 150 billion cubic metres in the next 15-20 years.

**FIGURE 4**

**The impact of shale gas capacity on US prices is already significant, and a factor in uncoupling gas from oil prices**

<table>
<thead>
<tr>
<th>Year</th>
<th>Oil (Eur/bbl)</th>
<th>Euro Spot (TTF)</th>
<th>Italy (PSV)</th>
<th>USA (HH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>70</td>
<td>25</td>
<td>3%</td>
<td>0</td>
</tr>
<tr>
<td>2009</td>
<td>25</td>
<td>25</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2010</td>
<td>25</td>
<td>25</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2011</td>
<td>25</td>
<td>25</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
1.2 Europe’s road to decarbonisation and the single market

European energy policies pursue two main goals: the progressive move to a low-carbon economy and the completion of the single market.

The road to decarbonisation

In recent years, the European Union has decided to take on a global leadership role in reducing greenhouse gases. The first key step in this process was to establish ambitious goals to be achieved as early as 2020:

- In 2008, the European Union approved the “Climate and Energy Package” (known as the “20-20-20” package), which set the following energy and climate targets for 2020:
  - A unilateral commitment by the EU to reduce greenhouse gas emissions by at least 20% compared to 1990 levels. The initiatives undertaken to achieve the 2020 targets will continue to produce results after that date, and help reduce emissions by 40% by 2050.
  - A binding target to raise the share of gross EU energy consumption produced from renewable resources to 20%, including a 10% target for biofuels;
  - A reduction of 20% in primary energy consumption, with respect to the levels forecast for 2020, through energy efficiency measures. Although the package did not address the energy efficiency target directly, it was later incorporated, albeit in a non-binding form, in the energy efficiency Directive approved definitively in June 2012.

- Italy fully embraces the spirit of the Energy and Climate Package and has transposed the European legislative framework, with the following targets for 2020:
  - A binding commitment to reduce emissions by 18% overall; this can be broken down as follows: 21% for the Emissions Trading Scheme (ETS) sectors, most notably electricity generation, and, in the non-ETS sectors, 13% with respect to the 2005 levels.
  - A binding commitment to attain 17% of energy from renewable sources, including a 10% target for biofuels.
  - A commitment to reduce primary energy consumption by 20% with respect to the projected levels. The June 2012 energy efficiency Directive identifies a number of measures available to member states to achieve this goal.

Discussion has also begun in the European Union on long and very-long term scenarios and targets, extending beyond 2020.

- The Energy Roadmap 2050 envisages a reduction of greenhouse gas emissions to 80-95% below 1990 levels by 2050, with a 95% target for the electricity sector. The various scenarios examined by the Commission for the Roadmap attributed great importance to energy efficiency and production from renewables. The Commission also examined the use of nuclear energy and the
development of Carbon Capture & Storage (CCS) technology, with a key role being envisaged for gas during the transition period. This will enable emissions to be reduced by replacing coal and oil during the intermediate stage, at least until 2030-35. More specifically, the main structural changes will include:

- Increased **investment expenditure** accompanied by a reduction in the fuel spend.
- A greater **emphasis on electricity**, which will need to almost double as a proportion of final consumption (up to 36-39%) and help achieve the decarbonisation goals in the transport and heating sectors.
- A crucial role for **energy efficiency**, which should achieve reductions of up to 40% in consumption with respect to 2005 levels.
- A substantial increase in **renewables**, which could account for 55% of final energy consumption (and 60–90% of electricity consumption).
- Increased interaction between centralised and distributed systems.

- Within the European Commission, **discussion is already under way to identify further actions**, in addition to the 20-20-20 Package, to achieve the Roadmap’s long- and very-long-term goals:
  
  - As regards **renewables**, the Commission has suggested the adoption of **milestones for 2030** and has announced that concrete proposals will be submitted on the policies to be adopted post-2020.
  
  - On **energy efficiency**, by 30 June 2014 the Commission will assess the progress achieved towards meeting the overall European target and will consider the possibility of introducing binding goals.
  
  - Close attention will be paid to instruments designed to achieve the **emissions reduction** targets. In the case of the **sectors covered by the ETS Directive**, CO2 prices have not yet proved to be capable of sending a sufficiently strong signal to operators. The Commission is evaluating whether to significantly reduce the amount of permits to be auctioned in 2013-15, to a sufficient degree to stabilise and support CO2 prices (the Set-Aside mechanism).

This measure could, potentially, have a significant effect on the country’s energy/industrial production system, with positive aspects (for example, by making solutions involving lower use of fossil fuels than to cleaner sources more attractive, and a closer alignment of our prices to European levels). But it could also have negative effects (increases in wholesale electricity prices and higher production costs for energy-intensive businesses). As regards **all the other sectors**, a project to change energy taxation with a view to standardising the minimum tax level on energy products, on the basis of their energy content and the CO2 they emit, is currently being evaluated. This would eliminate market distortions such as the exemptions envisaged by the current system.
National Energy Strategy: for a more competitive and sustainable energy

The international and Italian contexts

It should be borne in mind that these measures partly overlap with other existing measures (most notably those regarding energy efficiency and energy production from renewables) designed to achieve an overall reduction in emissions.

- In the meantime, the **main European countries** are moving towards the adoption of energy strategy goals in line with the EU ones. Examples are the energy strategies of Germany, Denmark and the United Kingdom.
  - With the “Energiewende”, **Germany** intends to achieve: production from renewables amounting to 18% of consumption by 2020, reaching 60% by 2050 (for the electricity sector the goal is to develop renewables to 35% by 2020 and up to 80% by 2050); a reduction in primary consumption of 20% below 2008 values by 2020 (with, most notably, an expected 10% reduction in electricity consumption), rising to 50% by 2050; and a progressive phasing-out of nuclear power stations by 2022.
  - The **UK** Government, with “Enabling the transition to a Green Economy”, has introduced a series of policy instruments to support this transition. The Government’s goals for 2020 include a 34% reduction in greenhouse gas emissions and production from renewables amounting to 15%.
  - **Denmark’s** “Energy Strategy 2050” adopts a flexible long-term approach that aims to make the country independent of fossil fuels by 2050. Key points for 2020 are: production from renewables amounting to 30% of consumption and a reduction of primary consumption to 4% below the values for 2006.

**Completing the Single Energy Market**

In addition to its environmental targets, the European Union aims to achieve full integration of the national energy markets. The goal is to give consumers and businesses better products and services, at more competitive costs and with greater security of supply, through a more efficient and competitive energy system.

This goal encompasses drawing up and putting in place consistent and standardised market rules and instruments and constructing major cross-border connection infrastructure for both gas and electricity.

- From the point of view of **market instruments and rules**, the European Commission has set an ambitious target envisaging full market integration by the end of 2014. With the third legislative package for an internal EU gas and electricity market, approved in April 2009 and implemented in Italy in June 2011, it has already introduced:
  - Structural unbundling of transmission, on the one hand, and production and supply on the other, for vertically integrated companies.
  - New instruments to harmonise market and network operation rules at the pan-European level.
National Energy Strategy: for a more competitive and sustainable energy

The international and Italian contexts

- High standards of public service obligation and consumer protection (e.g. provisions simplifying consumer choice and transparency obligations for operators).

- Stronger powers and independence of national energy regulators.

- A new institutional framework, with the creation of a European Agency for the Cooperation of Energy Regulators (ACER) and the strengthening of the European Network for Transmission System Operators’ associations (for electricity and gas) – the ENTSOs.

- From the point of view of network integration and development, the Commission aims to ensure that all connection and storage infrastructure deemed to be strategic for European energy security and integration is completed by 2020.

- In October 2011 the Commission adopted the proposal for a Regulation on “Guidelines for Trans-European Energy Infrastructure”. This identifies 9 priority corridors and 3 areas of interest covering the electricity and gas transmission and storage networks, oil pipelines, smart grids and networks for CO\textsubscript{2} transportation and re-injection. The Commission intends to select a certain number of “projects of common interest” that are important for achieving the energy and climate targets. Projects awarded the “common interest” label will enjoy a twofold advantage: streamlined permit-granting procedures, which will be quicker, simpler and more transparent, and EU financial support (for 2014-2020, €9.1 billion should be earmarked under the Connecting Europe Facility (CEF))

- Italy is touched by 5 of the corridors (2 for electricity and 3 for gas) and, like all member states, by the 3 priority thematic areas. The following are of interest to Italy:
  - For the electricity sector, the North-South (NSI West Electricity and East Electricity) corridors.
  - For the gas sector, the North-South (NSI West Gas, East Gas, and Southern Gas) corridors.
  - The thematic areas for the development of smart grids, electricity highways and CO\textsubscript{2} transport networks.

The regulation is expected to be adopted by the European Parliament and Council by the end of 2012, and to enter into force in early 2013. This will give plenty of time to draw up an initial list of projects of common interest at the EU level that will be eligible for funding within the CEF framework due to enter into force in 2014. Indeed, work has already begun and is being taken forward intensively on the basis of provisional criteria.
National Energy Strategy: for a more competitive and sustainable energy

The international and Italian contexts

1.3 The starting point for Italy: challenges and opportunities

The challenges: the macro-economic context, security and energy competitiveness

The Italian economic context is, at present, both difficult and uncertain. After a decade of very limited growth, the impact of the economic crisis of 2008 has reduced Italian GDP by over 5%. The most recent forecasts again point to difficult growth in the short-term, with recovery only expected from 2013/14. Sustainable growth, the main priority for both the Government and the country, can be achieved only if the competitiveness of the Italian economic system improves substantially.

If the industrial and manufacturing sector is to retain its central role for the development of the country, we will need to act on all of the structural factors with the potential to improve our competitive situation with respect to our international competitors.

These most definitely include the energy sector, which is faced with significant and, in part, contrasting challenges:

- First, Italy's energy prices are, on average, higher than Europe's and much higher than those of the United States. This situation burdens heavily the competitiveness of the Italian economic system, and can largely be explained on the grounds of four structural reasons:
  - The current mix, in particular for electricity, is fairly costly because it is based primarily on gas and renewables. It differs greatly from the average EU mix in light of the absence of nuclear power and the low share of coal.
  - Wholesale gas prices are on average higher in Italy than in other European countries. The average price of gas on the PSV (Punto di Scambio Virtuale, the Virtual Exchange Point of the gas system) spot market in 2011 was about 25% higher than on the principal north-European hubs (the price of long-term Italian take-or-pay (ToP) contracts was also higher, on average, than similar European ToP contracts).
  - Historically, Italy has the highest incentives in Europe for production from renewables (for example, the unit incentives for photovoltaic production are about double those of Germany). This has a strong impact on energy costs: about 20% of the Italian electricity bill (taxes excluded) goes to cover incentives for production from renewables.
  - Lastly, there are a several other costs and widespread inefficiencies. For example, for the electricity sector: "other system costs" (e.g., costs for nuclear decommissioning, system research, special tariff schemes); grid bottlenecks (for example between Sicily and the mainland); and high incentives for certain types of production (e.g. non-renewable CIP6...
National Energy Strategy: for a more competitive and sustainable energy

The international and Italian contexts

[incentives approved by the Interministerial Price Committee – CIP]), and incentives for certain categories of customers.

FIGURE 5

High energy costs

- Second, the issue of **security and independence of supply** is highly important for Italy. This problem can be broken down into two areas:
  - **Import dependence**: 84% of Italy’s energy needs is covered by imports, with domestic production from renewables, gas and crude covering just 10%, 4% and 3% respectively of the national demand. This figure compares with a significantly lower average import share for the “Europe of 27”, at 53%. This factor has a strong macro-economic impact on the country, which had an **energy bill** for 2011 of around €62 billion (net energy imports). For years, this has kept the trade balance deeply in the red. Moreover, **diversification of sources** of supply is fairly limited, especially for gas.
  - **Limited gas-system response capacity in emergency peak conditions**: at times when reductions in supply from abroad coincide with prolonged periods of exceptionally cold weather throughout the country – as happened in February 2012 – the system is still insufficiently resilient. Faced with an estimated peak demand in exceptional weather conditions of about 480 Mmc/day, the reserve margin is somewhat limited, at around 50 Mmc/day. This applies in particular towards the end of the thermal winter, when delivery capacity from storage is low. During these emergency periods, the electricity sector has been asked to deliver additional flexibility measures, with a resulting increase in energy costs for electricity users.
The high proportion of energy imports means that security of supply is especially pertinent to Italy

Production and imports of energy resources, 2010

Source: MiSE

System fragility “at peak”
Mcm/day, 2012

Source: MiSE
National Energy Strategy: for a more competitive and sustainable energy

The international and Italian contexts

- Lastly, some segments of the electricity sector are experiencing difficult economic and financial conditions. Most notably:

  - The electricity companies most reliant on combined cycle gas production (CCGT). These suffer from high over-capacity in electricity generation, caused in part by the fall in demand (which is not expected to grow significantly in coming years), in part by the notable increase in thermo-electric production capacity (about 20 GW of new CCGT from 2005 to 2011), and in part by the increased production from renewables.

  - Companies with long-term (ToP) gas contracts, with purchase prices indexed to oil. These are having to deal with a market characterised by lower demand (where the volumes requested are often below the ToP threshold) and strong competition from the spot market, where prices are lower than oil-linked prices.

  - The oil refining sector, which is suffering a fall in demand, both cyclical (as a result of the economic crisis) and structural (as a result of vehicles’ ever-improving energy performance and the influence of biofuels). Another factor is the increased competition from plants in regions like India, the Middle East and China.

The foundations to build on: the strengths of the Italian energy system

In addressing the challenges described above, Italy’s energy system has significant strengths to draw on. These include:

- High environmental standards. Today, Italy is one of the world’s most energy-efficient countries (with primary energy intensity 15% lower than the European average). In addition to being historically well positioned in this area, the country has seen a fall in consumption in recent years. This is a result not just of the economic crisis, but also of the reduction in energy intensity (5% lower than in 2005). Contributory factors include increased electricity generation yields and the introduction of the energy efficiency plan for end uses (e.g. tax rebates, White Certificates, minimum requirements for buildings and electricity equipment). This year, the American Council for an Energy-Efficient Economy (ACEEE) placed Italy third in the world after Great Britain and Germany in its comparison of countries’ efforts to increase their energy efficiency levels.

- A favourable geographical position that sees our country acting as a bridge between continental Europe and the Mediterranean, with privileged access to North Africa, the Balkans and the Middle East – important regions from the energy perspective.

- Solid foundations in terms of service quality. If, for example, we consider unplanned interruptions in the electricity service, Italy is well-placed with respect to other European countries. According to the CEER report for 2011, Italy had just 47 minutes/year of unplanned interruptions in 2010, compared to 63 in France, 70 in Great Britain and 88 in Spain.
National Energy Strategy: for a more competitive and sustainable energy

The international and Italian contexts

- A highly developed regulatory framework. For example, regulation of the electricity distribution system is at an advanced stage and has led to notable efficiency gains and service quality improvements, through reward and penalty schemes.

- A good level of technological progress, with a number of areas of excellence, thanks to the considerable investment made in recent years. For example, we lead the world in the deployment of smart metering and have one of the most efficient CCGT generating pools.

- Moreover, for Italy energy is an important industrial sector, which employs about 470,000 (one of the few sectors showing growth, with about 36,000 new jobs in 2011)\(^1\). The sector has attained a highly competitive international position in certain segments, both in the area of "clean" economies (for example, concentrated solar, heating and cooling renewables and energy efficiency) and in more traditional sectors (such as hydrocarbon exploration and production).

---

\(^1\) Figures from the Sole 24 Ore’s Energy Report, February 2012
National Energy Strategy: for a more competitive and sustainable energy

The goals of the new National Energy Strategy

2. The goals of the new National Energy Strategy

2.1 Energy’s role for growth and the value of an Energy Strategy

As mentioned earlier, the first priority for the country and for the Government is sustainable economic growth. The energy sector is a key element for growth, both as an enabling factor and as a growth factor in itself:

- **As an enabling factor for sustainable growth**, since energy has a decisive impact on business and household costs. Energy bills are significant items of expenditure – and therefore a competitiveness factor – for Italian businesses, which find themselves facing directly international competitors whose energy costs are often much lower. For example, the average cost of electricity, per MWh, for an industrial customer consuming between 2,000 and 20,000 MWh/year can be up to 25% higher in Italy than in the major European countries.

  Moreover, for more than 80% of our energy needs we depend on fuel imports. This dependency makes us vulnerable to uncontrollable external events (e.g. increases in commodities prices). It weighs heavily on the country’s finances, given that we had an energy bill of €62 billion in 2011.

- **As a growth factor in itself**, the energy sector is a potential driver of economic recovery. It is, indeed, a sector that is experiencing continuous growth at the global level, with high rates of investment (from now until 2035 the IEA estimates that $38,000 billion will be invested in the sector) and the resulting innovation and spin-off effects. Our country is well-placed to take advantage of several areas of opportunity, pertaining both to the green-white economy (renewables, energy efficiency, sustainable mobility and transport) and in the more traditional areas.

In a context like the one described in the previous chapter – with wide discrepancies at the international and national levels and significant challenges for the future – it is of vital importance for the country to draw up a National Energy Strategy (NES). Such a strategy serves to delineate the direction in which the sector will develop, the main strategic choices to be made, and our priorities. The NES will guide our decisions and choices in coming years, albeit knowing that we are acting in a free market context and with development scenarios that cannot be centrally controlled. The strategy must be consistent and act in synergy with the National Action Plan for Renewable Energy (which will need to be up-dated in line with the NES), the Action Plan for Energy Efficiency, and, lastly, with the Plan for CO2 Reduction and Decarbonisation of the Italian economy, which is currently being drawn up.

It is important for this to be done in consultation with all stakeholders – institutions, trade associations and social partners – while bearing in mind that the goal of developing the energy sector must coincide with the general interest of the country, and not with the interests of specific groups. After the consultation, it is envisaged that the goals and initiatives established will be set out in a proposed
National Energy Strategy: for a more competitive and sustainable energy

The goals of the new National Energy Strategy

implementation roadmap that identifies in detail those responsible and the instruments and timetables for each initiative.

From a methodological perspective, this document analyses the energy sector and breaks it down into 5 sub-sectors/areas of intervention. These are based on the energy source (electricity, gas, oil) and/or the different stages of the value chain (upstream, i.e. generation or extraction; midstream, i.e. transport or refining; downstream, i.e. distribution; and, lastly, consumption). The 5 areas are:

- Energy consumption
- Electricity infrastructure and market
- Gas infrastructure and market
- Oil product refining and distribution
- Oil and gas exploration and extraction

And then there is one area that cuts across all 5 areas: the governance of the sector. This concerns policy and regulation (international, European, national, regional and local) and administrative and authorisation processes.

FIGURE 8

5 distinct areas of intervention in the energy sector

Source: MiSE
National Energy Strategy: for a more competitive and sustainable energy

The goals of the new National Energy Strategy

In terms of timing, the Energy Strategy focuses primarily on the medium-long term, up to 2020. However, a number of its considerations – some of a general nature and others applying more specifically to sectors with a structurally very long outlook – concern the long to very-long term (2030-2050). The 2020 timeframe provides sufficient freedom to establish a direction for development (albeit with certain constraints linked to the current situation) and at the same time to establish reasonably concrete interventions and priorities for action. The 2030/2050 timeframe, on the other hand, provides scope to guide the underlying choices and decisions.

2.2 Four key goals for the sector

In line with the comments made earlier regarding the international context, the challenges facing Italy and the country’s strengths, the new National Energy Strategy focuses on four main goals:

1. To significantly reduce the energy cost gap for consumers and businesses, by bringing energy costs and prices into line with European levels.

2. To achieve and surpass the environmental decarbonisation targets set out in the European Climate and Energy 2020 Package.

3. To continue improving our security and independence of supply.

4. To foster sustainable economic growth by developing the energy sector.

Each of the above objectives is briefly analysed below:

1. Reducing the cost gap for consumers and businesses is by far the leading goal, in light of the country’s intention of becoming more competitive and achieving more – and sustainable – growth. As we have seen, this is also the area where we are starting out from the position of greatest disadvantage, and the one which will require the greatest effort. Given the structural nature of this gap, the actions to be undertaken will show their effects gradually over the medium-term.

   To achieve this goal, gas prices will need to be aligned (a critical element, not least in reducing electricity prices), while the widespread inefficiencies in the system, which cause higher prices, will need to be reduced. Reducing energy costs and prices means not just restoring business competitiveness on the international markets and increasing citizens’ spending capacity. It also means offering our electricity generation sector the prospect of exporting – or of importing less.

2. The second objective is to meet and surpass the European environmental targets, which are a key element in the sustainable development pathway the country intends to follow, in line with the policies set out in the European Climate and Energy Package (“20-20-20”) and by the Energy Roadmap 2050. All of our energy policy decisions will therefore be designed to improve environmental and decarbonisation standards – which are already among the world’s highest – and to give the country a role as an example at a global level.

3. We then need to focus on security and independence of supply, in both the electricity and gas sectors, but especially the latter. In terms of security, Italy’s starting position is more or less in line with European standards (for example, with respect to the “n-1 rule”). However, as we discussed in
National Energy Strategy: for a more competitive and sustainable energy

The goals of the new National Energy Strategy

the “Background” chapter, **further improvement is needed**. This goal can be broken down as follows. First, a reduction in the levels of fossil fuel and electricity **imports** (so as to reduce the overall level of dependence and improve our trade balance). And second, a **diversification** of sources of supply (which at present, for gas, are somewhat concentrated), and the optimisation of **flexibility of supply** (for example, through gas storage) to respond to peaks in consumption and unexpected reductions in imports.

4. Implementing the energy strategy will involve significant investment and technological innovation and will therefore be an opportunity for growth in the energy sector. If we also take into account the considerable international opportunities that will arise, and our favourable starting point in areas where we have a notable tradition and expertise, the **industrial growth of the energy sector** is in itself a goal of the energy strategy. The strategy therefore intends to **foster spin-offs, throughout the national supply chain**, of the initiatives undertaken in all of the areas of action that we will be analysing.

**Open points for consultation – The objectives**

**C1.** Setting priority objectives implies a **trade-off with other potential energy policy goals**. What other objectives should the NES pursue, taking into account the international context and the position the country is starting from?
3. Priorities of action and expected results

3.1 Seven priorities for the coming years

To achieve the medium to long-term objectives (2020), the National Energy Strategy has been divided into 7 priorities, each with specific support measures already undertaken or being drawn up, as described below. In addition to these 7 there are, of course, numerous other areas of intervention the Government will be focusing on, but the priorities illustrated here are the ones with the greatest importance and impact.

1. **Energy efficiency.** Energy efficiency will play a part in achieving all of the energy policy objectives mentioned in the previous chapter:
   - reducing energy costs, thanks to savings in consumption;
   - reducing environmental impact (energy efficiency is the most cost-effective way to lower emissions, with a return on investment that can often be positive for the country. As such, it should be a preferred means of achieving our environmental quality goals);
   - improving our security of supply and a reduction in our energy dependency;
   - achieving economic development generated by a sector with strong knock-on effects on the national supply chain, where Italy is in a leading position in several areas and can therefore view other countries as further, and rapidly expanding, markets.

   At the same time, the strong drive to energy efficiency will absorb a substantial part of the expected increases in demand from now until 2020, both primary and for end users. In this context, the sector will need to take a realistic approach to a scenario where demand will remain flat, at levels comparable with those of recent years: it will therefore be even more necessary to guide choices and decisions towards measures to increase system efficiency.

2. **Competitive gas market and Southern European Hub.** A priority for Italy is to create a liquid and competitive domestic market that is fully integrated with those of other European countries. Moreover, in the next 15-20 years Europe will significantly increase its gas imports (an additional 100-150 billion cubic metres). For Italy, this could be an opportunity to become an important crossroads for gas entering Europe from the South. The main expected impact is an alignment of our gas prices with European prices; this will be accompanied by increased security of supply thanks to improved infrastructure and greater market liquidity. More competitive gas prices will make it possible for Italy to act as a trading and/or transit country towards Northern Europe, while restoring competitiveness to the country’s gas-fired combined cycle installations and reducing electricity imports.

3. **Sustainable development of renewable energy.** Italy intends to meet and surpass the European targets for production from renewables (“20-20-20”) and to play a significant part in reducing emissions and achieving the energy security objective. While so doing, however, it is most important at this time to keep energy bills down, given the burden they place on businesses and households. Incentives need to be brought into line with European levels and further impetus needs to be given to the development of renewables in heating and cooling, which have good
growth potential and lower specific costs than electricity. It will also be necessary to focus spending on the most virtuous technologies and sectors, those with the highest returns in both environmental terms and the greatest potential for the national supply chain. In this respect, close attention will be devoted to waste recovery and re-use. Renewables are a central segment of the green economy, which is increasingly being seen at the international level as an opportunity for economic recovery.

4. **Development of infrastructure and the electricity market.** The Italian electricity market is undergoing far-reaching changes, caused by numerous changes. To mention just the most evident: the slow-down in demand, the large (excessive) amount of thermo-electric generating capacity and the increased production from renewables, which has occurred at a markedly faster pace than envisaged in previous planning documents. In this context, the fundamental choices and decisions will focus on maintaining and developing a free and efficient electricity market that is fully integrated with the European market in terms of both infrastructure and regulation, and with prices increasingly converging with European levels. Production from renewables will also need to be fully integrated with the market and with the electricity grid.

5. **Restructuring the refining sector and the fuel distribution network.** The refining sector is experiencing major difficulties, both for cyclical reasons (fall in demand caused by the economic crisis) and also, and above all, for structural reasons, given the progressive fall in consumption and growing competition from countries new to the sector. The sector is in need of restructuring if it is to become more competitive and technologically more advanced. Fuel distribution also needs to be modernised, to make it more efficient and more competitive and to improve service levels for consumers.

6. **Sustainable development of domestic hydrocarbons production.** Italy is heavily dependent on fossil fuel imports; at the same time, the country has substantial gas and oil reserves. We are therefore duty bound to exploit these resources, given the benefits they offer in terms of employment and economic growth in a sector where our expertise is widely recognised. That said, we realise the potential environmental impact. It will be essential, therefore, to show the greatest possible care to prevent any such impact. Our environmental and safety regulations will need to be aligned with the most advanced international standards (while noting that in this sector Italy has one of the best records of any country in the world as far as accidents are concerned). The Government does not intend to develop projects in sensitive areas offshore or on land; nor does it intend to pursue shale gas extraction.

7. **The modernisation of the governance system.** To make it easier to attain all of the above objectives, we will need to increase the effectiveness and efficiency of our decision-making process, which is bound by far more red tape and far longer timescales than is the case in our competitor countries. Agreeing on a clear and consistent National Energy Strategy will be a first, important step in this direction.
National Energy Strategy: for a more competitive and sustainable energy

Priorities of action and expected results

FIGURE 9

7 priorities identified with concrete objectives and specific support measures

<table>
<thead>
<tr>
<th>Governance</th>
<th>&quot;Upstream&quot;</th>
<th>&quot;Midstream&quot;</th>
<th>&quot;Downstream&quot;</th>
<th>Consumer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8. Sustainable production of domestic hydrocarbons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. Modernisation of the governance system</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: MiSE

Open points for consultation – The priorities

C2. The proposed priorities of action will be the main energy policy focus in the medium-term. **What other priorities**, if any, should the NES take into account to ensure that the objectives set for the sector are achieved?
National Energy Strategy: for a more competitive and sustainable energy

Priorities of action and expected results

3.2 Expected results by 2020

First, a comment on methodology: formulating long-term projections is difficult. It requires us not just to establish the policy actions the Government intends to take forward, but also to make a series of assumptions on conditions external to the system. These clearly cannot be controlled and could end up, in the event, markedly different from our forecast. In drawing up this document we therefore prepared – with the valuable and greatly appreciated collaboration of the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) – a series of development scenarios to 2020 and beyond. These represent, in quantitative terms, the probable results of the actions set forth in the Energy Strategy (for simplicity, in the document we only include the summary data for the “NES Scenario”, i.e. the scenario we consider most likely in terms of exogenous variables and the implementation of the actions described).

More specifically, as regards economic growth (GDP), we have assumed an economic recovery starting in 2014, with an average annual growth rate of 1.1% up to 2020 (in line with the forecasts used by the European Commission for Italy in “The Ageing Report 2012” 2).

This said, the result expected from the implementation of all of the priority activities described above will be a gradual but significant development of the system, on both the economic and environmental fronts. This envisages, by 2020:

- The restraint of consumption with respect to 2010, both for total primary consumption and electricity (with an expected reduction of ~4% for primary, and electricity consumption essentially flat or rising only slightly), thanks to the strong drive on energy efficiency.

- A strong increase in the part played by renewables in the production mix in all sectors (electricity, heat, transport). Renewables will amount to up to 23% of primary consumption compared with 11% in 2010, with the share represented by fossil fuels gradually falling while still remaining predominant (about 76% of primary consumption).

More specifically, the mix in the electricity sector will increasingly focus on gas and renewables – a trend expected to be followed in other European countries too – with renewables even becoming the main component of the mix, at an expected 36-38% – equal to or higher than gas.

- A lower dependence on imports, from 84% to 67% of our energy requirement, and a resulting reduction in the national energy bill of about €14 billion a year from the current €62 billion (or of about €19 billion with respect to the projected €67 billion at 2020, under the reference scenario and at constant prices). The expected savings on imports equate to about 1% of GDP and, by themselves, could restore the trade balance to surplus, after years of deficit. This will happen thanks to the

---

2 The other main assumptions relative to the “SEN Scenario” include: crude price: $110-120/bbl; coal price: $100-110/T; gas price: $8-10/Mbtu; CO₂ price: €20-25/T.
National Energy Strategy: for a more competitive and sustainable energy

Priorities of action and expected results

- planned energy efficiency initiatives, the increase in renewables, higher national hydrocarbon production and the reduction in electricity imports.

- A significant development of investment in both the green economy (renewables, energy efficiency) and in the traditional sectors (electricity and gas networks, regasification and storage facilities and hydrocarbon production). We expect investments to amount to around **€180 billion** by 2020. These will be private investments, partly supported by incentives, and are expected to generate positive economic returns for the country.

**FIGURE 10**

**A gradual but significant development of the system: gross primary energy consumption**

| Source: MiSE |
|--------------|--------------|
| 2010        | 2020         |
| Electricity imports | 2%   | 1%   |
| Coal         | 9%   | ~1%  |
| Renewables   | 11%  | ~23% |
| Oil          | 37%  | 30-32% |
| Gas          | 41%  | 35-37% |
National Energy Strategy: for a more competitive and sustainable energy

Priorities of action and expected results

FIGURE 11

Electricity consumption: shift to a gas-renewables mix

Development of gross electricity consumption mix

| Source: MiSE |

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>346</td>
<td>345-360</td>
</tr>
<tr>
<td>Oil</td>
<td>3%</td>
<td>-2%</td>
</tr>
<tr>
<td>Imports</td>
<td>13%</td>
<td>7-10%</td>
</tr>
<tr>
<td>Coal</td>
<td>14%</td>
<td>13-14%</td>
</tr>
<tr>
<td>Renewables</td>
<td>23%</td>
<td>36-38%</td>
</tr>
<tr>
<td>Gas</td>
<td>45%</td>
<td>35-38%</td>
</tr>
</tbody>
</table>

FIGURE 12

The country's potential for savings is significant

Billions of euros/year, price estimates taking imports as constant

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net imports</td>
<td>62</td>
<td>48</td>
</tr>
<tr>
<td>Energy efficiency</td>
<td>-8</td>
<td>-19</td>
</tr>
<tr>
<td>Renewable production</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Hydrocarbon production</td>
<td>5</td>
<td>48</td>
</tr>
<tr>
<td>Potential imports to 2020, in presence of measures</td>
<td>5</td>
<td>48</td>
</tr>
</tbody>
</table>

1 Assuming halt in energy efficiency measures and incentives for renewables, and natural decline of hydrocarbon production

2 Primary energy, Eurostat methodology, compared to 2010 values
National Energy Strategy: for a more competitive and sustainable energy

Priorities of action and expected results

- Strong progress in our environmental standards, to reach and surpass the European targets by 2020, and progressively attain the Roadmap 2050 objectives:
  - Greenhouse gas emissions will fall by about 19% with respect to the 2005 levels, thus exceeding the European target for Italy (of 18%) by one percentage point. This is in line with the CO₂ reduction and decarbonisation plan for the Italian economy (currently being drawn up).
  - As for the development of renewable sources, this form of energy is expected to account for 20% of gross final consumption (and 23% of primary energy consumption). This will exceed the National Plan target of 17% of consumption.
  - Turning to energy efficiency – an area where the 20-20-20 targets are not binding – Italy aims to surpass the European goal of 20% of consumption compared with the reference scenario, with an expected saving of 24% (around 20 MTOE of primary energy with respect to today’s level). It will adjust the Action Plan for Energy Efficiency accordingly (for the Plan, in accordance with Directive 2006/32/EC, the binding deadline is 2016).

These results will be accompanied by benefits, whose overall impact is difficult to quantify, in terms of economic growth and employment. These gains will be produced, primarily, by increased competitiveness in the most electricity- and gas-intensive sectors; savings of resources currently being used to import fuels; substantial investments in the energy sector and in the associated supply industries; and a revitalisation of research and innovation in the sector.
3.3 A flexible approach to long/very long-term decarbonisation

In the long/very long term, Italy embraces the spirit of the European Roadmap 2050 for a low-carbon economy, with emissions being reduced by up to 80% compared with the 1990 levels. This goal will guide the policies to be adopted post-2020.

Recent decades have, however, shown us the difficulty of predicting developments in technology and the market, especially in the long term. We need only consider that, only 25 years ago, the three electricity generation technologies (CCGT, solar and wind) that now make up a large proportion (over 60%) of national production were still in the early stages of development. Formulating precise strategies over a timescale of as many as 40 years seems, therefore, both difficult and inadvisable. Moreover, recent experience has shown the importance of reconciling environmental objectives (e.g. emissions reduction) with economically sustainable and efficient approaches to development. For example, the approach followed in recent years in the development of renewable technologies, especially solar, has not been optimal.

Italy must therefore adopt a flexible and efficient long-term strategy that makes it possible to adapt to technological and market developments and is, as far as possible, technology-neutral in the development of the mix. In other words, without any a priori preference for specific technologies, unless these are justified by significant external factors. It will be important, therefore, to pay attention to and closely follow how certain potential “step changes” develop, for example in the development of technologies that are not yet fully mature and/or competitive with respect to traditional ones, and to earmark sufficient resources for research and development to explore the most promising solutions.

In Chapter 5 we will examine technological research and development in more detail; here we will simply list possible developments in the technology and the markets that to date seem most significant.

- A faster reduction in costs and/or more rapid improvement in the programmability of renewable technologies, thanks to marked advances in technological development. Renewables costs are already expected to fall significantly over time (see Figure 2). This will see photovoltaic solar energy, for example, attain grid parity in various parts of the country in just a few years (although parity with wholesale prices is still distant). An acceleration in this trend would see a higher proportion of renewable sources than today seems feasible rapidly enter the system.

- The development of technology and cost reductions for electricity storage. Storage technologies, along with the development of the network, will be of fundamental importance in guaranteeing the secure development of renewable electricity and fostering the wider use of electric vehicles and smart grids. To date, the technology is not yet sufficiently mature for widespread industrial use. Worldwide, only 450 MW of electrochemical accumulators have been installed thus far. However, there is no doubt that this technology is developing rapidly – driven by the automobile sector – and will become increasingly competitive.

Italy does not want to miss out on this important industrial development opportunity, and not just at the national level. If, therefore, it seems premature to launch a wholesale installation programme in the next 2-3 years, it is vital to encourage experimentation in this sector and its national supply...
National Energy Strategy: for a more competitive and sustainable energy

Priorities of action and expected results

**chain** to acquire know-how and understand which are the most suitable technologies and the potential benefits for the system, and to distribute expenditure over time in a more informed manner until the technology matures and costs fall significantly.

- More rapid developments in the world’s **shale gas** sector. Just five years ago, global reserves were thought to be sufficient for 50-60 years; but the possibility of extracting unconventional gas and of finding other conventional gas fields has increased the estimated timescale to about 200 years. This has revolutionised the global production and consumption scenario. The United States, which pioneered the exploitation of this resource, have rapidly become not importers but potential exporters of natural gas, thus bringing the price of this fuel down by over 50%.

  It is early days yet, so it is very difficult to make precise forecasts as to the availability of this resource, and the ability to extract it, at the global level. However, we cannot rule out an acceleration in shale gas extraction, which would bring ample and widely available resources into play at relatively low costs. The impact for Italy will not be direct (since we do not envisage developing this resource). However, the indirect impact could be strong, thanks to the potential effect on world prices, especially in the LNG market.

- A strong impetus for a wider use of **biofuels**, thanks to the development of the second and third generation biofuels. At present, the outlook for biofuels is uncertain, since the predominant technology (“first generation”) has a number of problematic issues regarding their environmental and social impact. If the development of technologies that are economically more efficient – and, most importantly, less harmful to the land and to crops – could be speeded up, the growth in the use of biofuels to replace fossil fuels could rise significantly.

- The development of **Carbon Capture and Storage** (CCS) projects. At present, this technology is not commercially feasible, since it involves high levels of investment and energy consumption. However, in the long term a significant role for CCS in the energy system cannot be ruled out, not just in light of a potential revival of “clean carbon” generation, but also in combination with biomass and gas systems, and for high-emission sectors (e.g. cement). Italy therefore intends to go on contributing to research in this field and to carefully monitor the development of this opportunity.

- Lower costs for, and the rapid spread of, **electric vehicles**. This will enable a reduction in CO₂ emissions, currently between 25% and 40% “from well to wheel” compared with traditional vehicles in Italy. The outlook is for an even more marked reduction, as the electricity generation mix shifts towards renewables. Above all, the use of electric vehicles will mean the complete elimination of local pollutants in our town centres.

  However, the cost of this technology is still high, both for consumers and, more in general, for the country, compared with other initiatives to reduce emissions in the transport sector or to improve energy efficiency. The most recent estimated cost trends seem favourable, with a possible reduction for batteries, for example, of between 45% and 75% over the next 20 years. Italy is committed to supporting the progressively wider use of electric vehicles, in terms of public recharging infrastructure, encouragement of the use of these vehicles, and research and development. In this case too, spending will need to be spread over time, in line with falling technology costs.
National Energy Strategy: for a more competitive and sustainable energy

Priorities of action and expected results

- The development of renewable energy production in North Africa and the Balkans. The southern Mediterranean has significant potential for the production of solar and wind energy. This would also bring significant benefits to the citizens of North Africa and the Middle East (MENA). Ambitious development plans already exist, although implementing them will be difficult, given the high initial investment, the rapidly developing technological solutions, and, not least, the political problems.

However, this is an opportunity that Italy must follow closely, both from a long-term perspective that would see it as a re-export country, and from the perspective of industrial collaboration with North African countries with which we already collaborate closely. In the Balkan countries too, strong development of renewables is forecast, especially hydro-electricity. Italy has an important position in this framework, both because an interconnection cable with Montenegro is already under construction, and in view of existing Italian investments in the region.

- A change in the role and importance currently attributed to nuclear power. This could be the result of a possible recovery of investment at the global or European level, or the outcome of international research and cooperation programmes, in which our country too is engaged, on new generation reactors. Although this option will not directly involve Italy, given the result of the 2011 referendum, if the nuclear industry is able to provide a satisfactory answer to the safety, environmental quality and waste issues, then this could be a significant advance in global energy development in the long/very long term.

Open points for consultation – The road to decarbonisation, 2030-2050

C3. The strategy is not intended to be a detailed description of the energy system in 2030 or 2050. Its aim is to maintain a flexible approach to decarbonisation. Are there any different points of view and implications in terms of energy policy that you would like to put forward? If so, what are they?

C4. Given that the underlying European choice is for a low-carbon economy, the post-2020 targets would be focused solely on reducing emissions, leaving each country free to choose its own approach in the most flexible possible way, without specific targets for renewables or energy efficiency. What is the most appropriate approach for Italy?

C5. As we have observed, a number of technologies that are not yet fully mature could have a significant impact on our system in the long term. What different outlook or approach should be adopted on these or other potential advances?
4. The priorities of action, in detail

4.1 Energy efficiency

The goals

Energy efficiency is one of the top priorities of the new energy strategy. It plays a part, at any given time, in meeting all of the cost/competitiveness, security, growth and environmental quality targets. The centrepiece of these policies is the launching of a wide-ranging programme that makes it possible to:

- surpass Europe's 2020 targets.
- achieve a position of industrial leadership to capture the growth of the sector in Italy and abroad.

In terms of quantitative goals, the programme aims to:

- save a further 20 MTOE of primary energy, and 15 MTOE of final energy, so that by 2020 we will consume about 25% less than the European benchmark, based on the reference scenario (Primes 2008 Model).
- prevent the emission of about 55 million tonnes of CO₂ annually. Energy efficiency will therefore be the main driver in lowering CO₂ emissions.
- save about €8 billion each year in fossil fuel imports.
1. Energy efficiency

**FIGURE 14**

Energy savings target 2020 – Primary consumption

Primary energy consumption excluding non-energy uses, MTOE

![Graph showing energy savings target 2020 – Primary consumption](image)

Source: MiSE

**FIGURE 15**

Energy savings target 2020 – Final consumption

Final energy consumption excluding non-energy uses, MTOE

![Graph showing energy savings target 2020 – Final consumption](image)

Source: MiSE
National Energy Strategy: for a more competitive and sustainable energy

1. Energy efficiency

The starting point

In energy efficiency terms, Italy already performs very well compared to other European countries. However, significant room for improvement still remains, and can be exploited through initiatives with a positive economic return.

- Energy consumption (final consumption) in Italy is currently about 130 MTOE. Of this, heating (i.e., the use of energy for heating and cooling) takes the lion’s share, of around 45% of the total. Next comes transport, at just over 30%, followed by electricity. If we examine use on a sector basis, transport is the highest final energy consumer, followed by industry (26%), residential (23%) and services (13%), while government and the civil service represent just 2%, approximately.

FIGURE 16

In terms of energy efficiency, our country therefore, has a good start on other European countries. We are one of Europe’s best-performing countries for energy intensity, at about 15% below the average level (even though other European countries have, on average, improved this indicator more substantially in the last two decades than Italy has).
In recent years, thanks to the **Energy Efficiency Action Plan (EEAP)**, much progress has already **been made**. By 2010, the initiatives introduced under the EEAP since 2007 (for example, White Certificates, 55% tax rebate, incentives and minimum performance requirements) had already enabled a saving of around 4 MTOE/year in final energy (and about 6 MTOE of primary). The target for that date – of about 3.5 MTOE – was therefore outdone. These results were calculated net of the reduction in energy consumption resulting from the economic crisis that has hit the country.

Moreover, from the technological point of view, Italy has a **sound tradition in many industrial sectors** with a keen interest in promoting energy efficiency. Examples are household appliances and home automation, lighting engineering, boilers, engines, inverters and smart grids – and of course construction and vehicles.

A **high**, and as yet unexploited, **energy-saving potential** still remains, however, with numerous interventions that offer a positive economic return not just for the country but for individual consumers. For example, in Italy a building constructed to comply with energy efficiency standards enables occupants to save up to 70% in consumption compared with a traditional building. Numerous studies confirm this great potential, with positive economic returns for many energy efficiency initiatives. The following chart, for example, shows the cost curve of energy-saving initiatives, many of which have a “negative” cost (i.e., their investment is repaid by the economic savings gained).
• Given that energy efficiency initiatives often have a positive economic return, in a purely rational scenario we would expect these initiatives and investment to be market led and take place spontaneously. This virtuous mechanism is being held back, however, by numerous barriers to the adoption of energy efficiency technologies. While these vary from one sector to another, the main examples are:

  o In the civil sphere, the high initial investment costs often discourage small consumers (residential, offices). Adding to this factor is consumers’ often low awareness of the potential savings and difficulties in accessing incentives.

  o For the government and civil service, which do not have access to the tax rebate schemes and have difficulties with self-financing, greater reliance on the ESCO model would therefore seem fitting. However, the “principal–agent” problem – i.e., difficulties in contracting the allocation of costs and risk among the parties – makes it very difficult to implement measures in the public sector, which is intended to act as an example and guide for the rest of the economy (in spite of its low share of total consumption).

  o In the case of industry, limiting factors include the relative lack of internal expertise, especially for small and medium-sized enterprises, the scarcity of specialised personnel for what are often complex measures, and a low propensity to engage in projects with can often have long payback times.
1. Energy efficiency

**TABLE 19**

<table>
<thead>
<tr>
<th>Barriers to the adoption of energy-efficiency and renewable technologies have different degrees of relevance in different sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sector</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Residential</td>
</tr>
<tr>
<td>Services</td>
</tr>
<tr>
<td>Public sector</td>
</tr>
<tr>
<td>Industry</td>
</tr>
<tr>
<td>Transport</td>
</tr>
</tbody>
</table>

**The main initiatives**

Eliminating the above-described barriers to adoption is, therefore, the first priority in this area. Some initiatives have already been undertaken in recent months, including an extension to the tax rebate, while others are being drawn up. More generally, to overcome the barriers to the adoption of energy efficiency solutions it will be essential to **rationalise and reinforce the instruments and actions devoted to each market sector and segment**. Existing instruments have therefore been strengthened or new ones introduced, the aim being to match instruments to targets. This should be done on the basis of the potential efficiency gains in the consumption sector to which each instrument applies, and of the specific cost-benefit of the instrument itself (summarised in Figure 21). It will also be important to avoid overlaps between the various forms of incentive. The following initiatives are envisaged:

- **Stronger minimum and legal standards**, especially as regards the construction industry (for new buildings or major renovation works) and the transport sector (also to implement European legislation).

- **An extension of the timescale for tax deductions**, mainly for the civil construction sector (refurbishment and renovations). For example, the 55% rebate has recently been extended.

- **The introduction of direct incentives** for government and civil service initiatives (which cannot use the tax deduction mechanism) through the “Heating Account” currently being set up. Mandatory contract standards based on energy performance improvements are also envisaged: these would...
National Energy Strategy: for a more competitive and sustainable energy

1. Energy efficiency

boost the existing Energy Service Contract and establish ad hoc systems to measure and verify results.

- More rigorous targets and a tightening up of the White Certificates mechanism (Energy Efficiency Certificates or Titoli di efficienza energetica (TEE)). New instruments are already in place to support small-scale initiatives in the residential and public sectors (tax rebate and Heating Account). White Certificates could therefore be focused primarily on the industry and service sectors and the promotion of efficiency improvement measures at infrastructure level in sectors as yet scarcely involved (ITC, water distribution, transport). They would still retain a role for residential projects not covered by the tax and Heating Account measures.

FIGURE 20

<table>
<thead>
<tr>
<th>Energy-efficiency instruments available in the different sectors of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sector</strong></td>
</tr>
<tr>
<td>Residential</td>
</tr>
<tr>
<td>Services</td>
</tr>
<tr>
<td>Public Sector</td>
</tr>
<tr>
<td>Industry</td>
</tr>
<tr>
<td>Transport</td>
</tr>
</tbody>
</table>

Actions envisaged
- To be strengthened, especially for construction & transport
- Increased supply (new standard forms & areas of intervention)
- Introduction of direct incentive in "Heating Account"
- Extension of tax rebate (55%) improvements, e.g. benefit differentiation, cost parameters, elimination of overlaps

1 Stronger legislation, regulations and standards, acting primarily on new buildings and/or major renovation work

A more detailed description of these instruments is set out below.

- With regard to standards and legislative provisions:
  - In the construction sector, Directive 2002/91/EC on the energy performance of buildings established minimum primary energy requirements for the shell of new buildings; promoted energy certification and the use of higher-performance installations; and introduced requirements for monitoring and for the integration of renewables. The implementation of Directive 2010/31/EU will make it possible to tighten up the requirements for new buildings (Class B) and to introduce more effective ways of classifying existing buildings, by 2020. In this, tax deductions will be used or, in future, other instruments providing rewards when entire buildings are “promoted” to a higher energy-efficiency class. At the same time, inspection and penalty systems will have to be tightened up and all of the Regions’ systems...
1. Energy efficiency

brought into line. The Commission has estimated that the application of the Directive will lead to a 5-6% reduction in energy consumption at a European level.

- In the **high-efficiency cogeneration** sector, in line with the provisions of the new energy efficiency Directive, further regulatory measures will be introduced to supplement the incentive scheme currently in force. The aim here is to facilitate the wider use of these technologies, which offer significant – and as yet not fully exploited – potential to save primary energy. In this sector, Italy has a strong record in the industrial sphere, where the technology has been applied to specific production processes. Public support could aim, therefore, not just at developing new installations but also and above all at replacing and/or renovating existing plants and thus introducing higher-yield systems.

- Turning to the **transport** sector, the implementation of Regulation 443/2009/EC has led to a significant reduction in consumption. The Regulation requires automobile manufacturers to sell increasingly energy-efficient vehicles with low greenhouse gas emissions (95 g CO₂/km by 2020). Measures to encourage the rubber-to-rail shift are expected to bring further reductions, by improving metropolitan (light rail) networks and promoting sustainable urban transport. Attention will focus on regulatory measures to boost the wider use of electric vehicles.

- **As regards tax relief** (the “55%” scheme), it will be important to extend, adjust and improve this provision to increase its cost-benefit effectiveness and efficiency. Of the possible improvements, the most significant concern: a differentiation between the percentage of deductible expenditure and/or the duration of the refund, in proportion to the actual saving produced by the intervention; the introduction of maximum specific cost parameters for each type of intervention, to prevent part of the incentive being transferred to product prices; a tighter focus of the instrument on improving the energy efficiency of existing buildings, by reviewing the current scope of eligible initiatives in order to avoid overlaps with other, newly introduced, incentives having the same aim (Heating Account).

- The introduction of **direct incentives** for energy efficiency projects in the public sector which, in view of budgetary constraints and its ineligibility for tax deduction mechanisms, has not managed to fully exploit its energy saving potential. These new instruments include the “Heating Account” and the introduction of specific binding contractual models for the public sector. They will make it possible to comply with the obligation to improve the energy performance of buildings owned by central Government (3% per year of the overall floor area) envisaged by the new energy efficiency Directive.

- **White Certificates** have a key role to play in achieving the goals, given their increasing importance to initiatives in the industry and service sectors and the cost efficiencies that a “market” instrument of this nature should produce with respect to direct incentive systems (feed-in or tax relief). Analyses of the comparative effectiveness of the various regulations and legislative provisions introduced in Italy spotlight the important role played by Certificates in recent years, with a constant growth in the savings generated and improved cost-effectiveness for the state. Cost-effectiveness is likely to improve further, as the energy savings targets increase.

The proposed European Directive on the 2020 targets envisages an obligation on member states to set up mandatory national energy efficiency schemes based on requirements to be met by energy
National Energy Strategy: for a more competitive and sustainable energy

1. Energy efficiency

distribution or retail sales companies. Italy’s experience in this sector is, therefore, positive, and will enable us to maintain and, indeed, strengthen the system. We will need to resolve some “growth” and transition problems seen recently, entailing, for example, the need for greater flexibility, and provide adequate remuneration in relation to the lifespan of the initiatives. These problems have in part been addressed through the adoption of new guidelines by the Regulatory Authority for Electricity and Gas.

With the forthcoming decree establishing the targets that will enter into force on 1 January 2013, energy saving targets in line with the overall objectives of the NES and which aim to strengthen the role of White Certificates are currently being drawn up. These will take into account the areas of intervention “entrusted” to other instruments (Heating Account, cogeneration with renewable sources, etc.). They will also eliminate certain complexities arising from the need to reconcile the growth trend for certificates (which takes multiplicative factors into account) with the trend in actual efficiency generated over the year.

A review of the criteria for reimbursement, through tariffs, of the costs incurred for the initiatives is also envisaged, taking into account – as a priority – the price of White Certificate market transactions. Supply will also be increased by introducing new standard forms and including new areas of intervention (e.g. in distribution grids, the ICT sector, water distribution and transport). These should counteract the “erosion” of the area of intervention as a result of the introduction of new instruments (Heating Account, tax rebates) and new rules (ban on accumulation with other incentives). Other initiatives in this area will lead to a reduction in the timescale and red tape required and the introduction of “rewards” for virtuous technologies. The possibility of extending the range of players entitled to take part in the market will also be evaluated.

Efficiency improvement projects for buildings should stimulate and support a review of town planning and management methods and approaches, where the building becomes the core of broader improvement projects. This is especially pertinent if we consider that about 70% of energy is consumed in towns and cities. To implement the European Union’s action programmes (Smart Cities), initiatives will be launched, in coordination with the ministries concerned and with local and regional government, to introduce innovative planning models for urban services and energy flows, network efficiency, mobility and transport, renovation of the built environment, and public-private partnerships. The issue is already included in the Digital Agenda, in the “Cities Plan” established by the recent Development Decree Law, and in the current programming period for EU funding for sustainable development.

Another factor that will help attain the energy efficiency objectives is a trend, already evident, for a shift in consumption to electricity. This includes the more widespread use of applications such as heat pumps for heating and cooling, electricity-powered cars and trains, and improvements in the distribution network with the growing use of smart grids.

In addition to purely consumption-based efficiency gains, waste recovery and use/re-use is a major opportunity to pursue sustainable development goals. It should be considered systematically in all the initiatives currently being drawn up in the various spheres of intervention (e.g. in the renewables sector).

Alongside these instruments, which have a direct role to play in achieving the objectives, a number of other enabling factors will also be decisive for the energy efficiency programme. They include:
National Energy Strategy: for a more competitive and sustainable energy

1. Energy efficiency

- Enhancing the Energy Service Company (ESCO) model by introducing classification criteria, developing and disseminating innovative contract models for financing via third parties, and setting up dedicated guarantee funds.

- Monitoring and enforcing the measures, by stepping up inspection procedures and introducing heavier penalties, the aim being to ensure that operators obliged to do so comply with the regulatory provisions and standards and meet their energy saving targets. In this context, the system of monitoring and accounting for the results will also be improved.

- Communications and awareness-raising initiatives for the public, businesses and the public sector. The aim here is to launch an extensive communications campaign and provide easy access to information on energy saving, in close collaboration with the Regions and business associations. Other initiatives to be promoted are an energy audit campaign for the civil and industrial sectors, and the introduction of specialised energy efficiency training courses. Making end-consumers more active and better informed will be a vital factor in adopting the planned instruments, and in the success of the programme.

- Support for research and innovation, with financial incentives or other relief to promote research, development and technological innovation (for example, the RES and EE technological development funds, the Sustainable Growth Fund, and the Revolving Fund (Kyoto) to support enterprises and technological innovation).

These initiatives at the national level will be included in the framework resulting from the new energy efficiency Directive. Without setting binding targets for member states, the Directive establishes a common framework for the promotion of energy efficiency through measures in the supply and final use sectors (e.g. regarding mandatory energy saving schemes, buildings and procurement, measuring and accounting for consumption, and energy audits).

The results expected from the measures described above are significant, in terms of mix and absolute value:

- Compared to the efficiency measures of recent years – which focused on the residential sector – the new initiatives will involve major savings in the industrial and transport sectors too (which together will account for over 60% of the expected savings). The public sector will be given a specific role, with the introduction of dedicated instruments and an efficiency-improvement target of at least 20%.

- In terms of final energy consumption, the largest part of the savings will come from heating/cooling, which accounts for the lion’s share of national energy consumption in all sectors.

- Taken as a whole, these measures are estimated to reach €15 billion in public support by 2020. This could stimulate €50-€60 billion of aggregate investment, with major spin-offs in an industrial sector where the aim is to achieve international leadership, and savings of about €8 billion/year in fuel imports.
Lastly, a consideration for the long term. By 30 June 2014 the Commission will evaluate the progress made towards the overall target and will consider whether to introduce **binding targets** to 2020 and especially post-2020. Italy will play an active and constructive role in the debate, since it fully agrees with the underlying decision to gradually “decarbonise” the economy. However, Italy also considers that, in the long and very long term (2030 and 2050), the European targets should focus on reducing emissions, leaving each country free to choose its own approach in the most flexible, technology-neutral and cost-effective way possible. This will be achieved, therefore, **without specific targets** at EU level on energy efficiency and renewable energy (targets that have, however, been useful in providing an added impetus during this early stage).

**Open points for consultation – Energy efficiency**

**C6.** What further barriers have so far prevented energy-efficiency solutions from being more widely adopted, and what **possible actions and instruments** (new and existing) can be introduced or strengthened? How can the system of monitoring standards and service quality (i.e., building certification) be made more effective, without generating costs and new forms of “red tape”?

**C7.** As regard **White Certificates** in particular, could **extending the scope** of the mandatory requirements to sales companies (as in France and the United Kingdom) and/or to other operators increase the number of players directly involved? Would this suit end customers and their needs more closely, and therefore make it easier to meet the targets? What are the opportunities to review the mechanism in this sphere?
1. Energy efficiency

**C8.** The lack of experience and expertise, and the low emphasis given to this issue, in industrial sectors, especially in small and medium-sized enterprises, has been mentioned by some commentators as a problem if we are to meet our targets. Could the introduction of **mandatory energy audits** help solve this problem? What other initiatives could be introduced in this sphere?
2. A competitive gas market and the Southern European Hub

4.2 A competitive gas market and the Southern European Hub

The objectives

The development of a competitive and efficient gas market and the opportunity to become the main southern European hub are two **key elements that will enable Italy to recover competitiveness** and improve its security profile. The underlying choices and decisions inspiring initiatives in this area are based on the need to:

- Align Italian prices with those in the main European countries and create a liquid and competitive market.
- Guarantee the security and diversification of energy sources.
- Fully integrate the country with the European market and network, thus enabling Italy to become an energy trading hub and transit country and to offer high value-added services for other countries too (e.g. transit, storage, peak, modulation, etc.).

The main initiatives being drawn up in this area will therefore seek to achieve the following key goals:

- **Reduce the price differential** – which was €5.7/MWh in 2011 (-20%) – with the northern European markets, and therefore also increase the competitiveness of our CCGT production (which, as a result of the high cost of gas, is subject at present to a higher variable cost, in the range of €10-12/MWh).
- **Increase the system’s security margin** in emergency situations of exceptional peaks in demand.
Background

The international context

At the global level, the key factors determining demand and supply are translating into an increasingly important role for gas in the energy mix:

- **On the demand side**, the expected growth in consumption will be led by: i) the replacement of other fossil fuels by gas (e.g. oil in the Middle East, coal in the USA and China) thanks to its lower costs, emissions and local pollutant levels; ii) energy source diversification and, therefore, security of supply; iii) the flexibility offered by the CCGT technology required to complement the development of renewables.

There is also the possibility of gas consumption developing for vehicle use (especially heavy duty vehicles) in countries where gas is abundant and cheap (e.g. the US), although it is difficult at present to predict how this model will develop in practice.

- **On the supply side**, growth will be led by: i) the huge amount of available “conventional” resources; ii) the “unconventional gas revolution”, which – notwithstanding the uncertainty over its future development – has led to dramatic changes in the pioneering countries (United States and Canada) in terms of available capacity and prices (at present about 3-4 times lower than Europe’s).
National Energy Strategy: for a more competitive and sustainable energy

2. A competitive gas market and the Southern European Hub

The scope and speed of development of shale gas will be decisive factors in the growth of this market in coming years. On the grounds of the possible scenarios drawn up by the IEA, the production of shale gas could triple (Golden Rule scenario) by 2035 thanks, most notably, to the United States, China and Australia. Such a development would lead to a significant diversification of suppliers and downwards pressure on prices.

In this context gas, of which about one third would be shale gas, could represent 25% of the global mix. This compares with 20-21% of the mix in 2010. The uncertainties over technological developments, the feasibility of exploiting the geological resources, acceptance by public opinion, and support policies could, however, translate into slower development of shale gas. In this event, the importance of gas as a primary source at the global level would in any case increase, but less markedly, and reach 22-23% by 2035.

The future demand-supply balance and the resulting price movements are difficult to predict. In the short term (the next 3-4 years) the global/trans-regional market (led by LNG) could be short, as a result of the sharp increase in consumption in Asia (with a risk of higher European spot prices). In the medium-long term, the expected strong increase in production and liquefaction capacity should show their effects on the market and on prices. A gradual closing of the gap between prices in the principal regional macro-markets (North America, Europe, Asia) is also possible.

Turning to Europe, where the outlook for a recovery of demand is highly uncertain (both under the IEA Golden Rule scenario and in the event of a slow-down for shale gas), the need for imports will increase by about 150 billion of cubic metres (bcm) per year from the current 350 bcm to around 500 bcm in 2035. Over two-thirds of this increased import requirement will be caused by the expected reduction in European production, as a result of the rapid decline in production from the North Sea and the rest of Europe. The remaining third will arise from the expected increase in demand in the medium term (2025-2035), following the gradual replacement of coal and nuclear for environmental and energy policy reasons.

The European Commission recognises the role of gas for Europe as a “bridge” to the low-carbon Roadmap goal for 2050, and aims to diversify supply countries and routes. Thus, the North Stream, Southern Corridor and South Stream projects, and imports from North Africa, together with regasification facilities, will pay a complementary role in consolidating the continent’s energy security.
2. A competitive gas market and the Southern European Hub

FIGURE 23

In Europe, production is forecast to fall, against a possible increase in demand (gas “bridge” to Roadmap 2050)

Natural gas demand and production in the European Union, bcm, 2010-2035

Source: IEA, 2012

FIGURE 24

Increasing import capacity and diversifying sources of supply are European priorities

Not exhaustive

Regasification terminals
National Energy Strategy: for a more competitive and sustainable energy

2. A competitive gas market and the Southern European Hub

The national context

At a national level, gas plays a central role in the energy mix: Italy is the European country most dependent on gas, both for electricity generation (over 50%) and more generally as a share of primary consumption (about 40%). Gas is also a key factor in energy security, given our high degree of dependence on imports (over 90% of our requirement). The gas sector in Italy faces a number of challenges:

• **Demand-supply balance.** The recent economic crisis and the development of renewable technologies has led to a substantial fall in gas consumption, from 85 bmc in 2008 to about 78 bmc in 2011. Developments to 2020 are uncertain, and will depend mainly on the performance of the economic recovery, the effectiveness of the energy efficiency programme and the development of renewables. Even if demand were to increase to 90 bmc or more, the country's import capacity is much higher: currently around 114 bmc annually.

If we also consider domestic production (about 9 bmc), then Italy at present fully complies (about two years ahead of schedule) with "N-1 rule" for security of supply to protected customers. The rule was introduced by Regulation EU 994/2010, which provides that each member state must be able to guarantee supply for these customers in the worst conditions of winter demand, even in the absence of most of its sources of supply, for a given time period.

In normal operating conditions, therefore, the situation is one of structural over-capacity with respect to demand, even if we consider not simply the technical "rated" capacity of import infrastructure, but its effective contractual use. However, two factors should prompt us to consider further increasing our import capacity:

  o First, the need to diversify sources of supply. Most of our import capacity “from the South” (i.e., not from Europe), is constrained by single-supplier sources (Algeria, Libya and Qatar, through the Rovigo regasification facility). Developing a hub and a competitive market requires multiple sources of supply to enable a liquid market to develop.

  o Second, the potential reduction in supply from the north: if we deem it advisable for the country to become a net exporter to Europe (or at any rate to import less), and given that the continent is expected to need 150 bmc in the next 15-20 years, our current “southern” import capacity could be insufficient.

• **Prices:** Italy suffers from high gas prices (in 2011, 25% higher than in the northern European markets, on average, and about 4 times higher than US prices). This is mainly because of our contractual import arrangements. Most of our contracts are “take-or-pay” (ToP), with supply price adjustment clauses based on the international price trend for a basket of crudes. This mechanism is currently leading to high gas price levels in Italy. These show a disconnect with the spot price trend in Europe, which is falling as a result of the reduction in internal demand and the higher presence of LNG. Moreover, even with respect to European ToP contracts we suffer a significant price gap, caused by historic contractual conditions.

We are not yet fully integrated with the European markets, given the low availability of interconnections with Europe for use by third party operators and the lack of significant volumes of
National Energy Strategy: for a more competitive and sustainable energy

2. A competitive gas market and the Southern European Hub

available LNG regasification capacity under the regulated system for spot operations. The Panigaglia regasification facility, for example, has operational limits that exclude it from the international LNG market, while the Adriatic offshore facility has only a limited spot capacity. So while Italy has an over-capacity in terms of imports from producer countries, the spot market, although growing, is still insufficiently liquid and prices remain higher than those of our European competitors. That said, in recent months the spread has begun to narrow significantly and in June 2012 it was €3.8/MWh, thanks in part to growing spot market liquidity (in turn the result of increased access to gas from Baumgarten and the introduction of the balancing market).

FIGURE 25

LNG import capacity in Italy is lower than in other European countries
LNG import capacity, bcm and in % national consumption
2012, estimate
2. A competitive gas market and the Southern European Hub

FIGURE 26

A very significant share of cross-border transport capacity has been allocated but only partly used
Mcm/day, average October-March, thermal year 2011-2012

<table>
<thead>
<tr>
<th>Transitgas</th>
<th>Tag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total capacity</td>
<td>65</td>
</tr>
<tr>
<td>Free</td>
<td>2 (3%)</td>
</tr>
<tr>
<td>Allocated</td>
<td>63</td>
</tr>
<tr>
<td>Used</td>
<td>28 (43%)</td>
</tr>
</tbody>
</table>

- **Security:** Lastly, there is a major problem linked to the **limited flexibility of the system in “peak” conditions.** Even though import capacity is, overall, much higher than our average annual requirement, the margin of security for daily cover is still insufficient. The system should guarantee this margin to prevent interventions on the demand side being required in the event of exceptional peaks in demand coinciding with a reduction in supply from abroad. However, interventions which in other European countries are widely implemented through interruptible gas contracts, in Italy are not yet offered by the commercial sector.

Turning to storage, facilities are replenished between April and September, to then be used for delivery during the winter months. The delivery capacity they provide to the system can vary from 239 million m$^3$/day at the start of winter, when storage facilities are operating at maximum pressure, to the contractual level of 150 million m$^3$/day, which under the regulations must be guaranteed at the end of the delivery campaign (31 March).

In these conditions, the system’s security margin (before any interventions on the demand side) is about 40-50 million m$^3$/day for a period of several days. During the recent emergency of February 2012, the critical conditions were such that various measures from the Emergency Plan had to be adopted. These included the activation of oil-fired thermoelectric power plants and restrictions on gas consumption by those industrial customers who had offered this service on a payment basis, with high overall costs for the “country system”.

At present, natural gas storage capacity for thermal year 2011/12 is 15,620 million standard cubic metres (MSm$^3$), of which 4,600 MSm$^3$ for strategic storage. The storage system’s peak daily delivery
2. A competitive gas market and the Southern European Hub

Capacity was 239 MSm³/day at the start of this thermal year. In coming years, the implementation of new – already authorised – projects could play a significant part in raising energy security levels by increasing gas storage capacity. A further increase is envisaged following the application of Legislative Decree 130/2010, which commits ENI to developing new storage infrastructure amounting to 4 bcm by the end of 2015.

The initiatives

To attain the goals described above, the chosen strategy is to create a competitive and efficient gas market, and the major southern European hub, in Italy. The aim is to enable Italy to:

- **Align its gas prices** to those of the other European countries, through a market that is fully integrated with the European market.

- Become the main **entry point** for gas from the south to the rest of Europe and provide high-value-added services to the other European markets. The creation of an Italian gas hub should include both a **physical hub** (a point where multiple suppliers can meet multiple buyers) and a **Gas Exchange**. The Exchange should bring together a considerable proportion of gas supply and demand, and provide a forum for spot and forward operations with the market operator as counterparty.

- Pave the way for a reduction of costs and prices on the **electricity market** and enable the national electricity system, which has one of the most efficient generating pools in Europe and is characterised by significant over-capacity, to export to central Europe, or at least to import less.
To ensure that this strategy is implemented efficiently and effectively, Italy’s legislative, regulatory and infrastructure framework should develop in a way as to ensure a gradual diversification of sources of supply. It should also ensure an increase in the number of operators (and relative volumes traded) on the Gas Exchange, so that a price signal strongly linked to demand and supply equilibrium on the gas market can emerge.

While a more prominent role for spot supplies (for the necessary price alignment) is the preferred option, the role that long-term import contracts can play in ensuring security of supply is recognised. Their role in the market will be reconsidered, since they have performed their original function of enabling the construction of the supply infrastructure. And, above all, since the competition framework for the gas sector has changed considerably (most notably with respect to the price indexing formulas originally linked to crude, as the gas-substitution fuel).

To gradually increase the proportion of supply linked to spot prices – and bring the country into line with the main European countries – the intention is to encourage a gradual reformulation of existing import contracts so as to guarantee price adjustment mechanisms linked to actual gas price movements, in a “gas-to-gas competition” context. Another goal is to promote, for new long-term contracts, the inclusion of indexation clauses linked to hub prices.

The proposed initiatives (in order of importance) to promote the liquidity and security of the system are listed as follows:

- **Promoting the full use of existing transport capacity from Europe to Italy** by applying the European rules, which will enter into force in October 2013, both rapidly and rigorously. These rules govern the management of congestion and cross-border capacity allocation mechanisms with a view to maximising transport capacity into Italy, including through hub-to-hub products (which include integrated transport services on several operators’ networks). They will facilitate gas transits and trading, also through the introduction of mechanisms for the sale or transfer of capacity booked but not used, also on a continuous basis.

   Another aim is to **promote the full use of capacity on the Transitgas pipeline**. As the main connection route with the more liquid markets of northern Europe, the pipeline is of strategic importance to Italy. The intention is to promote, also through specific inter-governmental agreements, most notably with Switzerland, the application of the EU transport capacity allocation rules and the “Use It or Lose It” (UIOLI) rules. This will be done by assigning the obligation to manage the secondary capacity market directly to the relevant TSOs, which can offer unused transport capacity on the market, also for short periods (up to intra-day).

- **Fostering cooperation between Member States’ Regulators, TSOs and Governments** in order to prevent tariff or other types of barriers to the full integration of the single gas market, not least in relation to the planned Italian reverse-flow projects.

- **Building strategic infrastructure** to ensure that there is sufficient import capacity, with special reference to LNG and above all for spot operations. For these works, a guaranteed mechanism could be envisaged for the recovery of the total investment costs, to be covered by the system. This would also apply in a context of falling consumption, a factor that would slow down construction if left to
A competitive gas market and the Southern European Hub

purely market-based mechanisms. The infrastructure (including in implementation of the provisions of art. 3 of Legislative Decree 93/2011 on national strategic infrastructure, in accordance with the NES) would be earmarked for regulated access, primarily for short-term operations. It would benefit from regulations envisaging incentives (for example through guaranteed revenues, also in case of only partial use) and fast-track authorisation procedures.

A study coordinated by the Ministry for Economic Development and the Energy Authority is currently under way. Its aim is to establish the needs of the system in terms of new infrastructure for market development purposes, with the emphasis on regasification facilities. At the date of publication of this consultation document the results of the study were not available. However, the initial findings suggest that the need for investment, in quantitative terms, will be low, with a potential impact on tariffs of less than one per cent. For reference purposes, investment in one regasification facility, with an estimated cost of one billion euros, if funded entirely through gas tariffs, would be equal to a cost to the system of about 130 million euros per year. Considering that expenditure on the gas commodity alone can be estimated at around 25 billion euros per year, even a limited reduction in the gas price attributable to the increased liquidity provided by the new infrastructure could justify the investment.

Once this need has been accurately established, the infrastructures in question will be selected (including from existing projects) through public tenders. These will be based on transparent, non-discriminatory cost-benefit criteria designed to foster the efficiency of Italy’s gas system and its integration with European Union and/or global LNG markets. The criteria include: minimisation of impact on tariffs; contribution to daily peak and available spot capacity; market integration; construction and implementation timescales, etc.

One criterion in selecting this infrastructure will be to ensure that the expected improvements in terms of price competitiveness and security of supply will amply exceed the costs to the system. The new European regulation on infrastructure, currently under discussion in the Council, envisages the identification of “projects of common European interest”. As such, it could act as a basis for a national instrument to select and incentivise such infrastructures.

- **Facilitating the construction of other import and storage infrastructure not deemed strategic, also by exempting it from third party access,** without any guarantee of revenue and public grants. These facilities could play a key role in diversifying sources and routes of supply and in developing Italy’s role as a transit country (on a structural basis) towards northern Europe, and as a provider of value-added services.

In particular, the aim is to press for the construction of recently authorised LNG projects (three since early 2012: Porto Empedocle, Gioia Tauro and Falconara) and others currently awaiting authorisation. Another aim, regarding pipelines, is to open up the southern Corridor to import gas to Italy from the Caspian and other regions, especially through the TAP project. The development of the SouthStream project (which would reach Italy at Tarvisio or in the south), the GALSI project from Algeria and new projects to import gas from the Mediterranean basin will also be followed closely.

- **Promoting the availability of virtual and physical reverse-flow capacity towards the markets of Central and Northern Europe.** To fully exploit our geographical position as a link between Europe
2. A competitive gas market and the Southern European Hub

and the Mediterranean, SnamReteGas is already working on projects on the Italian network. These will ensure that from 2016 a physical reverse flow of gas from Italy to northern Europe, at a level of about 40 million cubic metres/day, will be continuously available. Transport capacity from the south and the islands to the north of Italy will also be up-graded.

Appropriate regulatory and/or legislative instruments to ensure that virtual reverse-flow capacity (and the related forward-flow capacity thus freed up) is made immediately available at market conditions on the Transitgas pipelines will also be identified. So too will instruments to coordinate the various TSOs, in order to manage the necessary investment to create physical capacity and implement the UIOLI principles. The recent agreements between Snam and Fluxis are already moving in that direction. Lastly, new connections with Europe, such as the TGL (Italy-Austria-Germany) pipeline, will be evaluated; these would be developed in accordance with the trans-European corridors project to be defined at Community level.

- **Promoting the development of new storage capacity**, especially for peak delivery requirements, both to help the market function better and to guarantee high levels of security of supply for the system. If we consider programmes already authorised, those awaiting authorisation and those included in the plan envisaged by Legislative Decree 130/2010 as mentioned above, the total is 18 projects. Of these, 7 are to expand capacity in sites already operating and 11 are for new storage sites in depleted fields. Another possibility to be assessed is countering peak demand through peak-shaving installations fed by LNG.

The choice of which storage infrastructure to build will be based on selective criteria designed to maximise the benefits to the system and limit the impact on tariffs.

However, since the increase in storage capacity, especially for peak delivery, will only begin in 2014/15, for the next 2-3 thermal years we will need to stay focused on system security and on our readiness to activate the envisaged emergency measures. These include the use of a number of power stations fed by fuel oil, which will probably have a useful function to the system for some years yet. Subsequently, we will need to evaluate whether this type of plant should be downsized/converted.

- **Fully launching the Gas Exchange (through the Electricity Market Operator (GME))**. This is an essential condition to create an efficient and liquid market capable of providing price signals that depend solely on the demand/supply balance. Regulating the forward market will facilitate the integration of the existing trading platforms and the balancing market, thus improving gas system efficiency. Measures to encourage significant volumes of commercial transactions to move to the exchange will also be evaluated with a view to increasing liquidity more rapidly (for example, by incentivising the offering of domestic production and imports on the exchange).

As reliable exchange prices emerge, it will be possible to link them more fully and efficiently to **benchmark commodity prices for price bids on the protected market** and gradually move on from the current indexation mainly linked to ToP import contracts.

- **Reviewing the arrangements for the allocation of and access to storage capacity** in a non-discriminatory manner for all operators in the various segments. For the use of storage capacity (a
scarce resource), the aim is to establish an efficient allocation system by gradually adopting non-discriminatory market mechanisms. These should reveal the true values of this resource (and gradually supersede the current break-down of capacity on the basis of usage), not least to stimulate new investment in capacity. The true need for modulation storage for the civil sector will also be reviewed in order to "make room" for the needs of the industrial and thermoelectric segments. The aim here is to optimise their supply portfolios and reduce the cost of gas and, indirectly, of electricity. The measures adopted recently through the "Liberalisation" and "Growth" decrees also move in this direction. Similar market mechanisms could be used in relation to regasification capacity.

- **Building on the rapid completion of the ownership unbundling of SNAM** to create a strong, independent and stable operator that is able to:
  - develop new investment in transport, storage and regasification infrastructure both in Italy and abroad (directly or in partnership with other operators) in order to promote the role of the Italian gas system in Europe;
  - guarantee full third-party network access and focus on developing the infrastructure required for a competitive and diversified market;
  - guarantee the continuity of the long-term strategy in the interests of the country.

The unbundling operation is nearly complete. The lines for development will be contained in the 10-year network development plan envisaged by the internal market Directives, which will need to be harmonised with the plans of the other European TSOs. A Ministry for Economic Development (Italian initials MiSE) decree establishing the drafting criteria is about to be issued.

- **Promoting tenders for the concession of the gas distribution service**, organised in 177 “catchment areas” covering the entire country. These should take place over the coming two years, the aim being to facilitate a transition to a more efficient and lower-cost distribution system that will be to users’ advantage. To this end, the plan is to set up a Coordination and Monitoring Committee composed of representatives of the MiSE, the Regulatory Authority for Electricity and Gas, the National Association of Italian Municipalities (ANCI) and the Ministry for Regional Affairs, the aim being to support local authorities and tendering bodies in applying the new provisions. The MiSE also plans to publish guidelines on how to determine any reimbursement to be paid to the out-going operator, with a view to minimising any potential source of disputes and speeding up the tenders.

**Open points for consultation – The development of the Gas Hub**

**C9.** Do you agree with the need to increase import capacity through the “Strategic Infrastructure” instrument? What new capacity would be needed, and in what timescale? What should the selection criteria be?

**C10.** Making the gas exchange more liquid: what are the most suitable instruments to foster the development of a liquid and competitive gas exchange and encourage operators to transfer significant volumes of gas to it?

**C11.** Opportunities and risks of a gradual migration of supply from a market linked to long-term contracts to a spot market. What is the best mix between the two in the Italian situation?
3. Sustainable development of renewable energy

4.3 Sustainable development of renewable energy

The goals

Renewables are a core element in achieving the goals of the Energy Strategy. The basic decisions are to:

- **Exceed the European 20-20-20 targets** for renewables output, striking a better balance between different energy sources (with a greater focus on **renewables for heating and cooling**).

- Achieve **economically sustainable development** in the sector, with incentive costs aligned to European levels and support for a gradual move to grid party.

- Give preference to technologies with greater **spin-offs for the sector** and for the Italian economy.

- Gradually **integrate electricity renewables** with the electricity market and grid.

In terms of quantitative targets, the intention is for renewables to account for **20% of gross final consumption** (compared with the European objective of 17%), or some annual ~24 MTOE of final energy. This will enable a reduction in emissions of up to 50 million tons of CO₂.

- More specifically, as regards the **electricity sector**:
  
  - The goal is to develop renewables so that they account for **36-38% (and potentially more) of final consumption**, which equals to about 130 TWh/year or 11 MTOE. This would make production from renewables the leading component in the electricity generating mix in Italy, at par with or exceeding gas. In the longer term – 2030 and up to 2050, when a further notable fall in unit costs is anticipated – we can envisage even more ambitious developments.
  
  - In doing this, the aim is to keep consumers’ bills down by accompanying development with progressively decreasing incentives commensurate with technology costs. Overall, to achieve the 2020 targets, around **€12.5 billion** are being made available each year (from the approximately €9 billion already earmarked at the end of 2011), over a 20-year period. The remaining resources will be allocated on the basis of priority criteria that favour efficiency, technological innovation, lower environmental impact and the national supply chain.

- As regards the **heating and cooling sector**:
  
  - The goal here is to bring renewables production up to **20% of final consumption** by 2020 (compared with the 20-20-20 target of 17%). This would amount to about 11 MTOE/year.
  
  - In terms of mix, the most recent market estimates for the various technologies suggest an increase in production from biomass heating with respect to the National Action Plan’s initial estimates.
  
  - To rationalise and provide continuity to the support mechanisms, a Heating Account is being introduced to incentivise small-scale projects, with up to approximately **€1 billion/year** being
3. Sustainable development of renewable energy

made available. The planned instruments to support remote heating networks will also be activated.

- Turning to the transport sector:
  - Italy has confirmed the 2020 consumption target of 10% for biofuels, which amounts to about 2.5 MTOE/year.
  - We will push as strongly as possible for the adoption of second generation biofuels.
  - In terms of system costs, in view of the price differential for biofuels the impact by 2020 could amount to around €1 billion/year.
Renewable Electricity – Background

The production of renewable electricity has seen very strong development in recent years, led by generous incentives that have generated considerable costs for the system. Significant expertise and technologies have also been developed in Italy, that could be taken advantage of internationally:

- In the electricity sector, the **20-20-20 target** has already almost been met, nearly 8 years ahead of time (~92 TWh of generating potential from installed capacity at the end of 2011, compared to the 2020 target of 100 TWh). This can be explained by the strong **increase in installations** in recent years, most notably photovoltaics. In 2011, Italy accounted for 33% of the photovoltaic capacity installed worldwide that year (about 6 times the amount installed in the United States, for example), with a total of around 12.5 GW of installed capacity (second only to Germany).

- The main reason for this rapid growth is the **very generous incentive system** in force in the past years. This has not always taken into account the rapid fall in technology-related costs (photovoltaic technology costs have fallen by about 70% since 2005), which has translated into very high profitability and incentives exceeding those of the other European countries. At January 2012, Italian incentives per photovoltaic unit were double or triple the levels in Germany or France, and those for wind about 50% higher.

- This has led to **significant costs** for the system, with an impact of about €9 billion/year on Italian consumers’ energy bills (considering installed capacity at the end of 2011). This equals to **nearly 20% of the Italian electricity bill**, with a total commitment of around €170 billion over the 15-20 year lifespan of the incentives. All of that said, the incentives have produced **environmental benefits** (e.g. a reduction of 18 million tons of CO₂), as well as employment, energy security and economic benefits (including a reduction in fossil fuel imports of €2.5 billion/year and a flattening of the demand curve on the wholesale market, for an estimated €400 million/year).

- Italy has also developed an industrial sector that has seen continuous growth – even in these crisis years – and is now well positioned to capture **global industrial opportunities** in various market segments concerned with renewable electricity generation. In some technologies, we can boast a position of excellence. As we have already noted, the sector is expected to experience continuing robust growth at the global level in coming years, and so presents market opportunities our operators can seize.

- The growing amount of production from intermittent, non-programmable sources is increasingly becoming a **challenge for the network infrastructure and for the market**, an aspect we will examine in more detail in the next section (on, precisely, infrastructure and the electricity market). Discontinuous production from renewables is, for example, concentrated, and will probably become even more so in future, in the south and centre-south of the country, and on the islands. By 2016 the power generated in this macro-region is expected to exceed peak demand there (25,000 MW and 21,000 MW respectively). However, demand is higher in northern Italy, so the existing transmission infrastructure linking the north and south of the country, which provides capacity of around 2,300 MW, will need to be up-graded.
3. Sustainable development of renewable energy

- In future, the challenge posed by the development of renewable electricity will be even more significant. **Renewables technology** is expected to **develop rapidly**; some sources are expected to see costs fall considerably, to the level of or below those of the traditional technologies. It will be vital, therefore, to support their development and address the possible implications in a timely fashion.

**FIGURE 29**

In the electricity sector, the 2020 target has almost been reached, 8 years ahead of schedule

**Total annual production renewable electricity**

```
<table>
<thead>
<tr>
<th>Year</th>
<th>Annual production (TWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>48</td>
</tr>
<tr>
<td>2008</td>
<td>58</td>
</tr>
<tr>
<td>2009</td>
<td>69</td>
</tr>
<tr>
<td>2010</td>
<td>77</td>
</tr>
<tr>
<td>2011</td>
<td>83</td>
</tr>
<tr>
<td>2012</td>
<td>~100 TWh</td>
</tr>
</tbody>
</table>
```

Annualised value of installations at end 2011
Renewables electricity – the initiatives

To meet the 2020 production targets, the Government recently issued two Ministerial Decrees (the first for photovoltaic solar technology and the second for other renewable technologies). These will continue to support the development of renewable electricity sources, while keeping system costs down and increasing the capacity for governance.

- Overall, a further €3.5 billion in annual incentives will be allocated once the system is fully up and running (from the €9 billion earmarked at the end of 2011 to €12.5 billion). This makes a total commitment over the 20 years of a further €70 billion in addition to the approximately €170 billion already allocated.

- Individual incentives are being reduced to align them more closely to European levels, while still maintaining a lead over other countries. The system will gradually be guided toward competitiveness (grid parity) and the integration of renewable technologies – especially solar – in the electricity system.

- The impact of incentives on the energy bill will be stabilised, bringing a reduction in expenditure of about €2.5-3 billion/year with respect to the reference scenario under the previous regime.

- The mix will be shifted towards more innovative technologies with greater spin-off potential for the sector and the national economy.

- The foundations will be laid for orderly and sustainable development in the sector, through competition (auction) mechanisms and the governance of volumes (registries).
National Energy Strategy: for a more competitive and sustainable energy

3. Sustainable development of renewable energy

- In this period, it will be essential to help the various renewable electricity technologies attain full competitiveness with traditional sources and complete integration with the market and with the grid.

In the case of photovoltaics, grid parity has almost been achieved and in many cases is already a reality. At the same time, the effects of the incentive system provided by the “5th Energy Account” will soon have run their course. For this sector, measures to help attain grid parity will need to be put in place for the coming years. For example:

- a further simplification of authorisation procedures for grid connections and plant activation, so that indirect costs, as well as technology costs, can be reduced;

- tax advantages deriving from the provisions governing works implemented to achieve energy savings, including those following on from the installation of renewables plants (decree law 201/2011);

- a possible review of the net metering service. The aim here is to extend its scope of application and enable renewables producers to share fully in some of the “system” costs that they themselves generate, in order to prevent these costs from falling on an increasingly restricted, and therefore excessively penalised, customer segment.

Lastly, waste recovery and use is a major opportunity to pursue sustainable development goals. Rather than waste disposal in landfill sites, which is still widely used today, recycling and, where this is not possible, waste-to-energy generation, are the primary objectives in this field. In this light, the Ministerial Decree of 6 July 2012 on renewables other than photovoltaics envisaged and regulated the incentive system for electricity production, leaving an ample margin for the development of waste treatment facilities.

As regards the integration of renewable sources with the market and with the grid, the necessary measures are discussed in the next chapter (development of electricity infrastructure and market). These measures are vital since the current structure of the market and grid must be reviewed and strengthened to enable the integration of distributed production, which is often non-programmable and volatile, and conceived with dispatching priorities in mind.

This approach will pave the way for gradual and orderly growth in the sector, with inputs from both incentivised and non-incentivised production – essentially photovoltaics. Indeed, production levels of 125-140 TWh/year (the assumption used in the “NES Scenario” of 130 TWh/year) will be possible. This forecast is based on the construction and use of all the capacity envisaged in the two ministerial decrees of 2012; on possible new installed capacity (on a grid parity basis) for photovoltaic averaging 1-2 GW/year; and on a “substitution effect” for other renewable technologies. These could develop without generating significant increases in the tariff surcharge, essentially as a result of the withdrawal of old plants from the previous, and more costly, incentive measures.

With the additional support made available and grid parity for photovoltaics expected to be achieved soon, about €50-60 billion in aggregate investment in renewable electricity– including renovation of and up-grades to installations – is expected by 2020. This will have significant spin-off effects on an industrial sector where Italy has built up considerable expertise, which could also be taken advantage of
National Energy Strategy: for a more competitive and sustainable energy

3. Sustainable development of renewable energy

in the international markets. Indeed, Italian companies, some of which are already major players with a significant international presence, have notable growth opportunities abroad, given the expected development of this sector in other countries. Moreover, in view of the highly fragmented nature of the Italian market, we can assume that a gradual consolidation process will occur, which could produce benefits in terms of efficiency and economies of scale.

Lastly, it is worth noting that, given the rapid progress with which capacity has developed in Italy in recent years, the strategic relevance of import projects from other countries (Balkans, North Africa), which had been forecast in the National Action Plan, will wane. This notwithstanding, the Government intends to respect the commitments it has undertaken thus far (especially those concerning the interconnection with Montenegro).

Open points for consultation – Electricity renewables

C12. The Strategy envisages continuous support for investment in renewables, albeit with lower incentive levels than in the past (and with closer attention to volumes). Are different options advisable? What direction should they take?
Renewables for heating and cooling – Background

Renewables for heating and cooling (H&C renewables) are a key element in the Italian strategy to achieve the “20-20-20” goals, in view of their cost-efficiency and ease of widespread installation. To date, they have been somewhat neglected by the regulatory framework; however, they have experienced significant development on their own.

- As we have seen, heating/cooling uses represent the lion’s share of our energy consumption, in both the civil and industrial sectors (about 45% of total final consumption).

- Renewables for heating and cooling are in general more efficient and less costly means of meeting the European targets (in terms of cost per ton of avoided CO₂ or cost per kWh of final energy produced). They also bring significant benefits in fuel savings for end-users (for example, through biomass heating) and for the country as a whole (lower fossil fuel imports).

- In the last 5 years, H&C renewables have developed in line with the goals of the National Action Plan (NAP) (5.4 MTOE in 2010), but in the absence of a stable, dedicated framework of incentives to guide consumers towards more “virtuous” technologies. Support measures largely coincide with those for energy efficiency – tax rebates and white certificates – but with a lack of dedicated initiatives. Moreover, to date there has been no accurate statistical accounting mechanism for the initiatives adopted.

- Italy is well positioned in the H&C renewables industrial segment, especially in the biomass sphere, where about 65% of the technology is Italian-produced, including in the segments with the highest technological content. However, the level of biomass imports is by no means negligible.
Renewables for heating and cooling – The initiatives

The strategy for the development of renewable energy for heating and cooling is based on a series of specific mechanisms dedicated to the different usage categories:

- To stimulate small-scale H&C renewable projects (mainly for the civil sector), the Government plans to introduce a ministerial decree directly incentivising the installation of dedicated plant. The model followed would be a “Heating Account” similar to the one used in the Photovoltaic Energy Account. This mechanism:
  - Provides access to the incentive scheme for the most virtuous technologies, with the setting of minimum criteria for each type of initiative.
  - Allocates incentives to cover a proportion of the initial investment costs. These would vary in line with amount and climate region and be paid over 2 years (for small-scale domestic projects) or 5 years (for the others). Additional “rewards” are envisaged for the most efficient technologies. From our interactions with consumers’ and producers’ associations, we feel that this formula should be well received and therefore attract many users to sign up (in all probability, more than for the tax deduction instrument).

Up to 2020, the Heating Account alone will make it possible to reach the National Action Plan target for H&C renewables, i.e. 17% of gross final consumption, or ~10 MTOE. This will represent a total cost for the system, on full implementation, of about €900 million/year, with cover coming from gas surcharges (estimated maximum increase of about 2.2% on the gas price per cubic metre).
3. Sustainable development of renewable energy

• As regards larger-scale initiatives, mainly industrial, the support mechanism continues to be White Certificates, the aim being to select major investments on the basis of maximising the effectiveness and efficiency of the initiative concerned.

• In view of the potential offered by district heating and cooling, as yet not fully exploited in our country, special attention will be devoted to the activation of initiatives encouraging the application of these technologies. In this sphere, the activation of the guarantee fund for investment in district heating/cooling networks is envisaged. This fund, which was set up under the Cassa Conguaglio per il Settore Elettrico (Electricity Equalization Fund – Italian initials CCSE), is in turn financed by a surcharge applied to methane gas consumption.

The incentive scheme is expected to generate about €15-20 billion of investment to 2020, with important spin-offs in an industrial sector of considerable significance in Italy and in some segments of the international markets.

Finally, greater use will be made to biomass for the production of energy for heating/cooling (and of second-generation biofuels – see the next chapter). To address this, we will need to focus on promoting investments in the national forestry sector, in line with the plan for the reduction of CO2 and the decarbonisation of the Italian economy.

Open points for consultation – Renewables for heating and cooling

C13. In addition to economic incentives, which additional support instruments should be evaluated to speed up the development of renewables for heating and cooling?
Renewables in transport – background

The transport sector is responsible for a significant proportion of greenhouse gas emissions (about 20% in the EU). It is a cause of energy dependence, given that consumption in the sector is based almost entirely on petroleum products imported to Europe or refined from imported crude oil. That is why the development of biofuels is so important in the European context.

- More specifically, the European target (the same for all countries, Italy included) for the use of renewable sources in the transport sector is 10% by 2020. The main instrument envisaged by the legislation is the obligation on all consumers causing vehicle fuel emissions to include a given proportion of biofuels in their consumption (mainly biodiesel, bioethanol and derivatives, ethyl tertiary butyl ether (ETBE) and biomethane or biohydrogen).

- The development of biofuels is, however, the subject of some debate, given the doubts over the sustainability of “conventional” biofuels – doubts linked, for example, to the overall balance of emissions reduction, potentially in conflict with food uses, and high costs. The European Commission is preparing a review of the section of Directive 2009/28/EC covering biofuels and bioliquids. The underlying choice is to make the transition to the second and third generation, but the technology to completely replace first generation “conventional” production is not yet mature.

- Pending the review of the Directive, Italy has thus far fulfilled or exceeded its obligations, with the proportion of biofuels rising from 1% in 2007 to 4.5% in 2012. This is partly the result of the introduction of a number of supporting measures, such as a reduction of the duty on biodiesel, bioethanol and ETBE. To implement the EU requirements, a national system has also been set up for the certification of biofuel and bioliquid sustainability. This envisages checks and inspections to ensure that the criteria for the attainment of the 2020 targets and for access to incentives are being met. The National System also envisages the full implementation in Italy of the voluntary systems approved at the EU level.

- This has made it possible to develop an important industrial sector in Italy in recent years (the fourth in Europe for biofuel production). However, the sector is going through a difficult period as a result of:
  - Strong competition from non-EU countries attracted by growing European demand, and who are shifting their production from the raw material to the finished product (a shift that is also advantageous in terms of taxes). Many European plants are producing at only limited levels, given that the players subject to the mandatory requirements (oil companies) prefer to purchase finished products from abroad at more competitive prices.
  - Production over-capacity, which developed following the rapid construction of new production facilities, accompanied by an overall fall in demand – and so in demand for fuel – as a result of the economic crisis.

As expected, the upstream element of the sector (agricultural produce), both European and Italian, is very small in scale, as imported raw materials are very cheap.
Renewables in transport – The initiatives

Italy intends to meet its European obligations and will play an active part in the review (expected in 2014) of the European Directive to conduct a critical analysis of the sustainability of the solutions adopted thus far and decide how to continue the development of renewables in the transport sector. Italy’s view is that:

- Biofuels must continue to be included in the targets for renewable energy production, given their potential significant contribution to reducing CO₂ emissions.

- At the same time, it is vital to verify whether biofuels are being produced in a sustainable way, with a real reduction in emissions and no negative impact on the environment (e.g. deforestation) or on the use of the land for food crops.

- Only second and third generation biofuels can provide guarantees in this respect, which is why it is very important to support them through research and incentives. If it turns out that more time is needed to develop these technologies properly, the possibility of postponing the 2020 target (of 10%) can be assessed. In this sphere, Italy holds a significant technological lead (as developed, most notably, by Mossi & Ghisolfi), which we should exploit at both the national and international levels.

- The current crisis in the industrial sector must also be addressed. The sector’s development was initially helped by the system of obligations and incentives but it is currently going through a troubled period.

- Finally, the development outlook for biomethane for transport use will need to be carefully evaluated. According to some studies, it has significant growth potential in terms of volumes – above all from livestock farms, food transformation companies and waste disposal dumps – and spin-offs for Italian industry, taking into account its lead in the methane-fuelled vehicles sector and the possibility of aiming at a leading position in other markets too. The competitiveness of biomethane, which can be sold over the natural gas distribution network, therefore needs to be carefully considered, as compared with imported biofuels.

The use of methane and biomethane in the transport sector could also grow as a result of new technologies in the refining sector. In this field, technologies enabling the use of methane, to varying degrees, in fuel production are particularly interesting: Eni Slurry Technology (EST) and gas to liquids (GTL), for example. EST is an advanced production method that could generate significant competitive advantages in an environmentally-friendly manner. The GTL method produces fuels of a particularly high environmental (and technological) quality in view of the absence, in methane, of the typical impurities found in petroleum products. The advantages deriving from the use of methane in refining could increase even more if the conditions (including contractual conditions, by exploiting gas transport and distribution networks) for the use of biomethane were put in place.

In the short term, the Government adopted a number of “tactical” provisions in the recent “Growth Decree”:

- An attempt has been made to guide the sector towards more sustainable production, by assigning the “double value” recognised for compliance purposes only to second generation biofuels.
3. Sustainable development of renewable energy

(a segment where Italy can boast excellent technology levels) and those produced by waste and sub-products that have no other industrial uses.

- Steps have been taken to encourage the development of the national and Community production system, throughout the “supply chain”. Most notably, for the calculation of the European obligations, a higher value has been assigned to biofuels that use raw materials from crops grown within the EU. Limits on authorisations for imports of biofuels produced in non-EU countries have also been introduced. These concern, inter alia, compliance with the environmental legislation of the country in which the production facility or unit referred to in the authorisation application is located.

Open points for consultation – Renewables in transport

C14. What measures are possible to encourage the development of second and third generation biofuels? What measures can be taken to develop the sector and its supply chain in Europe?
4.4 Developing the electricity market and infrastructure

The objectives

The Italian electricity market is undergoing a far-reaching transformation, caused by numerous changes – some recent, and some expected in coming years. The strategy being pursued in this sector has three main objectives:

- **To align electricity prices and costs to European standards**, including through reductions in production costs, in order to lighten energy bills for households and businesses, increase the country’s competitiveness and reduce the level of net electricity imports.

- **To ensure full European integration**, both by creating new infrastructure and by harmonising the rules governing market operation.

- **To go on developing a free electricity market and integrate energy produced from renewable sources**, gradually removing all market distortions and absorbing current surplus production capacity.

The measures set out in the NES will lead to a gradual, but substantial, development of the scenario and of the production mix from now until 2020. The following changes are expected:

- **Electricity costs will be contained**, indeed are expected to be essentially stable with respect to 2010, as a result of the economic situation and, above all, the strong drive for energy efficiency.

- The production mix will see a **marked increase in the proportion of renewable energy**, up to 38% of consumption. Renewables will therefore become the leading source, equal to or overtaking gas. Taken together, **renewables and gas** will cover about 75% of electricity consumption. Coal’s share will remain essentially unchanged, while fuel oil will fall to **near zero levels**.

- **Net imports will fall**, as our wholesale prices gradually draw closer to European levels as a result of the expected alignment of gas prices.
Background

The electricity market is experiencing a period of significant change:

- The gradual **liberalisation process** mapped out in the late 1990s has in recent years reached **full maturity**. The components of the market in Italy (players, rules, instruments) are now well developed and have succeeded in increasing and diversifying supply, reducing the degree of concentration, and stimulating major investment in production capacity and networks. These developments have had significant effects on reserve margins, environmental impact, and service quality for consumers.

- This context is **currently being transformed** as a result of numerous factors that have emerged in recent years. Most notably, the **rapid growth of Combined Cycle Gas Turbine (CCGT) and renewable production capacity** (especially solar) has not been mirrored in annual electricity consumption trends. This has led to a situation of **marked over-capacity** with respect to our coverage needs. If we observe the national coverage margin, no problems are anticipated in the short/medium term – at least for mainland Italy.
Against this background of profound change, in coming years the system will need to tackle three major challenges:

- Reducing electricity **prices**, at present among the highest in Europe.
- Full integration with the European markets, to achieve which we will need to strengthen grid interconnections and standardise market procedures and governance.
- Integration of renewables, especially solar and wind technologies, in the electricity market, with all the related grid and service security issues that entails.

These three challenges are analysed in more detail below.

- **Electricity costs and prices** are at present considerably higher than the European average. As we saw in Chapter 1.3, this is due to four main structural factors:
  - The electricity generation **mix**, which is based mainly on gas and renewables (nearly 80%, excluding imports) and differs notably from the average European mix by reason of the absence of nuclear and the low share of coal, which can lead to lower costs. In recent years, coal and CO₂ price trends (-7% and –50% respectively since 2010) have had a negative impact on the cost differential of Italian electricity generation. On the basis of developments in European CO₂ policies (for example, the implementation of the “Set-Aside” mechanism) and future coal price trends, the relative cheapness or cost-effectiveness of the different technologies could change.
National Energy Strategy: for a more competitive and sustainable energy

4. Developing the electricity market and infrastructure

In addressing the issues arising from environmental policies and from phasing out nuclear, the principal European countries are expected to gradually converge towards a mix that is more similar to Italy’s. This will probably help bring our prices more closely into line with European levels (in the World Energy Outlook for 2011, before certain nuclear phase-out decisions had been taken, the International Energy Agency (IEA) already predicted a fall of around 10 percentage points in average European generation from coal and nuclear by 2020 – from ~52% to ~42%).

TABLE 34

The generation mix has changed significantly in the last 10 years and today is very different from the European mix

Gross electricity generation mix by source, %

- Wholesale gas prices, as we analysed previously, with a differential of around 5.7 euro/MWh in 2011 with respect to European prices, have led to an increase of about €10-12/MWh in the cost of electricity produced by a CCGT power station compared with similar production in Europe.

- Incentives for renewable electricity production, as analysed earlier, amount to about €9 billion/year and are set to rise to €12.5 billion/year. These costs account for nearly 20% of the total electricity bill (excluding taxes).

- Network inefficiencies and bottlenecks, which create an estimated €500 million/year in additional costs to the system. The connections between the islands and the mainland are one example, and produce a significant price differential for Sicily. Then there are the bottlenecks between central and southern Italy, which can limit the potential for renewables (and so create a need to “switch off” overflow wind production, for example, while still paying for this production downtime). Other factors are the cost of certain public policies funded through energy bills (system research, CIP6 incentives, charges for nuclear decommissioning...
National Energy Strategy: for a more competitive and sustainable energy

4. Developing the electricity market and infrastructure

– dismantling and land compensation), and **advantageous conditions** for certain customer segments or for major energy consumers.

**TABLE 35**

**Action must be taken on all critical cost items of the Italian “electricity bill”**

<table>
<thead>
<tr>
<th>Bill Items (excluding taxes)</th>
<th>€bn/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Energy</td>
<td>21.1</td>
</tr>
<tr>
<td>• Incentives for renewables (A3)*</td>
<td>1.0</td>
</tr>
<tr>
<td>• Grids</td>
<td>2.4</td>
</tr>
<tr>
<td>• Dispatching</td>
<td>0.8</td>
</tr>
<tr>
<td>• Sales</td>
<td>0.4</td>
</tr>
<tr>
<td>• Nuclear decom./ land compensation (A2+MCT)</td>
<td>0.4</td>
</tr>
<tr>
<td>• Special tariff Schemes – FS (A4)</td>
<td>0.5</td>
</tr>
<tr>
<td>• Other charges</td>
<td></td>
</tr>
<tr>
<td>• Total</td>
<td>41.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Beneficiaries</th>
<th>€bn/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Conventional producers***</td>
<td>13.5</td>
</tr>
<tr>
<td>• Renewables producers*</td>
<td>3.3</td>
</tr>
<tr>
<td>• Assimilated/CAR**</td>
<td>0.3</td>
</tr>
<tr>
<td>• Distributors</td>
<td>1.4</td>
</tr>
<tr>
<td>• Terna</td>
<td>1.0</td>
</tr>
<tr>
<td>• Others</td>
<td>0.9</td>
</tr>
<tr>
<td>• High-Energy consumers****</td>
<td>0.8</td>
</tr>
<tr>
<td>• Sales companies</td>
<td>0.3</td>
</tr>
<tr>
<td>• ESCO</td>
<td></td>
</tr>
<tr>
<td>• Total</td>
<td>41.9</td>
</tr>
</tbody>
</table>

* Aggregate cost of installed plant at end-2011. Energy: 3 Md€; A3 PV: 5.6 Md€; A3 non-PV: 2.5 Md€; Revenue CV: 0.7 Md€.
** CAR: High-efficiency cogeneration. Energy: 5.4 Md€; A2: 0.9 Md€ (non-renewable CIP6).
*** Energy: 12.7 Md€; Cap payment: 0.15; Services: 1 Md€; UESS: 0.3; CV Cost: -0.7 Md€.
**** Interruptibility: 0.6 Md€; Virtual amount: 0.3 Md€ (+ exemptions: 0.3 Md€)

- The full **integration of Italy’s markets and electricity system** with Europe will most certainly be a challenge in terms of regulation and infrastructure development, not least in view of the tight deadlines envisaged by the European Roadmap. In general terms, this process could offer significant margins for the development of internal competition. It could also be – for our system, with its high over-capacity – an **opportunity** to export energy (or reduce imports) and to develop new “flexibility” services that the Italian system could offer the European one. Indeed:

The European Commission is pushing for **rapid market integration**, and has set **2014** as the deadline for the creation of the single energy market. The adoption of the Third Energy Package gave a strong impetus to the creation of the single electricity market. Its measures include a strengthening of the functions of the super-national bodies (ACER and ENTSO-E), greater responsibilities for the national regulatory authorities and network operators, and the creation of European network codes (a most important measure, containing common rules for network access, requirements for generators, congestion management, price coupling on the day-ahead and infra-day markets, the supply of ancillary services and the management of balancing).

The codes open up the prospect of different ways of using the interconnection lines, with a **greater emphasis on variable and two-way** exchanges.
Moreover, a number of European countries are phasing out their nuclear production. They include Germany (which has already shut down over 8GW and plans to decommission its remaining nuclear plant by 2022), Switzerland (which is drawing up a decommissioning programme that will be completed in 2034), Belgium (where 7 reactors will be closed between 2015 and 2025) and France (which plans to reduce the proportion of nuclear in its mix).

This suggests that the composition of the generating pool of many Central European regions will gradually converge with the Italian one. This will create a need to build new generating capacity (in which natural gas combined cycles can be expected to play a central role) or import electricity.

For example, initial estimates suggest that, in 2011, if Italian combined cycles had had a gas cost in line with European levels (a key goal of the NES) and had not been penalised by the implicit cost of Green Certificates, then they would have been competitive with respect to the European markets – by more than 1500 additional hours per year. A significant potential export market to Central Europe therefore exists for energy produced by Italian combined cycles. We could turn this potential into reality by adopting the measures envisaged for the gas system and factoring out the effects of the European CO2 reduction policies, which should lead to higher CO2 prices than at present.

Lastly, it will be most important to manage the integration of our growing non-programmable renewable capacity. Most notably, the extremely rapid growth of renewables means that we should focus on two key criteria:

- Network problems caused by excess production with respect to consumption, at the national or local levels. Capacity is concentrated in regions that are distant from the main consumption centres and where grid development has not kept pace with the spread of production facilities. This creates local over-production problems under certain conditions (for example strong solar radiation combined with low consumption), with risks to the balance and security of the grid and costs deriving from the remuneration of any breaks in production.

In more general terms, at certain times domestic production from renewables can exceed the country’s entire electricity demand. This situation is likely to become more common in the future, as available capacity from renewables increases.

The same problem is found on the distribution network, to which a growing proportion of generation from renewables is connected. The distribution networks will therefore have to develop the systems and infrastructure needed to manage local input. And this will require investments.

- A market-related problem that derives in part from the need to provide adequate back-up capacity to ensure system security and in part from the effects of the “crowding out” of the thermoelectric generating stock (especially CCGT). The large proportion of generation from renewables, which is difficult to forecast and is subject to rapid changes in production levels, means that high levels of reserves are needed, and a high degree of flexibility for
National Energy Strategy: for a more competitive and sustainable energy

4. Developing the electricity market and infrastructure

those reserves. This leads to intervention by the network operators that could entail higher costs for the system as a result of the need to buy more resources on the dispatching and balancing services markets.

At the same time, the thermoelectric stock, which is increasingly necessary to guarantee security of supply in the high-stress conditions described above, is being brought into play for increasingly limited periods. This can be explained both by the increased production from renewables, and – above all – by the slow-down in consumption and the increase in installed CCGT capacity. This has effects on the prices offered at different times of the day (as witnessed by the recent strong price increases in late evening hours, when solar production ceases). In the future, the available supply could also be reduced (as a result of possible halts/closures in the presence of excess capacity on the market). This would create potential risks to system security in specific regions, as well as the risk of a re-concentration of supply.

The initiatives

The above challenges mean that a structured approach and broad range of initiatives is needed. These are set out below, on the basis of the three elements described above:

1. Eliminating the cost differential

To eliminate the cost differential three actions – in addition to those already described to align gas prices and renewables incentives, which are deemed to be most effective with respect to the objective – are considered to be a priority. They are: stepping up initiatives to develop the domestic network to reduce bottlenecks and overcome possible market restrictions and reduced competitive margins; limiting current market distortions and inefficiencies; and reviewing the advantageous conditions extended to specific customer segments.

- From the point of view of infrastructure, the transmission network development plan should give the utmost priority to intervention to reduce congestion between market zones (by increasing transit capacity by about 5,000 MW) and areas of limited production. The constraints on the full exploitation of the most efficient plants’ production capacity (and, as described earlier, that of production from renewables) should be eliminated.

To achieve this, the administrative simplification measures introduced during the process of evaluating the Development Plan and those authorising individual projects must be applied to reduce the time required for works to begin. As with electricity power stations in 2002, in this field too the aim is more effective collaboration between central and regional government. This should be sealed through a specific agreement to cut the time required for prior consultation.

Tariff regulation, for its part, should continue to create effective stimulus for grid concession holders to develop the necessary investment in the envisaged timescale; improve their forecasting and planning capability with respect to the objectives set out in the Strategy (most notably, the development of renewables); and achieve real reductions in system costs.
The issue of “price zones” has gradually decreased in significance. At present, we can confidently say that, in structural terms and for a few more years, it will – in essence – only affect Sicily, until the new electricity line connecting the island to the mainland is built and the Sicilian network completed. The SAPEI transmission system linking Sardinia to the mainland will soon be fully up and running, and efficient, after an initial period characterised by considerable downtime. In the rest of southern Italy, prices in recent years have essentially come into line with those of the Centre-North, as the result of network development policies and the construction of new production hubs. In spite of this, significant operational constraints remain in the south, on which operators must be pressed to take action.

**TABLE 36**

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sicily</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sardinia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PUN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Progressive convergence of zone prices, not yet complete for Sicily and Sardinia

Average annual zone prices, €/MWh

Source: GME

- **“Other system costs”** (other than incentives for renewables, as already discussed) account for about 4% of the cost of electricity for average consumers. A detailed review of bill items has been initiated with the aim of reducing their specific impact, while safeguarding the investments made thus far and the public policies underpinning them. The review on CIP6 incentives for non-renewable sources has already begun, leading in many cases to the early – voluntary – withdrawal from the agreements. It will soon be extended to the CIP6 incentives for renewables and waste (here too, with the prospect of voluntary cancellation of the agreements). The parameters for the “avoided fuel cost” incentive tariff (Italian initials CEC) will also be reviewed in the near future, as envisaged by Law 99/2009, with further savings as a result.

As non-renewable plant take up the option to withdraw voluntarily from the CIP6 scheme, the provisions already adopted will produce an estimated total saving of over €400 million/year. To this should be added the impact of the other measures outlined above. The new rules to make up for the delays in nuclear decommissioning (still less than 15% complete 26 years on from the closure of
nuclear power stations) and the creation of a National Storage Facility for radioactive waste are steps in the same direction. The Storage Facility responds to a precise obligation towards both the European Union and the Regions where the temporary facilities are currently located. It will make it possible to review the overall cost of nuclear waste management, currently included in the electricity tariff.

These are the most significant areas of intervention. However, other initiatives too could help keep costs down. For example, greater competition in the hydroelectric segment, by conducting tenders to award concessions coming up for renewal, and the use of part of the revenue from the bids to reduce system costs, following criteria that will be agreed with the Regions in coming months. In more general terms, a comprehensive review of the charges covering all the costs of the electricity system will be undertaken.

In addition, a further reduction in system inefficiencies could be driven by a greater rationalisation of the electricity distribution system. Here, the continuing presence of companies that are sub-optimal in size (one hundred or so distributors with fewer than 5,000 customers still remain, out of a total of about 150) has a negative impact on electricity service costs, especially downstream costs.

Lastly, the potential most certainly exists to rationalise the advantageous conditions enjoyed by certain customer segments, with a view to achieving greater equity. The criteria for allocating costs to non-residential consumers will therefore be reviewed before the end of 2013. Care will be taken to safeguard highly energy-intensive activities and achieve greater equity, to the advantage of highly energy-intensive small and medium-sized consumers. Some categories, the last-named in particular, are placed at a disadvantage by the current system. To address this problem, the “Development Decree” sets out criteria and instruments to re-determine the fiscal and related components (e.g. surcharges for renewables) weighing on energy intensive businesses. These take into account not just the amount of energy consumed but also its relative impact on the company’s activity and production costs.

Along with these measures, which will require specific decisions and provisions by the Government, the regulatory framework of the sector and the provisions to protect competition and the market will also need to go on operating. Their role is to enable a transparent market to develop; increase the amount of information available to consumers regarding the opportunities and alternatives available (better informed consumers can make better choices); and strengthen the role of the demand side in the operation of the market and in bringing down system costs.

In coming years, growing demand in the free market and the development of distributed generation and production from renewables will bring significant changes to the role played by consumers. They will be more active in choosing their supplier and in adopting energy efficiency and self-production solutions. This will create a favourable climate for a rapid transformation of consumers’ role, from actors primarily to be “protected” to active players in reducing the prices of their supplies.
2. European integration

To grasp the opportunities opened up by European integration and not simply be subjected to the constraints it imposes, we will need to take steps to harmonise our current system with the European one and ensure that all future decisions taken at the national level converge with shared and agreed rules.

Important steps have already been taken in this direction, most notably through the decision to retain the current market model based on the system marginal price (rather than introduce a pay-as-bid system) and the adaptation of the institutional architecture for the management of congestions. Until 2011, this was based on annual MiSE decrees and AEEG resolutions, instruments that are no longer consistent, in terms of the timescales and the players involved, with the system mapped out by the new European regulations. Strategic attention should be focused on:

- Drawing up European network codes and market governance instruments, not least to exploit the specificity of the Italian system, through an institutional working group (MiSE, Terna, GME, Regulatory Authority for Electricity and Gas) and regular dialogue with market operators. The new guidelines for the allocation of transport capacity and the management of cross-border congestions are particularly important. These are based on joint procedures to allocate rights (physical or financial) and on implicit allocation and market coupling systems for daily capacity, and continuous negotiating systems for same-day delivery allocation. A similar effort will be dedicated to promoting a review of the cross-border transport rules and compliance by non-EU countries, most notably Switzerland, with those rules.

- Harmonising operational procedures (such as operating rules, calculation algorithms, operational timescales and payment regulation) with a view to fostering efficient market coupling. Here, the question of whether or not to keep the Single National Price (SNP) is particularly important. The SNP was originally introduced following an understandable, and indeed justified, political decision not to create regional inequalities (especially between the north and south of the country) in the supply price of an essential service – electricity. Such inequalities could derive, for example, from shortcomings in the development of the infrastructure (grids and production hubs) and failure to develop a sufficiently competitive market. In effect, if the SNP had not been introduced the effects in the past would have been unsustainable for much of southern Italy – and would be even today for Sicily and Sardinia (the latter, in the periods when the SAPEI underwater cable is out of action).

In the medium term, the conditions should be created for a discussion on eliminating the SNP. In this context, "medium-term" means once the essential national infrastructure to eliminate the discrepancies existing at the time of the liberalisation of the electricity sector (and here the new Sicily-mainland cable will, by 2014-15, play a key role) is complete. The effects of eliminating the SNP are deemed to be positive, for example in light of the greater effectiveness of the market coupling system and greater uniformity with respect to the rules applied for exports. For the purpose of market coupling with the European markets, maintaining a zone-based sales price different from the purchase price (i.e., the SNP, which is one element that sets Italy apart from the other European markets) is not an insurmountable obstacle. It can, indeed, be maintained by changing its calculation methods. However, specific solutions would need to be found to adapt the price to the single calculation algorithm and adapt the mechanism currently used.
4. Developing the electricity market and infrastructure

- Increasing cross-border interconnection capacity, thanks to the completion of Terna’s Development Plan and interconnector and merchant lines financed by private operators in accordance with Law 99/2009. Terna’s Development Plan (2012) includes a programme to increase the public grid by an estimated 4,000 MW, of which about 1,000 MW on the Balkans side and about 3,000 on the northern border. A further 2,500 MW need to be produced by the selected operators through the procedures set out in the above-mentioned law.

Other lines could be added to these initiatives, with a smaller quantitative impact, and built using the interconnector model. However, given the way the European regulatory framework and prices have developed, the impetus for this is likely to be less strong. Moreover, in view of the outlook for the development of energy and electricity service exports, the need might arise to boost domestic connections (e.g. between northern and central-northern Italy).

In a situation of progressive unification of the European market and increasing harmonisation of the rules of the different countries, the ability to export both energy and dispatching services for interconnected electricity systems is an opportunity the network operator should grasp – once again with adequate regulatory support. This would exploit the greater efficiency and flexibility of the national thermoelectric stock and relieve the economic sustainability problems caused by its current over-capacity.

The integration of the balancing markets brings more resources into play. And, by mediating the needs arising from more geographically extensive regions with different predominant technologies (wind, photovoltaic, hydroelectric), it reduces the relative variability of production from renewables. From the economic point of view, it increases competitiveness in meeting domestic needs and places the Italian generating pool, most notably combined cycle, in a position to participate in the supply of dispatching services at the European level. As the actions to align gas prices take full effect, and as the regulation of the sector succeeds in aligning grid operators’ interests with those of the system, this opportunity will become all the more concrete.

3. Integrating renewable capacity

To integrate the growing amount of renewable capacity to best and fullest effect, it will be necessary to address both the network problems caused by over-production and those related to system security arising in a market where the thermoelectric stock is gradually being “crowded out”. This “crowding out” is a result of increased production from renewables, and – above all – of the slow-down in consumption and the increase in installed CCGT capacity.

- Potential over-production from renewables at the local or national level will be managed as follows:
  - First, pre-emptively, with effects on new plant, by identifying critical areas with a high concentration of non-programmable renewables (GSE, the energy services operator, has begun this analysis), restricting the power that can be incentivised in those areas and adopting specific prescriptive measures in terms of service delivery. Given the outlook of potential inconsistency in the service, with increased solar capacity in grid parity conditions (therefore excluded from public incentives), it will be increasingly important to establish
monitoring mechanisms and develop a better ability to forecast the access of further capacity to the grid, to avoid severe problems for the electricity system.

In this respect, the creation of a full information system linking the institutions that authorise the plant (regional, provincial and municipal government), network and grid operators, and the GSE is vital. So too is the (already envisaged) direct or indirect participation of network operators in the authorisation procedures for larger plants.

- More specific interventions on the grid include the following:
  - In the short term, a "rationalisation" of interruptions to imports and/or production from renewables in the event of overflow, also envisaging adequate monitoring mechanisms.
  - In the medium term, a strengthening of transmission lines from the areas with the highest concentration of renewable generation (initiatives already envisaged in the Network Development Plan), and of distribution lines.
  - In the longer term, it will be necessary to develop advanced monitoring systems for the distribution network (smart grids or, more in general, measures to increase grid flexibility). Success in fully integrating renewables is linked, to a large degree, to grid efficiency. Structural adjustments to the distribution networks will therefore be necessary; initially conceived as passive, these networks have now become active as they are sources of distributed generation, the purpose for which smart grids have essentially been developed.

  The development of smart grids will need to hand in hand with the installation of energy storage systems, both pumped hydro systems (including small-scale ones) and battery systems serving the grids in the most critical areas. As discussed earlier, Italy intends to concentrate – including from the industrial perspective – on batteries, as a major opportunity. The focus at present is on experimentation, but the goal is to launch a major installation programme when the economic fundamentals for the technology are more favourable.

- With regard to guaranteeing the adequacy and security of the service, against a background of poor production programmability and rapid production changes:
  - In the present situation of overcapacity, the network operator will be able to guarantee continuity with existing service remuneration mechanisms. A focus here is on fully exploiting the Dispatching Services Market, with the creation of the necessary reserve and real-time balancing. As already mentioned, the integration of the single market should provide an export opportunity, also for dispatching services, for the Italian generation pool.
  - In the medium-long term, a well-calibrated and stable capacity payment mechanism should be introduced, in the absence of adequate price signals on the energy market, to guarantee the necessary reserve margins. In view of the importance of this issue at the European level, a proposal for harmonised regulation of the "capacity markets" is likely, given the diverse
range of solutions currently adopted or suggested by the different countries. This would be desirable, not least to supplement the work of drafting the Network Codes.

We should note, however, that the European Commission has recently recommended extreme caution with respect to the capacity markets, given the fear that they could be an obstacle to the development of the internal market and in some cases could be viewed as state aid.

In this sphere, it will soon be necessary to take decisions at the national level, with an evaluation of Terna’s proposal, based on the Authority for Electricity and Gas guidelines, for the new system that should enter into force in 2017. Capacity payment will be based on a market mechanism entrusted to auctions that will start in 2013. For these, Terna has been tasked with creating demand curves expressing the “adequacy target” for each area, understood as the unit value of productive capacity relative to the capacity level, the aim being to **minimise total system costs**. Once a stable power remuneration system has been set up (one, therefore, that replaces the current provisional system) it will provide an additional instrument to manage the national electricity system in secure conditions and stimulate the necessary ability to forecast its long-term needs.

The Regulatory Authority for Electricity and Gas set 2017 as the date the new system will enter into force. By that time the configuration of the electricity system is unlikely to be very different from the current one. Nor is the system likely to require the development of new generating capacity, at least as an effect of general phenomena connected with increased demand.

It is possible, on the other hand, that continuing over-capacity will create a need to restructure and “downsize” the thermoelectric generating stock. This situation would need to be monitored closely to prevent a re-concentration of supply, which would be a negative development. At the same time, the need could arise to satisfy a need to boost the margins at “zone” level. This context makes it possible to guide the development of the auctions and the drafting of the technical-economic parameters for implementation, ensure that the service is efficient, as well as effective, and contain the overall costs.

On a more fundamental level, we cannot rule out that the significant changes currently under way, with a mix less and less based on supplies subject to variable production costs and a shift to generating systems where production is determined solely by fixed costs or regulatory mechanisms, might open the way to a **more in-depth review of the market model**. This prospect will need to be further studied in the framework of unifying the rules at the European level, since adoption at individual country level would only make the market harmonisation goals more remote.
Open points for consultation – Developing the electricity market and infrastructure

C15. Do you agree with the main challenges described for the sector? What further initiatives do you suggest should be adopted to tackle these challenges?

C16. The document considers a re-balancing of the prospects for the exploitation of combined gas cycles, through initiatives to ensure that the current surplus power is competitive on the foreign markets (cost reduction for thermoelectric, integration of the energy and services markets). What other measures do you think are necessary? Could the policies on containing CO₂ be a significant element or area of action on which to focus?

C17. The paper does not include actions regarding the retail market or instruments to protect individual customer categories (residential, SMEs) among the principal challenges. The current Italian system provides a high degree of protection for consumers, in forms deemed by the European Commission to be compatible with the liberalisation of the sector. Do you think it is important to establish objectives for changes in this segment too? If so, what sort and to what end?
National Energy Strategy: for a more competitive and sustainable energy

5. Restructuring the refining sector and the fuel distribution network

4.5 Restructuring the refining sector and the fuel distribution network

The objectives

Refining and fuel distribution, sectors of huge importance to Italy, are currently undergoing major changes and difficulties. The Government’s principal objectives in this sector are:

- **To accompany the refining sector towards a progressive restructuring** and modernisation in a period of severe structural crisis, in order to safeguard the industrial and employment importance of the sector, with benefits too in terms of security of supply and prices.

- **To contain oil product prices and improve the quality of the distribution service for consumers** by rationalising and modernising the operational models.

The refining sector - Background

The European refining segment, like the entire downstream petroleum sector, is undergoing a severe crisis, with numerous divestment plans and the closure of a number of plants (in Italy, the Tamoil refinery in Cremona in 2011, and TotalErg in Rome, as well as temporary halts to production in the ENI refineries in Marghera and Gela, and the API facility at Falconara). Since the start of the refining crisis in Europe (2008), divestment and closure has been proposed for 33 plant out of a total of 104 currently operating, while about 75% of European refining activity is estimated to be economically unsustainable. This difficult situation can be explained by several factors:

- **The fall in demand** linked to the difficult economic situation in Italy and, indeed, throughout the European continent, with lower commercial and private traffic on the roads. In the last 10 years demand in OECD countries has fallen by 5%, compared with a 50% rise in demand in non-OECD countries. The centre of gravity of consumption and refining is therefore shifting to Asia, driven by demand for transport fuel.

  To this situation should be added the difficulties experienced by some Italian refineries following the embargo decided at the European level on crude oil supplies from Iran. This had a sharper impact on Italy, since our refineries’ processing cycles are based on heavy crude oil, for which Iran was our major source of supply. As a result of the embargo, Italian refineries have had to switch to higher-priced crude oil from other markets, the Saudi market in particular.

- **Structural changes** in the refining sector’s consumption market, which have a long-term timeframe for development:

  - The gradual replacement of certain oil products with other sources, most notably the replacement by methane of heating oil and of fuel oil for thermoelectric generation. The use of petroleum products is now concentrated mainly in the transport sector (and in the petrochemical, bitumen (for roads) and lubricant industries)
5. Restructuring the refining sector and the fuel distribution network

- In the transport sector, the gradual reduction of consumption resulting from increasingly energy-efficient engines and the growing use of biofuels.

- Europe’s determination to follow a long-term process of significant decarbonisation of the economy, as defined in the Roadmap 2050, even as global demand for petroleum products, driven by non-OECD countries, continues to grow.

- The need to adjust refining cycles. These were initially conceived to maximise petrol yields, and are thus no longer adequate to meet the higher demand for medium distillates. However, given the massive investment needed and the contraction of the European market, this adjustment is not being made.

- Increasingly strong international competition, mainly from large, efficient refineries located in Asia, albeit sometimes in competition-distorting conditions (e.g. lower environmental, safety and social protection constraints, and subsidies of various kinds).

The refining sector – The initiatives

Having overcome the impact of the embargo on Iranian crude, the Italian refining industry now faces a structural problem, which will inevitably require a gradual reduction of capacity and a focus on advanced production methods and higher added value. The principal measures addressed to the refining sector aim, therefore, to facilitate the restructuring or conversion of production capacity while changing the emphasis to higher quality products, provide equal conditions with those of non-EU countries, and develop biofuels, especially second generation (a topic already discussed in the section on renewables).

- As regards the restructuring and conversion of refining capacity:
  - Under the provisions of the “simplification” law, a survey has been conducted on the strategic importance of refineries, major logistics structures, coastal storage depots for mineral oil and aviation oil, vegetable oil production plant and oil pipelines of national interest. This means assigning administrative responsibility for strategic installations to the central Government, which will exercise that responsibility in agreement with the Regions, so as to manage initiatives in the sector in a unified and coordinated manner. Simplified fast-track authorisation procedures, underpinned by the provisions of the Development Decree, have also been introduced for the conversion of refineries into storage facilities and to enable plant to continue operating even during the conversion work.

  - The Ministry intends to promote a restructuring plan for the sector and to identify strategic refining capacity and the possibility of new investment to rationalise and modernise production cycles. The focus here will be improved environmental performance and higher-quality refining products. To this end, a working group on refining has been set up, with the participation of the social partners. A European Forum on Refining, coordinated by the Commission, has also been proposed. Its task would be to develop and implement all the support measures agreed for the sector.
National Energy Strategy: for a more competitive and sustainable energy

5. Restructuring the refining sector and the fuel distribution network

- Meetings at the Community level have also been promoted, making it possible to bring the seriousness of the problems faced by the refining sector, not least their knock-on effects on Europe’s economic system and on employment, to the attention of the Commission and Parliament. The intention is to take forward and develop this action at the EU level with a view to adopting support measures. It is important to reiterate the strategic nature of the refining segment, and the risk we run of becoming highly dependent on imported refined products.

The Commission has taken the situation on board and has undertaken to verify, at the drafting stage, the potential impact of new European legislative proposals on the refining sector (e.g., in the cases of the Fuel Quality Directive and Roadmap 2050).

- As regards the alignment of competitive conditions with non-EU countries, Italy has proposed, at Community level, the introduction of a “green label” for products refined in Europe. Under the proposal, only those products obtained using industrial processes meeting European environmental standards could be used in Europe (this measure applies to the same sphere of sustainability criteria as established in the Directives on biofuels and fuel quality). As far as Italy itself is concerned, a first step has been taken to implement this measure, with the adoption (in the recently approved Development Decree) of an authorisation mechanism for imported oil products. This would make it possible to verify the environmental footprint of non-European products.

The Legislative Decree enacting Directive 2009/119/EC on the obligation to maintain minimum stocks of petroleum products, which must enter into force on 1 January 2013, will be issued before the end of 2012. The new law will aim to minimise the overall costs of the new system, by envisaging the intensive use of existing private or publicly owned storage infrastructure. In 2011, companies’ stockholding obligations amounted to about 12 million tons. Once the Directive has been implemented in Italy, a central stockholding entity (CSE), like the ones already established in nearly all the other member states, will be set up. Its task will be to manage stocks for which the state is responsible and ensure that they are both flexible and readily available. A logistics platform is also envisaged, so that a market for petroleum products storage capacity can develop. Operators, and the CSE itself, will be able to operate on the market to obtain logistics services in an efficient and transparent manner, not least in view of the strategic interest of the sector.

The fuel distribution network - Background

The fuel distribution sector in Italy suffers from major structural problems, which are evident when compared with the structure of the sector in other major European countries. Italy’s distribution network is extremely fragmented, with high numbers of service stations (23,000, about double the number for comparable size countries). They are medium-small in size (in terms of litres delivered/sold and square metres per sales-point), old, and poorly diversified in non-oil products (which account for only 3% of revenues, compared to over 30% in other countries). The situation is exacerbated by the fall in sales over the last three years. This is having a lose-lose effect: low profitability for service stations go along with relatively high unit prices for Italian customers (who have the sole advantage, with respect to other countries, of a more widespread network and higher numbers of service staff).
National Energy Strategy: for a more competitive and sustainable energy

5. Restructuring the refining sector and the fuel distribution network

For service stations owned by oil companies, the segment has thus far been characterised by the predominance of the commodate (gratuitous loan) model. This form of concession is tied to a sole supply contract for fuel from the oil company, which decides on recommended prices and discount policies. In Europe, on the other hand, the agency model is more widespread. The sustainability of the Italian system has been undermined in a situation of falling margins and demand, with strong trade union tensions and rigidities in the sector hindering rationalisation. The problems pertaining to restructuring and the competitiveness of the fuel distribution network have been keenly felt recently.

The fuel distribution network – The initiatives

The initiatives to be introduced in this context aim to increase the competitiveness of the fuel market and influence price levels by enhancing consumer protection and increasing price transparency and the quality of the service provided. Significant measures were introduced by the recent Liberalisation Decree Law.

- Many of the initiatives are designed to promote fuller liberalisation in the sector. They include:
  
  o Increased use of self-service arrangements, not least since this form of refuelling is more cost-effective for customers. It will be achieved through an obligation to install self-service equipment in service stations and the possibility (thus far not envisaged) of having totally automated service stations, without restrictions, outside urban areas.

  o The removal of many constraints on, and the wider availability of, non-oil products and services (newspapers, cigarettes, etc.) – a measure that has met with opposition from other categories of shop owners. The development of non-oil is essential if concession-holders are to gain higher margins in a period of declining demand for fuel.

  o Improved communication and transparency with respect to fuel prices to users. Service stations will be required to display fuel prices, while the requirement to highlight the first two figures after the decimal point will be defined more clearly, as will the minimum features required for posters, billboards and the like. This will have the double result of ensuring that the prices actually applied to consumers are more visible and transparent, without penalising existing investment on posters and other display material (so as not to burden companies with additional costs).

  In addition, after a brief trial period, the new method of calculating the “Italy price” will be introduced. This will make it possible to monitor the price actually offered to customers, taking into account self-service, discounts, and the different types of service on offer at different times of the day.

  This should bring the methodology used to calculate the average Italian value more closely into line with the one used in other EU countries, where the prices reported to Eurostat are, essentially, self-service prices. As a result, it should be possible to have a better perception of the actual “Italy gap”, which has been a focus of disputes.
National Energy Strategy: for a more competitive and sustainable energy

5. Restructuring the refining sector and the fuel distribution network

- A first step to **eliminating the “sole supplier” constraint** was the introduction of the possibility for service station operators, who also hold the petroleum permit, to be released in part (50%) from that obligation and so obtain some of their supplies directly on the wholesale market.

- Some regional laws in Italy envisage an obligation for new service stations to also supply **liquefied petroleum gas (LPG) or vehicle-quality methane**. The new law has clarified that the obligation cannot be applied universally in cases where it entails economic burdens or where the technical obstacles would be disproportionate to the aims pursued in promoting the wider use of these types of fuel.

- Lastly, the arrangements for **electronic payments** are being reviewed with a view to extending this type of payment. The aim here is to increase operators’ safety and improve services to customers.

- As regards **rationalising** the fuel network and contractual arrangements, the following steps are envisaged:
  - The implementation of measures for the closure of service stations defined as **“incompatible”** (i.e., with the town planning laws, the highway code, etc.). The ministerial decree on the Fuel Network Rationalisation Fund, soon to be issued, will introduce measures to refinance and extend the scope of the fund to include grants for the environmental costs entailed in cleaning up former service station sites. This instrument will also be used to incentivise rationalisation measures to eliminate network inefficiencies, by introducing grants for incompatible service stations. The funding would remain in place, and be increased if necessary, until the stations are closed down.
  - The introduction of **new types of contract** to regulate relations between oil companies, independent operators and “tied” operators. This major innovation will make it possible to flank the current “gratuitous loan” contract and the connected sole-supply contract with other forms of contract. These include franchising, commission and branch rental contracts, to which various forms of supply contract can be linked. In cases where the trade associations fail to reach agreement on the new contract categories, the Ministry will intervene directly, so that the new contracts can begin operating by the end of 2012.
  - The possibility for sales-point owners and operators to **redeem their facility**, for example by setting up consortia or other forms of affiliation, in order to increase the number of independent operators and “**white pumps**” (fully independent filling stations that obtain all of their supplies on the wholesale markets).
  - Incentives to encourage the wider use of **automotive methane**, which is peculiar to the Italian network (about 900 supply outlets and counting, albeit concentrated in certain Regions and hardly present at all on the motorways). More extensive use is currently penalised by factors such as the rules governing capacity allocation at redelivery points on the network; such factors will be eliminated. The constraints hindering penetration on certain roads or motorways, such as the rules governing the distance between facilities and the arrangements.
National Energy Strategy: for a more competitive and sustainable energy

5. Restructuring the refining sector and the fuel distribution network

for fuel delivery and sale, will also be reduced. At the European level, the Government will make sure that the unique nature of the Italian sector is taken into consideration, to ensure that tax regulations that would be unsustainable for it are not introduced.

Further to the provisions of the Liberalisation Decree, a fuel wholesale market will be set up as part of the implementation of the minimum stocks Directive: an embryonic “fuel exchange” where independent owner/managers and operators can also get their supplies. As liquidity grows in this market, it could also provide benchmark price indicators for comparison with the traditional Platt’s benchmark on the Mediterranean market, which is currently used for transactions in Italy.

Open points for consultation – Restructuring the refining and fuel distribution networks

C18. Which initiatives should be given priority for the restructuring and development of the refining sector?

C19. What is the best fuel distribution restructuring model for Italy?
The objectives

Italy is heavily dependent on fossil fuel imports, with a negative energy trade balance of €62 billion and the adverse consequences that it implies for security of supply. At the same time, the country has substantial gas and oil reserves, the largest in Europe after the Nordic countries. We are therefore duty-bound to exploit these resources, given the benefits they offer in terms of employment and economic growth in a sector where Italy can boast notable, and widely recognised, expertise.

That said, we realise the potential environmental impact. It will be essential, therefore, to show the greatest possible care to prevent any potential negative repercussions (while noting that Italy has one of the best records of any country in the world as far as accidents are concerned). The Government does not intend to develop projects in sensitive areas offshore or on land; nor, and in particular, does it intend to pursue shale gas extraction.

The new energy strategy proposes to:

- **Develop** domestic hydrocarbon production, both gas and oil, with a return to 1990s levels, **while meeting the highest possible international environmental and safety standards**.

- **Support** the **industrial development** of a sector that starts from a position of **international leadership** and a presence in the most important global markets, and is an important driver of investment and employment.

In terms of quantitative objectives, in 2020 we expect to:

- **Increase production** by about 24 million boe/year for gas and 57 boe/year for oil, increasing their contribution to the total energy requirement from ~7% to ~14%.

- **Mobilise investments of about €15 billion** and create **25,000 new jobs**, with an annual **saving in energy expenditure of about €5 billion** in view of the reduction in fossil fuel imports.
Background

- At least in the medium term (2020/2030), Italy will remain **dependent on fossil fuels**, especially gas and oil. In 2010, about 86% of our energy requirement was covered by fossil fuels, mainly oil (41%) and gas (37%).

- Over **90%** of the **hydrocarbons** in Italy are **imported**, a much higher proportion than for our European partners. We import 91% of our gas (more than 70% of which from just 3 countries: Russia, Algeria and Libya), and 93% of our oil. This has a major impact on:
  
  - **Energy security.** With respect to the EU average, we are more dependent – by about 30 percent – on imports (84% as against 53%).
  
  - **System costs.** Our energy imports bill totalled about €62 billion in 2011.

- Italy has **significant national hydrocarbon resources** that could potentially be exploited, especially in the south (a factor which is not widely known). It is one of continental Europe’s leading countries in terms of available reserves:
  
  - Total potential resources amount to **700 MTOE** of hydrocarbons (since exploration has fallen to minimum levels in the last 10 years, this figure probably falls well short of the actual level). If we consider that current annual production amounts to 12 MTOE, this equals to a coverage period of **over 50 years**, and over 5 years if we consider current total annual consumption of about 135 MTOE of gas and oil.
National Energy Strategy: for a more competitive and sustainable energy

6. Sustainable hydrocarbons production in Italy

- If we exclude the Nordic countries, with their significant off-shore reserves, Italy’s proven reserves are the most significant of continental Europe.

### TABLE 38

Italy is one of the leading European countries in terms of hydrocarbon reserves

<table>
<thead>
<tr>
<th>Consumption and reserves of gas and oil in Italy, 2011, m. toe</th>
<th>Proved reserves 2011, m. toe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic production: 12</td>
<td>Domestic production: 2,765</td>
</tr>
<tr>
<td>Annual oil and gas consumption: ~700</td>
<td>Domestic production: 1,146</td>
</tr>
<tr>
<td>Reserves in Italy: 135</td>
<td>Domestic production: 656</td>
</tr>
<tr>
<td>Probable and Possible: 126</td>
<td>Domestic production: 194</td>
</tr>
<tr>
<td>Proved: 12</td>
<td>Domestic production: 6</td>
</tr>
<tr>
<td>Reserves in Italy: 23</td>
<td>Domestic production: 20</td>
</tr>
<tr>
<td>Reserves in Italy: 9</td>
<td>Domestic production: 126</td>
</tr>
</tbody>
</table>

### TABLE 39

More specifically, 5 zones in Italy have a high potential

Map of licenses for exploration, production and storage, 2011
• **5 zones** in Italy offer a high development potential: the Po Valley, the Upper Adriatic, the Abruzzo Region, Basilicata and the Strait of Sicily.

• Italy has also developed a **strong industrial sector**, with a notable history, expertise and international presence, in the upstream spin-off segments. The sector includes over 120 active companies; more than 65,000 jobs; sales of over €20 billion in 2010, of which €5.5 billion in Italy alone; and research and development spending of €300 million.

• The upstream sector, in Italy, also stands out for its (very) **best practice and safety and environmental protection standards**. For example, it can boast excellent performance levels at both the drilling and exploitation stages.

• Opportunity to mobilise investment in this sphere have, however, been **limited by a legislative framework and decision-making processes** that have slowed down or even halted many initiatives over the last ten years. Waiting times for permits can be up to 10 times the legally envisaged timescales, at both the exploration and production stages, and are much higher than worldwide averages. In recent years we have seen waiting times for permits grow even longer. Three problem areas stand out:

  o The complexity and long timescales, of the **authorisation system**. For example, in Italy exploration and production can only go ahead once 2 or 3 different permits (decided on a case by case basis) have been received. In some European countries (for example Norway or the United Kingdom), a single authorisation permit is granted for each zone identified and evaluated in advance by the competent authorities.

    The recent draft European Directive on this subject removes the distinction between licenses for exploration and for production, which it deems run counter to practice. In Italy, the licensing procedure includes State-Regions agreements, without a deadline for the latter to express an opinion. In all the other producer countries licensing decisions are taken at the central level. It should be noted that the marked slow-down in exploration and production in Italy occurred after 1999, when constitutional reforms changing the roles of central and regional government in the decision-making process were introduced (see the graph below).

  o **Restrictions on offshore activity**. Offshore activity is heavily influenced by the prohibitions introduced by Legislative Decree 128/2010 (known as the “environmental corrective”). This banned such activities in many areas and in effect blocked most offshore R&D work and led to the cancellation of projects worth €3.5 billion. No other European country has adopted similar laws. Norway, for example, has no generalised ban although certain areas (the Lofoten Islands, for example) are “off-limits” for environmental reasons. Such reasons are in any case taken into consideration in Italy – by the legislation to defend protected areas, to which the Government intends to devote the utmost attention.
The initiatives

To attain the goals described, two types of initiative will be required. First, it will be necessary to enact legislation or regulations that guarantee compliance with the highest international safety and environmental protection standards and simplify the bureaucratic procedures for issuing permits. And second, schemes to support the industrial sector and encourage the further development of technological “hubs” will also be needed. More generally, new investment opportunities and environmental protection requirements should not be viewed \textit{a priori} as mutually exclusive. Projects should be evaluated on the basis of scientific analyses with the involvement of local authorities and communities so that they can proceed – where they prove to be feasible – with all of the necessary guarantees in terms of safety and environmental protection.

- The new \textbf{legislative and regulatory provisions} will be specifically designed to:
  - \textbf{Strengthen the safety measures governing operations}, particularly by implementing the offshore safety measures envisaged by the draft European Directive. The Government \textbf{does not intend to develop projects in sensitive areas} offshore or on land; nor, and in particular, does it intend to pursue shale gas extraction.
  - \textbf{Bring the procedures for issuing permits into line with European standards}, particularly those envisaged by the European Parliament’s recent proposal. This could be achieved by, for example, adopting a model for issuing one single permit for both exploration and production, and setting a deadline for local authorities to submit an expression of interest or an opinion (see also the next chapter on Governance).
Develop the **spin-offs for the local economy and employment** in the Regions concerned. Part of the increased revenue from extracting hydrocarbons will therefore be used to develop infrastructure and employment growth projects in the areas where the production plants are established and in neighbouring Regions, as has been recently introduced with the "Liberalisation" decree law.

Develop production, particularly of **natural gas** – with due respect for the offshore protection restrictions in the (recently up-dated) Environment Code – while keeping safety margins at levels equal to or higher than those of other EU countries and maintaining the current safety and environmental and landscape protection constraints.

The recent “Growth” decree law, of June 2012, established a **fund to boost environmental, security and marine protection monitoring** activities, financed through an increase in royalties. The decree also envisages the **standardisation of the criteria used to identify the areas where oil and gas extractive activities** will be prohibited. These are: offshore zones up to 12 miles from the coastline and marine and coastal areas subject to environmental protection constraints.

The decree also introduces a provision **safeguarding permits already issued**, and the licensing procedures under way when Legislative Decree 128/2010 entered into force (i.e. on 29 June 2010). The aims here are to: be able to exploit any reserves already discovered, mainly of natural gas; eliminate disputes with operators who have already set up infrastructure; avoid the potential cost to the Government of compensation or damages payments to operators and/or of decommissioning (dismantling and clearing) installations that never even began operating.

- It will be important to accompany new legislative and regulatory provisions with initiatives to support the system and **boost the country’s technological/industrial hubs**. Hydrocarbon production has led to the development of “energy districts” in Emilia-Romagna, Lombardy, Abruzzo, Basilicata and Sicily that could be revitalised in line with the further development of extraction activities. For example:
  - **Emilia-Romagna** and **Lombardy**, already in leading positions at the global level, could further develop their roles as centres of technological excellence.
  - **Abruzzo** is home to some of the major oil services companies, whose facilities could be used as logistics hubs for the development of new extractive activities in southern Italy.
  - The industrial potential of **Basilicata**, which plays a strategic role in our national energy policy, has not yet been exploited. Measures here will focus on developing infrastructure and services, building up the industrial fabric to facilitate the transfer of economic activities, speeding up licensing procedures and developing an administrative system that is adequate to the size and extent of the industry and its investments.
  - The further development of the oil sector in **Sicily** could focus on boosting extractive activities, developing port structures and building up ship-building and repair. This could act as a strong driver in boosting spin-off activities. The extractive activities themselves could
6. Sustainable hydrocarbons production in Italy

benefit, especially in the offshore sector, with significant – and positive – effects on employment.

One of the most important enabling factors in revitalising production is improved support from the MiSE. The Ministry has begun a review of its internal project management procedures for permit authorisations. Additional human resources and instruments will be devoted to project management and the Ministry’s relations with local government and operators.

Open points for consultation – Revitalising Italy’s hydrocarbons production

C20. What initiatives should be adopted at the national, regional and local levels to encourage greater involvement by communities and develop an agreed process to attain public acceptance of extractive projects?

C21. What additional actions should be taken to foster the development of local industry by setting up technological districts, and thus increasing the spin-off effect from the development of investment programmes in the extractive sector?
4.7 Modernising the system of governance

The objectives

Energy is an issue that brings together competences, initiatives and decisions at various levels: international, European, state, regional and local. At the same time, investment in the sector requires a clear, stable framework and guidance for the medium-long term; a legislative and regulatory framework that evolves in a foreseeable manner; and transparent and efficient government. To achieve these conditions, and on the basis of an agreed energy strategy, we will need to:

- **Strengthen** and coordinate Italy's participation throughout – but especially in the advanced stages of – the international (and especially European) decision-making processes that determine long-term choices and shape legislative and regulatory instruments.

- Improve and simplify horizontal coordination at the national level: interaction on energy issues by the various ministries concerned, the Regulatory Authority for Electricity and Gas, network operators and service providers.

- Improve or introduce new forms of coordination between central and regional government in matters concerning legislative functions, and between central, regional and local government for administrative matters. The aim here is to provide a framework of clearly defined rules and considerably simplify and accelerate authorisation procedures.

Background

The international context

The country’s actions in energy matters are strongly influenced by the international – and especially Community – context. Italy's participation in and monitoring of European decision-making processes is at times inadequate:

- Before the Lisbon Treaty came into force, the founding treaties did not contain specific provisions governing the EU’s intervention in the energy sector. This notwithstanding, through its jurisdiction in competition and environmental matters, Europe has given a decisive impetus to the construction of the single energy market and the promotion of renewables and energy efficiency. The Lisbon Treaty explicitly set out the Union's jurisdiction over measures governing security of supply and the satisfactory functioning of the energy market, and the promotion of network and grid interconnections and energy efficiency.

- The influence of European intervention is witnessed by the fact that a significant part of our domestic legislation in energy matters in recent years derives from Community sources (for example, the 20-20-20 Climate and Energy Package, or the 3rd Energy Package). Moreover, many of the most complex issues in authorisation procedures (Environmental Impact Assessment (EIA), Strategic Environmental Assessment (SEA), Integrated Environmental Authorization (IEA), the impacts assessment on specially protected sites) are handled using procedures dictated by Community law.
7. Modernising the system of governance

- At times, Italy fails to pay monitor or pay sufficient attention to negotiations in which it is taking part, on issues having a significant impact on the sector, or fails at the onset to evaluate their economic or social impact.

National context

- Where Community issues are concerned, each Government department contributes to the drafting of legislation concerning its sector, in the context of the European Council working groups. Coordination is the responsibility of the Inter-Ministerial Committee for European Community Affairs. Its task is to facilitate the examination of issues pertaining to Italy’s participation in the European Union and coordinate the ministries concerned, with the possibility of involving regional and local government where necessary.

- Turning to domestic decision-making processes in legislative matters, the main problem concerns delays in issuing the ministerial decrees required to transpose the primary legislation. This applies in particular to inter-departmental laws that require concerted action and which are often issued months after the legal deadline.

The current institutional framework also envisages a fully independent regulatory authority with broad-ranging powers, with Government and Parliament essentially playing a guidance role. This framework seems on the whole to be satisfactory and indeed is probably one of the most advanced in Europe. To ensure that the goals of the energy strategy are achieved, the Government authorities and the Regulator will need to act in synergy, each within its remit.

- As for the relationship between central, regional and local government, the following points should be underscored:
  - Under the present constitutional framework, energy issues are governed under a system of “concurrent legislative powers”. This means that the Regions have legislative powers over energy matters, except for the fundamental principles, which are determined by central Government. The application of this constitutional provision causes considerable difficulty in terms of harmonising the legislation, with growing numbers of disputes being heard by the Constitutional Court.
  - A corollary of this law is the more extensive role entrusted to the Regions in administrative matters. As a result, authorisation for any given project, even those of national import, will always require agreement from the Region concerned. Moreover, the growing use of renewable sources, which by nature are not concentrated in a given location, means that an active, primarily administrative role for regional and local authorities is inevitable. Italian legislation on this matter – abundant, complex and scattered as it is – is based on criteria that in principle are effective, with extensive recourse to single procedures, specified timeframes and clearly defined responsibilities. However, this does not prevent those same procedures, in practice, from being uncertain and involving unpredictable timescales and lengthy delays that take them well beyond their legal deadlines.
  - The Legislative Decree enacting the 3rd European Package envisages that, on the basis of the NES, the requirements regarding strategic up-grades to production, import and transport
National Energy Strategy: for a more competitive and sustainable energy

7. Modernising the system of governance

infrastructure for electricity and gas, and storage facilities in the case of gas, should be reviewed every ten years.

The initiatives

As regards the formation of European legislation, the intention is to:

- Enhance the quality and incisiveness of the role played by the various Government departments in drafting Community laws, reinforcing the MISE’s oversight, more closely coordinating the work of the Inter-Ministerial Committee for European Community Affairs, and ensuring that the positions formulated are always accompanied by an analysis of their social and economic impact.

  Participation in the drafting of Community legislative proposals has recently been extended to the regional government level. It will be important to ensure that this involvement is implemented in a streamlined and efficient manner and duplication is avoided (for example, many Regions already have their own representation in Brussels, with costs that could be rationalised). Above all, it will be important to prevent it from slowing down our participation in Community proceedings, which are nearly always conducted with limited timescales for reaction.

- Strengthen consultation with national stakeholders: Italian trade associations in the energy sector often lobby at Community level, potentially creating situations where the interests of the sector are promoted to the detriment of the general interest of the country. The introduction of a transparent consultation process is proposed, with the publication of documents on planned Community initiatives, in order to establish consolidated national positions on the items on the agenda.

- Better coordinate relations with the Italian members of the European Parliament so that agreement can be reached on the issues under discussion and on the interests of the country. This would be achieved through regular meetings with Italian MEPs sitting in the relevant Committees.

At the national level, it will be important to introduce forms of early consultation and prior agreement between Government departments around objectives and instruments, including sectoral ones, as was done with the Action Plans on renewables and energy efficiency. The next step would be to define more clearly the remit of each central Government department and thus reduce, as far as possible, the need for consultation on secondary legislation such as ministerial decrees.

With regard to relations between central, regional and local government:

- A change in the Italian Constitution is deemed necessary by many commentators. The Government recently submitted a bill on this matter, the aim of which is to restore legislative powers to central Government in energy matters where projects and infrastructure facilities of national importance are concerned.

  A reform of this nature would be useful in harmonising both the legislation and the underlying decisions. It could be implemented through a limited amendment to article 117 of the Constitution to eliminate the concurrent legislation principle governing this type of infrastructure. Such an
National Energy Strategy: for a more competitive and sustainable energy

7. Modernising the system of governance

amendment would not exclude the Regions from the decision-making process, but would return the legislation in these sectors to one single level and simplify the authorisation process. The Regions would retain their role in formulating the underlying central Government decisions. Another advantage of this change would be to give the national interest priority over more local interests, which at present, in legislative terms, have an equal weight.

- In tandem with this, **local government involvement** in decisions relating to energy installations, a growing number of which will be powered by renewables, should also be addressed.

This question is also being debated at the European level, in the draft Regulation on guidelines for trans-European energy infrastructure. The regulation proposes the introduction, drawing on the experience of northern European countries, of “public debate” to ensure that before the authorisation procedure even begins the purpose and characteristics of the infrastructure or installation are known. The aim here is to pave the way for the insertion of the project in the Region concerned and in its economic-social context.

Public debate should help prevent the players from adopting the sort of *a priori* opposition that has often been a feature of the debate in Italy. Such opposition, in fact, is often a consequence of the lack of reliable or concrete information on the infrastructure project and its true impact on the Region or on the environment.

- **Cost/benefit analyses of planned works and infrastructure** at the national/regional/local levels should also be introduced. These would illustrate the advantages of the works and the disadvantages of failure to build them, or of delays in doing so, and should increase local authorities’ accountability with respect to the decisions involved and their national/regional/local repercussions.

- **Early coordination with the Regions** should also be introduced on regional provisions concerning energy matters so that they can be coordinated with the domestic and European legislation. This would also reduce uncertainties and disputes and avoid the need to challenge regional laws in the Constitutional Court.

Turning to **administrative/authorisation issues:**

- For **strategic infrastructure**, the first step is to identify the infrastructure itself and its location in the Regions concerned. Once the NES has been agreed upon and approved, this step will be taken in agreement with the Permanent Conference of the State and the Regions. For such projects, the proposal is that all environmental impact assessments and authorisation procedures should be carried out at central Government level. The decision would be reported to the Council of Ministers in the event of failure to reach agreement with the Region concerned. A fast-track procedure could also be established to resolve administrative disputes.

- On the question of authorisation timescales, the Development Decree includes measures to overcome Regional governments’ **inertia in reaching and expressing agreement**. If the Region has not expressed agreement in the envisaged timescale (150 days) on authorisation of an energy infrastructure project over which central Government has jurisdiction, the MiSE will be able to appeal to the **Prime Minister’s Office**, in consultation with the Region concerned, to obtain a rapid, definitive decision. This is in line with the jurisdictional position currently expressed by the Constitutional Court.
7. Modernising the system of governance

- For **works other than strategic infrastructure**, the existing authorisation procedure will remain in place. However, environmental permits will be placed on the same footing as construction and operating permits.

- **Guidelines** will be drawn up for the principle authorisation procedures in order to clarify detailed aspects of tasks, competences, responsibilities, timescales, and the departments that should be involved.

---

**Open points for consultation – Modernising the governance system**

**C22.** With regard to the review of the remits of *central Government* and the Regions, do you think Title V of the Constitution should be amended?

**C23.** As regards the division of roles and remits between the *Authority for Electricity and Gas*, the *Government* and *Parliament*, do you think the design and implementation of the current framework are satisfactory? What changes or adjustments could be made to improve governance in the sector?
5. The energy sector as a driver of economic growth

5.1 Research and development in the energy sector

Background

As part of the Government’s new energy policy guidelines, the priorities allocated to renewable energy sources, efficient energy use and the sustainable use of fossil fuels will all require research and the development of state-of-the-art technologies.

- As we saw in Chapter 3.3, technological developments have brought rapid and profound changes to the industry (for example, only 25 years ago, CCGT, solar and wind, which today are the main electricity generation technologies, had only a marginal role. We saw too that – to meet our long-term decarbonisation targets – it is vital to focus on the further development of technologies that are not yet mature, or on entirely new technological solutions.

- Research and development (R&D) in the energy sector are of primary importance at the global level, with about $65 billion in investment in 2010, continuing growth even in times of economic crisis, and a marked shift in recent years towards the renewables and energy efficiency sectors. Nuclear, on the other hand, has lost ground, especially in Europe.

- At the European level, the “Strategic Energy Technology Plan” (SET Plan) is the strategic response to the major climate and energy challenges. Its aims include:
  
  - In the **medium term** (2020), a greater dissemination of technologies already available today: further development of wind, photovoltaic and concentrated solar power; the development of smart grids to encourage distributed energy generation and the use of renewables; the development of biofuels; and the dissemination of more efficient white goods and equipment for industry and transport.
  
  - In the **long term** (2050), a concentrated technological research and innovation effort in the industrial system, with the focus on: second generation renewables; energy storage; the development of new energy efficiency technologies and materials; CO2 capture and storage; vehicles powered by fuel and hydrogen cells; demonstration projects for fourth generation nuclear reactors; and the construction of the ITER nuclear fusion reactor.

The European Commission has taken other initiatives, most notably the Horizon 2020 programme which, from 2014 to 2020, will gather research and innovation measures into a single framework programme. Of these, energy (especially renewables) will have a prominent position.

Italy has important areas of international excellence in specific fields. An analysis of the aggregate input (investment) and output (scientific and patent production) indicators reveals that research and innovation in the energy field is being held back. This can mainly be explained by the limited resources for research and innovation, the high level of fragmentation of the parties and areas of
National Energy Strategy: for a more competitive and sustainable energy

The energy sector as a driver of economic growth

research involved, and the lack of a single coordination “control room” and clear-cut policy establishing research priorities.

- The country has internationally recognised areas of excellence. For example, on the most recent front for production from renewable sources, the outlook for concentrated solar power is good. Here, the Italian industry, underpinned by ENEA patents, is in a strong position to play a leading role in coming years. For the development of the emerging smart grids sector, Italy recently consolidated its leadership by coordinating the creation of the International Smart Grids Action Network (ISGAN). In addition, the country is engaged in important R&D programmes on clean coal, second generation biofuels, and accumulation systems.

- However, if we compare the system with those of our principal European partners, we can see from a more comprehensive perspective that:
  
  o The level of resources devoted to research and innovation, both private and public, is significantly lower in Italy. In 2010, our country allocated about $1.3 billion, of which about $400 million in public money. This compares with $4 billion for Germany, $3.8 billion for France and $1.5 billion for the United Kingdom. We are followed by Spain, with $0.8 billion. This positioning reflects that of “System Italy” in general, in the R&D sphere.
  
  o In terms of patents, too, Italy does not hold a leading position and in the last decade has lost ground internationally – at least in quantitative terms – with a decline from 1.4% to 0.6% of the world’s patents in the energy sector. This compares with 10% for Germany and 2.4% for France.

- Along with limited public resources, the following critical areas in the system are obvious obstacles:
  
  o Low private sector participation in R&D investment in the energy sector (here, the main difference between Italy and other countries is the lower engagement of private companies).
  
  o The high degree of fragmentation among the parties and the areas of research involved, which sometimes translates into overlaps or an inability to “act as a system” around major initiatives and/or hubs of excellence.
  
  o The lack of clear guidelines on energy research priorities for the country, on which to concentrate resources, and of a single coordination “control room” for the sector to facilitate collaboration and the more effective allocation of the resources available.

The key choices

The key choices that will guide R&D decisions in the energy sector will focus on overcoming the problems described above, the aim being to pave the way for wider and more effective participation by industry and the country’s public and private research centres in future R&D programmes. Establishing a National Energy Strategy, after years without one, fills one gap: the lack of clear policy guidelines to
The energy sector as a driver of economic growth

catalyse the interest and resources of the scientific and industrial communities and in itself act as a stronger spur to action.

- In terms of available resources, it will be important to support R&D promoted by private sector stakeholders. The tax reliefs recently introduced by the ”Development Decree” are a step in this direction. As for public funding, the Revolving Fund (Kyoto) is another important element to which two other instruments, both financed from electricity and gas tariff revenues, should be added. They are the Fund for System Research in the Electricity Sector (which has about €60 million/year), and the Fund for Technological and Industrial Development in the field of renewable energy sources and energy efficiency (about €100 million/year). This new fund (established under art. 32 of Legislative Decree 28/2011) will begin operating by the end of the year, in keeping with the NES priorities for intervention.

Public research has an important role to play in the higher-risk and longer-term areas of technology. The intention, therefore, is to increase the amount of resources available under competitive access conditions to create partnerships between universities and research establishments on the one hand, and private sector companies, on the other. These would include business incubators, start-ups and producers from other member states. Enhanced cooperation on shared priorities is the best way to achieve critical mass and more effective results in individual areas of research.

- Considering the limited resources available, we will need to focus on making public investment in research as effective as possible. From this perspective, we will need to identify new organisational models (as initiated by the recent Stability Law) that supersede the present segmentation of measures entrusted to various entities and ministries. These new models should also facilitate the creation of cross-connections and public-private partnerships (in the case of medium-term research, where scientific advances and technological innovation can be developed in effective collaboration).

The Ministry for Education, the Universities and Research has recently issued tenders for National Technology Clusters. This is an interesting innovation in both organisational terms and from the perspective of the issues that will be developed, many of which are directly relevant to the energy strategy.

- As regards priority development areas, it will be important to ensure that Italy's technological innovation activities are closely coordinated with the SET Plan. This is because Community R&D resources will increasingly be allocated in coming years to the priority projects identified under the Plan, as already happens for the 7th EU Framework Programme for Research and Innovation. Italy considers the following areas to be of priority interest:

  o Research into innovative renewable technologies, particularly those in which, as a country, we already start off in a strong position. For example, in concentrated solar power and second-generation biofuels.

  o Research into smart grids, partly to facilitate distributed generation, and into storage systems, also in relation to sustainable transport and mobility.

  o Research into energy efficiency materials and solutions, and their technological transfer.
The energy sector as a driver of economic growth

- The development of projects on CO₂ capture and sequestration methods, mainly from the perspective of Italy's participation in the European action programme around this technology, and possible technological transfer initiatives in non-EU areas.

From a longer-term perspective, the development of international collaboration in the field of safety and studies on fusion and on fourth generation nuclear fission reactors, in which Italy can boast scientific and technological expertise, will also be important.

- A reorganisation of the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) – one of the most important energy research bodies at both the Italian and international levels – is also planned. Its aim is to focus ENEA’s activities and organisational structure on priority research fields for the National Energy Strategy, and to rationalise potential overlaps with other public agencies. A census of national competences in the energy research sector is also planned, a vital preliminary step in establishing more precise priorities and properly calibrating the incentives applied to specific branches of technology.

Open points for consultation – Research and development in the energy sector

C24. How should effective forms of public-private partnership be developed, and using what instruments?
National Energy Strategy: for a more competitive and sustainable energy

The energy sector as a driver of economic growth

5.2 Green-white economy and traditional sectors: expected impact on growth

As mentioned earlier, the energy sector is of central importance to the country not just as an enabling factor but as a growth factor in itself. On the basis of the strategy mapped out in this document, investment in the energy sector is expected to amount to around €180 billion in Italy by 2020. This will mainly be concentrated in the most innovative sectors of the green and the white economy (linked, respectively, to renewables and to energy efficiency). However, investment will also be made in the more traditional sectors of energy infrastructure.

Major, and strongly expanding, international opportunities are also envisaged in the energy sector (from now to 2035, the IEA anticipates investment of $38,000 billion at the global level). To seize these opportunities, it will be vital to act “as a system” in and around the sector. We will need to provide sufficient public support in the most innovative segments – in terms of both regulatory stability and economic incentives – and greater coordination between the business, research and training communities, as well as the financial institutions and operators in the sector.

TABLE 41

<table>
<thead>
<tr>
<th>The energy sector as a whole will be a driver of investment for the country’s growth in coming years</th>
<th>Estimated aggregate investment to 2020, €billion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewable energy</td>
<td>~70</td>
</tr>
<tr>
<td>Energy efficiency</td>
<td>~60</td>
</tr>
<tr>
<td>“Traditional” sectors*</td>
<td>~50</td>
</tr>
<tr>
<td>Total</td>
<td>~180</td>
</tr>
</tbody>
</table>

Green-white economy ~€130 billion, 70% of total expected investment

* Includes: hydrocarbon E&P; gas transport and distribution network; regasification, gas pipelines and storage; electricity generation, transmission and distribution

The renewable energy and energy-saving sectors will present the principal opportunities for direct growth in the sector. Indeed, in the next decade they will overtake the traditional sectors in terms of investment (to reach about two-thirds of total anticipated investment). However, the traditional sectors will also require robust developments:
The green economy (essentially: electricity, heating/cooling and transport renewables, including electric vehicles) is one of the few sectors that – in spite of the global recession in recent years, which has hit Italy particularly hard – has continued to grow in terms of investment and employment. It has been driven, in particular, by the development of renewable electricity generation.

In 2011 investment in this sector was an estimated $260 billion at the global level, nearly 20% higher than in 2010 and double the pre-crisis level of 2007. Italy accounted for over 10% of the world’s investment in the sector, with $30 billion dollars, a 40% rise on the 2010 figure. This created about 45,000 jobs in the sector, a rise that runs counter to the macro-economic trend. As we have already discussed, the development of the green economy in Italy has in part been the result of a costly incentive system, which has recently been amended in the interests of sustainability.

- This growth has helped create areas of excellence in Italy, which stand us in good stead to grasp opportunities, including at the international level, in the fields of solar electricity renewables, H&C renewables, and second generation biofuels. More and more Italian companies, bolstered by the expertise acquired nationally, are now operating – successfully – on the international markets.

- The expected growth in renewable capacity in the near future will require significant investment, both for new plant and for renovations and up-grades. From now until 2020, about €50 billion in aggregate investment will be necessary, for electricity renewables alone, to which must be added investment for H&C renewables, and electric vehicles, for a total of €70 billion.

- In addition to the major impact anticipated in terms of employment and economic growth, the development of the sector will play an important part in reducing fossil fuel imports. The potential savings on the energy bill, compared with 2010, as result of increased production from renewables equalling around €6 billion per year.

The development of energy efficiency (the white economy) will be equally important. In this sphere too, Italy is starting out from a good international position in the main industry sectors concerned (lighting engineering, home automation, sustainable construction, household appliances, invertors). These will need to adapt rapidly if they are to grasp the opportunities, in both the Italian and international markets.

- If Italy is to achieve its savings target for 2020, major investment will be needed in this area too: an estimated €60 billion, aggregate, in the civil, industrial and transport sectors. This should be underpinned by the incentives described in the relevant chapter (White Certificates, Heating Account, tax rebates, mandatory standards). The European agenda will require similar efforts from all the countries of the Union, and will thus help create a stimulating market where our country can aspire to a position of leadership.

- In this case too, in addition to the direct impact on investment and employment, the energy efficiency gains will have important – and positive – repercussions on the country’s energy bill, with an expected annual saving of up to €8 billion.
National Energy Strategy: for a more competitive and sustainable energy

The energy sector as a driver of economic growth

- Significant **investment** will also be vital in the more “traditional” **sectors**: gas pipelines, regasification and gas storage facilities, electricity transmission and distribution networks and grids, the exploration and extraction of national resources, etc. Estimated investment in these areas is an **aggregate €50 billion** by 2020.

For this major development actually to occur, a series of pre-conditions will need to be satisfied:

- For the green and white economies, a **stable and sustainable regulatory system** that channels the limited available resources selectively towards the most virtuous technologies, those with the greatest spin-off effects on the sector, and those that create a favourable environment for high-technology jobs, especially for young people.

  Measures in this context include initiatives to incentivise the production of renewables (electricity and heating/cooling), and energy efficiency incentive systems involving tax relief, funding mechanisms, and efficiency certificates. Initiatives to facilitate the employment of young people in the sector are another example.

  It will be equally important to improve coordination mechanisms between the worlds of training and business, to ensure that the market sends out timely and clear signals of its needs in terms of skills and expertise. The same applies to coordination between the research community and operators, to create hubs of excellence around the most distinctive and most advanced areas in the sector in Italy.

- As for the more traditional sectors, we are generally starting out from **more established technologies** and a longer tradition of knowledge, experience and expertise. In this sphere, to facilitate the major investment programme that will be required, the most important step will be to **speed up the removal of legislative, regulatory and authorisational obstacles** standing in the way of major works. Central, regional and local government must provide as much support as possible to overcome potential implementation difficulties at the local level.
National Energy Strategy: for a more competitive and sustainable energy

The energy sector as a driver of economic growth