

IEA-Advanced Motor Fuels ANNUAL REPORT 2015



ITALY

Italy

Introduction

In 2014, the consumption of primary energy in Italy was around 166 million metric tons or megatons of petroleum equivalent (Mtpce). As in previous years, oil remained the main energy source, representing 34.5% of consumption. Natural gas (NG) followed closely at 30.6%, and the percentage for renewable sources was 20.9% of consumption (Fig. 1).

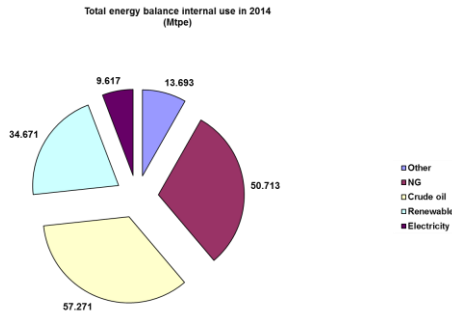


Fig. 1 Total Energy Balance by Type of Source in 2014 (Source: Ministry for Economic Development, 2014, *National Energy Balance*)

In 2014, Italy depended largely on imported oil; it imported 71.190 Mtpce (Fig. 2)

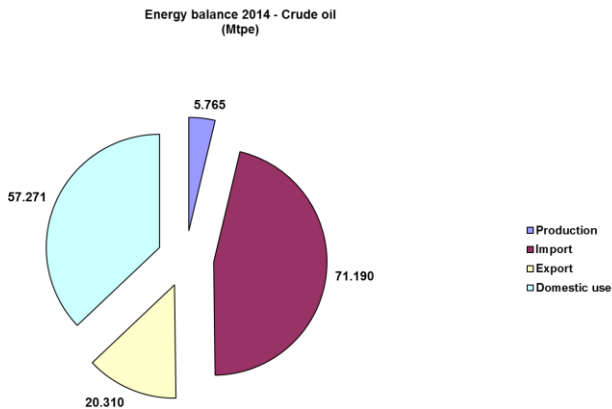


Fig. 2 Crude Oil Energy Balance in 2014 (Source: Ministry for Economic Development, 2014, *National Energy Balance*)

The major user (about 69%) of derived oil products in 2014 was the transportation sector (Fig. 3).

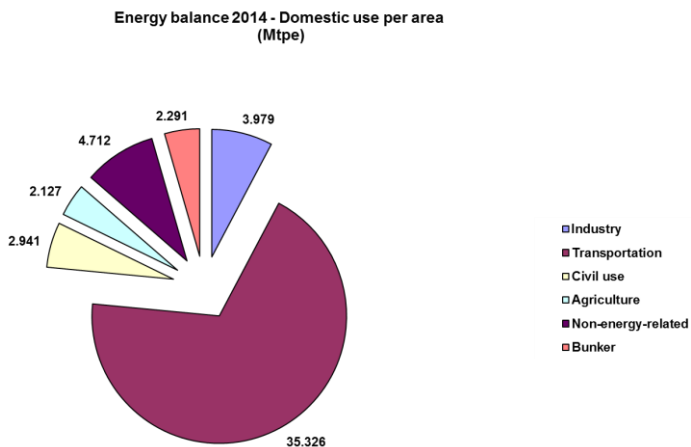


Fig. 3 Domestic Use of Oil per Sector in 2014 (Source: Ministry of Economic Development, 2013, *National Energy Balance*)

The main fuels used in road transportation were diesel fuel (66%), followed by gasoline (26%). Significant amounts of natural gas (NG, 3%) and liquefied petroleum gas (LPG, 5%) were also used in this sector (Figure 4).

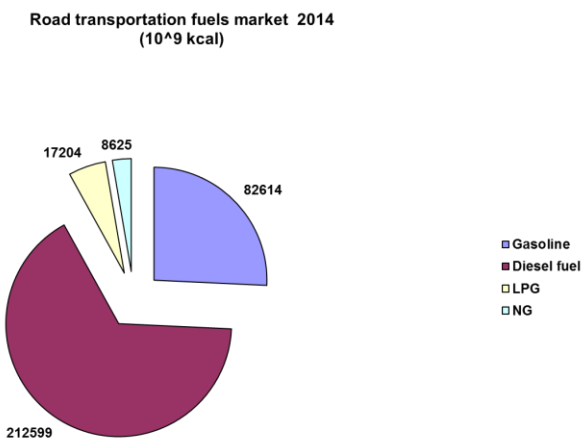


Fig. 4 Market for Different Types of Fuels in Road Transportation Sector in 2014
 Source: Ministry for Economic Development, 2014, *National Energy Balance*

With regard to the types of vehicles using the fuels, the top categories (in terms of number of vehicles) were passenger cars (76.13%), followed by motorcycles (13.49%) and lorries (8.05%) (Fig. 5).

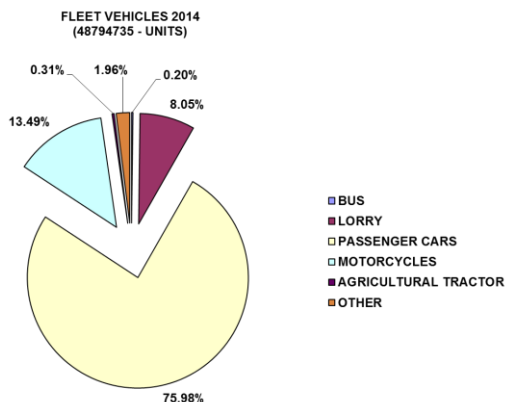


Fig. 5 Types of Fleet Vehicles Used in Road Transportation Sector in 2014 (Source: ACI, 2014, *Autoritratto*)

With regard to passenger cars, the top categories were those that ran on gasoline (50.96%), followed by diesel fuel (41.10%). A significant percentage of vehicles also ran on NG (2.25%) and LPG (5.51%) (Figure 6)

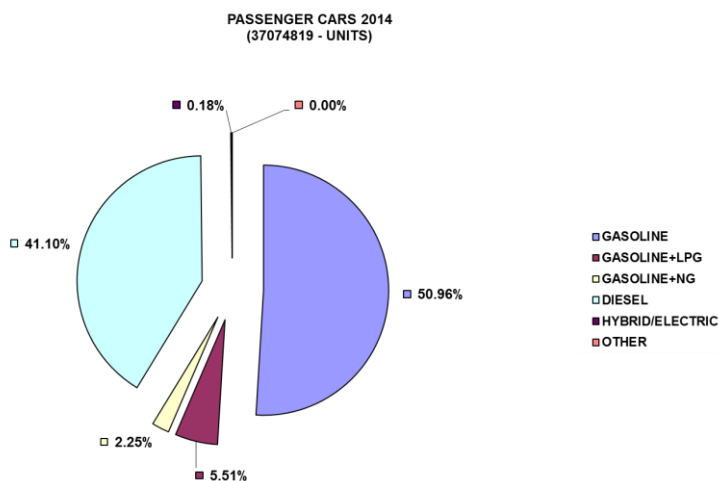


Fig. 6 Alternative Motor Fuels Used for Transportation in 2014 (Source: ACI – Autoritratto 2014)

In addition, diesel-fuelled vehicles could employ up to 7.0% of biodiesel, and gasoline-fuelled vehicles could employ gasoline containing oxygenated bio-fuels in which the oxygen content could amount to 3.7%.

Policies and Legislation

In both the long and the very-long term (until 2030-2050), Italy will subscribe to the spirit of the European Roadmap 2050 for a low-carbon economy. It aims to reduce emissions by up to 80%. In recent decades, however, it has been difficult to predict developments in technology and to predict vehicle and fuel markets, especially over the long term. Italy therefore intends to adopt a flexible and efficient long-term strategy for pursuing its key low-carbon policy. It will focus on and exploit (especially through research and technological developments) any pursuits that could result in significant positive changes. Examples would be more rapid cost reductions in renewable and storage technologies, use of biofuels, and the capture and storage of carbon dioxide (CO₂).

Italian Law has adopted two European directives: Renewable Energy Directive (RED, 2009/28/EC) and Fuel Quality Directive (FQD, 2009/30/EC). Under Italian Law 2009/99 (July 23, 2009) and in accordance with European Specification EN590:2009, the Italian Government has given permission for diesel fuel to contain biodiesel fuel (fatty acid methyl ester or FAME) in a percentage of up to 7%, as in other European County. Italian Decree 2011-28 acknowledges all European directives that promote the use of fuels or any other renewable sources. Italy grants energy incentives like double counting for using second generation renewable-source- as derived from wood cellulose or plant and animal residues. Italian Decree 2012-83 of June 22, 2012, established a limit of 20% for double-counting assigned to second-generation renewable sources.

Moreover, Italian municipalities have implemented important local measures that affect transportation. In order to improve air quality, reduce emissions of particulate matter with a mean diameter of 10 µm or less (PM₁₀), “smooth out” traffic on the road system, and lower noise in the cities, they have introduced measures to limit traffics in urban areas.

Implementation: Use of Advanced Motor Fuels

Biodiesel is the primary source for renewable advanced motor fuel in Italy. From 2009 until the present, biodiesel has been blended with up to 7 vol% diesel fuel. The renewable fuel currently used in gasoline is bio-ethyl *tert*-butyl ether (ETBE), derived from bioethanol. In 2014, the amount of bio-ETBE used in gasoline was 11 kilotons (kt), and the amount used in bioethanol was 1.5 kt.

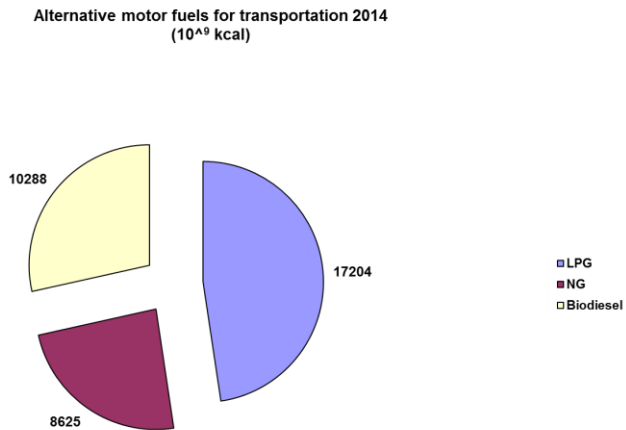


Fig. 7 Types of alternative Fuel Used by Passenger Cars in 2014 (Source: Ministry for Economic Development, 2014, *National Energy Balance*)

At the end of 2013, there were 996 NG stations in the country, as well as a fleet of more than 700,000 passenger cars that use NG.

The network was located mostly in northern Italy; central and southern Italy were not homogeneously represented. In the region of Sardinia Island, there were no NG service stations at all. At the end of 2013, the LPG filling station network consisted of 3,250 stations, and there was a fleet of more than 1.9 million LPG-fueled passenger cars. Figure 6 shows percentages of motor fuels used in 2014.

In 2012 the Italian oil and gas company Eni launched the Green Refinery project, which will lead to the conversion of the Venice Refinery into a bio-refinery, producing innovative and high-quality bio-fuels. The project is the

first in the world designed to convert a conventional refinery into a bio-refinery, utilizing the UOP/Eni Ecofining™ technology developed and patented by Eni in collaboration with UOP, a Honeywell company.

The Green Refinery project started with an initial conversion of the existing facilities of Venice refinery; that was started in the second quarter of 2013 and completed by the end of 2013. Biofuel production started in the second quarter of 2014 and grown progressively as new facilities have begun operating.

At the new green plant site in Venice, industrial operations will be maintained in an economically sustainable manner over the long term, with a low environmental impact. Another activity associated with the Green Refinery project will be the construction of a new logistics center at the Venice plant site.

The Green Refinery project is based on distinctive environmental technologies that are highly compatible with Eni's continued commitment to research and innovation.

In 2006, Chemtex-M&G began research and development activities designed to demonstrate the technological and environmental sustainability of second-generation bioethanol production from lignocellulosic feedstock (PROESA™ technology). Specifically, Chemtex-M&G conducted research on cellulosic crop optimization and agronomics; designed, engineered, developed, and tested (at both laboratory and pilot scales) proprietary technology and components for key aspects of the biomass-to-fuel conversion process; and partnered with leading technology providers to obtain the key biological process components. The world's largest cellulosic ethanol plant — in Crescentino, Vercelli Province, Italy — began production in 2012. The M&G PROESA™ process technology is extremely economical in converting nonfood biomass to sugars for the production of bioethanol. On October 9, 2013, the new technology was inaugurated at the plant in the presence of the Minister of Economic Development, and other local authorities

With regard to the optimization of the fossil fuel refining process, in 2013, Eni completed construction of the first plant for the total conversion of fossil fuel crudes at the Sannazzaro Refinery. The conversion process is based on its proprietary Eni Slurry Technology (EST). Startup was completed on October 14, 2013. This new hydroconversion process, which can completely convert unconventional oil, heavy crude, and tar sands into high-quality, high-performance fuels, is based on slurry technology that uses a special catalyst and self-starting hydrogen from natural gas. EST is the first

invention in the history of scientific discoveries related to the oil sector that came out of Italy, and it came 40 years after the last oil manufacturing process was invented. Unlike traditional oil processes, EST can produce gasoline and gasoil without generating coke or fuel oil, for which the market is constantly declining.

Outlook

Italy has confirmed the 2020 target of 10% for Biofuels. At the same time, the Country 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 possibility for a European assessment on whether to postpone the target in case more time is needed to adequately develop these technologies.

In the short run, the Italian Government has already adopted a number of “tactical” measures to steer the sector toward 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.

In 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. The key decision will be whether to transition to second- and third-generation biofuels. For now, however, these biofuels are not able to completely replace traditional sources.

It will also be important to carefully evaluate the prospects for developing the domestic production of bio-methane for transport use.

Italian Decree 10 October 2014 GU n°250 27-10-2014 defined the yearly minimum increases in the percentage of energy to be derived from biocomponents from 2015 to 2022:

From January 1 to December 31, 2015: 5% biocomponents

From January 1 to December 31, 2016: 5,5% biocomponents

From January 1 to December 31, 2017: 6,5% biocomponents

From January 1 to December 31, 2018: 7.5% of biofuels of which at least 1.2% of advanced biofuels

From January 1 to December 31, 2019: 9% of biofuels of which at least 1.2% of advanced biofuels

From January 1 to December 31, 2020: 10% of biofuels of which at least 1.6% of advanced biofuels

From January 1 to December 31, 2021: 10% of biofuels of which at least 1.6% of advanced biofuels

From January 1 to December 31, 2022: 10% of biofuels of which at least 2% of advanced biofuels

In 2014 the minimum percentage of energy to be derived from biocomponents was 5%.

Algae, straw, crude glycerine, bagasse, shells or other cellulosic material were considered advanced biofuels.

Additional References

- <http://www.federmetano.it/home.php?id=1>
- <http://www.unione petrolifera.it/it/pubblicazioni/2015>
- <http://dgerm.sviluppoeconomico.gov.it/dgerm/ben.asp>
- <http://www.federchimica.it/Federchimica/AssociazioniSettore/ASSOGASLIQUIDI.aspx>
- <http://www.aci.it/laci/studi-e-ricerche/dati-e-statistiche.html>
- <http://www.acea.be/publications/archives/category/reference-documents>

AMF Success Stories

In Italy, information on AMF activities is disseminated during regular meetings at the Ministry of Economic Development attended by the ExCo delegates of the IEA “end use” Implementing Agreements.