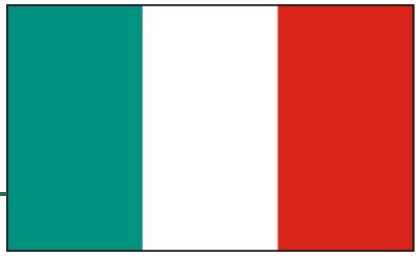
18 Italy



18.1 Summary of Coal Industry

18.1.1 Role of Coal in Italy

Italy is severely deficient in coal resources and relies almost entirely on imports for its coal supply. Coal's contribution to total energy use in the country was about 8.7 percent in 2012, amounting to a consumption of 23.6 million tonnes (Mmt) (EIA, 2014).

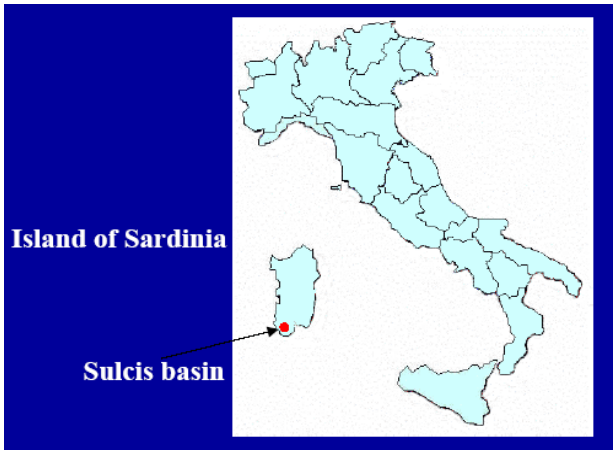
Italy produces about 0.08 Mmt of coal annually (see Table 18-1), sourced entirely from Miniera Monte Sinni, Italy's only active underground coal mine, located in the Sulcis Basin in the south-west of Sardinia Island (Figure 18-1). Estimates of Italy's sub-bituminous and lignite reserves are about 50 Mmt of mineable coal (out of a worldwide total of 900 Mmt) (EIA, 2014).

Table 18-1. Italy's Coal Reserves and Production

Indicator	**Anthracite & Bituminous** (million tonnes)	**Sub-bituminous & Lignite** (million tonnes)	**Total** (million tonnes)	**Global Rank**
Estimated Proved Coal Reserves (2011)	0	50	50	64 (0.006%)
Annual Coal Production (2012)	0.080	0	0.080	58 (0.088%)

Source: EIA (2014)

Figure 18-1. The Only Underground Coal Mine in Italy



Source: IEA Clean Coal Center (2005)

18.1.2 STAKEHOLDERS

Table 18-2 lists potential stakeholders in Italy's coal mine methane (CMM) industry. SOTACARBO, a 50-percent state-owned company, has joined Carbosulcis in promoting methane recovery from the Sulcis Basin. SOTACARBO partners with University of Caligari and the Istituto Italiano di Geofisica e Vulcanologia (INGV).

Table 18-2. Key Stakeholders in Italy's CMM Industry

Stakeholder Category	Stakeholder	Role
Mining Companies and CBM Developers	▪ SOTACARBO ▪ Kimberley Oil ▪ Carbosulcis ▪ European Gas Limited ▪ Heritage Petroleum ▪ Independent Resources plc ▪ Vico Indonesia (Eni S.p.A. subsidiary) ▪ Shell ▪ Future Corporation Australia ltd	Project hosts
Developers	▪ See http://www.epa.gov/coalbed/networkcontacts.html	Project opportunity identification and planning
Engineering, Consultancy, and Related Services	▪ See http://www.epa.gov/coalbed/networkcontacts.html	Technical assistance
Universities, Research Establishments	▪ The Istituto Italiano di Geofisica e Vulcanologia ▪ University of Caligari ▪ National Institute for Geophysics and Vulcanology	Technical assistance
Government Groups	▪ Ministry of Productive Activities – Directorate for Energy and Mineral Resources ▪ Ministry of Environment, Environment, Land and Sea ▪ Energy Authority (Autorità per l'Energia Elettrica e il Gas, AEE)	Licensing, Monitoring and Control

18.1.3 STATUS OF COAL AND THE COAL MINING INDUSTRY

Carbosulcis' Miniera Monte Sinni is currently the only operating coal mine in Italy, and its concession is owned by the Regional Government of Sardinia (M2M, 2005). Like other European countries, however, coal production will be phased out per European Union (EU) directives. The Santa Barbara mine in Tuscany, Italy's single source of lignite, closed in 2003 after production declined sharply from 156 thousand tonnes in 1998 to an estimated 10 thousand tonnes in 2002. The mine was previously operated by Enel (Ente Nazionale per l'energia Elettrica), the state-owned electricity company (USGS, 2002; USGS, 2003).

Italy's EU membership has initiated privatization of the country's energy sector. Ente Nazionale Idrocarburi (ENI), the state-held oil and gas giant, and Enel became joint-stock companies in 1992. The state sill has a 30 percent stake in each company. Consequently, several new participants have emerged in Italy's energy markets this past decade, and both companies have an international presence (ENI, 2014; ENEL, 2013).

Italy is the fourth highest consumer of energy in Europe, with consumption at 7.5 quadrillion Btu in 2011 (EIA, 2014). Fueled by the rising demand for power, Italy has increased its dependence on

coal for power generation over the past decade. But consumption has recently plateaued as natural gas use has expanded, and Italy currently relies on coal for only 9 percent of its overall energy needs (EIA, 2014). Planned coal mine and power plant projects have been abandoned in some cases due to political and administrative barriers (USGS, 2007).

18.2 Overview of CMM Emissions and Development Potential

The Global Methane Initiative (GMI) International CMM Projects Database currently identifies no projects in Italy, in operation or under development (GMI, 2014). Updates on future CMM projects in Italy can be found at https://www.globalmethane.org/coal-mines/cmm/index.aspx.

18.2.1 CMM Emissions from Operating Mines

Methane emissions in Italy totaled 2.1 million cubic meters (m^3) in 2000, but are projected to decrease to 1.4 million m^3 by 2015, and then remain stable through 2030 (see Table 18-3).

Table 18-3. Italy's Projected CMM Emissions (million cubic meters)

Emissions	2000	2005	2010	2015 (projected)
Total CH_4 Emitted	2.1	1.4	1.4	1.4

Source: USEPA (2012)

18.2.2 CMM Emissions from Abandoned Coal Mines

There are no current CMM recovery projects in Italy.

18.2.3 CBM from Virgin Coal Seams

Key companies involved in coal bed methane (CBM) exploration in Italy include European Gas Limited (formerly known as Kimberley Oil NL) and Heritage Petroleum. They have targeted the Sulcis Basin as well as three areas in southern Tuscany. Nearby volcanic centers and geothermal activity in these locations are believed to have created high concentrations of gas (Heritage Petroleum, 2007).

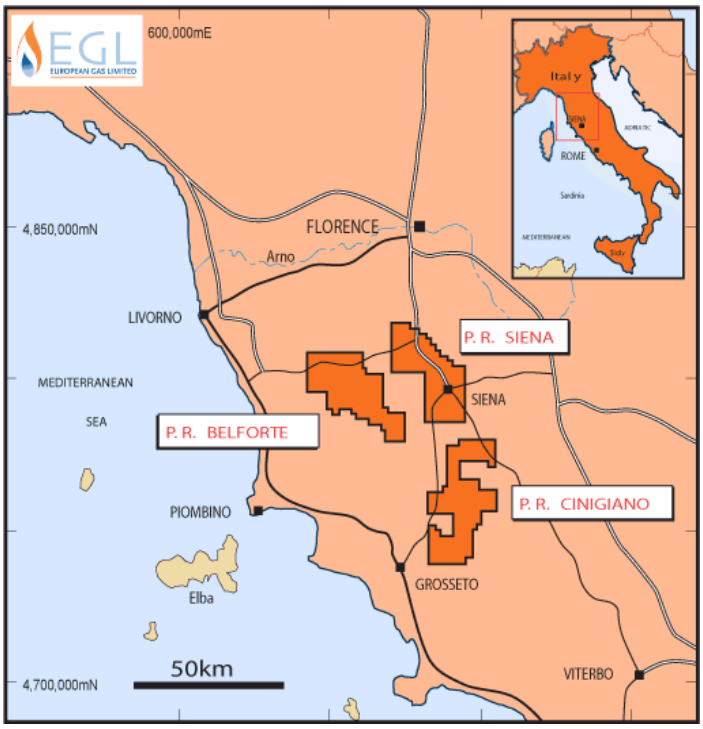
The Sulcis Basin is estimated to have as much as 1,000 Mmt of sub-bituminous coal from the Eocene age. Along with a 150-m thick coal sequence, substantial thicknesses of impure coal and carbonaceous shale also exist, which have the capability to generate significant methane aside from the coal seams. Although coal mining in the eastern region did not indicate much methane, the geological conditions are different in the western region, suggesting significant gas reserves. The Porduttivo formation in the west is overlain by the Oligocene-Miocene volcanic centers. Geothermal activities from this condition would lead to strong maturation of coal seams and high concentrations of gas (Heritage Petroleum, 2007).

Also, SOTACARBO has partnered with Carbosulcis and University of Caligari to promote CBM production. Their main activities include sampling and analyzing Sulcis coal, finding new deeper

coal seams, checking the use of CBM methods currently in place in the region, and updating enhanced CBM technologies.

Meanwhile, European Gas Limited and Heritage Petroleum have been granted three research permits in Tuscany (Figure 18-2). These permits cover 1,500 km^2 of three basins containing Miocene coal. Mining in this area was discontinued in 1959 due to a methane gas explosion that killed 42 people. As with the Sulcis Basin, it is believed that geothermal activities and enhanced heat flow in the area have created conditions for high levels of methane production (Heritage Petroleum, 2007; EGL, 2010).

Figure 18-2. European Gas Limited's Tuscany Projects



Source: EGL (2010)

18.3 Opportunities and Challenges to Greater CMM Recovery and Use

Italy is an Annex I partner under the Kyoto Protocol (see Table 18-4) and has agreed to reduce its carbon dioxide emissions by 2008-2012. However, it will do so as a collective target for all the EU countries. Under EU commitment, Italy must reduce its emissions by 6.5 percent below the 1990 level. However, Italy is not on track, unlike other EU countries, to meet its pledge. During the 2009 UNFCCC Copenhagen Conference, the EU community, speaking through the European Commission, pledged to reduce emissions 20 percent unconditionally by 2020. They further pledged a 30 percent cut by 2020 if an international accord was reached (EC, 2009).

Table 18-4. Italy's Climate Change Mitigation Commitment

Agreement	Signature	Ratification
UNFCCC	June 5, 1992	April 15, 1994
Kyoto Protocol	April 29, 1998	May 31, 2002

Source: UNFCCC (2014)

In 2007, the Italian Ministry for the Environment and Territory produced the *Environmental Action Strategy for Sustainable Development in Italy*, aimed at helping Italy comply with greenhouse gas reduction targets under the Kyoto Protocol. However, this document has not been formally adopted by the Italian government. It also does not address energy-related greenhouse emissions, including CMM (UN, 2007).

18.3.1 Market and Infrastructure Factors

Currently, Italy is pursuing several technical issues related to CMM recovery. Developing an effective methane survey system and analysis models for recovery of CMM from the Sulcis Basin is the top priority. Improving gas drainage, identifying CMM utility and measuring emissions at surface mines are among other issues facing Italy. In general, Italy is not prepared for CMM projects in terms of public attitude, R&D efforts, or private financing. The country will benefit by networking with countries with advanced CMM experience.

Italy's natural gas market is highly evolved, providing for about 40 percent of the total energy consumed by the country (IEA, 2009a). Therefore, Italy has a well-established network of pipelines extending for 30,000 km—the third largest pipe network in Europe—and offers open access. As of now, Sardinia is not connected to this gas transportation system but that will soon change with the anticipated Galsi project: a gas pipeline that would transport natural gas from Algeria to Sardinia. With a capacity of approximately 8 billion m^3 per year, the Galsi pipeline will be approximately 830 kilometers long, 270 of which will be on Sardinian territory (ABO, 2014). This would be strategic for implementing CBM marketing in Italy, since the Sulcis Basin in southern Sardinia is the most promising site for CBM.

18.3.2 Regulatory Information

Italy's energy and natural resources policies allow both government and private companies to operate production. Companies may be given concessions that need periodic renewal to recover methane or mine coal. For a given coal basin, mining coal and draining methane can be executed by separate companies.

The CMM recovery work is still in its infancy in Italy, and the country lacks legal regulation for the CMM industry. An extension of the natural gas legal framework may, therefore, apply. ENI has been controlling the gas industry almost completely. But, since 2000, the gas industry is slowly being liberalized in compliance with the EU policies, including freeing of gas prices and decentralizing production and distribution. Italy still has the state involved in response to public opinion. There is no domestic private investment, but foreign private sector investments are involved (EIA, 2008).

All natural resources are owned by the government. Licenses may be given at discretion to private companies for exploration and production; terms of such deals appear open for negotiation. An exploration permit is granted for six years and has to be renewed twice, every three years. A

production license runs for 20 years and is renewable. For a license to be granted, the company at hand must possess local knowledge. Royalties are set at 7 percent of the annual net production and the corporate tax rate is set at 34 percent.

Italy is gradually defining stronger environmental regulations, not only to be in compliance with EU standards, but also to respond to domestic opinions. The legal text of EU's environmental laws is in the process of being incorporated into Italian law (EIA, 2008). Contributing to sustainable development, the CMM project outputs (electricity and pipeline gas) may enjoy competitive pricing in a free trade market.

18.4 Profiles of Individual Mines

Sulcis Basin, Sardinia

General Information

Total mineable reserves, million tonnes	50 (EIA, 2014)
Total mining area	615 km^2
Depth of shafts	400 m
Mining capacity	400,000 tonnes/year

Geologic and Mining Conditions

Rank of coal	Sub-bituminous coal
No. of seams	Up to 13
Seam thickness	35 to 40 m cumulative thickness over 13 seams
Depth of mining	150 m
Calorific Value	5,000 kcal/kg
Ash content	Poor quality
Sulfur content	Poor quality
Mining equipment	Longwall

Source: Heritage Petroleum (2007); IEA (2009b)

18.5 References

ABO (2014): "Algeria: A country with enormous opportunities, About Oil, 11 June 2014. http://www.abo.net/oilportal/interview/view.do?contentId=2255528

EC (2009): *Fifth National Communication From The European Community Under The UNFCCC*, European Commission, Brussels, Belgium, 12 December 2009. http://unfccc.int/resource/docs/natc/ec_nc5.pdf

EGL (2010): "Tuscany Projects," European Gas Limited, 2010.

EIA (2008): EIA Country Analysis Briefs – Italy. Hosted by Encyclopedia of Earth, 2008.

EIA (2014): International Energy Statistics, U.S. Energy Information Administration, Washington, DC, accessed July 2014. http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm

ENEL (2013): Shareholders, Ente Nazionale per l'energia ELettrica, Rome, Italy, 2013. http://www.enel.com/en-GB/investor/shareholders/

ENI (2014): "Corporate Governance, Major Shareholders," ENI, Rome, Italy, 2014. http://www.eni.com/en_IT/governance/shareholders/relevant-participation/relevant-participation.shtml

GMI (2014): International Coal Mine Methane Projects Database, Global Methane Initiative, accessed July 2014. https://www.globalmethane.org/coal-mines/cmm/index.aspx

Heritage Petroleum (2007): *Company Information: Heritage Petroleum,* Heritage Petroleum, January 2007.

IEA (2009a): *2009 Energy Balance for Italy.* International Energy Agency, Paris, France, 2009. http://www.iea.org/stats/balancetable.asp?COUNTRY_CODE=IT

IEA (2009b): Energy Policies of IEA Countries – Italy, International Energy Agency, Paris, France, 2009. http://www.iea.org/countries/membercountries/italy/

IEA Clean Coal Center (2005): Coal Recovery from Waste Fines of the Nuraxi Figus Coal Treatment Plant by Selective Flotations, presented at the Second International Conference on Clean Coal Technologies for our Future, 2005. http://www.iea-coal.org.uk/publishor/system/component_view.asp?LogDocId=81265&PhyDocId=5654

M2M (2005): Coal Mine to Market Subcommittee Country Profile – Italy, Methane to Market Partnership, 2005. https://www.globalmethane.org/documents/events_coal_20050427_italy_profile.pdf

UN (2007): Environmental Action Strategy for Sustainable Development in Italy, Ministry for the Environment and Territory. http://www.un.org/esa/agenda21/natlinfo/countr/italy/Italian%20NSDS.pdf

UNFCCC (2014): Ratification Status – Italy, United Nations Framework Convention on Climate Change, accessed June 2014. http://maindb.unfccc.int/public/country.pl?country=IT

USEPA (2012): *Global Anthropogenic Non-CO_2 Greenhouse Gas Emissions: 1990 - 2030*, U.S. Environmental Protection Agency, Office of Atmospheric Programs, Climate Change Division, December 2012. http://www.epa.gov/climatechange/EPAactivities/economics/nonco2projections.html

USGS (2002): The Mineral Industry of Italy, 2002. http://minerals.usgs.gov/minerals/pubs/country/2002/itmyb02.pdf

USGS (2003): Italy Production of Mineral Commodities, 2003.

USGS (2007): 2005 Minerals Yearbook – Italy, U.S. Geological Survey, Reston, VA, 2007. http://minerals.usgs.gov/minerals/pubs/country/2005/itmyb05.pdf