ITALY

CLIMATE TRANSPARENCY REPORT COMPARING G20 CLIMATE ACTION AND RESPONSES TO THE COVID-19 CRISIS

2020

This country profile is part of the **Climate Transparency Report 2020**. Find the full report and other G20 country profiles at: www.climate-transparency.org

PER CAPITA GREENHOUSE GAS (GHG) EMISSIONS BELOW G20 AVERAGE

Italy's greenhouse gas emissions (GHG) per capita are slightly below G20, and have decreased at the rate of 8.6% over the past five years (2012-2017).

Italy's total GHG emissions (excl. land use) have only decreased by 17.47% between 1990-2017.

GHG emissions (incl. land use) per capita (tCO$_2$e/capita)[1]

6.78
Italy

7.32
G20 average

5-year trend (2012-2017)

-8.6%
Italy

-2.3%
G20 average

Data for 2017. Sources: Enerdata, 2020; UN Department of Economic and Social Affairs Population Division, 2020; Gütschow et al., 2019

NOT YET ON TRACK FOR A 1.5°C WORLD

As an EU member state, **Italy committed to contributing to the EU NDC.** The EU's 'at least 40%' reduction target is not consistent with EU's 1.5 'fair-share' range of **below 806 MtCO$_2$e by 2030 and below -3,989 MtCO$_2$e by 2050.** The European Commission and Parliament have separately proposed increasing the EU27's goal to "at least 55%" and "60%" below 1990 levels, respectively. These could move the EU closer to its 'fair-share' range. EU member states have yet to agree to either proposal.

'Fair-share' pathways and ratings for individual EU member states are not provided due to the intricacies and inter-linkages of the internal burden sharing system.

EU28 1.5°C 'fair share' pathway (MtCO$_2$e/year)[1&2]

4,385,9 MtCO$_2$e

EU NDC target
Ambition gap

806 MtCO$_2$e

-3,989 MtCO$_2$e

2017   2030   2050
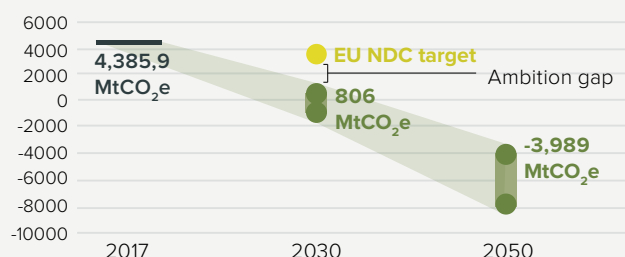
Source: Climate Action Tracker, 2020

KEY OPPORTUNITIES FOR ENHANCING CLIMATE AMBITION

IDEAL FOR SOLAR ENERGY

Due to its geographical location, Italy has excellent **solar energy potential, both for electricity and heat generation.** Italy should embrace this opportunity to reduce GHG emissions and its dependency on imported fossil fuels.

EXPAND RAILWAYS

The existing rail-**way infrastructure could be further expanded** to accelerate the shift from road and airplanes to rail.

IMPROVE BUILDING EMISSIONS

Improving the energy efficiency of the building sector, especially in Northern Italy, **could reduce emissions from the sector which is currently responsible for a fifth of the country's** GHG emissions.

RECENT DEVELOPMENTS

👍 Italy will receive the largest share (28%) of the EU's EUR 750bn economic recovery fund. The government's draft expenditure proposal is expected to focus on six priorities: decarbonisation of the economy, digitalisation, healthcare, education, infrastructure, and social cohesion.

👍 EUR 8.1bn of the Piano nazionale di resilienza e rilancio (Rescue Fund) has been allocated to planned high-speed railway lines, including the Palermo-Messina-Catania railway and the Naples-Bari link.

👍 The "Ecobonus" scheme offers a 110% tax deduction for expenses incurred from the thermal insulation and other energy efficiency measures between July 2020 and December 2021. These include energy efficiency retrofits such as heat pumps and private installations of solar PV and columns for charging electric vehicles.

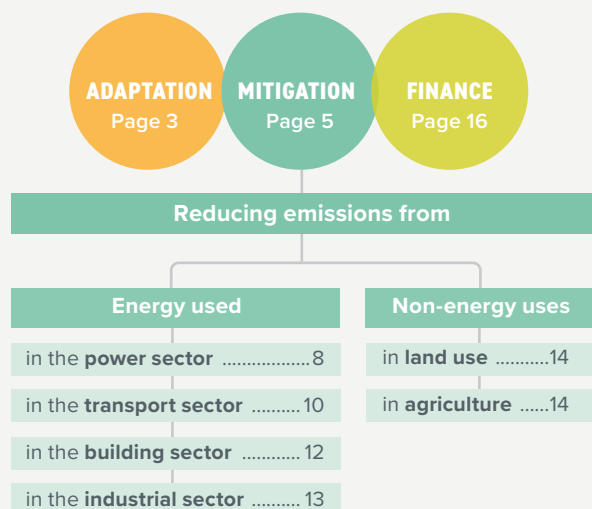*Sources: Cavallone, 2020; Speak, 2020, Ministero dell'Economia e delle Finanze, 2020*

☀ CORONAVIRUS RECOVERY

Italy has been the EU Member State hardest hit by the COVID-19 health crisis and the ensuing economic recession. For this reason, it will also be one of the major beneficiaries of the funding in the framework of the EU's Multiannual Financial Framework and the NextGenerationEU (NGEU) recovery fund. The climate target agreed by the EU27 heads of states of spending at least 30% of the funding on climate action presents Italy with an opportunity to create new jobs and restart its economy by investing in climate change mitigation, especially renewable energy, low-carbon transport, and energy efficiency.

Reference: European Council, 2020

CONTENTS

We unpack Italy's progress and highlight key opportunities to enhance climate action across:

ADAPTATION Page 3

MITIGATION Page 5

FINANCE Page 16

Reducing emissions from

Energy used

in the **power sector** 8

in the **transport sector** 10

in the **building sector** 12

in the **industrial sector** 13

Non-energy uses

in **land use** 14

in **agriculture** 14

LEGEND

Trends show developments over the past five years for which data are available. The thumbs indicate assessment from a climate protection perspective.

Decarbonisation Ratings[4] assess a country's performance compared to other G20 countries. A high score reflects a relatively good effort from a climate protection perspective but is not necessarily 1.5°C compatible.

Very low   Low   Medium   High   Very high

Policy Ratings[5] evaluate a selection of policies that are essential pre-conditions for the longer-term transformation required to meet the 1.5°C limit.

Low   Medium   High   Frontrunner

SOCIO-ECONOMIC CONTEXT

Human Development Index

The Human Development Index reflects life expectancy, level of education, and per capita income. Italy ranks very high.
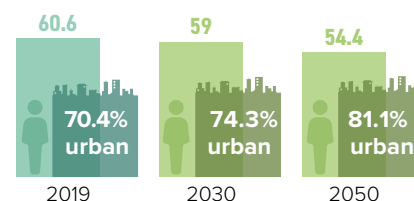
Very high
High
Medium
Low

VERY HIGH
0.883
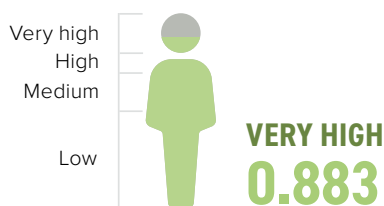
Data for 2018. Source: UNDP, 2019

Population and urbanisation projections
(in millions)

Italy's population is expected to decrease by about 8.5% by 2050 and become more urbanised.

60.6 — 70.4% urban — 2019
59 — 74.3% urban — 2030
54.4 — 81.1% urban — 2050

Sources: United Nations, 2018; The World Bank, 2019

Gross Domestic Product (GDP) per capita
(PPP constant 2015 international $)

45,107 ITALY

22,230 G20 AVERAGE

Data for 2019. Source: The World Bank, 2020

Death rate attributable to air pollution

Ambient air pollution attributable death rate per 1,000 population per year, age standardised

0.1 ITALY

0.1–1.1 G20 RANGE

Over **28,924 people die in Italy every year as a result of outdoor air pollution,** due to stroke, heart disease, lung cancer and chronic respiratory diseases. Compared to total population, this is still one of the lower levels in the G20.

28,924 deaths per year

Data for 2016. Source: WHO, 2018

JUST TRANSITION

IMPORTED COAL SUPPLY

Italy has agreed to phase out coal by 2025, but as approximately 90% of its coal supply is imported, a coal phase-out would have a lesser impact on upstream workers compared to other G20 countries. As an EU Member State it will have access to the EU resources available in the framework of the Just Transition Mechanism, especially through the Just Transition Fund.

The EU's Just Transition Mechanism aims to mobilise at least EUR 100bn between 2021 and 2027. Additional resources were committed in the framework of the COVID-19 recovery programmes adopted by the European Council in July 2020. The money will be spent based on just transition plans prepared by the EU Member States for the regions affected by coal phase-out.

Reference: European Council, 2020.

1. ADAPTATION
ADDRESSING AND REDUCING VULNERABILITY TO CLIMATE CHANGE

PARIS AGREEMENT **Increase the ability to adapt to the adverse effects of climate change and foster climate resilience and low-GHG development.**

VULNERABLE TO CLIMATE CHANGE
Italy is vulnerable to climate change and **adaptation actions are needed.**

HIGH COST OF EXTREME WEATHER
On average, **997 fatalities** and **almost USD 1.65bn losses** occur annually due to extreme weather events.

SEVERE IMPACTS ON AGRICULTURE SECTOR
With global warming, society and its supporting sectors are increasingly exposed to **severe impacts such as droughts** and reduction in crop duration in the agricultural sector.

ADAPTATION NEEDS

Climate Risk Index

Impacts of extreme weather events in terms of fatalities and economic losses that occured. All numbers are averages (1999-2018).

Annual weather-related fatalities

997 DEATHS

1.69 PER 100,000 INHABITANTS

Death rate — High / Low

RANKING 3rd IN THE G20
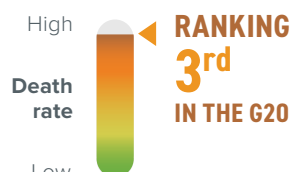
Source: Based on Germanwatch, 2019

Annual average losses (USD mn PPP)

$ 1,649

0.08 PER UNIT GDP (%)

Losses — High / Low

RANKING 12th IN THE G20
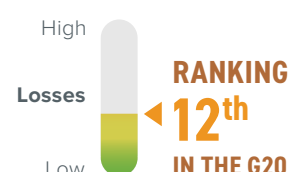
Source: Based on Germanwatch, 2019

Exposure to future impacts at 1.5°C, 2°C and 3°C

**Impact ranking scale:**
Very low | Low | Medium | High | Very high

			1.5°C	2°C	3°C
WATER		% of area with increase in water scarcity	Medium	Medium	Very high
		% of time in drought conditions	High	High	High
HEAT AND HEALTH		Heatwave frequency	Medium	High	Very high
		Days above 35°C	Low	Low	Medium
AGRICULTURE	**Maize**	Reduction in crop duration	Low	High	Very high
		Hot spell frequency	Very low	Low	Medium
		Reduction in rainfall	Low	Very low	Very low
	Wheat	Reduction in crop duration	Very low	High	Very high
		Hot spell frequency	Very low	Very low	Very low
		Reduction in rainfall	High	High	High

Source: Water, Heat and Health: own research. Agriculture: Arnell et al., 2019.

Note: These indicators are national scale results, weighted by area and based on global data sets. They are designed to allow comparison between regions and countries and, therefore, entail simplifications. They do not reflect local impacts within the country. Please see technical note for further information.

Adaptation readiness

The figure shows 2000-2015 observed data from the ND-GAIN Index overlaid with projected Shared Socioeconomic Pathways (SSPs) from 2015-2060.

Notre Dame Global Adaptation Initiative (ND-Gain) Readiness Index
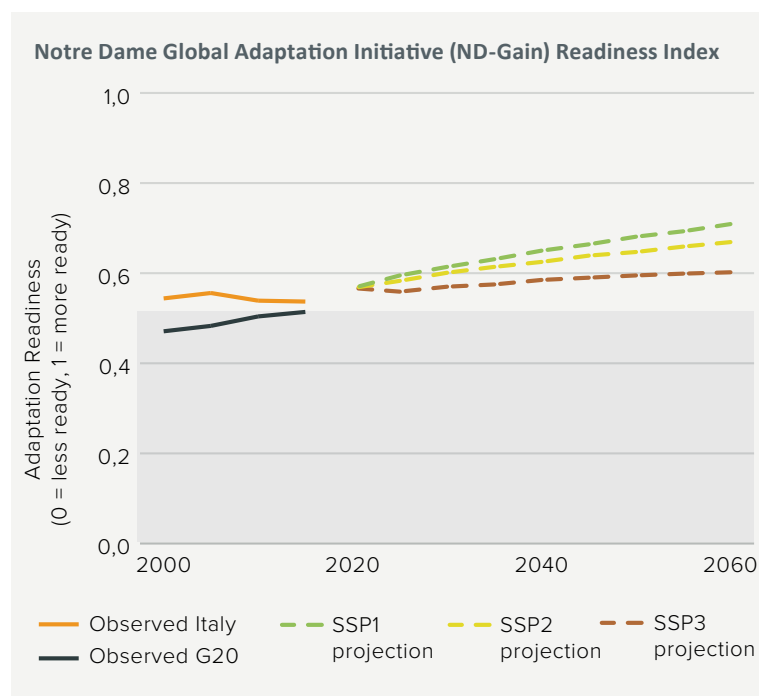
Italy scored just above the G20 average in 2015 in terms of adaptation readiness. While adaptation challenges still exist, Italy is well-positioned to adapt to the impacts of climate change. Socio-economic developments in line with SSP1 would produce faster improvements in readiness, whereas measure in line with SSP3 would produce very limited improvements over time.

The readiness component of the Index created by the Notre Dame Global Adaptation Initiative (ND-GAIN) encompasses social economic and governance indicators to assess a country's readiness to deploy private and public investments in aid of adaptation. The index ranges from 0 (low readiness) to 1 (high readiness).

The overlaid SSPs are qualitative and quantitative representations of a range of possible futures. The three scenarios shown here in dotted lines are qualitatively described as a sustainable development-compatible scenario (SSP1), a middle-of-the-road (SSP2) and a 'Regional Rivalry' (SSP3) scenario. The shaded area delineates the G20 average in 2015 for easy reference.

Source: Andrijevic et al., 2020

ADAPTATION POLICIES

National Adaptation Strategies

Document name	Publication year	Fields of action (sectors)													M&E process
		Agriculture	Biodiversity	Coastal areas and fishing	Education and research	Energy and industry	Finance and insurance	Forestry	Health	Infrastructure	Tourism	Transport	Urbanism	Water	
National Climate Change Adaptation Strategy	2015	●	●	●		●		●	●	●	●	●		●	5-year review of the contents to evaluate, through specific monitoring, the additional needs in terms of planning and allocation of the necessary economic and financial resources
National Climate Change Adaptation Plan	2017	●	●	●						●	●		●	●	Guidelines and indicators to monitor state of implementation and the effectiveness of adaptation actions

Nationally Determined Contribution (NDC): Adaptation

| Targets	Actions
Not mentioned	Not mentioned

2. MITIGATION
REDUCING EMISSIONS TO LIMIT GLOBAL TEMPERATURE INCREASE

PARIS AGREEMENT **Hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit to 1.5°C, recognising that this would significantly reduce the risks and impacts of climate change.**

EMISSIONS OVERVIEW

CO₂ **DECREASE EMISSIONS**
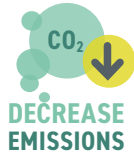
Italy's **GHG emissions have dropped by only 17.5%** between 1990 and 2017.
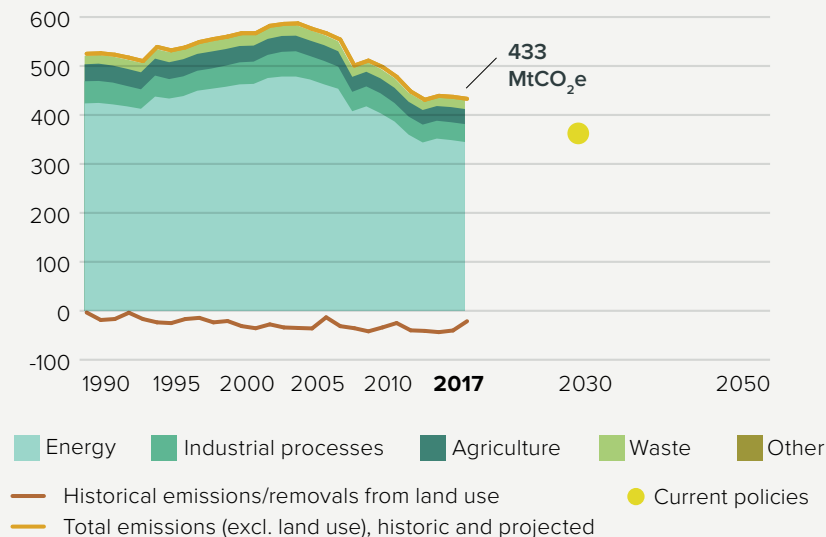
1.5°C **COMPATIBILITY**
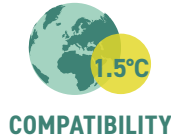
In 2030, global GHG emissions need to be 45% below 2010 levels and reach net-zero by 2050. **Global energy-related CO₂ emissions must be cut by 40%** below 2010 levels by 2030 and reach net-zero by 2060.
Source: Rogelj et al., 2018

GHG emissions across sectors (MtCO₂e/year)

Total GHG emissions across sectors (MtCO₂e/year)

433 MtCO₂e

Legend:
- Energy
- Industrial processes
- Agriculture
- Waste
- Other
- Historical emissions/removals from land use
- Current policies
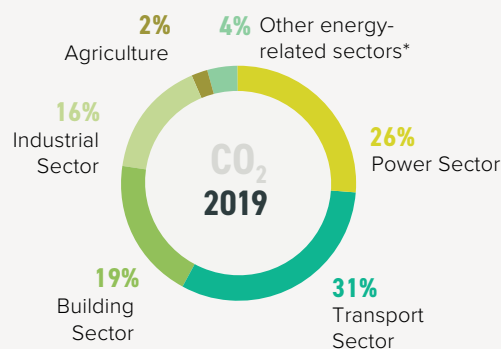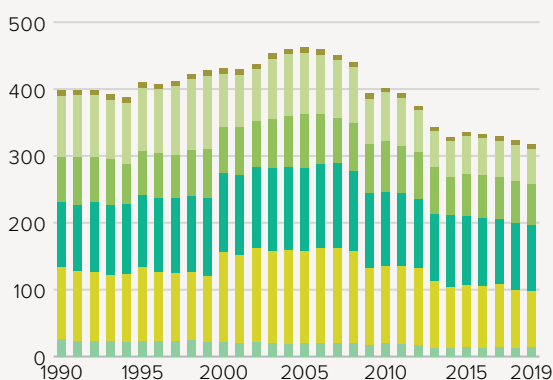- Total emissions (excl. land use), historic and projected

Italy's emissions (excl. land use) have decreased 17.5% between 1990 and 2017, with most of the reductions coming from the energy sector. Total GHG emissions peaked in 2005, and declined rapidly between 2008 and 2014. A brief increase in 2015 was followed by a slower decrease in 2016 and 2017.

The most recent emissions projections show that under current policies, emissions will continue to decline to 383 MtCO₂e by 2030; a 25% emissions reduction from 1990 levels.

Source: Gütschow et al., 2019.

Energy-related CO₂ emissions by sector

Annual CO₂ emissions from fuel combustion (MtCO₂/year)

CO₂ **2019**
- 2% Agriculture
- 4% Other energy-related sectors*
- 16% Industrial Sector
- 26% Power Sector
- 19% Building Sector
- 31% Transport Sector

The largest driver of overall GHG emissions are CO₂ emissions from fuel combustion, which, in Italy, have decreased over the last decade. The transport sector is, with 31%, the largest contributor, followed by electricity and heat (26%), and buildings (19%).

Source: Enerdata, 2020

* 'Other energy-related sectors' covers energy-related CO₂ emissions from extracting and processing fossil fuels. Due to rounding, some graphs may sum to slightly above or below 100%.

ENERGY OVERVIEW

79%

OF ITALY'S ENERGY MIX IS FOSSIL FUELS

Fossil fuels still make up 79% of Italy's energy mix (counting power, heat, transport fuels, etc). Despite the increase in renewable energy over the last two decades, the carbon intensity of the energy mix has barely changed.
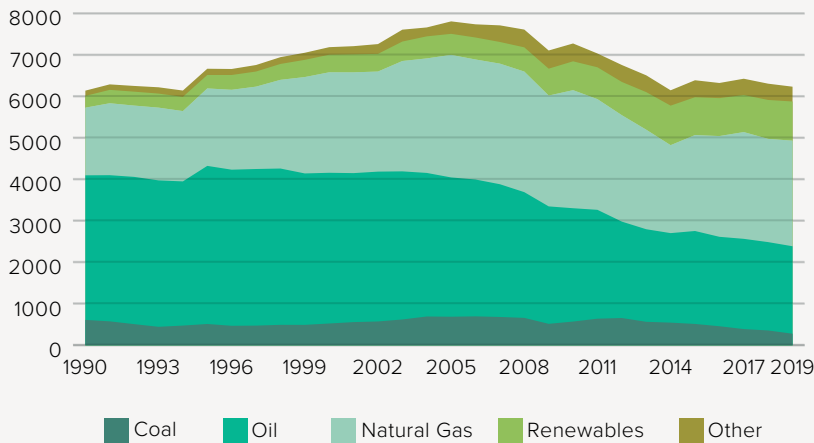
1.5°C COMPATIBILITY
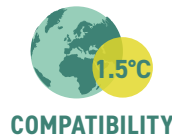
The share of **fossil fuels in the global primary energy mix needs to fall to 67% by 2030 and to 33% by 2050** and to substantially lower levels without Carbon Capture and Storage.
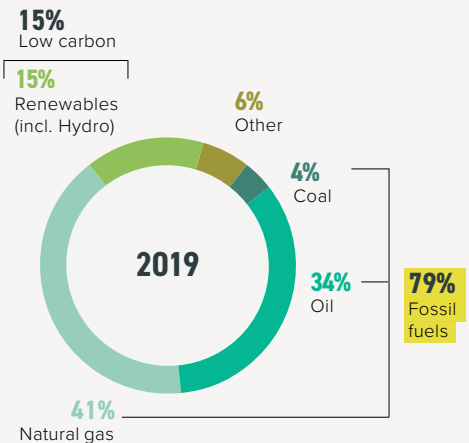
Source: Rogelj et al., 2018

Energy Mix

Total primary energy supply (PJ)

15% Low carbon

15% Renewables (incl. Hydro)

6% Other

4% Coal

34% Oil

79% Fossil fuels

41% Natural gas

2019

Coal | Oil | Natural Gas | Renewables | Other
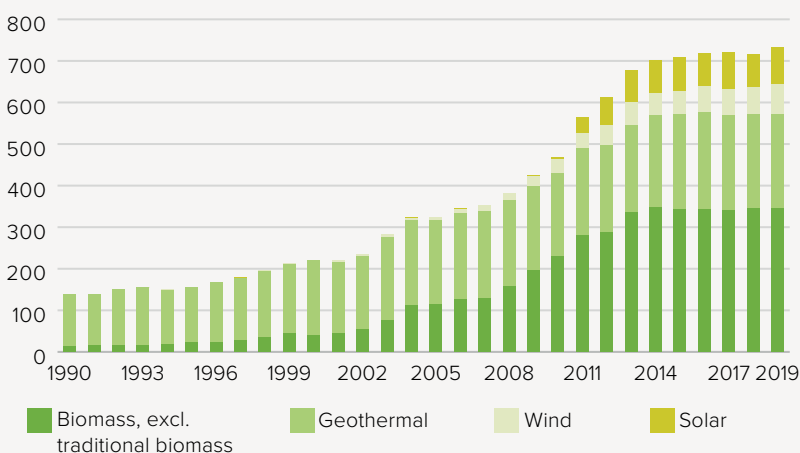
Source: Enerdata, 2020

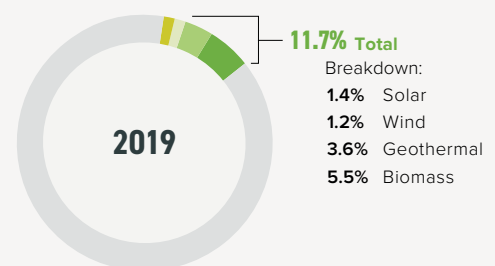*Due to rounding, some graphs may sum to slightly above or below 100%.*

This graph shows the fuel mix for all energy supply, including energy used not only for electricity generation, heating and cooking, but also for transport fuels. Fossil fuels (oil, coal and gas) still make up 79% of Italy's energy mix, which is lower than the G20 average of 81%. While the share of renewables in the energy mix increased, it has mainly replaced coal and oil in the energy mix.

Solar, Wind, Geothermal, and Biomass Development

Total primary energy supply (TPES) from solar, wind, geothermal and biomass (PJ)

Solar, wind, geothermal and biomass account for 11.7% of Italy's energy supply

11.7% Total
Breakdown:
1.4% Solar
1.2% Wind
3.6% Geothermal
5.5% Biomass

2019

Biomass, excl. traditional biomass | Geothermal | Wind | Solar

Source: Enerdata, 2020

Large hydropower and solid fuel biomass in residential use are not reflected due to their negative environmental and social impacts.
Due to rounding, some graphs may sum to slightly above or below 100%.

Decarbonisation rating: RE share of TPES compared to other G20 countries

5-year trend (2014-2019): **Very low**

Current year (2019): **Very high**

Source: own evaluation

Solar, wind, geothermal and biomass account for 11.7% of Italy's energy supply – the G20 average is only 6.4%. The share in total energy supply has increased by around 2.8% in the last five years in Italy (2014-2019). Bioenergy (for electricity and heat) makes up the largest share.

Carbon Intensity of the Energy Sector

Tonnes of CO_2 per unit of total primary energy supply (tCO_2/TJ)

50.9 tCO_2/TJ

■ Italy ── G20 Average

Source: Enerdata, 2020

Decarbonisation rating: carbon intensity of the energy sector compared to other G20 countries

5-year trend
(2014-2019):   **High**

Current year
(2019):   **High**

Carbon intensity shows how much CO_2 is emitted per unit of energy supply. In Italy, carbon intensity has slightly decreased over the last five years and remains at 50.90 tCO_2 /TJ and lower than the G20 average (58 tCO_2). This reflects dropping coal and oil use; the level is now below the G20 average at 50 tCO_2/TJ.

Source: own evaluation

Energy supply per capita

(GJ/capita)

103
Italy

97
G20 average
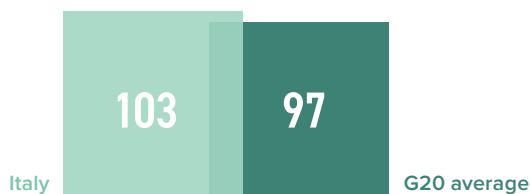
Sources: Enerdata, 2020; The World Bank, 2019

TPES per capita (GJ/capita): 5-year trend (2014-2019)

👎 **+0.5%**
Italy

👎 **+1.9%**
G20 average

The level of energy use per capita is closely related to economic development, climatic conditions and the price of energy.

Energy use per capita in Italy is 103 GJ/capita, well above the G20 average. It is still increasing at the rate of 0.5% (2014-2019) but lower than the G20 average (1.9%).

Decarbonisation rating: energy supply per capita compared to other G20 countries

5-year trend
(2014-2019):   **Medium**

Current year
(2019):   **Medium**

Source: own evaluation

Energy intensity of the economy

(TJ/PPP USD2015 millions)

2.32
Italy

4.46
G20 average

Data for 2018. Source: Enerdata, 2020

Energy intensity of the economy: 5-year trend (2013-2018)

👍 **-5.3%**
Italy

👍 **-11.6%**
G20 average

This indicator quantifies how much energy is used for each unit of GDP, which is closely related to the level of industrialisation, efficiency, climatic conditions and geography.

Italy's energy intensity is one of the lowest in the G20 but is decreasing at a lower rate (5.3% over 2013-2018) than the G20 (11.6%).

**Decarbonisation rating: energy intensity compared to other G20 countries**

5-year trend
(2013-2018):   **Low**

Current year
(2018):   **Very high**
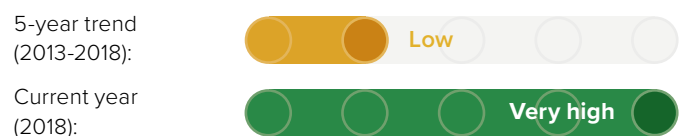
Source: own evaluation

POWER SECTOR

Emissions from energy used to make electricity and heat

Italy produces 7% of electricity from coal. The decision to phase-out coal power by 2025 is in line with a 1.5°C temperature goal. Renewables already account for 41.4% of the power mix, but a long-term strategy towards 100% is still lacking.

26% Share in energy-related CO_2 emissions from electricity and heat production
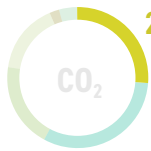
Source: Enerdata, 2020
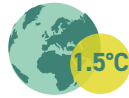
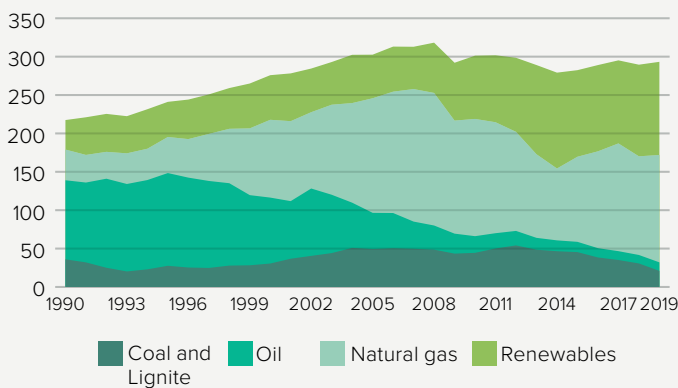**1.5°C COMPATIBILITY**

Coal and decarbonisation

Worldwide, **coal use for power generation needs to peak by 2020,** and between 2030 and 2040, all the regions of the world need to phase out coal-fired power generation. **Electricity generation has to be decarbonised before 2050**, with renewable energy the most promising alternative.

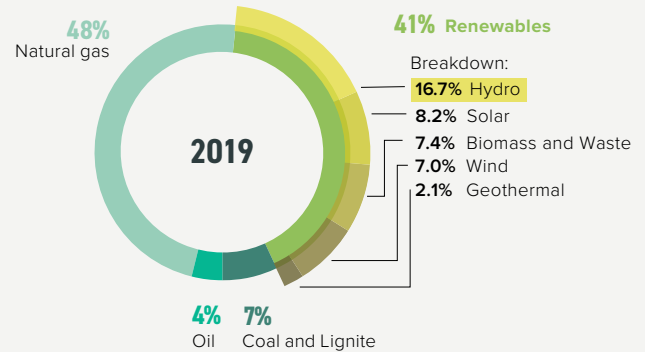*Sources: Rogelj et al., 2018; Climate Analytics, 2016; Climate Analytics, 2019*

STATUS OF DECARBONISATION

Electricity mix

Gross power generation (TWh)

48% Natural gas

41% Renewables

Breakdown:
- **16.7%** Hydro
- **8.2%** Solar
- **7.4%** Biomass and Waste
- **7.0%** Wind
- **2.1%** Geothermal

2019

4% Oil   **7%** Coal and Lignite

Legend: Coal and Lignite · Oil · Natural gas · Renewables
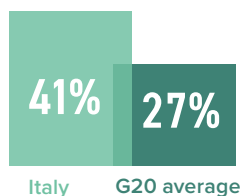
Source: Enerdata, 2020

Due to rounding, some graphs may sum to slightly above or below 100%.

Italy is increasingly producing power from renewables, accounting for 41.4% of the power mix, mainly hydro (16.7%), biomass (7.4%) and wind onshore (7%). Natural gas remains the most important power source at 48%. The shares of coal and oil have decreased further and now account for only a combined 11% of the electricity mix.

Share of renewables in power generation

(incl. large hydro)

41% Italy   **27%** G20 average

Source: Enerdata, 2020

Decarbonisation rating: share of renewables compared to other G20 countries

5-year trend (2014-2019): **Very low**
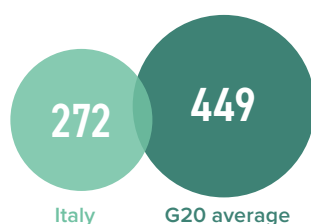
Current year (2019): **High**

Source: own evaluation

Share of renewables in power generation: 5-year trend (2014-2019)

-5% Italy   **+19.5%** G20 average

Emissions intensity of the power sector

Country vs G20 average (gCO$_2$/kWh)

272 Italy

449 G20 average

Source: Enerdata 2020

Emissions intensity: 5-year trend (2014-2019)

👍 **-12.5%** Italy

👍 **-10.3%** G20 average

For each kilowatt hour of electricity, 272gCO$_2$ are emitted in Italy. This is well below the G20 average and the emissions intensity is decreasing faster (12.5% between 2014 and 2019) than the G20 trend of -10.3% over the same period.

Decarbonisation rating: emissions intensity compared to other G20 countries

5-year trend (2014-2019): **Medium**

Current year (2019): **High**

Source: own evaluation

POLICY ASSESSMENT

Renewable energy in the power sector

Medium

According to its 2019 National Integrated Plan for Climate and Energy, Italy aims to have 55.4% renewables in the electricity mix by 2030, half of it coming from solar. However, Italy has no 2050 renewable energy target. The EU approved Italy's auction scheme of EUR 5.4bn for large-scale photovoltaic and rooftop systems in June 2019 . This scheme primarily focuses on generation capacity, aiming to support the expansion of EV charging infrastructure.

Reference: own evaluation, based on Bellini, 2019

Coal phase-out in the power sector

Frontrunner

In its 2017 National Energy Strategy, the Italian government announced a coal phase-out by 2025. **Implementation is due to begin in 2020.**

Reference: own evaluation

TRANSPORT SECTOR

Emissions from energy used to transport people and goods

In Italy, 82% of passenger transport is by private car, and 78% of freight transport is by road. Both sectors are still dominated by fossil fuels. In order to stay within a 1.5°C limit, passenger and freight transport need to be decarbonised.

Share in energy-related CO_2 emissions from transport sector

Source: Enerdata, 2020

CO_2

1% Electricity-related emissions

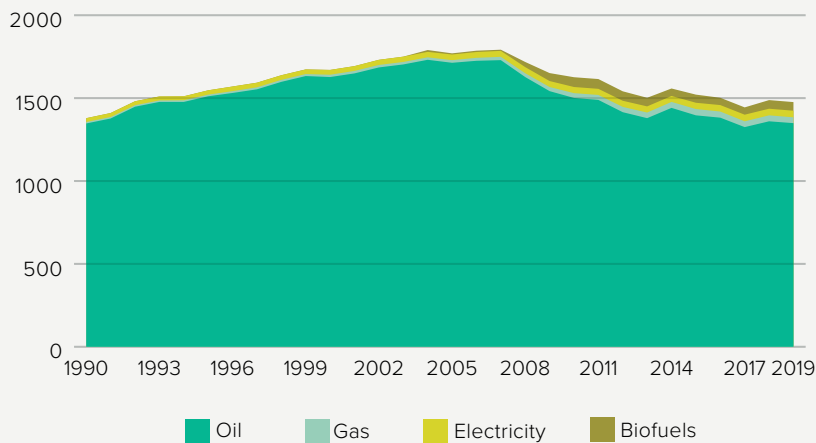**31%** Direct emissions

1.5°C COMPATIBILITY
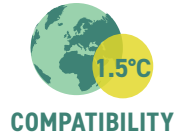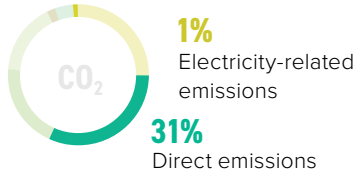
The share of low-carbon fuels in the transport fuel mix must increase to about 60% by 2050.

Source: Rogelj et al., 2018

STATUS OF DECARBONISATION
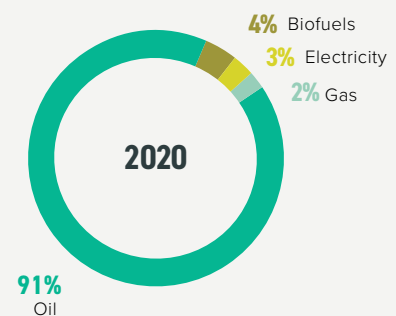
Transport energy mix

Final energy consumption of transport by source (PJ/year)

2020

4% Biofuels
3% Electricity
2% Gas
91% Oil

Oil   Gas   Electricity   Biofuels

Source: Enerdata, 2020

Due to rounding, some graphs may sum to slightly above or below 100%.

Electricity and biofuels combined make up only 6.2% of the energy mix in transport.

Transport emissions per capita

excl. aviation (tCO_2/capita)

1.71 Italy

1.16 G20 average

Data for 2018. Sources: Enerdata, 2020; The World Bank, 2019

Decarbonisation rating: transport emissions compared to other G20 countries

5-year trend (2013-2018): **High**

Current year (2018): **Medium**

Source: own evaluation

Transport emissions: 5-year trend (2013-2018)

👍 **-5.1%** Italy

👎 **+5.5%** G20 average

Aviation emissions per capita[6]

(tCO$_2$/capita)

0.21 Italy

0.16 G20 average

Data for 2017. Source: Enerdata, 2020

Decarbonisation rating: aviation emissions compared to other G20 countries

5-year trend (2012-2017): **High**

Current year (2017): **Medium**

Source: own evaluation

Aviation emissions: 5-year trend (2012-2017)

+9.7% Italy

+18.7% G20 average

Motorisation rate

869 VEHICLES PER 1,000 INHABITANTS (2016)

82% of the kilometres travelled is by car, and 869 per 1,000 inhabitants have a car in Italy.
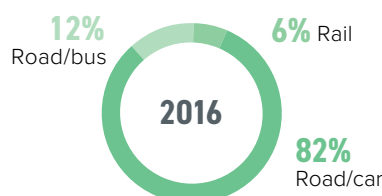
Source: Vieweg et al., 2018

Market share of electric vehicles in new car sales (%)

No data available
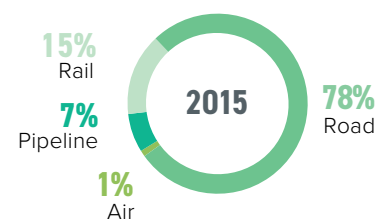
Source: IEA, 2019

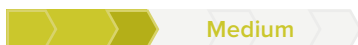## Passenger transport

(modal split in % of passenger-km)

12% Road/bus
6% Rail
2016
82% Road/car

Data for 2016. Source: Vieweg et al., 2018

Freight transport

(modal split in % of tonne-km)

15% Rail
7% Pipeline
2015
78% Road
1% Air

Data for 2015. Source: Vieweg et al., 2018

POLICY ASSESSMENT

Phase out fossil fuel cars

Medium

Italy applies the EU CO$_2$ efficiency standards for cars, which have recently been tightened. The government aims to put one million electric vehicles on the road by 2022. It provided subsidies of EUR 60m in 2019, with EUR 70m planned for 2021/22, for the purchase of new electric and hybrid vehicles, but has no target for phasing out internal combustion cars.

Reference: own evaluation

Phase out fossil fuel heavy-duty vehicles

Medium

According to 2019 EU legislation, manufacturers of heavy-duty vehicles will be required to cut CO$_2$ emissions from new trucks on average by 15% from 2025 and by 30% from 2030, compared to 2019 levels. A toll differentiating between vehicle class applies on most motorways.

Reference: own evaluation

Modal shift in (ground) transport

Medium

Italy is striving towards a shift of about 10% of passenger transport demand by 2030 from private cars to public transport, carpooling, bicycles and walking. It supports the shift of freight from road to rail, e.g. through funding support schemes. In November 2018, the government launched a new high-speed rail transport service 550 km in length for goods freight.

Reference: own evaluation

BUILDING SECTOR
Emissions from energy used to build, heat and cool buildings

Italy's direct building emissions – including heating and cooking – make just under one fifth (18%) of the country's total CO_2 emissions. **Per capita, building-related emissions are more than double the G20 average.**

Building emissions occur directly (burning fuels for heating, cooking, etc) and indirectly (grid-electricity for air conditioning, appliances, etc.)

Source: Enerdata, 2020

13% Electricity-related emissions

18% Direct emissions

1.5°C

COMPATIBILITY
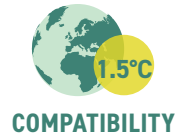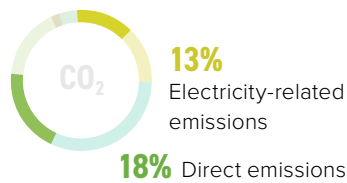
Global emissions from buildings need to be halved by 2030, and be 80-85% below 2010 levels by 2050, mostly through increased efficiency, reduced energy demand and electrification in conjunction with complete decarbonisation of the power sector.

Source: Rogelj et al., 2018

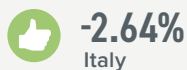## STATUS OF DECARBONISATION

Building emissions per capita
(incl. indirect emissions) (tCO$_2$/capita)

1.73 Italy

1.48 G20 average

Source: Enerdata, 2020

Italy's buildings emissions, including heating, cooking and electricity use, make up a third of total CO_2 emissions. Buildings emissions is 1.7 tCO$_2$/capita which is slightly above the G20 average. In contrast to the G20 average trend, Italy has managed to decrease emissions from the building sector by 2.6% combined in the 2014-2019 period.

Building emissions: 5-year trend (2014-2019)

-2.64% Italy

+1.82% G20 average

Decarbonisation rating: building emissions compared to other G20 countries

5-year trend (2014-2019):   Medium
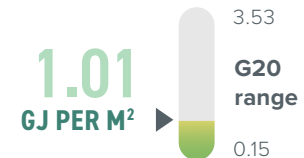
Current year (2019):   Medium

Source: own evaluation

Residential buildings
Energy use per m²

0.55 GJ PER M²

0.91

G20 range

0.17
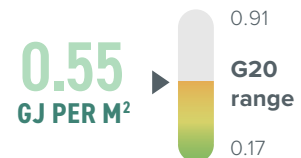
Commercial and public buildings
Energy use per m²

1.01 GJ PER M²

3.53

G20 range

0.15

Building emissions are largely driven by how much energy is used in heating, cooling, lighting, household appliances, etc. **In Italy, energy use per m² is in the middle range of the G20 countries.**

Source: Castro-Alvarez et al., 2018

POLICY ASSESSMENT

Near zero energy new buildings

Frontrunner

Italy is obliged under EU law for all new buildings to reach near zero energy from 2020 onwards. A building code is in place.

Reference: own evaluation

Renovation of existing buildings

Medium

Mandatory national building energy codes apply for both commercial and residential buildings, applicable to any renovated areas of a building.
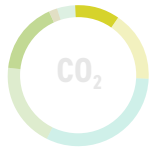
Reference: own evaluation

INDUSTRY SECTOR
Emissions from energy in the industrial sector

Industry-related emissions from fossil fuel combustion make up 16% of the country's total CO_2 emissions in Italy.
Italy has managed to only slightly reduce emissions from this sector.

Share in energy-related CO_2 emissions from industrial sector
Source: Enerdata, 2020

16% Direct emissions CO_2 **10%** Electricity-related emissions

1.5°C
COMPATIBILITY

Industrial emissions need to be **reduced by 75-90%** from 2010 levels by 2050.
Source: Rogelj et al., 2018

STATUS OF DECARBONISATION

Industry emissions intensity[7]
(tCO$_2$e/USD2015 GVA)

0.23 Italy   **0.71** G20 average

Data for 2016. Sources: Gütschow et al., 2019; Enerdata, 2020

Industry emissions: 5-year trend (2013-2017)

👍 **-20%** Italy   👍 **-12%** G20 average

Decarbonisation rating: emissions intensity of industry compared to other G20 countries

5-year trend (2012-2017): **High**

Current year (2017): **Very high**

Source: own evaluation

Carbon intensity of cement production[8]
(kgCO$_2$/tonne product)

721 Italy   **614** World average

Data for 2016. Source: CAT Decarbonisation Data Portal, 2020.

Carbon intensity of steel production[8]
(kgCO$_2$/tonne product)

803 Italy   **1,900** World average

Steel production and steelmaking are significant GHG emissions sources, and are challenging to decarbonise. Italy's steel industry is less than half as emissions-intensive as the world average.

Data for 2016. Sources: World Steel Association, 2018; CAT Decarbonisation Data Portal, 2020

POLICY ASSESSMENT

Energy Efficiency

Frontrunner

With the lower industry intensity in general and the implementation of comprehensive policies, such as mandates for energy managers, audits for facilities and energy management systems (EnMS), Italy is considered a top-performing country. Enforced in 2005, the White Certificate obligation scheme in the industrial sector has resulted in the energy saving of 1.69 Mtoe/year in 2017 and is expected to save 5.5 Mtoe/year by 2020. The 2017 Italian National Energy Strategy (SEN) aims to promote

energy efficiency in small and medium-sized enterprises (SMEs) through calls for co-financing of energy audits and management systems. Existing voluntary programmes in cooperation with businesses focus primarily on promoting energy efficiency. Energy consumption in the industry sector in Italy has decreased primarily due to energy savings through improvements in energy efficiency.

References: own evaluation, based on Malinauskaite et.al, 2019, Odyssee-Mure, 2020
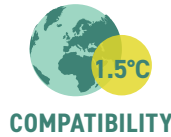
LAND USE SECTOR

Emissions from changes in the use of the land

NET SINK OF EMISSIONS

In order to stay within the 1.5°C limit, **Italy needs to make the land use and forest sector a net sink of emissions,** e.g. by halting the expansion of residential areas, and by creating new forests.
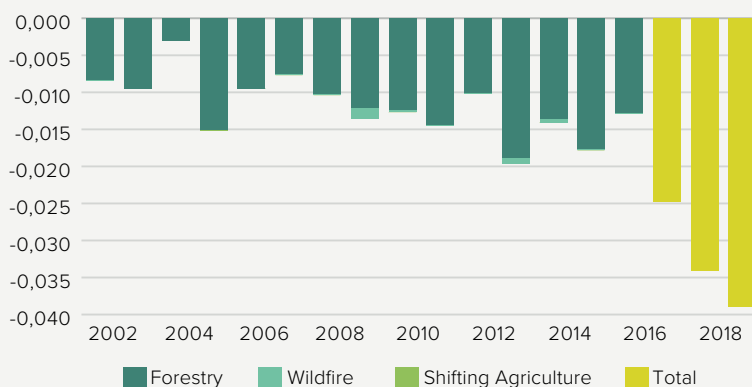
1.5°C COMPATIBILITY

Global deforestation needs to be halted and changed to net CO_2 removals by around 2030.

Source: Rogelj et al., 2018

Global tree-cover loss

Gross tree-cover loss by dominant driver (million hectares)

Legend: Forestry | Wildfire | Shifting Agriculture | Total

This indicator covers only gross tree-cover loss and does not take tree-cover gain into account. It is thus not possible to deduce from this indicator the climate impact of the forest sector. 2000 tree cover extent – >30% tree canopy.

Source: Global Forest Watch, 2019

From 2001 to 2018, Italy lost 299 Mha of tree cover, equivalent to a 3.2% reduction since 2000. This does not take tree-cover gain into account. Forest management is the main driver.

POLICY ASSESSMENT

Target for net-zero deforestation

Medium

Italy adopted a new Forest Law in 2018. Based on the law, a committee nominated by the Italian Ministry of Agriculture, Food and Forestry Policy is developing the National Forest Strategy 2019-2039.

Reference: own evaluation

AGRICULTURE SECTOR

Emissions from agriculture

DIETARY SHIFTS ARE NEEDED

Italy's non-energy agricultural emissions mainly come from digestive processes in animals, livestock manure, and the use of synthetic fertilisers. A 'fair-share' 1.5°C pathway requires dietary shifts, increased organic farming, and less fertiliser use.

1.5°C COMPATIBILITY

Global methane emissions (mainly enteric fermentation) need to decline by 10% by 2030 and by 35% by 2050 (from 2010 levels). Nitrous oxide emissions (mainly from fertilisers and manure) need to be reduced by 10% by 2030 and by 20% by 2050.

Source: Rogelj et al., 2018

Emissions from agriculture (excluding energy)

- 4% Crop Residues
- 8% Rice Cultivation
- 13% Synthetic Fertilisers
- 35% Manure
- 39% Enteric Fermentation

TOTAL 29.5 MtCO2e
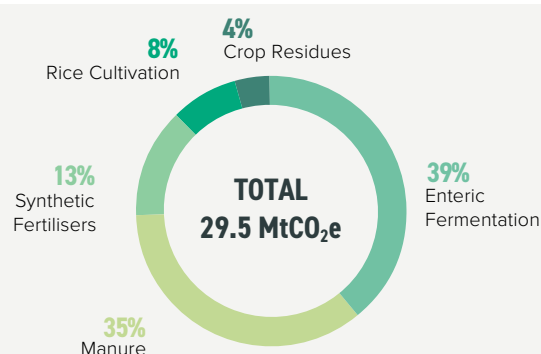
Data for 2017. Source: FAO, 2019

In Italy, the largest sources of GHG emissions in the agricultural sector are enteric fermentation (41%), livestock manure (36%) and the use of synthetic fertilisers (14%). A shift to organic farming, more efficient use of fertilisers and dietary changes can help reduce emissions.

Due to rounding, some graphs may sum to slightly above or below 100%.

MITIGATION: TARGETS AND AMBITION

The combined mitigation effect of nationally determined contributions (NDC) submitted by September 2020 is not sufficient and will lead to a warming of 2.7°C by the end of the century. This highlights the urgent need for all countries to submit more ambitious targets by 2020, as they agreed in 2015, and to urgently strengthen their climate action to align to the Paris Agreement's temperature goal.

AMBITION: 2030 TARGETS

Nationally Determined Contribution (NDC): Mitigation

Targets

Italy contributes to the EU-wide target of reducing emissions by "at least 40%" compared to 1990 levels.

Actions

Not mentioned

Climate Action Tracker (CAT) evaluation of EU NDC and actions

Critically Insufficient
Highly Insufficient
● Insufficient
2°C Compatible
1.5°C Compatible
Role Model

NDCs rated "insufficient" are in the least stringent part of a country's 'fair-share' range and not consistent with holding warming below 2°C, let alone with the Paris Agreement's stronger 1.5°C limit. If all government NDCs were in this range, warming would reach over 2°C and up to 3°C.

As Italy is an EU member state, the EU's NDC has been rated by CAT. While the EU is currently discussing increasing its emissions reduction goal to "at least 55%" from to 1990 levels, this still does not go far enough. An increase of this goal – to 65% – accompanied with funding climate action abroad, would make the EU the first region with commitments compatible with the Paris Agreement.

Note: 'fair-share' ratings for EU member states are not provided due to the intricacies and inter-linkages of the EU's internal burden sharing system.

Evaluation as at October 2020, based on European Union's NDC. Source: Climate Action Tracker

TRANSPARENCY: FACILITATING AMBITION

Countries are expected to communicate their NDCs in a clear and transparent manner in order to ensure accountability and comparability.

The NDC Transparency Check has been developed in response to Paris Agreement decision (1/CP.21) and the Annex to decision 4/CMA.1. While the Annex is only binding from the second NDC onwards, countries are "strongly encouraged" to apply it to updated NDCs, due in 2020.

NDC Transparency Check recommendations
For more visit www.climate-transparency.org/ndc-transparency-check

To comply with the Paris Agreement by ensuring clarity, transparency and understanding, it is recommended that the EU provides the following additional information in the upcoming NDC Update (compared to the existing NDC), including:

- Provide link to the long term temperature goal of the Paris Agreement. Include grounds on why the NDC target is fair and why it constitutes the EU's "highest possible ambition"

- Expressly cover the land sector and explain how the land sector is included in the EU target.

- State source of data for quantifying the reference point as well as provide information under which the EU would update the value of the reference indicators

AMBITION: LONG-TERM STRATEGIES

Status	Not submitted
2050 target	Agreed to EU's, 2050 climate neutrality goal
Interim steps	None
Sectoral targets	No
Net-zero target	No

The Paris Agreement invites countries to communicate mid-century, long-term, and low-GHG emissions development strategies by 2020. Long-term strategies are an essential component of the transition toward net-zero emissions and climate-resilient economies.

3. FINANCE
MAKING FINANCE FLOWS CONSISTENT WITH CLIMATE GOALS

PARIS AGREEMENT **Make finance flows consistent with a pathway towards low-GHG emissions and climate-resilient development.**

FOSSIL FUEL SUBSIDIES **Italy spent USD 9.6bn on fossil fuel subsidies in 2019, mostly on petroleum.** In contrast, revenues through the EU Emissions Trading Scheme generate only a fraction of this amount. There are no financial policies supporting a shift toward decarbonisation.

1.5°C COMPATIBILITY Investment in green energy and infrastructure needs to outweigh fossil fuel investments by 2025.

Source: Rogelj et al., 2018

FISCAL POLICY LEVERS

Fiscal policy levers raise public revenues and direct public resources. Critically, they can shift investment decisions and consumer behaviour towards low-carbon, climate-resilient activities by reflecting externalities in the price.
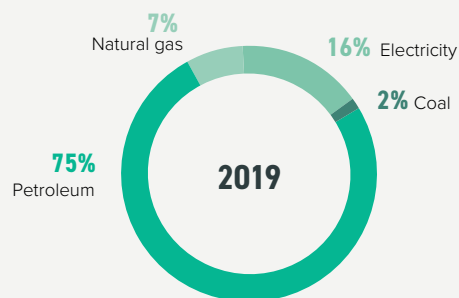
Fossil Fuel Subsidies

Italy Fossil fuel subsidies (USD billions)
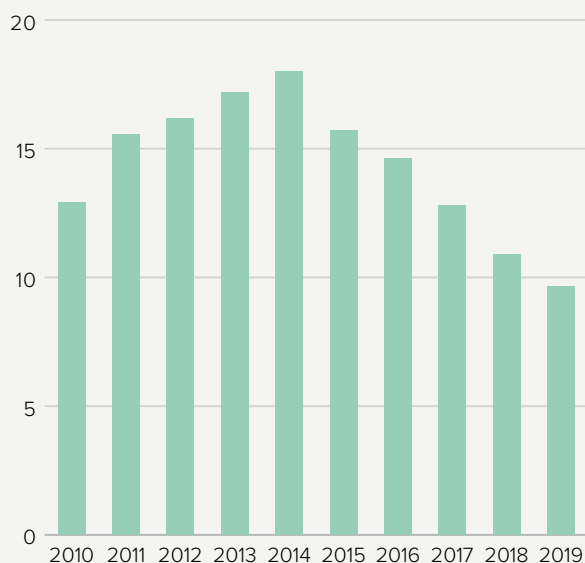
Source: OECD-IEA Fossil Fuel Support database, 2020

Fossil Fuel Subsidies by fuel type

Subsidies by fuel type

7% Natural gas
16% Electricity
2% Coal
75% Petroleum
2019

*Due to rounding, some graphs may sum to slightly above or below 100%.*

Source: OECD-IEA Fossil Fuel Support database, 2020

In 2019, Italy's fossil fuel subsidies totalled USD 9.6bn (compared to USD 12.9bn in 2010 and the last decade's peak of USD 18bn in 2014). Almost all of the subsidies identified were for the consumption of fossil fuels, with 2% going to their production. The highest amount of quantified subsidies was for petroleum, at USD 7.3bn, followed by fossil-fuel-based electricity at USD 1.9bn. The highest amount of subsidy results from the differential excise tax treatment for diesel fuel (USD 3.5bn).

Carbon Pricing and Revenue

Italy is part of the EU ETS covering 45% of emissions, mainly from the power and industry sectors. Due to the increasing price of the emissions allowances, which in 2019 reached USD 28/tCO_2, the system generated USD 1.5bn in 2019 in Italy alone.

Carbon Pricing and Revenue (USD billions)
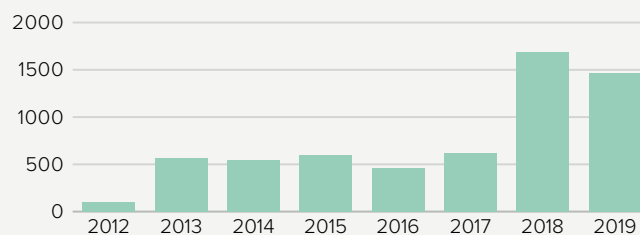
Source: I4CE, 2019 ; OECD, 2018

CORONAVIRUS RECOVERY Italy will receive the largest share (28%) of the EU's EUR 750bn economic recovery fund. The government's draft expenditure proposal is expected to focus on six priorities: decarbonisation of the economy, digitalisation, healthcare, education, infrastructure, and social cohesion.
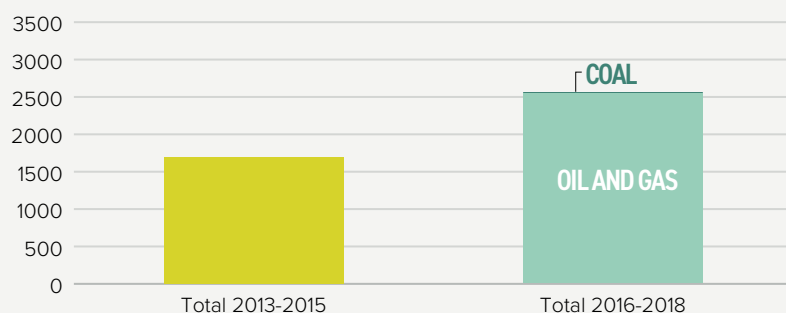
PUBLIC FINANCE

Governments steer investments through their public finance institutions, including via development banks both at home and overseas, and green investment banks. Developed G20 countries also have an obligation to provide finance to developing countries, and public sources are a key aspect of these obligations under the UNFCCC.

Public finance for fossil fuels

Public finance provided to fossil fuels (in USD millions)

The database used to estimate public finance for fossil fuels is a bottom-up database, based on information that is accessible through various online sources and is, therefore, incomplete.

Source: Oil Change International, 2020

Between 2016 and 2018, Italy provided average public finance support equal to USD 2.5bn per year to the oil and gas sector, and a much smaller USD 7m per year to the coal sector. This was predominantly provided through the Italian ECA Servizi Assicurativi del Commercio Estero (SACE). All in all, this represents an increase in the total public finance provided by the country to fossil fuels (USD 2.5bn) if compared to the previous period 2013-2015, when average yearly support of USD 1.7bn for the fossil fuels sector overall was recorded.
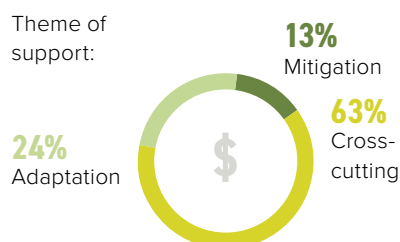
Provision of international public support

(annual average 2017 and 2018)

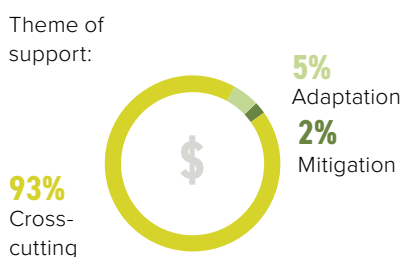Climate finance contributions are sourced from Party reporting to the UNFCCC.

Bilateral, regional and other channels

Annual average contribution
330 MN USD

Theme of support:

13% Mitigation
63% Cross-cutting
24% Adaptation

Multilateral climate finance contributions

Annual average contribution:
293 MN USD

Theme of support:

5% Adaptation
2% Mitigation
93% Cross-cutting

Core / General Contributions

Annual average contribution:
531 MN USD

Italy's contributions to climate finance have slowly increased since 2013/14. It reports most of its spending to actions supporting both mitigation and adaptation (cross-cutting). In 2017/18 it nearly doubled its bilateral climate finance contribution, though amounts remain relatively small compared to other G20 members obliged to provide climate finance. It ranks seventh ahead of Canada and Australia for bilateral finance flows and fifth for contributions to the multilateral climate funds in 2017/18, in absolute values. At the recent Green Climate Fund replenishment meeting, Italy pledged USD 338m, only just exceeding its first contribution to the Fund.

FINANCIAL POLICY AND REGULATION

Financial policy and regulation

Through policy and regulation governments can **overcome challenges to mobilising green finance**, including: real and perceived risks, insufficient returns on investment, capacity and information gaps.

Category	Instruments	Objective	Under Discussion/ implementation	None identified		
Green Financial Principles	n/a	This indicates political will and awareness of climate change impacts, showing where there is a general discussion about the need for aligning prudential and climate change objectives in the national financial architecture.	●			
			Mandatory	**Voluntary**	**Under Discussion/ implementation**	**None identified**
Enhanced supervisory review, risk disclosure and market discipline	Climate risk disclosure requirements	Disclose the climate-related risks to which financial institutions are exposed		●		
	Climate-related risk assessment and climate stress-test	Evaluate the resilience of the financial sector to climate shocks		●		
Enhanced capital and liquidity requirements	Liquidity instruments	Mitigate and prevent market illiquidity and maturity mismatch				●
	Lending limits	Limit the concentration of carbon-intensive exposures				●
		Incentivise low carbon-intensive exposures				●
	Differentiated reserve requirements	Limit misaligned incentives and channel credit to green sectors				●

Italy has a National Dialogue for Sustainable Finance since 2016, with the Italian Central Bank (Banca d'Italia, BdI) endorsing TCFD principles in 2017, and a national observatory on sustainable finance (ONFS) tasked with assessing the impacts of environmental issues on the Italian financial system. Under the Dialogue, a series of working groups comprised of leaders in the financial sector and the research community were convened (along with the United Nations Environment Programme), to take stock of existing green finance practice, identify key challenges, and suggest policy options. There is increased awareness of risks and opportunities within the finance sector and the need for new banking rules to enhance risk analysis. In May 2019, BdI revised its investment criteria to put a stronger emphasis on firms with beneficial environmental, social, and governance (ESG) practices. Investment criteria that take account of ESG profiles were adopted for the financial investments of the Bank's funds, namely, the equity portfolios of shares issued by euro-area firms (including Italian firms). BdI is a member of the NGFS.

Nationally Determined Contribution (NDC): Finance

Conditionality	Not applicable
Investment needs	Not specified
Actions	Not mentioned
International market mechanisms	No contribution from international credits for the achievement of the target

ENDNOTES

For more detail on the sources and methodologies behind the calculation of the indicators displayed, please download the Technical Note at: www.climate-transparency.org/g20-climate-performance/g20report2020

1 'Land use' emissions is used here to refer to land use, land use change and forestry (LULUCF). The Climate Action Tracker (CAT) derives historical LULUCF emissions from the UNFCCC Common Reporting Format (CRF) reporting tables data converted to the categories from the IPCC 1996 guidelines, in particular separating Agriculture from Land use, land use change and forestry (LULUCF), which under the new IPCC 2006 Guidelines is integrated into Agriculture, Forestry, and Other Land Use (AFOLU).

2 The 1.5°C 'fair-share' ranges for 2030 and 2050 are drawn from the CAT, which compiles a wide range of perspectives on what is

considered fair, including considerations such as responsibility, capability, and equality. Countries with 1.5°C fair-share ranges reaching below zero, particularly between 2030 and 2050, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by contributions to global emissions reduction efforts via, for example, international finance. On a global scale, negative emissions technologies are expected to play a role from the 2030s onwards, compensating for remaining positive emissions. The CAT's evaluation of NDCs shows the resulting temperature outcomes if all other governments were to put forward emissions reduction commitments with the same relative ambition level.

3 In order to maintain comparability across all countries, this report utilises the PRIMAP year of 2017. However, note that Common Reporting Format (CRF) data is available for countries which have recently updated GHG inventories.

4 The Decarbonisation Ratings assess the current year and average of the most recent five years (where available) to take account of the different starting points of different G20 countries.

5 The selection of policies rated and the assessment of 1.5°C compatibility are informed by the Paris Agreement, the IPCC's 2018 SR15 and the Climate Action Tracker (2016). The table below displays the criteria used to assess a country's policy performance.

6 This indicator adds up emissions from domestic aviation and international aviation bunkers in the respective country. In this Country Profile, however, only a radiative forcing factor of 1 is assumed.

7 This indicator includes only direct energy-related emissions and process emissions (Scope 1) but not indirect emissions from electricity.

8 This indicator includes emissions from electricity (Scope 2) as well as direct energy-related emissions and process emissions (Scope 1).

On endnote 5.	Low	Medium	High	Frontrunner
Renewable energy in power sector	No policy to increase the share of renewables	Some policies	Policies and longer-term strategy/ target to significantly increase the share of renewables	Short-term policies + long-term strategy for 100% renewables in the power sector by 2050 in place
Coal phase-out in power sector	No target or policy in place for reducing coal	Some policies	Policies + coal phase-out decided	Policies + coal phase-out date before 2030 (OECD and EU28) or 2040 (rest of the world)
Phase out fossil fuel cars	No policy for reducing emissions from light-duty vehicles	Some policies (e.g. energy/emissions performance standards or bonus/ malus support)	Policies + national target to phase out fossil fuel light-duty vehicles	Policies + ban on new fossil-based light-duty vehicles by 2035 worldwide
Phase out fossil fuel heavy-duty vehicles	No policy	Some policies (e.g. energy/emissions performance standards or support)	Policies + strategy to reduce absolute emissions from freight transport	Policies + innovation strategy to phase out emissions from freight transport by 2050
Modal shift in (ground) transport	No policies	Some policies (e.g. support programmes to shift to rail or non-motorised transport)	Policies + longer-term strategy	Policies + longer-term strategy consistent with 1.5°C pathway
Near zero energy new buildings	No policies	Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options)	Policies + national strategy for near zero energy new buildings	Policies + national strategy for all new buildings to be near zero energy by 2020 (OECD countries) or 2025 (non-OECD countries)
Energy efficiency in Industry	0-49% average score on the policy-related metrics in the ACEEE's International Energy Efficiency Scorecard	50-79% average score on the policy-related metrics in the ACEEE's International Energy Efficiency Scorecard	80-89% average score on the policy-related metrics in the ACEEE's International Energy Efficiency Scorecard	Over 90% average score on the policy-related metrics in the ACEEE's International Energy Efficiency Scorecard
Retrofitting existing buildings	No policies	Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options)	Policies + retrofitting strategy	Policies + strategy to achieve deep renovation rates of 5% annually (OECD) or 3% (non-OECD) by 2020
Net-zero deforestation	No policy or incentive to reduce deforestation in place	Some policies (e.g. incentives to reduce deforestation or support schemes for afforestation / reforestation in place)	Policies + national target for reaching net-zero deforestation	Policies + national target for reaching zero deforestation by 2020s or for increasing forest coverage

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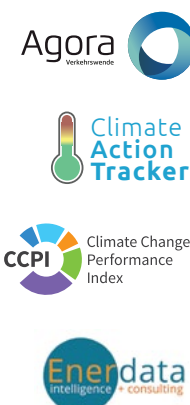
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Supported by:

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

based on a decision of the German Bundestag