

Italy and Coal: How to Phase It Out by 2025 in a Safe, Just and Sustainable Way

by Luca Bergamaschi

ABSTRACT

This study identifies the actions and policies Italy must undertake to phase out the use of coal in the electricity sector by 2025 in a safe, just and sustainable way. The study analyses and compares the available climate and energy scenarios at global, European and Italian levels in order to understand the role of coal-phase out in reaching the goals agreed for limiting global warming. The results of the study were discussed and elaborated together with the main industrial, civil society and institutional stakeholders at a workshop held in Rome on 4 October 2018.

Italy | European Union | Energy | Climate change | Sustainable development

keywords

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Key points

- The scientific community has warned that we are underestimating the effects of climate change. We have less time than previously thought to limit global warming within the safer Paris Agreement's 1.5°C goal, and the commitments and action taken to date are not sufficient.
- However, we already have most of the technology and financial resources required to tackle the challenge. The key factor is the political will to embark on a socio-economic transformation at an unprecedented pace and scale.
- To achieve the Paris Agreement goals, the reduction in fossil fuels must take place at a much deeper and rapid rate than today. For Europe and Italy, this means reaching the goal of net-zero emissions well before, and not beyond, 2050.
- Phasing out coal is a first necessary but not sufficient step. Ideally, Europe should phase out coal around 2030. Italy's plan to phase out coal by 2025 is one of the most ambitious goals in Europe and in the world.
- However, the latest Italian Energy Strategy (*Strategia energetica nazionale*, SEN) was not designed in line with the goals of the Paris Agreement. Also, it uses outdated cost assumptions for clean technologies. The SEN thus overestimates gas needs and underestimates the real value of renewables, energy efficiency, storage systems, interconnections and smart demand management systems.
- The main risk of new fossil fuel infrastructure is to face a significant loss in value if it they are not used as expected (thus becoming stranded assets) and to "block" future emissions into the system through the lock-in effect, which creates an inertial dependence of the system on them.

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· Study prepared in the framework of the project "Delivering Italy's coal phase out – Policy options and international implications", conducted by the Istituto Affari Internazionali (IAI) in collaboration with the European Climate Foundation (ECF).

- A range of studies demonstrate that phasing out coal can be managed in a safe and affordable way through deploying zero emission technologies without requiring new gas capacity (coal-to-clean).
- Achieving this requires, in the first place, greater political attention and greater competence at institutional level regarding the decarbonisation of the whole economy, which must be planned starting from the 2050 horizon, using updated cost assumption and in line with the Paris Agreement objectives, in particular the safer goal of 1.5°C.
- It is suggested that the Government identifies a clear time-frame for the closure of the still active coal plants within the framework of a long-term strategy and a review of the SEN, which should be reviewed every five years in line with the ambitious mechanism of the Paris Agreement starting in 2020.
- The long-term strategy definition process needs to be managed at the highest political and institutional level via an ad hoc Unit in the Prime Minister's Office led by a competent and recognised expert figure in order to provide the process with sufficient credibility.
- It requires the inclusion and participation of all stakeholders – prior to decisions – through a multi-layer consultation process and roundtable discussions open to the communities most impacted by the closure of coal related activities.
- Lastly, it is important to highlight four immediate actions in priority policy areas: (i) rethink the infrastructure approach in relation to the long-term decarbonisation goals; (ii) reform the electricity market by introducing new rules to incentivise investment in, and the use of, zero emission technologies; (iii) develop new social protection measures together with business, civil society, unions and local authorities for the most vulnerable workers and communities; (iv) develop and implement an ecological fiscal reform which rewards environmental sustainability and disincentivises the use of fossil fuels.

1. Global and European challenges and scenarios

The special report on *Global Warming of 1.5°C* published in October 2018 by the Intergovernmental Panel on Climate Change,¹ the United Nations body which represents the international scientific community on climate change, shows the clear risks, possible effects and mitigation scenarios necessary to limit average global warming to 1.5°C. This is the Paris Agreement's most ambitious goal, as compared to that of remaining well below 2°C.

¹ Intergovernmental Panel on Climate Change, *Global Warming of 1.5°C*, 2018, <http://www.ipcc.ch/report/sr15>.

This extra half degree would increase the number of people exposed to extreme temperatures by a factor of two and a half every five years. In 2050 this would mean exposing a grand total of two billion more people to extreme impact and conditions with a high risk of forced mass immigration. The frequency and intensity of drought in the Mediterranean would be considerably higher. The sea level would rise by an extra 15 per cent putting 10 million extra people at risk. Reductions in wheat harvests in the tropics and global fishing yields would be twice as devastating, thus undermining the food safety of the millions of people who depend on these. The number of summers in which the Arctic's glaciers would completely disappear would increase ten-fold, shifting from one glacier-free summer every 100 years to one every 10 years, significantly modifying oceanic currents. Loss of plant habitat would double and loss of insect habitat would triple. The report also warns against the risk of crossing environmental thresholds which would compromise the planet's stability in irreversible ways, such as coral extinction and the rapid melting of the polar icebergs.²

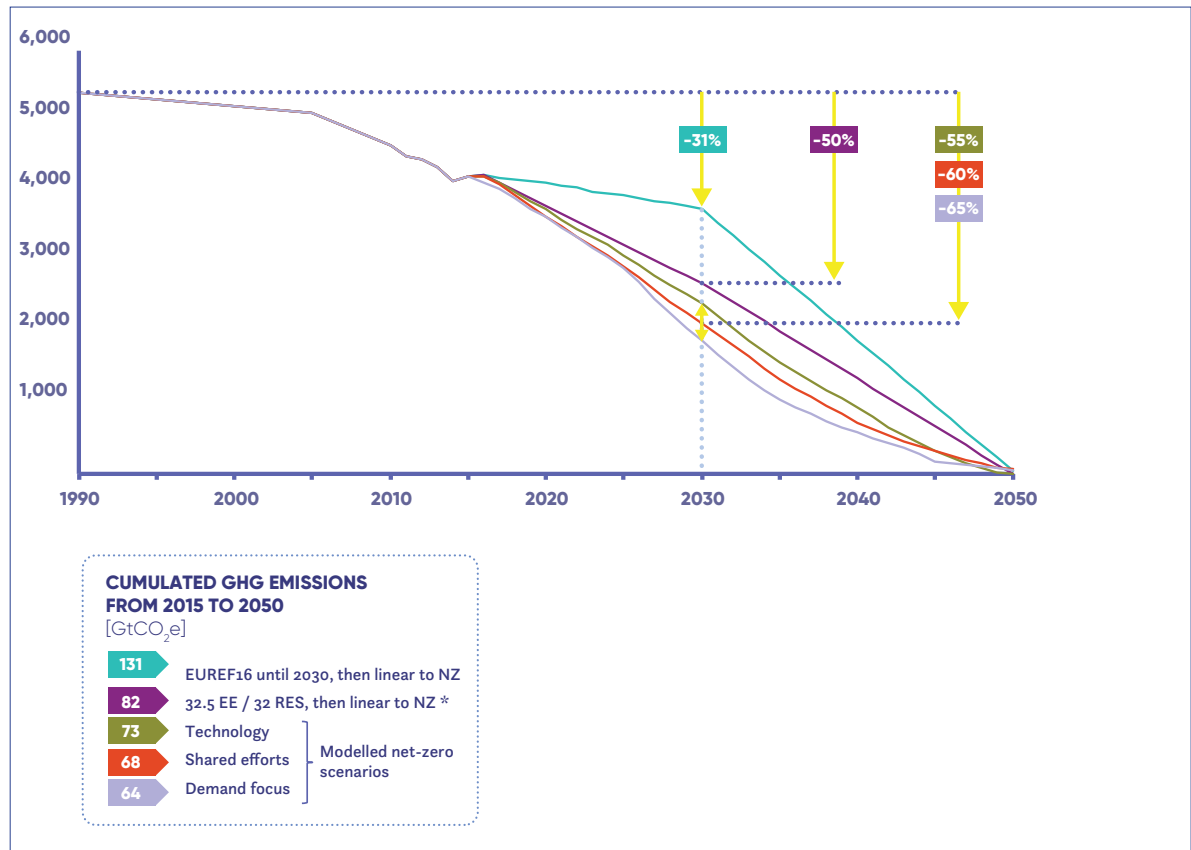
The report's message is clear: we are underestimating the effects of climate change – that is visible also through the effects of the extreme events which hit Italy in 2018 –, have less time than previously thought and the commitments and action taken to date are not sufficient. At the same time radical change is made possible through the technology and financial resources available to us. The key factor will be the political will to undertake unprecedented change.

The safest mitigation scenario, in terms of emission reductions and lower use of invasive geo-engineering technologies for the forced removal of CO₂ from the atmosphere (whose efficacy has, as yet, not been demonstrated), indicates that fossil fuel consumption must be reduced globally to a much greater extent and much more rapidly than was previously thought: compared to 2010 levels, coal consumption must be reduced by 78 per cent by 2030 (97 per cent by 2050), oil by 37 per cent by 2030 (87 per cent by 2050) and gas by 25 per cent by 2030 (74 per cent by 2050). The International Energy Agency shows similar results in its Sustainable Development Scenario, including the fact that the world demand for energy will not increase in the future but be kept under control especially thanks to energy efficiency.³

² The report warns against the risk of going beyond certain "tipping points", i.e. environmental thresholds which would trigger irreversible change and unmanageable impacts such as, for example, the activation of a process of sea level rise by various metres simply by passing the 1.5°C mark. With a 2°C rise the coral reefs and other marine eco-systems would risk complete extinction. Passing the 1.5°C mark would generate instability in the Antarctic sea icebergs and/or trigger irreversible loss in the Greenland icebergs such as to cause rises in the sea level by various metres in the course of hundreds and thousands of years. For further information on the risk and impact related to the tipping points, see Will Steffen et al., "Trajectories of the Earth System in the Anthropocene", in *Proceedings of the National Academy of Sciences*, Vol. 115, No. 33 (August 2018), p. 8252-8259, <https://doi.org/10.1073/pnas.1810141115>.

³ The International Energy Agency estimates that a historic change will be required in global energy demand and use of fossil fuel use trends. Limiting temperature increases even to below 2°C (with a 66 per cent probability) presupposes no overall increase in global energy demand which would be

Figure 1 | Total greenhouse gas emissions, 2015-2050



Source: European Climate Foundation, *Net Zero by 2050: From Whether to How*, cit., p. 33.

For Europe, this means reaching the goal of net-zero emissions well before 2050. The new long term strategy presented by the European Commission in November 2018 represents a good starting point and demonstrates the benefits of achieving net-zero emissions in 2050: a positive economic impact of 2 per cent of European GDP and a two-fold economic expansion since 1990, with savings of 2-3,000 billion euro in fossil fuel imports and a 40 per cent reduction in early death from particulates as well as health expense savings of 200 billion per year.⁴ Achieving this objective requires immediately increasing the 2030 goals. The Commission's proposal calculates that the 2030 emissions reductions goals should be taken to 51 per cent (from the current at least 40 per cent) while a study from the European

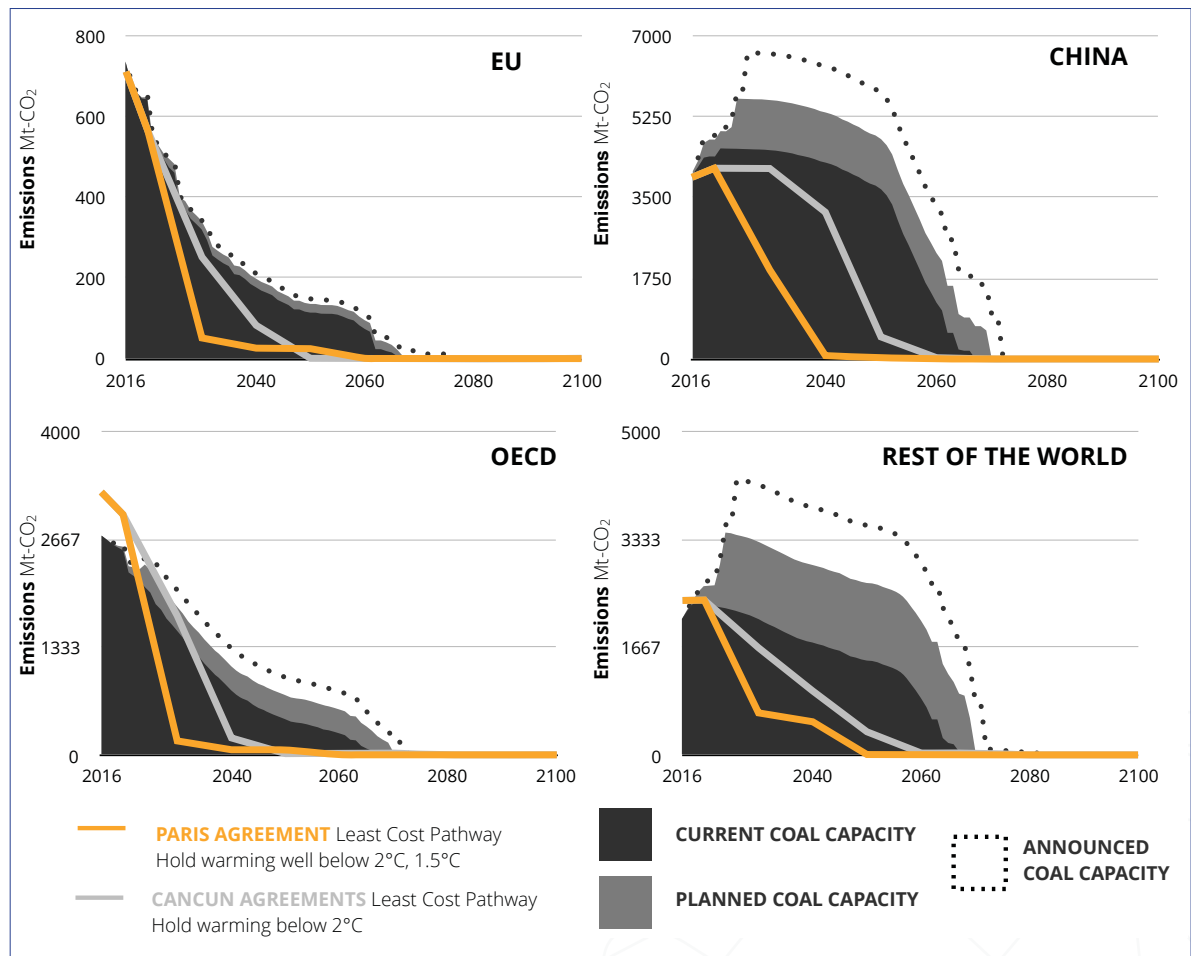
fixed at the same level in 2050 as it is today, thanks in particular to the role of energy efficiency. As compared to current non sustainable hydrocarbon consumption, in 2050 coal consumption should be 68 per cent lower, oil 63 per cent lower and gas 50 per cent lower. International Energy Agency and International Renewable Energy Agency, *Perspectives for the Energy Transition. Investment Needs for a Low-Carbon Energy System*, 2017, <https://www.iea.org/publications/insights/insightpublications/perspectives-for-the-energy-transition-investment-needs-for-a-low-carbon-energy-system.html>.

⁴ European Commission, *A Clean Planet for All. A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy* (COM/2018/773), 28 November 2018, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0773>.

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Climate Foundation calculates the goal as between 55 and 65 per cent.⁵ European renewable energy and energy efficiency objectives, now at 32 and 32.5 per cent respectively, should be updated accordingly – together with the 2030 objectives of the Italian National Energy Strategy – in order to put Europe on an energy transition path in line with 1.5°C and net-zero emissions by 2050.

Figure 2 | EU potential CO₂ emissions from existing and planned coal capacity against least-cost pathways, 2016-2080



Source: Climate Analytics, *Implication of the Paris Agreement for Coal Use in the Power Sector*, cit., p. 12.

All mitigation scenarios clearly show that the first step to be taken is a marked reduction in coal use, above all in the electricity sector. For Europe, this means moving closer to full phase-out around 2030, as a Climate Analytics study shows.⁶ A great deal of effort has gone into this although a great deal remains to be done

⁵ European Climate Foundation, *Net Zero by 2050: From Whether to How. Zero Emissions Pathways to the Europe We Want*, 2018, <https://europeanclimate.org/?p=12332>.

⁶ Climate Analytics, *Implication of the Paris Agreement for Coal Use in the Power Sector*, 2016, <https://climateanalytics.org/publications/2016/implications-of-the-paris-agreement-for-coal-use-in-the-power-sector>.

above all in those European countries, like Germany and Poland, in whose economy and politics coal plays an important role in power and socio-economic dynamics.

2. Italy's energy scenarios

As far as Italy is concerned, in November 2017 the government then in power decided, via the National Energy Strategy,⁷ to set the coal phase-out date at 2025. At the 23rd UN Climate Change Conference (COP23) held in Bonn in December 2017, Italy took part in and contributed to the launch of the Powering Past Coal Alliance, the first global coal phase-out alliance.⁸ Italy is thus one of the world's most ambitious nations in this respect. The issue is now how to achieve this objective in the safest, most equitable and sustainable way possible.

Firstly, it is important to underline that the SEN was drawn up on the basis of an emission reduction scenario not in line with the Paris Agreement goals and using European Commissions' cost technology reduction assumptions for renewables and energy efficiency which strongly underestimate the significant price reductions of recent years. The SEN's long term goal is, in fact, a reduction of just 63 per cent in emissions by 2050. It is important to note that the new Minister of the Environment, Sergio Costa, together with other nine European ministers, has committed Italy to a net-zero emissions by 2050 goal and to updating the European goals in 2030.⁹ By using unrealistic and outdated price assumptions, the SEN's long term goals leads to overestimate the needs of gas for electricity generation and underestimate those of renewable development, as well as its ability to replace gas in the electricity mix.

In this way – despite a significant growth in renewables – to achieve coal phase-out by 2025 the SEN favours the use of gas infrastructure and an expansion of gas capacity.¹⁰ The main risk of new fossil fuel infrastructure is that it might significantly lose value as gas demand drops, thus becoming “stranded assets” i.e. non-depreciable investments whose costs could be borne by the public and become a liability for businesses. Moreover, new fossil infrastructure risks “blocking” future emissions in the system through the “lock-in” effect, i.e. once built it is difficult not to use or to decommission it before the investment pays off, creating inertia and system dependence. It is also important to note that the SEN suggests a gasification strategy for Sardinia without comparing this with alternatives that take into account the deployment of zero emissions technologies.

⁷ Italian Ministry of Economic Development, *Strategia energetica nazionale*, 10 November 2017, <https://www.sviluppoeconomico.gov.it/index.php/it/198-notizie-stampa/2037347>.

⁸ See official site: <https://poweringpastcoal.org>.

⁹ *Joint letter to Commissioner Miguel Arias Cañete on climate ambitions in future EU long-term strategy*, 14 November 2018, <https://www.permanentrepresentations.nl/documents/publications/2018/11/21/joint-letter-on-climate-ambition-of-the-future-eu-long-term-strategy>.

¹⁰ Italian Ministry of Economic Development, *Strategia energetica nazionale*, cit., p. 57 and 178

By contrast, the study *Cleaner, Smarter, Cheaper*¹¹ shows that coal generation can be entirely replaced by a greater deployment of clean technology as well as a greater role of electricity interconnections and flexibility resources (such as storage, pumping and intelligent energy demand systems). The study uses updated clean technology price assumptions and take into account a more realistic role of commercially-available electricity interconnections and flexibility resources capable of guaranteeing the same level of security at lower costs than gas.

A secure transition from coal to zero emissions technologies, so-called “coal-to-clean”, can be achieved without building new gas generation capacity by exploiting existing gas capacity. These lower gas dependency scenarios have also been the results of the *Decarbonisation Roadmap by 2030 and Beyond* study commissioned by Legambiente¹² and by a WWF study.¹³ Thanks to the key role played by active demand participation and deeper co-ordination between European markets, the same security standards can be guaranteed through the current gas infrastructure. This can adequately meet gas demand both for its annual volumes and at peaks. Furthermore, the WWF scenario shows that it is possible to meet Sardinia’s energy needs without building new gas infrastructure through renewables and electricity interconnections with the mainland.

3. Which actions are needed to phase out coal in a safe, just and sustainable way?¹⁴

In general, considering the key role played by climate and energy for national security and prosperity, politicians should pay greater attention and apply greater expertise and coherence at institutional level to identify cost-effective decarbonisation scenarios and policies.

The analysis of the scenarios clearly demonstrates that identifying the need for, and the real value of, coal phase-out technologies and infrastructure – and consequently the level of investment needed – requires planning for scenarios and strategies that start from the 2050 horizon. Without a long-term perspective, we risk building a system more expensive than necessary and failing to achieve our coal phase-out goals, if the system does not change in time. Consistent planning is

¹¹ Energy Union Choices, *Cleaner, Smarter, Cheaper: Responding to Opportunities in Europe’s Changing Energy System*, 21 November 2017, <http://www.energyunionchoices.eu/?p=908>.

¹² Elemens, *Roadmap di decarbonizzazione al 2030 e oltre*, November 2017, <https://www.legambiente.it/contenuti/dossier/roadmap-di-decarbonizzazione-al-2030-e-oltre>.

¹³ Ref4e, *Phase-out del carbone al 2025. Ipotesi e impatti nello scenario elettrico*, October 2017, <https://www.ref-e.com/en/downloads/others-publications/phase-out-del-carbone-al-2025>.

¹⁴ This section’s conclusions were inspired by a closed door workshop at which Italy’s main industrial, social and institutional stakeholders were present. The workshop took place in Rome on 4 October 2018 in the context of the project “Delivering Italy’s coal phase out – Policy options and international implications” conducted by the Istituto Affari Internazionali (IAI) in collaboration with the European Climate Foundation.

key to achieve the goals of the Paris Agreement. In Europe, this means delivering net-zero emissions by 2050 with efforts to achieve this well before 2050 in the context of a wider national security and risk management strategy that aims to minimising Italy's exposure to climate risks. This approach must hold both for national and European scenarios, in particular for the new 2050 European strategy. These scenarios must also use up-to-date and realistic assumptions regarding clean energy price and effective security strategy. This is fundamental to generate the certainty required by economic actors to plan investments and adapt their business models to the energy system transformation.

Specifically, politics and institutions should identify a clear time frame for the closure of the still active coal plants within a national 2050 strategy in line with the European strategies. Developing this national long-term strategy will require a revision of the existing SEN, to be reviewed every five years in line with the five-year ambition mechanism of the Paris Agreement starting in 2020. This strategy must adopt a systemic approach and analyse the implications of coal phase-out for all key social, labour, infrastructure, health and foreign policy aspects. It is important to note that coal phase-out is only one side of the coin of climate change strategies. The other is adaptation and resilience to its effects. This strategy must encompass parallel goals, policies and assessments for building resilience similar to those examined for coal phase-out.

A critical element for the credibility, acceptance and effective implementation of climate change strategies and related policy, is providing inclusion and participation of all stakeholders prior to the decisions. This can happen through a multi-layer consultation process in 2019 and open roundtables across the country with the communities most impacted by the closure of coal related activities. The greater the transparency and sharing of the assumptions underlying the scenarios, the greater the acceptance by the economic and social actors will be. Stakeholder involvement can take place through themed workshops during the preparatory stages of the government's proposals, for example. For more complex situations, such as the Brindisi coal plant, local roundtables will be required in a similar way as those planned for the ILVA industrial complex in Taranto in order to achieve solutions supported by all social groups. Regions can and must take a more active part in the process and make technical and financial resources available. One of the greatest challenges will be cultural and institutional in nature and involve thinking and working in a systemic way, avoiding considering the various situations in isolation or favouring specific interest groups. All this must be guaranteed by the institutions, including via an ad hoc Unit in the Prime Minister's Office led by a trusted expert figure to provide the process with sufficient credibility.

Four thematic areas of particular importance are highlighted below for a successful coal phase-out in Italy:

- 1) It is key to rethink the approach to energy infrastructure in relation to the long term goals. Electricity infrastructure must become a planning and implementation priority as they will play an increasingly crucial role for the security of the system

through grid balancing, for reducing cost differentials between regions and the need of new generation capacity, and for enabling the increased use of renewables from high efficiency areas. All new fossil fuel infrastructure must be assessed in the context of the 2050 time framework and in line with the full decarbonisation of the system in order to minimise the risk of stranded assets and emissions lock-in. For the reconversion to biomass of existing coal plants, more assessment of their effective environmental and economic benefits over cleaner and cheaper alternatives are required. Specifically for Sardinia, all available coal phase-out plans must be given careful consideration (beyond a gasification-only approach).

2) The electricity market is changing profoundly and new rules are required to incentivise investments and exploit renewable energy capacity. For example, new rules are needed for (i) enabling “closed energy systems” to foster the development of prosumers and decentralised resources; (ii) offering long-term contracts between producers and consumers via Power Purchase Agreements (PPA), which establish fixed terms and long-term prices required for the financial investment sustainability; (iii) providing incentives for renewable technologies and storage systems which have not yet achieved market parity, i.e. market competitiveness; (iv) rewarding flexibility resources via capacity mechanisms which exclude coal and minimise gas subsidies – to be granted solely where strictly necessary for the adequacy of the system and in the absence of zero emission alternatives.

3) It is important to develop – together with businesses, civil society, unions and local authorities – new social protection measures for workers who risk losing their jobs as a result of coal plant closures and, in general, as a consequence of a progressive reduction in fossil fuel use, including gas given Italy’s significant dependence on it. What is needed is planning alternatives through concrete projects, including the re-industrialisation of sites, the re-allocation of staff across other activities or the early retirement, in addition to offering training to equip people with new skills and gain expertise in other fields.

4) Achieving decarbonisation goals requires environmental fiscal reforms that reward environmental sustainability and disincentivising the use of hydrocarbons. As a G7 country, Italy has committed to phase out fossil fuel subsidies by 2025. Achieving this, starting from the analysis on environmentally-harmful subsidies issued by the Italian Ministry of the Environment,¹⁵ requires developing a roadmap which shows the interim steps and measures required to manage the impact on the worst hit sectors. It also requires setting an adequate price floor of the current European CO₂ price (ETS), such as 30 euro per ton of CO₂ in 2020 as suggested by the OECD,¹⁶ and a progressive increase of 6 euro every two years between 2020

¹⁵ Italian Ministry of Environment, *Catalogo dei sussidi*, December 2016, <http://www.minambiente.it/node/7116>.

¹⁶ Organisation for Economic Co-operation and Development, *Effective Carbon Rates 2018. Pricing Carbon Emissions through Taxes and Emissions Trading*, September 2018, <http://www.oecd.org/tax/effective-carbon-rates-2018-9789264305304-en.htm>.

and 2030 as to reach a level of 60 euro by 2030. This could be accompanied by the introduction of a carbon tax in those high consumption sectors which are not including in the ETS, such as the transport, agriculture and residential sectors. Lastly, all new revenues from CO₂ pricing and savings from the fossil fuel subsidies should be reinvested to fund the just ecological transition. For example, part of this could be set aside to ad hoc funds for the social transition of most impacted areas.

Conclusions

There is a strong need for greater political and institutional commitment to building a climate and energy strategy able of delivering a secure and affordable energy system in line with Italy's European and international decarbonisation and resilience commitments. The coal phase-out represents the first step of a deeper transformation of the economy which should be completed by 2050 at the latest. This transition has unprecedented economic, industrial and social implications – in addition to reducing emissions – which must be dealt with through a holistic and long-term strategy. Beyond issues of process, there are key policy areas – from infrastructure and market regulation to social protection and fiscal reforms – which institutions must prioritise in order to equip themselves with the necessary tools for achieving the coal phase-out by 2025 and the full decarbonisation by 2050.

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