



Just Transition Platform

Case study: Futur-e

Key information

Member State:

Italy

Region(s):

Valle d'Aosta, Piemonte, Liguria, Veneto, Emilia-Romagna, Toscana, Abruzzo, Umbria, Marche, Puglia, Campania, Calabria, Lazio, Sicilia, Sardegna

Sector(s):

Energy

Duration:

Since 2015

Type of activities:

Industrial re-conversion, circular economy, multi-stakeholder engagement

Background

Description of the regional policy strategies relevant for the Just Transition Mechanism

The Futur-e initiative is a peculiar example of private-led transition programmes, targeting 24 industrial sites that have been or are soon to be dismissed from their original purpose as power generating facilities. Accordingly, while synergies and public funding may take place on a case-by-case basis, there is no wider financial agreement that calls onto the responsibilities of the State or of the European Union. It should also be noted that the two major sources of finance to be devoted to the pursuit of socially fair climate objectives in the past decade – namely the Just Transition Fund and the Resilience and Recovery Facility – came into being long after the inception of the project.

The share of funds devoted to Italy in the context of the Just Transition Fund – an amount of EUR 1 billion – is not destined to the territories targeted by this initiative but are instead targeted to the endemically problematic areas of Taranto (Puglia) and Sulcis Iglesiente (Sardinia). On the other hand, the initiative is under many respects aligned to the National Recovery and Resilience Plan (NRRP) that will inform the spending of the NextGenerationEU funds devoted to Italy. Indeed, for the plants that are still lacking a set re-conversion strategy, the possibility to apply for NRRP funds could afford new momentum to negotiations. After all, the repurposing of some of

the power plants towards the production of energy from renewable resources directly responds to the 'Power up' flagship programme of the NGEU, namely the objective of increasing the number of renewables within the national energy mix. At the same time, the re-conversion of the sites to purposes outside of energy production can aid a number of social inclusion objectives, such as the creation of job opportunities in resilient sectors and environmental reclamation, with positive consequences for public health.

Characteristics of the region(s)

The former industrial sites targeted by the Futur-e initiatives are evenly dispersed across the Italian territory, as shown by Figure 1. This implies that the contextual factors – major sectors providing employment in the area, level of technological innovation, educational attainment of the available workforce, etc. – that had to be considered before starting operations must be carefully reviewed on a case-by-case basis. Indeed, the viability of each project was assessed largely with reference to the sectors that offer growth opportunities in the region; and the commitments of Enel and the relevant public authorities with respect to each site were sanctioned by framework agreements to which all the interested parties contributed. Table 1 reports three illustrative examples of the types of considerations that informed the selection of projects and the final intended uses of the sites.

Figure 1 - Locations of the plants set to undergo re-conversion



Source: Enel (2016), Bilancio di Sostenibilità: Progetto Futur-e

The idea for which no one-size-fits-all solution could be applied to all the plants was recognised at the inception of the project. While all the sites represent an industrial heritage that can still deliver benefits to the country, each of them featured peculiarities in terms of geographical location and the evolution of the surrounding area. To orient the selection of projects, the 23 power plants were divided into three broad groups. The first group comprises plants that could be updated with new, cleaner technologies and maintain their historical purpose of energy production. The second group comprises plants that are either in proximity or even included within the urban, densely inhabited fabric, and for this reason are unsuitable for continuing production of electricity. For this category, tailored repurposing has been envisioned. The third group comprises plants that are too obsolete to continue producing energy even though their location is not prohibitive – i.e. they are far from inhabited centres. This group can expect the same outlook that characterises the second, as repurposing proposals are either being evaluated or been accepted.

Table 1 - Illustrative examples

Site	Experience
Pietrafitta (regione Umbria)	<ul style="list-style-type: none"> On 16 November 2016, the President of Regione Umbria and the responsible for Institutional Affairs of Enel Italia signed an agreement for the phase-out and re-conversion of the thermo-electric power plant of Pietrafitta. The agreement sanctioned the opening of a public call for projects, to be reviewed by a mixed committee featuring Enel executives, public authorities, and academia after a lengthy process of stakeholders' consultation. The final project was awarded in March 2020, with the plant set to become a site for the production of green hydrogen and research and development on the use and stocking of biomass, in close collaboration with the Science and Engineering department of the nearby University of Perugia.
Porto Tolle (Veneto)	<ul style="list-style-type: none"> On 11 May 2016, a public call for project to decide on the future of the industrial site of Porto Tolle was launched through a collaboration between Enel S.p.a., regional and local authorities, and Politecnico di Milano. In recognition of the favourable location of the site due to its natural amenities, the final project was awarded to Human Company, an Italian leader in the development and operation of touristic resorts. The project – named 'Deltafarm' due to its proximity with the Po river's delta and its emphasis on sustainability – will transform the area by building holiday accommodations, a water sports park, and by valorising the natural and cultural landscape of the area.

Site	Experience
Carpi (Emilia-Romagna)	<ul style="list-style-type: none"> On 14 March 2019, Enel unveiled its new high-tech logistical hub in Carpi, in the province of Modena. The hub stands on the premises of one of the obsolete thermo-electric power stations identified and targeted by the Futur-e initiatives. The decision to repurpose this specific plant into Enel's Northern Italy logistical hub was largely driven by its strategic location. Also relevant was the industrial mix of the surrounding area, which features many firms involved in recovery and recycling of materials. In line with Futur-e's circular economy precepts, the re-conversion of the area has been carried out while valorising all possibilities of re-use: a round of selective demolitions allowed operators to recover up to 3 500 tonnes of metallic materials and 7 000 tonnes of concrete, considerably reducing waste.

Source: Enel Press Centre and articles from local newspapers

Central framework conditions

The Futur-e initiative falls within the scope of Enel's zero emissions ambition. The Italian multinational is one of the private actors leading the way towards a carbon-less future. Indeed, Enel S.p.a. is one of the first signatories to the 'Business Ambition for 1.5°C', an initiative promoted by the United Nations that seeks to foster business models that are conducive to the objectives set out in the Paris Agreement. Amongst the goals of the company, there is the commitment to phase out all its coal-fired power plants by 2027, and to achieve net-zero targets by 2040, ahead of the global goal of 2050. According to the company's net-zero report, this is to be pursued through sheer reduction of Greenhouse Gases (GHGs) emissions – in the order of 30 % by 2030 – and not through mitigation measures, which are often subject to measurement inconsistencies. As a considerable player in the global market for energy, Enel S.p.a. may be an initiator of positive change: the company is responsive to new trends in consumers' desire for cleaner, smarter grids for the distribution of electricity and thermic energy and is rethinking investment planning and their business model to endorse principles of circularity.

With regards to the last point, Italy is a leader in the adoption of circularity principles: it has developed and adopted a

Description of the project

Futur-e represents a world-first example of a private company leading a wide scale industrial re-conversion process. In 2015, Enel S.p.a. set out to requalify 24 dismissed industrial sites – 23 coal-powered power plants and one mine – that span the entire Italian peninsula. This was to be achieved through the pursuit of the following strategies. First, the project catalysed investments in infrastructure. What is most exciting about these investments is their emphasis on the adoption of circular economy principles, namely the development of new

comprehensive legislative framework in support of the circular economy, it scores notably on the issue of the circular re-use of raw materials and recycling, performing better than the EU average, and has many research centres devoted to innovative recycling practices. The key industries that have been actively driving this effort towards sustainability come, perhaps unsurprisingly, from the manufacturing sector. But the government's commitment to the circular economy, testified for example by the National Strategy for a Circular Economy,¹ catalysed efforts in all markets. Also, one key precept of the Strategy is the emphasis on collaboration between stakeholders and bottom-up initiatives, which was thoroughly endorsed by Enel's Futur-e project.

For what concerns local conditions that are pertinent to each of the targeted sites, it should be noted that the process of stakeholder engagement that informed the selection of winning projects follows the script of Creating Shared Value (CSV) models. Namely, it is understood that Enel can generate long-term competitive advantages by identifying and addressing social issues that are directly related to its operations and to the territories in which they take place.

production capacities from the re-use of the current plants. Second, each re-conversion project aimed to foster economic diversification. A desire to achieve economic, environmental, and social sustainability lies at the base of all the awarded projects, but the future intended use of the sites varies widely. For example, the site of Porto Tolle (Regione Veneto) will be repurposed into a large holiday resort, whereas the one at Carpi (Regione Emilia-Romagna) already became a high-tech logistical centre in support of Enel's operations.

1 Italian Government (2022), Strategia Nazionale per l'Economia Circolare. Available at: https://www.mase.gov.it/sites/default/files/archivio/allegati/PNRR/SEC_21.06.22.pdf

Third, stakeholders' consultations preceded each call for project. This is in line with the precepts of the Just Transition Mechanism, which states that community engagement can help ensure that the needs and concerns of marginalised communities are taken into account, and that the benefits of the transition are shared equitably. Such extensive consultations also set the base for collaborations with governments, and private-public partnerships are welcomed initiatives in the path to net zero.

Enel S.p.a. launched an international call for proposals on how to re-convert the 23 dismissed power plants and one ex-mining area and infuse these sites with new life. The proposals had to embed principles of circular economy and sustainability and were judged based on these dimensions by a jury comprised of Enel executives, public authorities, and academia. The wide array of interests that were represented throughout the selection process ensured that the awarded proposals responded accurately to the necessities of the area that hosted the sites and stimulated engagement with local communities. This approach is part of ENEL's new 'Open Power' philosophy – which aims at openness and collaboration with the outside world – and signals a special commitment to the areas surrounding the thermal power plants that are closing, to mitigate the consequences that this change of model could have in the economic, environmental, and social sphere. The array of proposed projects is broad, ranging from shopping malls and leisure centres to economic facilities and technology hubs. Table 2 reports an extensive list of the intended repurposing of each site. Note that, while the Futur-e initiative represents a promising approach, it is not the case that a suitable intervention was found for all the targeted plants. For this reason, Table 2 reports the experience of 15 sites against the 23 identified.

A discussion of the **type of activities** must encompass how the sites targeted by the Futur-e initiative were divided into three groups. The re-conversion strategy for the ones which were still destined for energy production were devised by Enel itself in consultations with public authorities and local stakeholders. For the latter two groups, comprising of power plants featuring technologies too obsolete for upgrade or situated in urban areas of high value for communities, open calls for projects were put out in 2016, in the hope of sourcing innovative ideas for sustainable solutions from actors external to the firm and to engage local communities more strongly. This process unfolded in two steps. In a first step, a call for manifestations of interest addressing investors and developers has been put out for each site. These calls wished to stimulate innovative ideas. In a second step, the selection of the winning project for each site was operated by ad hoc committees comprised of Enel executives, public authorities and academia, with an emphasis on sustainability. On the one hand, the economic sustainability of the proposals was judged through strict due diligence on the participants to the calls, the validity of the business plan and the financial viability of the proposal. On the other hand, environmental sustainability was judged with respect to the potential of the project to re-use existing buildings and infrastructure and the impact that the project would have on the area. The award of these proposals, which took place between 2016 and 2017, signalled the closure of the first phase of the Futur-e initiative, aimed at uncovering externally sourced solutions for the re-qualification of the sites. Each of the winning projects was awarded a price of EUR 20 000. In a second phase, the interested parties took part in a more in-depth consultation and design process with the aim to effectively adopt the proposed solutions. It is worth emphasising how the activities promoted by the project adopt a shared-value approach. As detailed in Table 2, the range of adopted solutions varies widely, which is telling of the importance given to local needs and desires.

Table 2 – Account of the re-conversion strategies that have been promoted and documented for each interested site

Site	Intended use
Trino – Leri Cavour	On 14 October 2022, Enel Green Power began operations for the construction of a solar farm on the premises of the ex-thermal power plant 'Galileo Ferraris'. The farm will cover an area of 130 hectares, and at regime, it is expected to produce up to 130 GWh per year to supply to the local grid. It will avoid the emission of 56 tonnes of CO ₂ and the consumption of 29 million m ³ of natural gas.
Alessandria	While the site of Alessandria was the one that set off the Futur-e initiative as it represented the first open call for projects, a definitive decision on its repurposing has not been reached. The winners of the call – ranked from first to third – were an amusement park dedicated to extreme sports, an agricultural hub for the valorisation of local produce, and an oncology research centre.
Genova	The site, which directly faces the sea, will be converted into a museum and cultural hub hosting temporary exhibitions and fashion events. The rooftop of the building will be converted into a square freely accessible to everybody, linked to the waterfront by a suspended walkway.
Porto Marghera	The site has been officially sold towards the end of 2015 to three buyers that already had industrial estates nearby. The three buyers will repurpose the site to fit with their activities, namely port logistics, metal production, and design and production of industrial equipment.

Site	Intended use
Porto Tolle	On 28 June 2019, the operations for the re-conversion of the ex-power plant into a holiday resort have begun. The resort will be built and operated in accordance with circular economy and sustainability principles, and it is expected to welcome up to 8 000 visitors per day.
Carpi	Due to the strategic position of the site to service Northern Italy, the site has been re-converted by Enel into a high-tech logistical hub to monitor and manage the company's operations. The re-conversion was already successful, and the hub was completed on 14 March 2019.
La Spezia	The site was one of the last ones to be phased out, effectively switching off the carbon-powered plant in 2020. In the context of the Futur-e initiative, the site is still expected to keep its main purpose as an energy-generation facility, but it will be updated with new technologies – and switch to natural gas as a feedstock – to improve performance and resource efficiency.
Pietrafitta	In collaboration with the local university, the site in Pietrafitta is set to become a plant for the production of green hydrogen. The industrial plan is yet unclear on whether production will be more easily achieved and implemented through the setup of a system for electrolysis or other biomass-based production practices.
Montalto di Castro	Initially built as a thermo-nuclear production facility, the site was converted to traditional thermo-electric production after a public referendum in 1987 judged against nuclear energy in Italy. Through the Futur-e initiative, it is now set to become a museum on the energy transition.
Larino	The premises of the ex-power plant will be used to host a solar farm. The project, entirely managed by Enel Green Power, is set to commence in 2023.
Bari	The seven-hectares lot upon which Bari's thermo-electric power plant rose will be transformed into a multi-purpose centre to reinvigorate the surrounding neighbourhood. The result of consultations led to the desire to create a modular space for urban activities, inclusive of parks, expositional spaces, and social housing.
Rossano Calabro	The future of this site is very uncertain. Despite the call for projects was launched already in 2016, very few manifestations of interest were received. As of 2023, there are no clear guidelines on how to re-convert this plant. The last proposal was to turn it into a research centre on green hydrogen production, exploiting funds coming from the National Plan of Recovery and Resilience, but no agreement has been reached among parties.
Augusta	On 14 March 2023, a new research centre and a new solar farm were inaugurated on the premises of the former power plant. The research centre, which will host researchers from the National Research Committee (CNR) and the Scientific and Technological Park of Sicily (PSTS), will be devoted to the study of sustainable reclamation practices and the mitigation of the climate impact of obsolete infrastructures.
Termini Imerese	The re-conversion project of this site features minor involvements of local actors, and was decided upon by Enel executives, who wished to transform the ex-power plant into a storage facility for hydrocarbons. The initiative met with stark opposition of the affected communities and was stopped. As of 2023, the future of the plant remains uncertain.
Assemini	While initially included in the set of plants targeted by the Futur-e initiative, the power plant in Assemini was recognised an essential role in the provisioning of electricity to the insular region of Sardinia. Its role as a power plant was thus retained.

Source: Enel Press Centre and articles from local newspapers

Concerning the **goals** of the initiative, Futur-e responded to Enel's need to renovate its most inefficient electricity generation facilities and to provide new life to the sites that represented an important industrial heritage of the country, in line with

the Corporate Social Responsibility (CSR) commitments of the company. Indeed, one can distinguish two priorities underpinning Futur-e. The first one is the repurposing of plants to re-use them as part of the new energy production paradigm embraced by

Enel, i.e. to use the space of the plants for renewable energy or as storage for renewable energy. In the instance this priority was not pursuable in a given site due to the reasons expounded above, then the second priority was to repurpose the plant into something new and innovative, which could provide greater

benefits to the nearby communities. In all cases, the project aims to re-use existing power plant structures as much as possible, avoiding the cost and waste of major demolition, and aligning with circularity principles.

Key success factors and lessons learned

The overarching **key success factor** underpinning the success of the Futur-e initiative lies in Enel S.p.a.'s commitment to drive sustainable progress in a fair and just way. This commitment is encoded in the company's 'Open Power' philosophy. The precepts that inform this novel business strategy can easily be traced into the principles of Futur-e, and should be enumerated among its success factors. First, open innovation. Enel aims to encourage and develop new solutions through active collaborations with startups, research centres, and universities. The idea for which innovative ideas can be sourced externally was the prime motivation for the launch of call for projects freely accessible to all. Second, sustainability. As a global leader in the high-emitting industry of energy production and delivery, Enel S.p.a. is conscious of the environmental impact it is responsible for and is obviating to this by incorporating sustainability practices into its business operations. The sites targeted by the Futur-e initiatives – due to their low technological standards and obsolete feedstocks – are part of this responsibility, and there was a recognition for which the adoption of circularity principles in the repurposing of these plants, embodied in re-use and recycle of buildings and materials, can vastly reduce the number of emissions and waste arising from wholesale dismantling. The Futur-e initiative embodies a shift from a traditional approach to decommissioning to a novel one based on circularity. The traditional approach involves a linear understanding, with the plants considered as a sort of waste to be disposed of in a cost-effective manner. The circular approach, instead, aims at limiting the waste generated by dismantling activities through re-use and re-cycle; furthermore, it seeks to valorise the historical industrial legacy of the affected sites. Furthermore, the initiative's success lies on the pragmatic conviction for which such re-uses should be economically sustainable and financially viable. Finally, empowering communities. Active engagement of local stakeholders and public authorities propped up a CSV paradigm which is set to deliver long-lasting benefits. In addition to the above success factors, one should mention the technical and financial in-house capabilities of Enel S.p.a., as well as its renown, as conducive to the implementation of the Futur-e initiative.

Concerning **scalability and transferability**, many regions across Europe and North America are faced with the prospect of power plant decommissioning. Note that this issue not only concerns fossil fuel-powered plants, but also renewable energy plants on the verge of their End of Life (EoL). Given increased need and pressure to retire obsolete power generating assets, the question arises on how decommissioning and remediation can take place while keeping economic and environmental

interests at heart, with an eye to generate local economic growth to benefit the affected communities, as these risk potentially long-term earnings and tax revenue loss, on top of legacy environmental contamination. This suggests that the conditions for transferability of the initiative are in place and replication should be welcomed. The decommissioning of obsolete facilities is usually a lengthy and complex process, involving considerable risks if carried out inappropriately. Futur-E proposes a valid blueprint to approach this process. Two elements of this paradigm – namely the emphasis on circularity and the active engagement of local communities – deserve underscoring for effective replication.

Enel Group has devised a methodology – also thanks to the insights derived from Futur-e – to aid effective and sustainable decommissioning of obsolete power plants where needed. This strategy, outlined in the report 'Circl-E: From decommissioning to regeneration' written in collaboration with Arup and Intesa SanPaolo, revolves around the definition of a set of key performance indicators (KPIs) to evaluate proposed re-conversion strategies and monitor their unfolding. While this set can be considered to be universal, as it encompasses general considerations on technical, environmental, financial and social implications, there is a recognition for which local, specific interests should also be addressed in the design of each singular repurposing plan.

The approach proved to be successful enough that Enel Group extended the principles of Futur-e, which were uncovered in the Italian branch of the business, to the entire territory served by the group. Circularity and stakeholders' engagement precepts were thus used for the conversion of more than 40 sites on a global level, including Italy, Spain (e.g. Andorra), and South America.

One of the **key challenges** the project is facing is achieving as effective a stakeholders' engagement as it set out to. The process has proven particularly difficult in certain areas of the country. In Umbria, for example, the change of political colour of the regional administration over the unfolding of the project led to a halt in the re-conversion plans. Also, trade union's contestations on the future of employment at selected plans proved a rather delicate issue to tackle. In other instances, Enel was blamed to have fallen short of its commitment to hear local interests. As was the case for the Termini Imerese plant in Sicily. The definition of re-conversion strategies, let alone their implementation, has also been slower than expected in some instances. This challenge relates to the difficulty of attracting investors with the will and power to see through multi-annual and complex redevelopment strategies. This difficulty is

intensified by the wider Italian institutional framework, which is known for lengthy and cumbersome bureaucratic procedures that may discourage foreign investors.

The **strengths and weaknesses** of the project have already been amply documented. Among the former, one has to mention the emphasis on circularity, the pragmatic approach to economic sustainability, and the extensive consultations with local actors.

Among the latter, it must be said how extensive consultations could prove to be a double-edged sword when various interests are too far apart, and negotiations turn hostile. Furthermore, the fact that the sites targeted by the initiative were dispersed across the national territory led to a heterogeneous situation whereby some experiences were largely positive whereas others largely negative.

Outlook

Futur-e's main goal is to contribute to the climate pledge of Enel S.p.A. Therefore, the Futur-e project may continue at least until 2040, the year when Enel committed to achieving carbon neutrality. However, the underwhelming experiences of a few of the targeted sites suggested that other pathways to re-conversion should be explored, perhaps with stronger involvement of the national government. To this point, note that the sizeable funds granted to Italy in the context of its NRRP could be conducive to more effective action on some of the most delicate situations.

Finally, the Futur-e initiative has somewhat lost momentum after a decent amount of the targeted plants underwent conversion. At this stage, it is unclear how the remaining ones will be repurposed, and whether they will be converted according to the principles set out by the project. However, Futur-e served as a proof of concept and its insights will likely transpire in the re-conversion projects managed by Enel across the world and perhaps even by other industry participants faced with the same challenge.

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