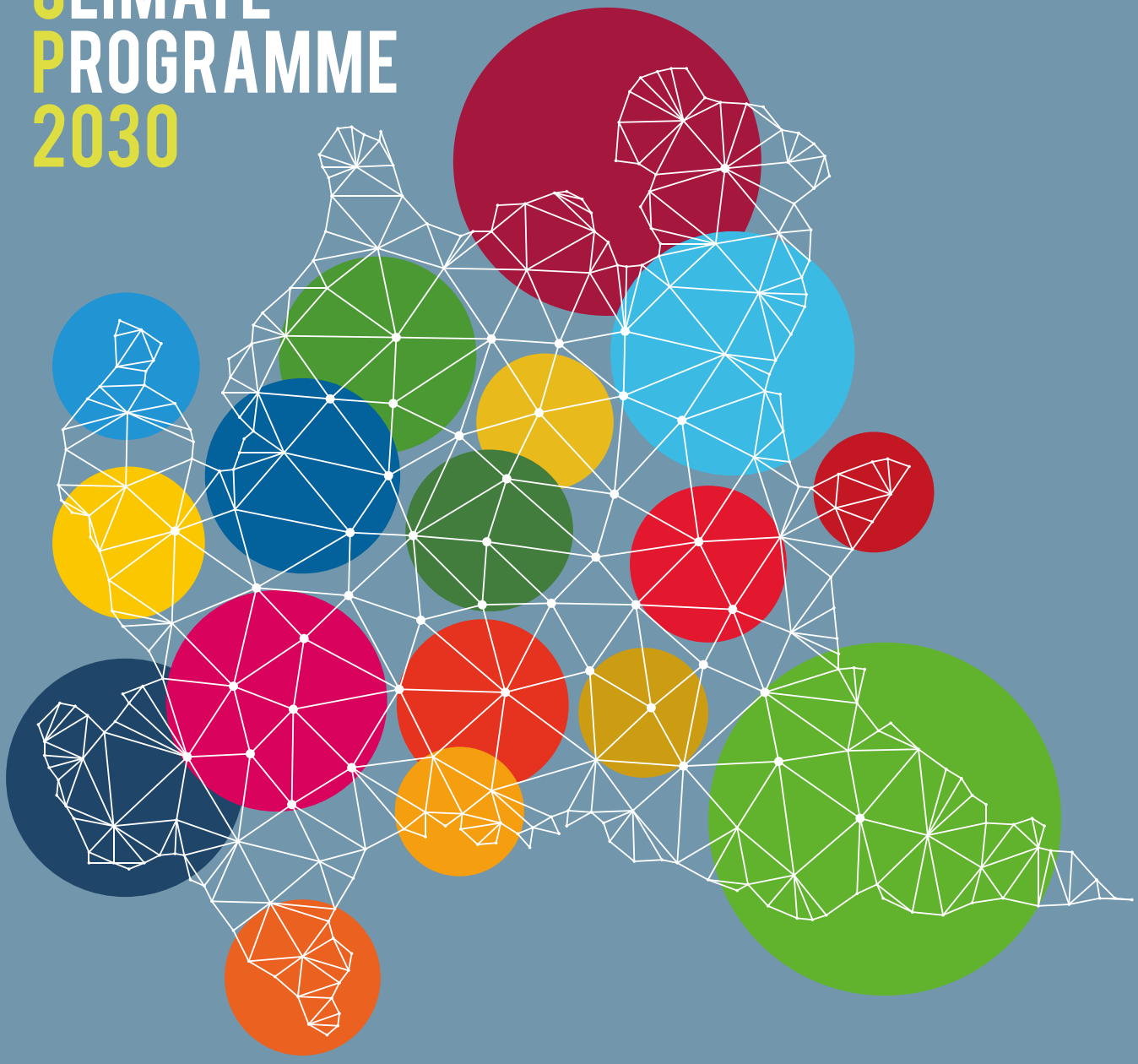
KEY FINDINGS

REGIONAL ENERGY ENVIRONMENT CLIMATE PROGRAMME 2030



Regione Lombardia

In collaboration with

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The **REECP** was launched following the **guidelines** given by the **Regional Council** in **November 2020**, based on a specific situation in Lombardy: the need to **give the Lombard community a concrete future of renewed social and economic well-being** able to **counter climate change**, **consolidate improvements in air quality**, **generate new opportunities for economic development and provide the basis for full access to the market and energy services**. The past two years, amidst the major effects of the pandemic, the energy crisis, and the uncertain European and international geopolitical context ensuing from Russia's invasion of Ukraine, have made the **environmental sustainability of Lombardy's economy and society, a crucial requirement**. This need will be met via the creative spirit that leads Lombardy **not to close itself off in a single technological perspective**, but to **valorise the most competitive industrial sectors and the most promising research and development paths**.

The evolution of European policies for the climate and for strengthening the energy system: the "Fit for 55" and "RePowerEu" proposals

After approving the "***Green Deal***," in which it affirmed the prospect of energy transition and decarbonization, Europe underwent at least two powerful "add-on" acts: the "***Fit for 55***" and the more recent "***RePowerEu***". Amid goals of combating climate change, the need to diversify energy supplies and safeguard the already challenging economic and social recovery, a true "**ecological revolution**" is taking shape, understood as a **dual environmental and economic opportunity**.

The Regional Council Guidelines Act

The Regional Council Guidelines Act indicated that Lombardy must establish itself as a **"net zero emission region" by 2050**, with the guarantee that this important transition will take place with a **positive balance for the economy and for the society**, focusing mainly on **support, promotion and incentive actions**. The REECP aims to relaunch Lombardy's **position as a vanguard in the implementation of climate policies and the development of a competitive, sustainable and leading economic system at the European and international level**. With a precise objective: **to valorise and provide useful tools for local areas to express their vocations** and work toward the goals of ecological transition according to **their own specific characteristics** and to enhance **their best resources, maximising the economic and social benefits**. The REECP also takes up the ideas contained in the recent *Position Paper* prepared by the Presidency of the Lombardy Region, as a

result of the inter-departmental initiative activated with specific reference to the energy emergency, including them in a path of development of measures between now and 2030.

The goals of the Regional Energy Environment and Climate Programme

The REECP **aims** to reduce climate gas emissions to **43.5 million tons** by **2030**, which means a **43.8% reduction compared to 2005** levels. In addition to the target for reducing climate-changing emissions, the aim is to reduce **energy end-use consumption by 35.2%** and to produce **energy from renewables for 35.8% of final energy consumption**. All this while reinforcing the quantitative targets already indicated by the Regional Council Guidelines Act (Table 1).

AIM	GUIDELINES ACT	REECP (MoSEL30 SCENARIO)
Climate-altering gas reduction vs. 2005	40%	43.8%
Reduction in final energy consumption	Between 28% and 32%	35.2%
Renewable energy coverage	Between 31% and 33%	35.8%

Table 1 - From the REECP Guidelines Act: the 2030 targets for reducing climate-changing gas emissions, reducing final energy consumption and covering final energy consumption with renewable sources.

MoSEL30: an evaluation model for defining the context and articulation of the REECP Measures quantifies the climate-changing gas reduction target using a tool developed by the Milan Polytechnic Foundation specifically for the purpose, called **MoSEL30** ***(Regional Model Energy Scenarios Lombardy 2030***): the model evaluates the various technological options, preferring in its choices the best investment : CO_2 reduction efficiency ratio.

The Measures and the Guidelines Act

Region of Lombardy builds the REECP on the **four** basic guidelines established in the **Regional Council Guidelines Act**: **reduction of consumption with** increased **efficiency in end-use sectors**, **development of local renewable sources** and **promotion of self-consumption**, **expansion of the production system**, **development and financing of research and innovation** in the decarbonization service and *green economy*, adaptive and **resilient response** of **the Lombard energy system to climate change**.

The REECP Measures: the system approach

The REECP Measures (Table 2) contain various **lines of action**, which will be detailed and implemented subsequently by constructing specific projects, focusing on expressing to the most the

potential of the various areas. The REECP Measures, which interpret the guidelines established by the Regional Council Guidelines Act, are the result of extensive discussions with the stakeholders involved, through the **Circular Economy and Energy Transition Observatory** and its Round Tables, which are also attended by representatives of other offices of the Regional Government.

The Measures aim to activate several **strategic levers**: **simplification and regulation**; **incentives**; **regional planning**; **participation and networking**.

Measure	Industry	Scope
Development of efficient **district heating** systems	Civil – Industry	Efficiency - Renewables
Promotion of **Renewable Energy Communities (RECs)**	Civil – Industry	Efficiency - Renewables
Private building efficiency	Civil	Efficiency - Renewables
Public building efficiency and energy saving in **public lighting**	Civil	Efficiency - Renewables
Photovoltaic development	Agriculture – Industry – Civil	Renewables
Woody biomass development	Civil – Industry	Renewables
Decarbonization of **industry**	Industry	Efficiency - Renewables
Mobility and **transportation**	Industry - Transportation	Efficiency - Renewables
The **agriculture** of **energy transition** and **decarbonization**: **bioenergy** and **carbon removals**	Agriculture	Efficiency - Renewables
Circular economy measures	Civil – Industry	Efficiency - Renewables
Hydropower development	Industry	Renewables
Development of the **hydrogen supply chain**	Industry - Transportation	Efficiency - Renewables
Development of **Lombardy's production chains for ecological transition**	All	Efficiency - Renewables
Simplification and regulatory tools	All	Territory
Measures to counteract **energy poverty**	Civil	Efficiency - Renewables
Adapting the energy system to climate change	All	Territory
*The **17 Territorial Areas** for Energy Transition*	*All*	*Territory*

Table 2 - The framework of the REECP Measures.

The regional nature of the REECP: the 17 homogeneous areas

The overall scheme of the reference energy system was structured by dividing the region into **17 homogeneous areas** (Figure 1).

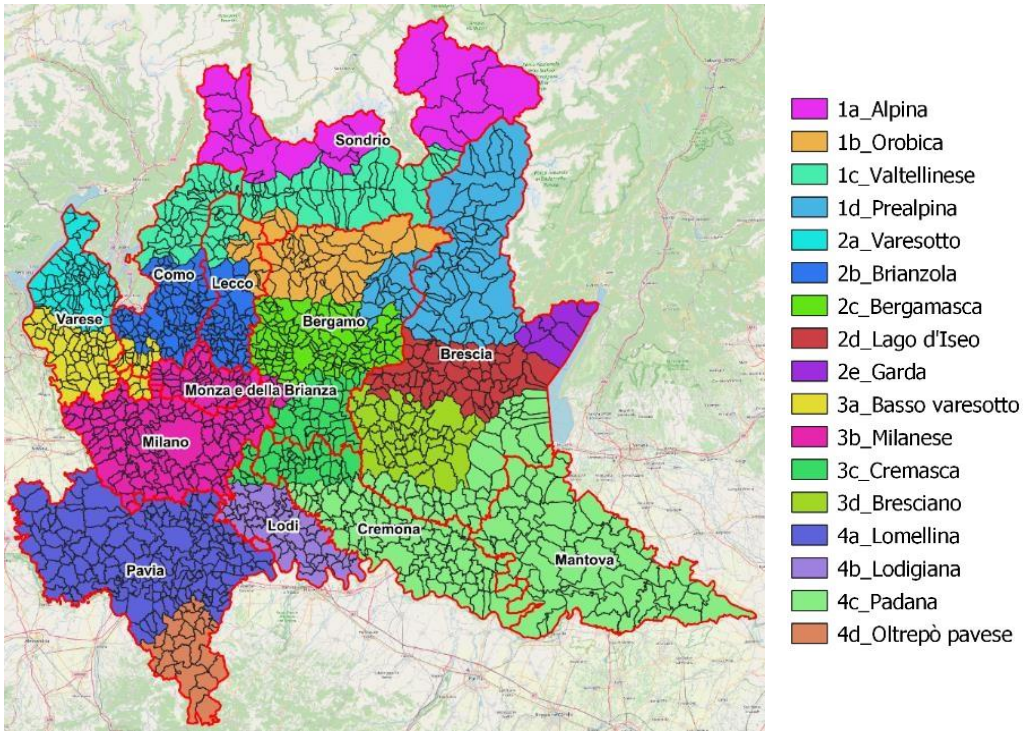

Figure 1 - The 17 homogeneous areas of the REECP 2030 Scenario.

Each area has specific needs (e.g., heat demand for residential heating, mobility demand, etc.), a plant and technology stock-current and potential-to meet requirements, and, lastly, a given availability of resources and regional vocations.

Using the MoSEL30 model, the **areas** were **projected to 2030 in the new energy context** that the REECP sets out to promote. All the technologies and processes analysed and evaluated have their own **investment** costs, fixed and variable costs, **efficiency or specific consumption**, possible **remaining capacity to install until the target year** (2030) and **penetration or availability constraints**, if any.

With the available technology and in the current economic context, **two tools emerge above all**: an **increased availability of renewables** - especially by widely exploiting areas that can be used for the installation of photovoltaic, starting with the roofs of buildings - and the **reduction of energy demand**, widely encouraging a change in behaviour and the pattern of consumption but maintaining - given all the available technological options - an attitude of **using technology to simultaneously ensure environmental, economic and social sustainability objectives**.

The aim of the REECP is to **increase efficiency in almost all sectors** and achieve greater inherent efficiency in the electrification of some services (especially, heating and mobility). This will result in

a **strong reduction in natural gas (-55%**, in part due to the important entry of biomethane) and an **increase in electricity consumption (+19%**), **also increasing the consumption of locally sourced biomass**, in the perspective of valorising and increasing Lombardy's extensive forests and **establishing the forest-wood-energy supply chain**.

Renewable energy sources

Renewable energy sources will increase appreciably, positively contributing to the decarbonization of the energy system as early as 2030: production is expected to reach close to **6 million toe** (tons of oil equivalent) of **energy (+70% compared to 2019**), which would mean covering around **36% of energy consumption**, **fully achieving the goal of the Regional Council Guidelines Act**.

The most widespread renewable source will be related to **heat pump** systems, while **hydropower** will account for just over 16% similarly to **photovoltaic**. **Biomethane**, added to biogas, will account for 13% of Lombardy's renewable production. **Woody biomass** will account for about 20%, also considering the portion that will serve district heating networks being developed.

Biogas burned in cogenerators and electric motors will decrease, as this source is expected to be absorbed by converting it back to biomethane, while maintaining-and increasing-smaller plants (<300 kW).

Woody biomass for domestic use will also be stationary, with plans for major **efficiency upgrading of existing plants**, with the **dual positive effect** of **improving air quality** (a substantial reduction in PM10 emissions is estimated at -57% between 2019 and 2030 for the residential sector) and increasing-especially by accelerating the spread of biomass-fuelled heat networks in mountain and foothill areas, equipped with effective pollutant abatement systems-the **development of the renewable share of final consumption**.

In percentage terms, confirming the strategic role that the agricultural and agroforestry sector-through a broad policy of **bioenergy** deployment-will play in the path of energy transition and diversification of supply sources, the largest increase is attributable to **biomethane** production, which will see a strong boost also resulting from the conversion of biogas plants. The substantial production of biomethane, even in newly installed plants, will have a positive impact on several sectors both from an economic point of view, through the **positive action of the agricultural sector**, which becomes a central player in the production of this energy carrier, and as regards the ability to decarbonize some end-use sectors-such as heating of buildings and transportation. The biomethane

fed into the distribution network will be able to reach end users directly, making an important contribution to the reduction of fossil natural gas consumption in civil and industrial sectors, on the one hand, and to the use of petrol and diesel for the decarbonization of the transportation sector, on the other.

With regard to the **development of district heating networks**, the plan is to expand the current plant fleet by an equivalent capacity of **about 15 medium-sized plants and related networks**. The Lombardy Region will concentrate on replacing obsolete plants still fuelled by diesel and, in parallel, on activating systems for the establishment of forestry supply chains functional to the recovery of local biomass, which can also help reduce the import of biomass from abroad.

Photovoltaic will see massive penetration corresponding to the installation of systems on about 10% of available rooftops, and this technology will play the most important role in the initial phase of establishing **Renewable Energy Communities (RECs**).

The historical renewable source present in Lombardy, **hydropower**, is intrinsically linked to the current weather and climate conditions: this is evidenced by the drastic drop in the first months of 2022 (about -40% compared to the same months in the previous year). It is hoped that revamping of the existing plant will still be possible accompanied by an appropriate increase in installed power.

Energy efficiency and reduction of climate-changing gas emissions in buildings

In the **civil sector** the REECP, which accounts for a significant share (32%) of CO_2equivalent emissions and just under half (47%) of final energy consumption, proposes important measures for **energy retrofit of buildings**. As regards **public buildings** - for which the REECP estimates energy savings in 2030 equal to 30% of 2019 consumption - the prospects for **energy upgrading of municipalities, school buildings, SAP buildings and other public buildings** stand out, as well as the structured **"New Energy for Welfare" programme,** which sets ambitious goals on energy and environmental sustainability issues in health care facilities. For **private building**, on the other hand, the framework of interventions is highly dependent on the **national incentive instruments**, in the hypotheses of the current tax exemption measures evolving combined with other incentive instruments, such as, for example, the **Conto Termico [Heating Fund]**, which the REECP will in any case accompany with **adequate communication and information initiatives**.

Transportation for energy transition and decarbonization

The transport industry plays a central role in the European Union's decarbonization policies, moving along at least two main paths. The first is the **green conversion of motor vehicles**, encouraging the spread of **alternative fuels**, from biofuels to, eventually, hydrogen, and adequately pushing, in the short to medium term, the penetration of electric. Still speaking of actions, the REECP highlights in any case the importance of measures to diversify travel, in favour of low or zero CO_2 equivalent modes, naturally complemented by the strengthening of public transport provision.

A new culture of energy saving

Energy efficiency and energy saving, as well as the technological and structural improvement options, in the building sector are results that can be achieved by changes in **energy consumption behaviour at all levels**, down to individual homes.

To this purpose, the REECP provides for the development of **information and communication actions**.

The investment framework

The REECP is based on the **co-responsibility of all levels of government** (European, national, regional, and local) in affirming the energy transition policy. This is realised with a package of Measures that aspire to having a major impact on Lombardy's economic and social system. The financial resources for implementing the policies are inextricably linked to the **systematization of all available resources**, through the integrated and complementary use of the regional, national and European level funds. The REECP provides an initial analysis of the investments that have been made, or are assumed will be made, in the Lombardy energy and economic system for decarbonization goals, taking into consideration primarily the sources of funding within the Lombardy region: PNRR, ERDF PR 2021-2027, Heating Fund for Public Administrations and individuals, White Certificates for energy efficiency, the tax-exemption systems (SuperEcoBonus, EcoBonus, House Bonus). This funding package is still being rethought, especially in light of the recent "*RePowerEu*".

The resulting picture (Table 3) shows considerable potential of economic resources which need to be catalysed and finalized for the implementation of REECP Measures.

SOURCE	ASSUMED TERRITORIAL SPILLOVER	Average annual forecast	Cumulative forecast to 2030
PNRR	15% of national funds provided for northern Italy aimed at decarbonization	830	3,315

PR-FESR 21/27	Share for decarbonization interventions and circular economy	91.70	642
Heating Fund (individuals share)	Values inferred from HF trend analysis 2021-2022	21.00	168
Heating Fund (P.A. share)	Values inferred from analysis of the 2018-2022 HF trend with forecast consolidation at around the 2020-2021 average	47.00	376
White Certificates	Values inferred from the WC 2020-2021 trend analysis	0.65	5.2
Tax-exemption systems	Value inferred from comparative analysis of current tax-exemptions, assuming reshaping of the Super Ecobonus to 65%	2,500	20,000
	TOTAL	**3,490.36**	**24,506.20**

Table 3 - Recognition of economic resources (Million €) potentially concentrated on the Lombardy region for implementation of climate policy objectives: annual and cumulative 2030 forecast of resource spillover to Lombardy.

Considering the due and reasonable approximations, public investment resources can be assumed to be **about €3.5 billion annually**, of which about 35% have to be spent on interventions on public building stock, with the remaining 65% directed to private stock (building stock and industrial system).

By 2030, it is plausible to assume an economic volume of about €24.5 billion, such as to accompany the full and effective decarbonization envisaged by the REECP, amounting to 16.5 Mt less of climate-altering gas emissions.

The economic impact

The REECP introduces a new element to regional energy, environmental and climate planning, finalizing a series of **economic impact assessments** that the 2030 scenario generates on Lombardy's production system, with particular reference to the supply chains involved. This element is characteristic of the REECP's declared statement of boosting Lombardy's *green economy*, as a practical application of another fundamental indication of the Regional Council Guidelines Act. The assessments made with the support of the Milan Polytechnic Foundation clarify how the **definition of objectives**, **the choice of technology mix as opposed to exclusive choices**, the **investment estimate** and structuring of the Measures have been conducted considering the potential of **an economic and productive system** - from the perspective of the different homogeneous areas considered-**which is the protagonist of the energy transition through the important development of its supply chains**. This includes reconverting and upgrading the traditional supply chains that will have to face the paradigm shift of the new energy system characterized by relevant sustainability

objectives, **ensuring all the conditions for the "Lombard ecological revolution" to be synonymous with new paths of economic development and the creation of new job opportunities**.

The implementation of the REECP: the joint action of the region

The division of the REECP Measures into specific actions, as happened in the definition of the Measures themselves, will follow a path of **maximum involvement of the various players**, ensuring the **best integration of the vocations and resources of local territories**, through appropriate tools (Agreements, incentive actions, creation of partnerships, etc.).

Sostenibilità in Lombardia

Regione Lombardia