TECHNICAL REPORT

GREEN BUILDING FRAMEWORK

CRIF
Together to the next level

1. INTRODUCTION

1.1. OBJECTIVES

CheBanca![1] commissioned CRIF S.p.A. to assist with the identification of the *Green Buildings* underlying a portfolio mortgages by assessing the eligible residential assets related to the acquisition, and construction, in line with:

1. the Institution's Bonds Framework;
2. International Capital Market Association's (ICMA) GBPs;
3. The UN SDGs and EU environmental objectives to address climate change.

1.2. CONTENTS SUMMARY

REPORT CHAPTER	SUMMARY
1. INTRODUCTION	It overviews of the Italian real estate market, focusing on energy efficiency and the Energy Performance Certificate (*EPC*).
2. ELIGIBILITY CRITERIA	It describes the eligibility criteria identified for both the Italian residential building stock.
3. CHEBANCA! PORTFOLIO ANALYSIS	It provides an overview of portfolio eligibility.

The present technical report reflects CRIF's independent opinion. The data were analyzed as received.

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[1] CheBanca! is the bank of the Mediobanca Group dedicated to savings and investments.

1.3. THE EUROPEAN AND ITALIAN TRANSITION TO ENERGY-EFFICIENT BUILDING STOCK

The European Union (EU) has set ambitious targets in agreement with the UN 2030 agenda, sustainable development goals, and the Paris climate agreement. The energy efficiency of buildings is estimated as a crucial element despite a low annual renovation rate of building stock across the Member States. Therefore a renovation boost is needed to meet the EU's energy efficiency and climate objectives. An agenda on Sustainable Finance has been developed since 2018 to achieve these goals that impact to the financial sector. In the EU's policy context, sustainable finance is understood as finance to support economic growth while reducing pressures on the environment and taking into account social and governance aspects Sustainable finance also concentrates on transparency regarding risks related to ESG factors that may influence the financial system and the mitigation of such risks through the appropriate governance of financial and corporate actors. On 11 December 2019, the Commission presented the European green deal, a growth strategy aiming to make Europe the first climate-neutral continent by 2050.[2]

European climate and energy-saving policies have a long history. Without going back too far, one of the European steps to integrate national energy policies is represented by the *2020 Climate and Energy Package* drafted by the European Council in 2007. In 2010, the Energy Performance of Buildings Directive (EU EPBD 2010/31) introduced the necessity of a minimum set of requirements regarding both new and existing buildings. The European Member States, according to this Directive, are responsible for setting the national minimum standards. And to boost the energy performance of buildings, the EU has established a legislative framework that includes the Energy Performance of Buildings Directive 2010/31/EU and the Energy Efficiency Directive 2012/27/EU[3]. Together, the directives promote policies that will help:

- *achieve a highly energy efficient and decarbonized building stock by 2050;*

- *create a stable environment for investment decisions;*

- *enable consumers and businesses to make more informed choices to save energy and money.*

Following the introduction of energy performance rules in national building codes, buildings consume only half as much today compared to typical buildings from the 1980s. Both directives were amended in 2018 and 2019 as part of the Clean energy for all Europeans package.[4] And then, a new energy policy framework was published in 2019 to

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[2] Overview of sustainable finance: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/overview-sustainable-finance_it

[3] Energy performance of buildings directive: https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en

[4] Clean energy for all Europeans package: https://energy.ec.europa.eu/topics/energy-strategy/clean-energy-all-europeans-package_en

move forward from the Energy Union Strategy (2015) while drafting a National Energy and Climate Plan (NECP) for 2021-2030. The so-called Clean Energy for All Europeans package has set three main energy targets by 2030:

- *At least 40% cuts in greenhouse gas emissions;*

- *At least 32% renewables in energy consumption;*

- *At least 32.5% more efficient in energy use.*

The figure below shows the per capita carbon dioxide emissions between 2008-2019, which is more significant for Italy than the European average.
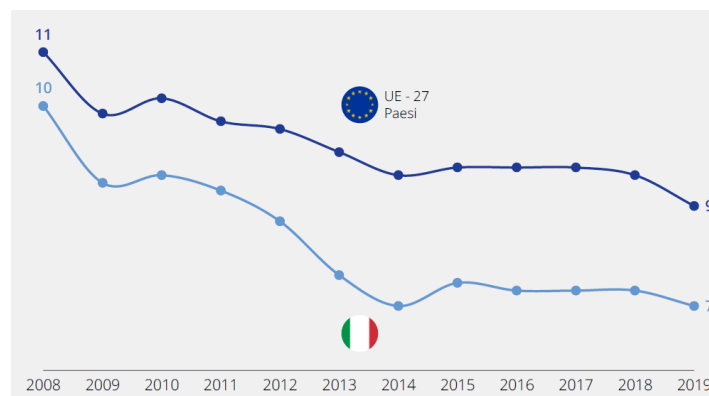
Figure 1 - Climate-altering gas emissions per capita - Italy and EU (tons/year) - Eurostat

Approved in 2020 to make the European Union climate neutral in 2050, the European Green Deal is a set of policies to reduce greenhouse gas emissions. Initiatives by the European Commission will review existing law and introduce new legislation in different areas such as[5]:

- *Transport: Making transport sustainable for all and achieving emission savings by cars, and vans. In particular with 55% reduction of emissions from cars by 2030, 50% reduction of emissions from vans by 2030, and 0 emissions from new cars by 2035.*

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[5] Examples and goals are available on: Delivering the European Green Deal https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en

- *Industry: Leading the third industrial revolution, because the green transition presents a major opportunity for European industry by creating markets for clean technologies and products.*

- *Energy: Cleaning our energy system and reducing greenhouse gas emissions by at least 55% by 2030 requires higher shares of renewable energy and greater energy efficiency.*

- *Real estate: Renovating our homes and buildings will save energy, protect against extremes of heat or cold and tackle energy poverty. As an example, the Commission proposes to increase the use of renewable energy in heating and cooling by +1.1 percentage points each year, until 2030*

- *Environmental protection: Restoring nature and enabling biodiversity to thrive again offers a quick and cheap solution to absorb and store carbon. The Commission proposes therefore to restore Europe's forests, soils, wetlands, and peatlands to make our environment more resilient to climate change.*

The proposals aim to make the EU's economy fit to meet the challenge of making Europe the first climate-neutral continent in the world. *The building sector is crucial for achieving the EU's energy and environmental goals and at the same time, better and more energy efficient buildings improve the quality of citizens' life while bringing additional benefits to the economy and the society.* Real estate is the most consuming energy sector (around 40%) and is responsible for approximately 36% of the total European greenhouse emissions.[6]

Furthermore, the *European Green Deal* is a plan to comply with the United Nations' sustainable goals and the Paris Agreement (2015), reducing the net greenhouse emissions to zero by 2050. In this regard, *the real-estate sector is crucial: 75% of the existing stock is inefficient, and only 1% of buildings undergo retrofitting interventions every year. At present, about 35% of the EU's buildings are over 50 years old and almost 75% of the building stock is energy inefficient*.[7] According to the *Renovation Wave for Europe – Greening our buildings[8]*, the renovation rate is expected to double in the next ten years. Besides, investments in energy efficiency stimulates the economy, especially the construction industry, which generates about 9% of Europe's GDP and directly accounts for 18 million direct jobs. SMEs in particular, benefit from a boosted renovation market, as they contribute more than 70% of the value-added in the EU's building sector.

Finally, the N*extGenerationEU* plan is a temporary European instrument designed to boost the recovery post-COVID-19 pandemic. Among other key objectives, the package focuses on climate change with 30% of the overall amount

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[6] https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en

[7] Energy performance of buildings directive: https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en

[8] Renovation wave: https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en

of funds, € 250 billion, representing the highest share ever of the European budget destined for environmental and climate targets. As highlighted by the EU commission, *Buildings are, therefore, the single largest energy consumer in Europe. Heating, cooling, and domestic hot water account for 80% of the energy that we, citizens, consume.* The Italian plan provides € 15.36 billion for energy efficiency and building renovation, over 8% of total resources.

In December 2021, the Commission proposed upgrading the existing regulatory framework to reflect higher ambitions and more pressing needs in climate and social action while providing EU countries with the flexibility needed to consider the differences in the building stock across Europe. It also sets out how Europe can achieve a zero-emission and fully decarbonised building stock by 2050. The proposed measures will increase the renovation rate, particularly for the worst-performing buildings in each country. The Commission proposes that **as** of 2030, all new buildings must be zero-emission.[9]

The Italian *National Energy and Climate Plan* (NECP) was provided to the European Commission in December 2019: *Italy is fully aware of the potential benefits inherent to the increased availability of renewables and energy efficiency, connected to the reduction in polluting and climate-changing emissions, improvements in energy security, and economic and employment opportunities for families and the production system. It intends to follow this path with conviction, with an approach that increasingly focuses on citizens, including in their capacity as prosumers, and businesses, small and medium-sized enterprises.[10]*

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[9] European Green Deal: Commission proposes to boost renovation and decarbonisation of buildings:
https://ec.europa.eu/commission/presscorner/detail/en/IP_21_6683
[10] Integrated National Energy and Climate Plan, December 2019, pag.4, NECP

Table 1 - Comparison between EU and Italian 2020 & 2030 energy targets
Source: CRIF elaboration from Italian Integrated National Energy and Climate Plan, 2019

	2020 OBJECTIVES		2030 OBJECTIVES	
	EU	ITALY	EU	ITALY
RENEWABLES ENERGIES (RES)				
Share of energy from RES in the final gross consumption	20%	17%	32%	30%
Share of energy from RES in the final gross consumption in the transport sector	10%	10%	14%	22%
Share of energy from RES in the final gross consumption for heating and cooling			+1.3% per year (indicative)	+1.3% per year (indicative)
ENERGY EFFICIENCY				
Reduction in primary energy consumption compared to the PRIMES 2007 scenario	-20%	-24%	-32.5% (indicative)	-43% (indicative)
Final consumption savings as a result of obligatory energy efficiency systems	-1.5% per year (without transport sector)	-1.5% per year (without transport sector)	-0.8% per year (with the transport sector)	-0.8% per year (with the transport sector)
GREENHOUSE GAS EMISSIONS				
Reduction in GHG vs 2005 for all plants subject to ETS rules	-21%		-43%	
Reduction in GHG vs 2005 for all non-ETS sectors	-10%	-13%	-30%	-33%
The overall reduction in greenhouse gases compared to 1990 levels	-20%		-40%	
ELECTRICITY INTERCONNECTEDNESS				
Level of electricity interconnectedness	10%	8%	15%	10%
Electricity interconnection capacity (MW)		9.285		14.375

The EU sets an indicative reduction goal of -32.5%, around ten basis points lower than the Italian one. This result suggests the importance of effective measures trimming the existing average gap between Italy's energy-efficient policies and many other European countries.

1.4. ENERGY EFFICIENCY AND THE REAL ESTATE MARKET

Real estate represents a strategic arena where energy-efficient measures can impact achieving CO2 reduction targets. Today's buildings sector accounts for almost one-third of total final energy consumption and 15% of end-use sector direct CO2 emissions, and its share of emissions rises to around 30% if indirect emissions from the electricity and heat used in the buildings are included. Energy use in the buildings sector accounts for almost 3 Gt of direct CO2 emissions today.[11] According to ENEA, in Italy, households are responsible for approximately 45% of energy consumption and 17,5% of GHG emissions.

According to EUROSTAT, *the main use of energy by households in the EU in 2020 was for heating their homes (62.8% of final energy consumption in the residential sector), with renewables accounting for more than a quarter (26.8%) of EU households space heating consumption.*[12] According to EUROSTAT, and as shown in the following figure: in Italy, 65.4% of the energy consumed in the residential sector has the purpose of space heating, a percentage higher than the European average. In Belgium, it is even higher because over 72% of energy is used for this purpose. On the contrary, the energy consumption for air cooling is 0.7% against 0.4% at the European level, but in Cyprus and Malta exceeds 10%. Consumption for water heating is also below average, just like that for lighting. In accordance, as illustrated by figure 2, space heating counts for two-thirds of the total energy consumption for the Italian residential sector, while cooling is around 6%.

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[11] International Energy Agency, World Energy Outlook, October 2021. Available at:
https://iea.blob.core.windows.net/assets/888004cf-1a38-4716-9e0c-3b0e3fdbf609/WorldEnergyOutlook2021.pdf
[12] Energy consumption in households: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Energy_consumption_in_households
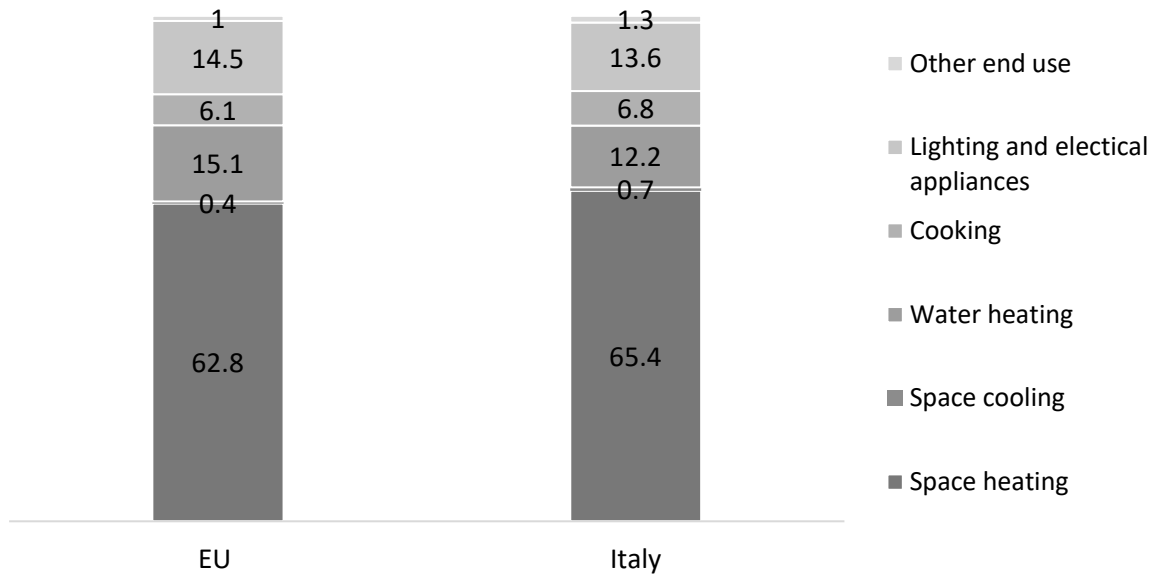
Figure 2 - Share of the energy consumption of households broken down by end-use – Eurostat, 2020

In 2020, most of the EU final energy consumption in the residential sector is covered by natural gas (31.7 %) and electricity (24.8 %). Renewables account for 20.3 %, followed by petroleum products (12.3 %) and derived heat (8.2 %). A small proportion is still covered by coal products (solid fuels) (2.7 %).[13] In recent years, global CO_2 emissions related to buildings have risen due to several factors primarily associated with an increasing energy demand for heating and cooling systems (e.g., air-conditioning), driven by climate change conditions (and extreme weather events). Considering the Italian residential sector, figure 3 shows how natural gas is still the most significant contributor to energy consumption. In contrast, over 20% relates to renewables and wastes and only approximately 6% to oil and petroleum sources.

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[13] Energy consumption in households: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Energy_consumption_in_households

EU

31.7
20.3
24.7
12.3
8.2
2.8

Italy

52
20.5
18.6
6.1
2.8
0

- Natual gas
- Renewables and biofuels
- Electricity
- Oil and petroleum products (excluding biofuel portion)
- Heat
- Solid fossil fuels, peat and peat products
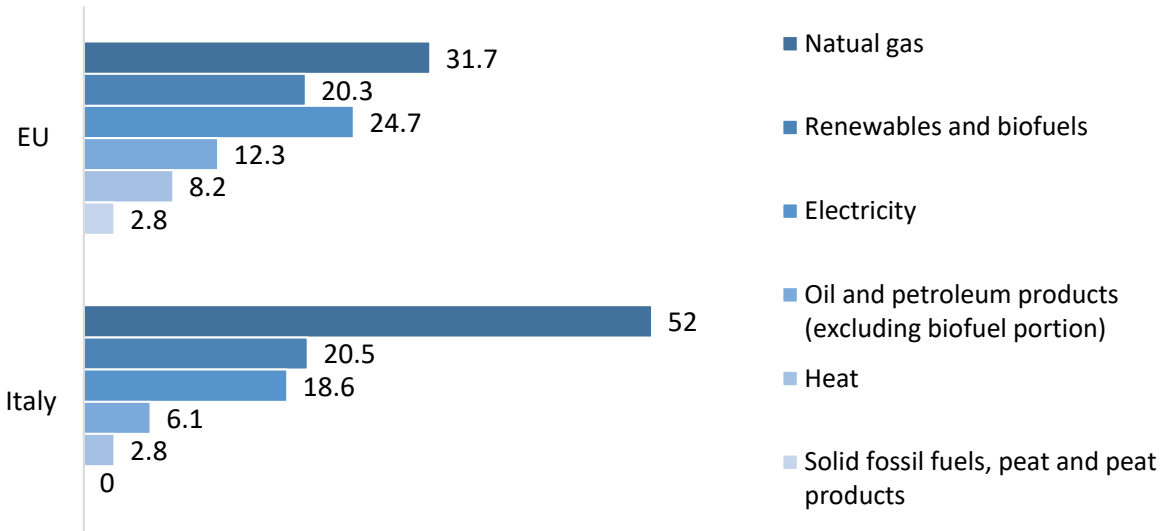
Figure 3 - Share of final energy consumption in the residential sector by fuel – Eurostat, 2020

Energy consumption for space heating is the cause of the most significant energy use in Europe and Italy. However, the Italian energy mix is more unbalanced on natural gas than the European average. Two-thirds of it is used in Italy, 20% more than the European average.

EU: 38, 26.8, 5.2, 15.6, 10.2, 4.2
Italy: 59.9, 28.9, 0.4, 6.9, 3.8, 0

- Natural gas
- Renewables and biofuels
- Electricity
- Oil and petroleum products
- Heat
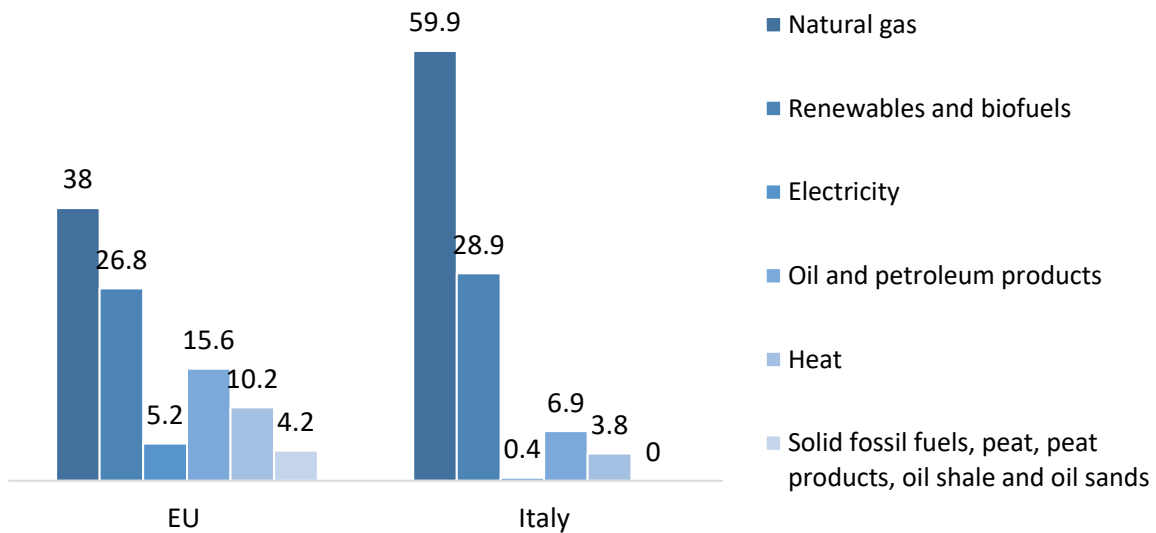- Solid fossil fuels, peat, peat products, oil shale and oil sands

Figure 4 - Share of fuels in the final energy consumption in the residential sector for space heating – Eurostat, 2020

In Italy, buildings for residential use amounted to 12.42 million, with almost 32 million dwellings. Over 65% of this building stock is over 45 years old, so it was already built in 1976 when the first law on energy saving entreated into force. In line with the European guidelines, Italy has set the new minimum requirements from 2021, providing that all new buildings and complete renovations comply with the nZEB (nearly Zero Energy Building) standard. The share of nZEB compared to the stock of existing buildings does not exceed 0.03%, and less than 10% of the nZEB are existing buildings that have been redeveloped to achieve high energy efficiency standards (ENEA, 2019). The SIAPE (System of Information on Energy Performance Certificates) provides information on the Italian building stock, and it is a portal created and managed by ENEA. SIAPE collects and organizes data from certificates in collaboration with Regions and Autonomous Provinces; 16 connected entities share aggregated information with ENEA and become public. The energy cadasters gathering EPCs are managed under the regional jurisdiction. Accordingly, EPCs' data are not publicly accessible for all the Italian regions. With this respect, Lombardia, the Province of Trento (Trentino Alto-Adige), represent those regions providing open access to data related to the energy efficiency of the buildings located on their territory. To address the problems associated with the lack of building's energy efficiency data, the Ministerial Decree on 26/06/2015 introduced a new national database, SIAPE, managed by ENEA, where contributing regions are required to upload the gathered EPCs by the end of March every year. As shown in figure 5, not all Italian regions today contribute to the SIAPE database. Indeed, the blue areas identify the energy cadasters providing EPCs' information, while the grey ones do not share information. The yellow regions are currently working on uploading their data into SIAPE.

Figure 5 - Map of the Italian regions contributing to the SIAPE database, from SIAPE, ENEA
Figure 6 – SIAPE Logo

The SIAPE has collected 2,915,669 EPCs issued in 2015-2022 from 16 regions when writing the present report. Overall, 86.2% of the records belong to residential buildings and 13.8% to non-residential ones. This result is consistent with the evidence of the last Italian census in 2011, when residential buildings represented 89% of the stock against the 11% of non-residential buildings. As shown in figures below, Italy is divided into six climate zones: climate zone A is the hottest, and zone F is the coldest. This subdivision is carried out at the municipality level, based on heating degree days.[14]

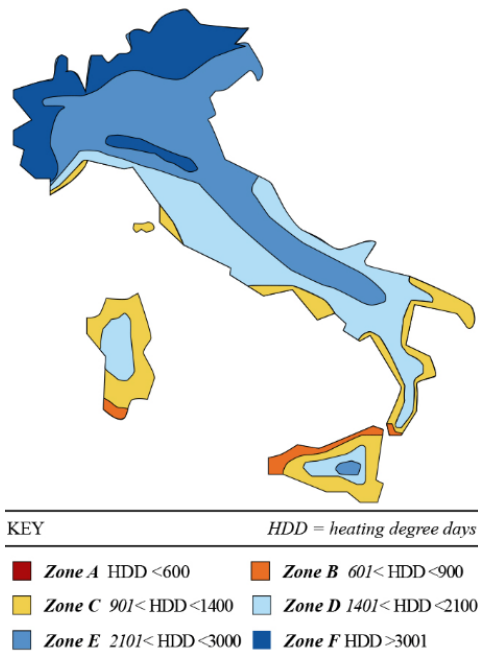| KEY	HDD = heating degree days
Zone A HDD <600	**Zone B** 601< HDD <900
Zone C 901< HDD <1400	**Zone D** 1401< HDD <2100
Zone E 2101< HDD <3000	**Zone F** HDD >3001

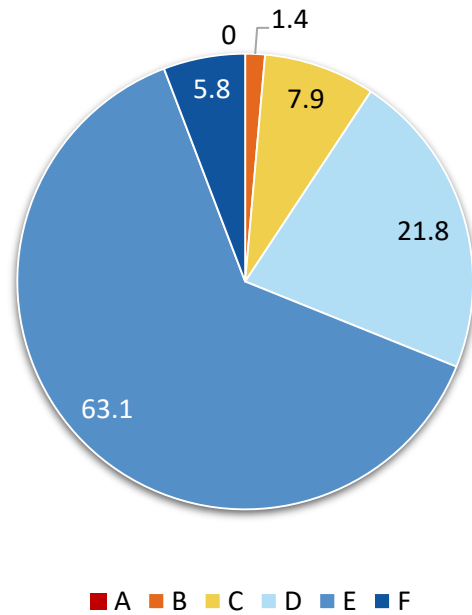*Figure 7A - Italian Climate Zones Subdivision [14]*   *Figure 7B - Share of SIAPE EPCs per Climate Zones*

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[14] The integrated design of building services by an equipped and eco-efficient module (MOTE2), December 2016 VITRUVIO - International Journal of Architectural Technology and Sustainability

1.5. GREEN BUILDING: MARKET REFERENCES

On 21 April 2021, the European Commission published the text of the EU Taxonomy Climate Delegated Act *establishing technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives*. The attention poses to those actions needed to mitigate climate change effects. Indeed, Annex I focuses on the technical screening criteria (TSC) related to a substantial contribution to climate change mitigation and *do no significant harm* ('DNSH') different activities. Accordingly, Table 2 provides an overview of the TSC for the *construction of new buildings.*[15] At the same time, Table 3 relates to the *renovation of existing buildings*[16] and table 4 on *acquisition and ownership of buildings*.[17] *The economic activities in this category could be associated with several NACE codes, in particular F41.1 and F41.2, including also activities under F43, in accordance with the statistical classification of economic activities established by Regulation (EC) No 1893/2006*, construction and real estate activities represent a fundamental economic category to pursue the objectives related to carbon emission reductions.

Table 2 - Substantial Contribution to Climate Change Mitigation: Construction of new buildings
Source: Delegated Act of the EU Taxonomy for sustainable activities

Construction of new buildings	Substantial Contribution to Climate Change Mitigation
1	The Primary Energy Demand (PED), defining the energy performance of the building resulting from the construction, is at least 10 % lower than the threshold set for the nearly zero-energy building (NZEB) requirements in national measures implementing Directive 2010/31/EU of the European Parliament and of the Council. The energy performance is certified using an as built Energy Performance Certificate (EPC).
2	For buildings larger than 5000 m2, upon completion, the building resulting from the construction undergoes testing for air-tightness and thermal integrity, and any deviation in the levels of performance set at the design stage or defects in the building envelope are disclosed to investors and clients. As an alternative; where robust and traceable quality control processes are in place during the construction process this is acceptable as an alternative to thermal integrity testing.
3	For buildings larger than 5000 m2 286, the life-cycle Global Warming Potential (GWP) of the building resulting from the construction has been calculated for each stage in the life cycle and is disclosed to investors and clients on demand.

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[15] *Description of the activity: development of building projects for residential and non-residential buildings by bringing together financial, technical and physical means to realise the building projects for later sale as well as the construction of complete residential or non-residential buildings, on own account for sale or on a fee or contract basis.*

[16] *Description of the activity: Construction and civil engineering works or preparation thereof.*

[17] *Description of the activity: Buying real estate and exercising ownership of that real estate*

Table 3 - Substantial Contribution to Climate Change Mitigation: Renovation of existing buildings
Source: Delegated Act of the EU Taxonomy for sustainable activities

Renovation of existing buildings	Substantial Contribution to Climate Change Mitigation
1	The building renovation complies with the applicable requirements for major renovations. Alternatively, it leads to a reduction of primary energy demand (PED) of at least 30 %.

Table 4 - Substantial Contribution to Climate Change Mitigation: Acquisition and ownership of buildings

Source: Delegated Act of the EU Taxonomy for sustainable activities

Acquisition and ownership of buildings	Substantial Contribution to Climate Change Mitigation
1	For buildings built before 31 December 2020, the building has at least an Energy Performance Certificate (EPC) class A. As an alternative, the building is within the top 15% of the national or regional building stock expressed as operational Primary Energy Demand (PED) and demonstrated by adequate evidence, which at least compares the performance of the relevant asset to the performance of the national or regional stock built before 31 December 2020 and at least distinguishes between residential and non-residential buildings.
2	For buildings built after 31 December 2020, the building meets the criteria specified in Section 7.1 of this Annex that are relevant at the time of the acquisition.
3	Where the building is a large non-residential building (with an effective rated output for heating systems, systems for combined space heating and ventilation, air-conditioning systems or systems for combined air-conditioning and ventilation of over 290 kW) it is efficiently operated through energy performance monitoring and assessment.

Intending to identify those buildings in a bank's portfolio eligible for a Green Bond issuance, acquisition and ownership, and renovations sections will play a fundamental role in the future. The EU Taxonomy aims to define a set of practices and thresholds to define business and activities aligned with the European climate change mitigation and adaptation objectives.

Similarly, the Climate Bonds Taxonomy *is a guide to climate aligned assets and projects. It is a tool for issuers, investors, governments and municipalities to help them understand what the key investments are that will deliver a low carbon economy.* Indeed, *The Climate Bonds Taxonomy identifies the assets, activities and projects needed to deliver a low carbon economy. Consistent with the 2 goals of the Paris Agreement. It has been developed based on*

the latest climate science including research from the Intergovernmental Panel on Climate Change (IPCC) and the International Energy Agency (IEA), and has benefited from the input of hundreds of technical experts from around the world. It can be used by any entity looking to identify which assets and activities, and associated financial instruments, are compatible with a trajectory to net zero by 2050.[18]

The CBI Taxonomy also defines a *Screening Indicator* for residential buildings, as the *emissions footprint in the top 15% of emissions performance in the local market or a substantial reduction in* gCO_2/m_2 *because of upgrade or retrofit*. With this regard, considering residential buildings*, existing instruments such as local building codes, energy rating schemes (e.g. US Energy Star) and energy labelling schemes (e.g. Energy Performance Certificates in the EU) are leveraged as emission performance proxies (using the proxy methodology).*[19]

Accordingly, two methodologies for establishing building proxies[20] (2016) for the identification of the top 15% most energy-efficient buildings are provided:

  A. *Benchmarking against local market emissions performance*;

  B. *The proportion of total ratings/labels awarded.*

Option A relies on the existence of data and statistics on the emission performance of buildings. Identifying the local top 15% bucket represents the starting point for drafting an *emission performance trajectory* that declines towards zero emissions in 2050. Conversely, Option B offers a solution in case of a lack of emission performance's data. The identification of the top 15% relies on the adoption of the national scheme as a benchmark where the analysis is supported by solid *evidence to demonstrate that the rating or label is in the top 15% of all ratings or labels awarded under the scheme (that predominantly rates buildings on energy efficiency/emissions).*

Mediobanca has adopted a Green, Social and Sustainability Bond Framework that *is aligned with the ICMA's Green Bond Principles (2021), Social Bond Principles (2021) and Sustainability Bond Guidelines (2021). Mediobanca is committed to being constantly aligned with best market practices, aiming at full transparency and quality of Green, Social and Sustainability Bonds issued. Where currently feasible and on a best-effort basis Mediobanca will pursue alignment with the Technical Screening Criteria of the EU Taxonomy Delegated Act4 and any future relevant update*

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[18] Climate Bond Taxonomy 2021
[19] https://www.climatebonds.net/standard/buildings
[20] Available at:
https://www.climatebonds.net/files/files/Methodology%20for%20Establishing%20Proxies.pdf

as applicable from time to time, including any other regulatory update or new standard proposed by European authorities. The section relating to properties includes the following selection criteria:

A. *Buildings with environmental standard certifications, such as LEED (Gold or above), BREEAM (Very Good or above), HQE (Excellent or above) or equivalent comparable international certifications;*

B. *For buildings built before 31 December 2020: compliance with energy efficiency class A or B; or belonging to the top 15% low carbon buildings in the region (including building with energy efficiency class C);*

C. *For buildings built after 31 December 2020: the Primary Energy Demand (PED) is at least 10 % lower than the threshold set for the nearly zero-energy building (NZEB);*

D. *Renovation projects with an improvement in terms of energy efficiency of at least 30% in terms of PED;*

E. *Acquisition of tax incentives related to investments in energy efficiency renovations and improvements introduced by Italian or other EU governments.*

Selection criterion B complies with the eligibility criteria set out by CRIF on the Italian market, as demonstrated in the following paragraphs.

1.6. ITALIAN EPC LABELLING SCHEME

In Europe, the normative framework for assessing the buildings' energy performance belongs to the Energy Performance of Buildings Directive (EPBD). *The EPBD aims to promote the improvement of the energy performance of buildings within the European Union, taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost-effectiveness.*

Since 2002, three versions of the EPBD are published:

1. Directive 2002/91/EC;

2. Directive 2010/31/EU;

3. Directive 2018/844/EU.

Indeed, the revision of 2018 introduced the obligation for Member States to disclose the national calculation methodology without forcing them to apply those standards provided in the Directive 2010/31/EU. This approach requires the Member States to explain existing divergences of the national application from the Directive.

The first Italian National Energetic Plan was introduced in 1991, while the energy label (ACE - *Attestato Certificazione Energetica*) in 2005 due to the introduction of the EPBD Directive 2002/91 (ENEA, 2020). Nowadays, the energy performance assessment of a building produces a new energy label (EPC), the APE – *Attestato Prestazione Energetica*, according to rules set in the Italian Directive 26/06/2015 (*Requisiti Minimi*). The Energy Performance Certificate is mandatory for rent, acquisition, construction of a new building, and energy renovation (retrofitting process). The EPCs are a valuable guide for the real estate market concerning energy aspects. Indeed label and energy performance is a part of a more comprehensive assessment of the building under evaluation. The performance is measured for the structural components (walls, windows) and the energetic systems, divided by use (space heating or cooling, heating water).

Based on the existing methodology, the energy performance is defined through a ranking from A4 (the most efficient) to G (the least efficient), as shown in figure 8.
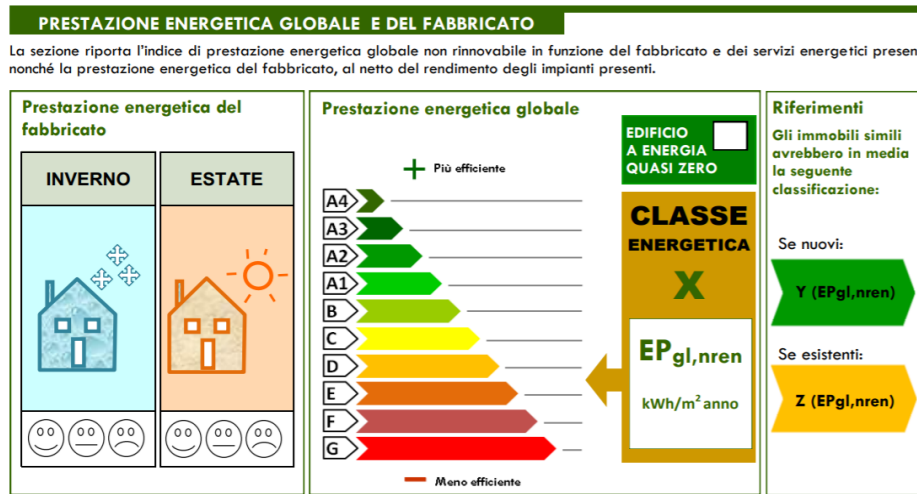
Figure 8 - Building's Energy Performance format
Source: Italian Decree 26/06/2015 (Requisiti Minimi)

In addition to the energy label, several energy indicators are automatically derived during the property assessment.

At first, the EPC class is assigned as a consequence of several steps and computations:

1. The $EP_{gl,nren,rif,standard}$ of a *reference building* is derived after providing specific input information related to the building under assessment. Indeed, the *reference building* has the same features as the assessed building in terms of geometry, location, exposition, and use but supported by standard technologies as defined by law.[21]

2. The $EP_{gl,nren}$ of the building under assessment. The $EP_{gl,nren}$[22] provides information about the kilo-wattage of energy required by the property under standard conditions per square meter of heated floor per year. Overall, the $EP_{gl,nren}$ is defined as:

$$EP_{gl,nren} = EP_{H,nren} + EP_{C,nren} + EP_{W,nren} + EP_{V,nren} + EP_{L,nren} + EP_{T,nren}$$

In particular, the above formula considers:

*   non-renewable primary energy demand for winter heating and air conditioning ($EP_{H,nren}$ and $EP_{C,nren}$);

*   non-renewable primary energy demand for hot sanitary water ($EP_{W,nren}$);

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[21] See the Decree 26/06/2015, national criteria and technical norms (UNI/TS 11300), EU Directive 2010/31
[22] Expressed in kWh/m²

- non-renewable primary energy demand for ventilation ($EP_{V,nren}$);

- non-renewable primary energy demand for artificial lighting (included for non-residential buildings) ($EP_{L,nren}$);

- non-renewable primary energy demand for the transport of people and things (included for non-residential buildings) ($EP_{T,nren}$).

3. Computing the ratio between (2) and (1), the EPC class is assigned following the scheme in figure 9.

	Classe A4	$\leq 0,40\ EP_{gl,nren,rif,standard\ (2019/21)}$
$0,40\ EP_{gl,nren,rif,standard\ (2019/21)} <$	Classe A3	$\leq 0,60\ EP_{gl,nren,rif,standard\ (2019/21)}$
$0,60\ EP_{gl,nren,rif,standard\ (2019/21)} <$	Classe A2	$\leq 0,80\ EP_{gl,nren,rif,standard\ (2019/21)}$
$0,80\ EP_{gl,nren,rif,standard\ (2019/21)} <$	Classe A1	$\leq 1,00\ EP_{gl,nren,rif,standard\ (2019/21)}$
$1,00\ EP_{gl,nren,rif,standard\ (2019/21)} <$	Classe B	$\leq 1,20\ EP_{gl,nren,rif,standard\ (2019/21)}$
$1,20\ EP_{gl,nren,rif,standard\ (2019/21)} <$	Classe C	$\leq 1,50\ EP_{gl,nren,rif,standard\ (2019/21)}$
$1,50\ EP_{gl,nren,rif,standard\ (2019/21)} <$	Classe D	$\leq 2,00\ EP_{gl,nren,rif,standard\ (2019/21)}$
$2,00\ EP_{gl,nren,rif,standard\ (2019/21)} <$	Classe E	$\leq 2,60\ EP_{gl,nren,rif,standard\ (2019/21)}$
$2,60\ EP_{gl,nren,rif,standard\ (2019/21)} <$	Classe F	$\leq 3,50\ EP_{gl,nren,rif,standard\ (2019/21)}$
	Classe G	$> 3,50\ EP_{gl,nren,rif,standard\ (2019/21)}$

Figure 9 - Italian EPC label thresholds
Source: Italian Decree 26/06/2015 (Requisiti Minimi)

1.6.1. NZEB buildings

The above-mentioned EPBD Directive 2010/31/EU also introduces Nearly-Zero-Energy-Building (NZEB).

NZEB buildings are characterized by a nearly zero balance between energy consumption and energy production: *The nearly zero or very low amount of energy required should be covered to a very significant extent from renewable sources, including sources produced on-site or nearby.*

At the same time, *as concrete numeric thresholds or ranges are not defined in the EPBD, these requirements leave room for interpretation and thus allow Member States to define their nearly zero-energy buildings (NZEB) in a flexible way taking into account their country-specific climate conditions, primary energy factors, ambition levels, calculation methodologies and building traditions.*

In Italy, the NZEB requirements are introduced by the Legislative Decree 26/06/2015 "Requisiti Minimi". Indeed, all the new constructions under public ownership must comply with NZEB technical requirements starting from 2019. Furthermore, the same criterium applies to all the other types of buildings since 1 January 2021.
Nevertheless, some virtuous regions decided to anticipate the scheduled deadlines. For instance, the Emilia-Romagna region has applied the NZEB requirements since 2017 for public buildings and in 2019 for the other types. Accordingly, the Lombardia region since 2016.

The current EPC format shown in figure 8 presents a dedicated box for the NZEB information (*EDIFICIO A ENERGIA QUASI ZERO*). As of today, according to the SIAPE, in Italy, 16,085 buildings are NZEB:

- 15,460 residential properties;

- 625 non-residential properties.

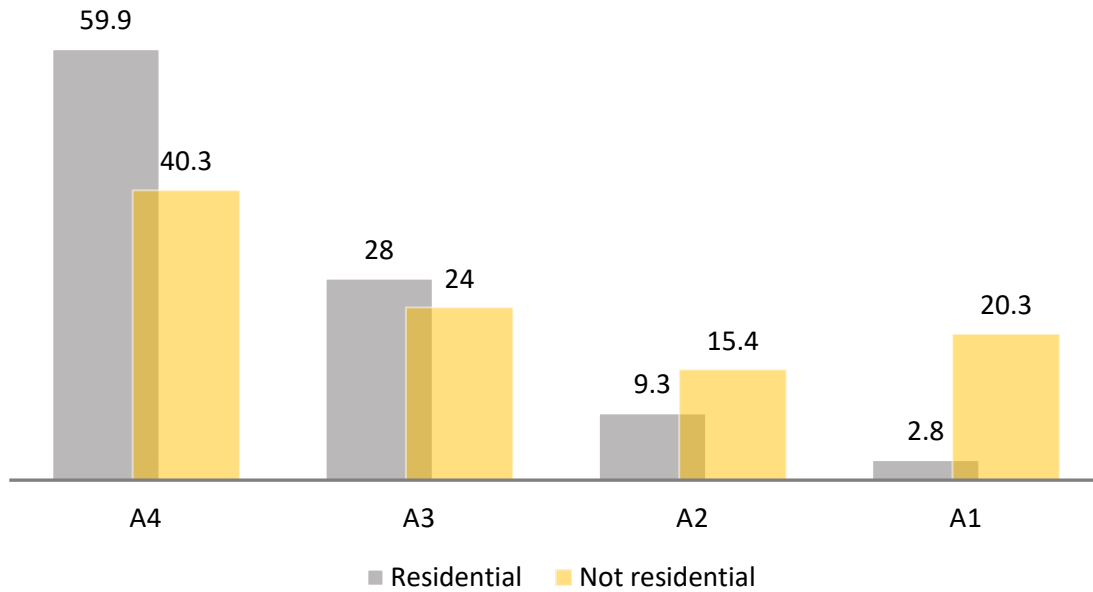Figure 10 shows the distribution (%) of the EPC related to NZEB.

Figure 10 - Share of NZEB residential buildings per EPC class
Source: CRIF elaboration on SIAPE data

2. ELIGIBILITY CRITERIA

The applied methodology to select eligible mortgages for energy-efficient buildings within the CheBanca! portfolio relies on Climate Bonds Taxonomy, and it is fully aligned with the Eligibility Criteria for green buildings set in the ISS's Second Party Opinion Framework.

2.1.   ENERGY EFFICIENCY AND REAL ESTATE MARKET: CRIF'S APPROACH

This chapter represents a fundamental premise in identifying the eligible buildings within the CHEBANCA!'s portfolio by providing a detailed analysis of the Italian building stock to identify those properties belonging to the top 15% of the most energy-efficient buildings using the current Italian EPC labelling scheme as a proxy.

As a result, the following milestones are considered:

1.   EPCs distribution for residential buildings;

2.   Construction year as a proxy for the residential buildings without EPC.

This section aims to identify the top 15% of the Italian residential buildings stock by analysing EPC data gathered in the SIAPE platform by ENEA. The latter constitutes the most critical and complete data source for EPCs at a national level.

At first, a filter to identify residential buildings[23] only is applied, slightly reducing the SIAPE data pool to 2,512,863 EPCs. Nevertheless, The SIAPE dataset is still robust in terms of dimension and provides a good representation of the buildings' distribution according to the Italian regions.

Figure 11 shows the distribution of EPCs, while figure 12 identifies the top 15% of properties.
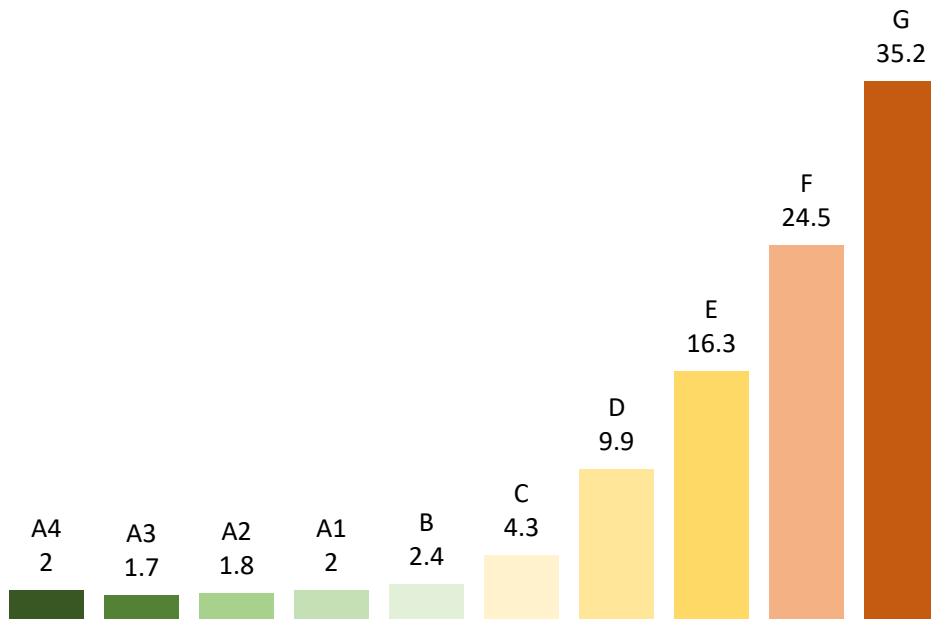

Figure 11 - Distribution (%) of EPCs for residential buildings
Source: CRIF elaboration on SIAPE data

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[23] DPR 412/93. *Destinazione d'uso in: E1(1) - abitazioni adibite a residenza con carattere continuativo, E(1) bis – collegi, luoghi di ricovero, case di pena, caserme, conventi and E1(2) - abitazioni adibite a residenza con occupazione saltuaria*
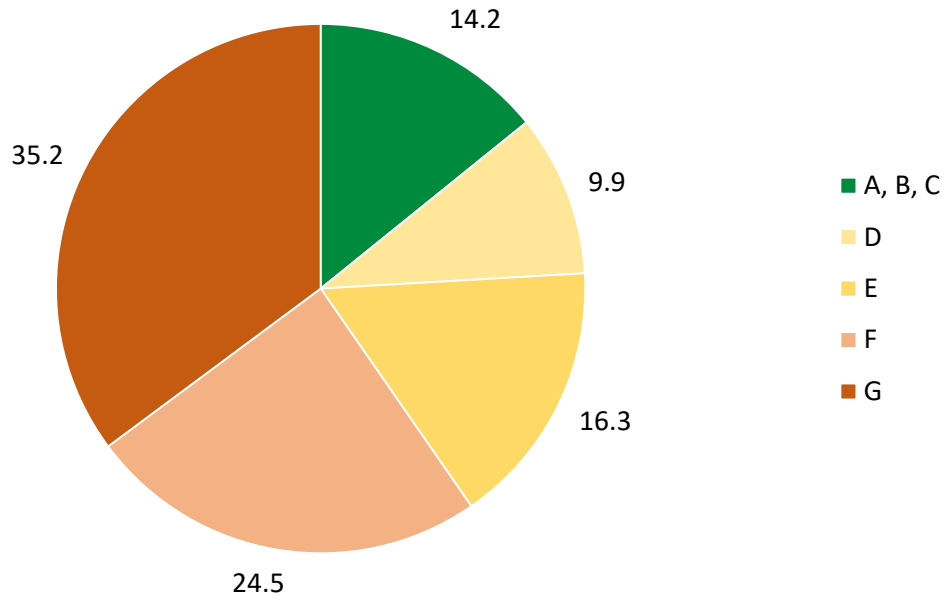
Figure 12 - Identification of the top 15%
Source: CRIF elaboration on SIAPE data

More than one-third of the data pool consists of G labelled buildings. Besides adding class F, more than half of the dataset is represented. On the contrary, A4 and A3 properties weigh 3.7%. In this regard, adding EPC A (containing A4, A3, A2, A1), B, and C results in 14.2% of the pool. As a result, A, B, and C labelled Italian residential properties can be considered to align the top 15% of the Italian stock's most energy-efficient buildings. Despite the 1.9% gap of the existing data from the threshold, adding D labelled properties does not guarantee the alignment with the top 15% (24.1% vs 15%), and for that reason, it is not possible to include this EPC class as a proxy.

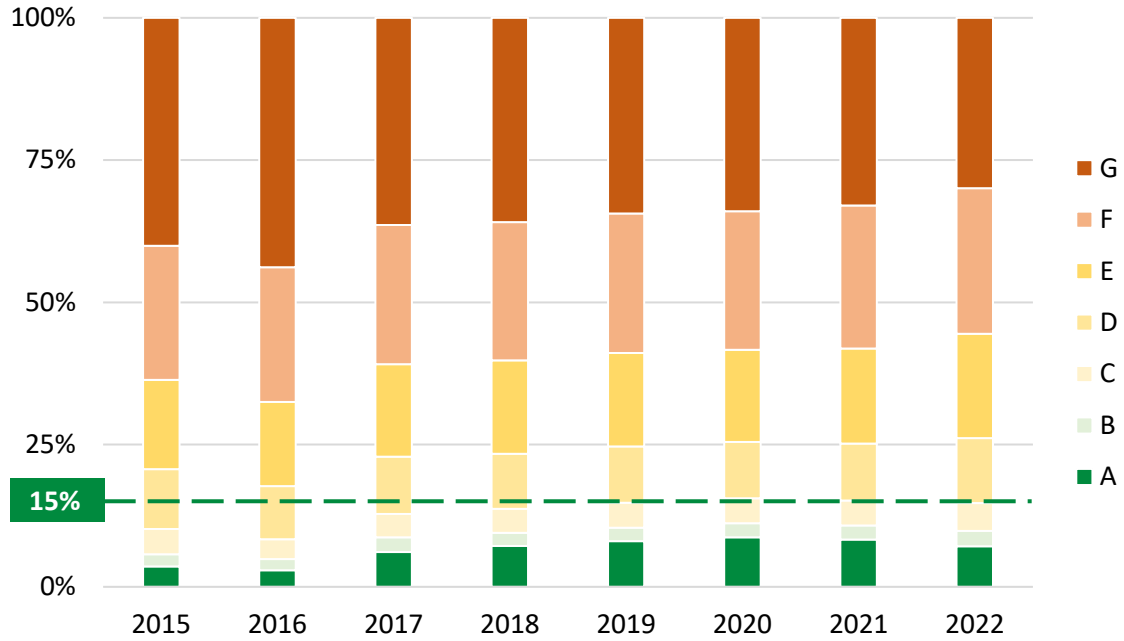Furthermore, figure 13 provides the distribution of EPCs per year of certificate issuance.

Figure 13 - Distribution (%) of residential EPCs per year of issuance
Source: CRIF elaboration on SIAPE data

As a result, the sum of EPC labels A (including A4, A3, A2, A1), B and C proves to be below the set threshold at 15% (green dotted line) in every observation year until 2020, then the sum is slightly higher the 15% however it does not have an impact on the overall.

2.1.2. CRITERION 2: TOP 15% ENERGY-EFFICIENT RESIDENTIAL BUILDINGS USING THE YEAR OF BUILDING'S CONSTRUCTION AS A PROXY

The second Criterion implements the buildings' construction year as a proxy to identify the top 15% of the Italian energy-efficient properties that do not present an attached EPC.

At first, accessing the SIAPE database, the distribution of EPCs per building's construction year is derived from the certificates issued in 2015-2022 (2,512,863 EPCs), as in figure 14.
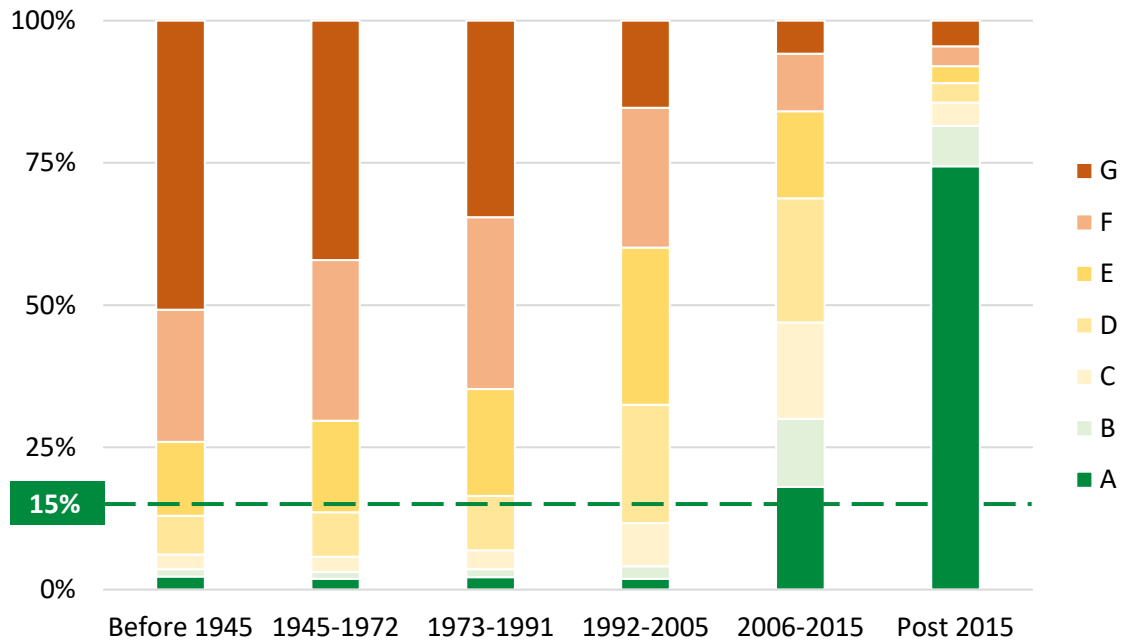

Figure 14 - Distribution (%) of EPCs per year of construction
Source: CRIF elaboration on SIAPE data

Overall, the Italian stock has experienced a massive change in energy efficiency according to the construction year. For those buildings built before 1991, G and F classes weighed about 60-70%, while in 1992-2005, the energy classes C and D significantly increased their contribution. In summary, it is the first signal of a real moderate change in the real-estate sector towards energy efficiency. On the other hand, looking at the G labelled properties, the Italian Law 10/1991[24] contributes to halving its contribution in the same period.

Accordingly, the legislative Decree 192/2005 introduced more severe restrictions to support energy efficiency-boosting, while the Ministerial Decree 26/06/2015 also provided massive support to the transition to high energy-

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[24] Available at: https://www.gazzettaufficiale.it/eli/id/1991/01/16/091G0015/sg

efficient buildings. Consequently, around 86% of residential properties built after 2015 and stored in the SIAPE data pool are A, B, and C labelled, the ones identified in the top 15% of the Italian market under criterion 1. Figure 15 focuses on the variation of A, B and C EPC classes over time.
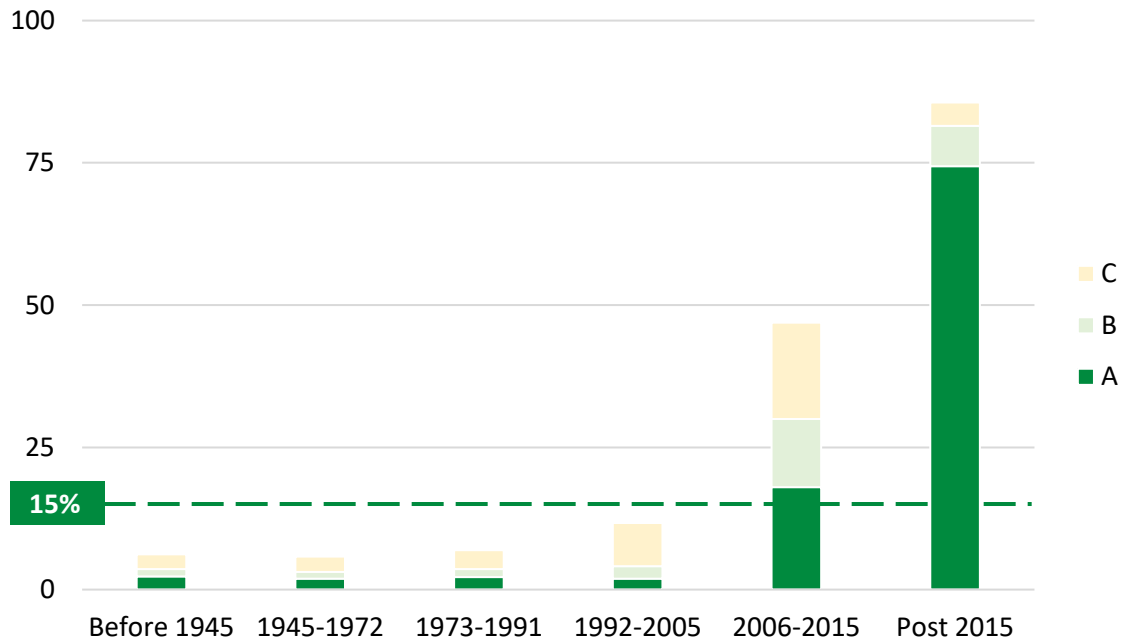

Figure 15 - Distribution (%) of EPC classes per construction year
Source: CRIF elaboration on SIAPE data

Finally, filtering on new residential properties built after 2015 only, figure 16 shows the distribution of EPCs in the SIAPE database. An additional filter on the year of EPC issuance is applied to analyse the period 2016-2020. As a result, the perimeter is slightly lower than 5% of the entire pool of residential EPCs uploaded to the SIAPE system. This result is also coherent with the rate of new constructions concerning the Italian stock in recent years.

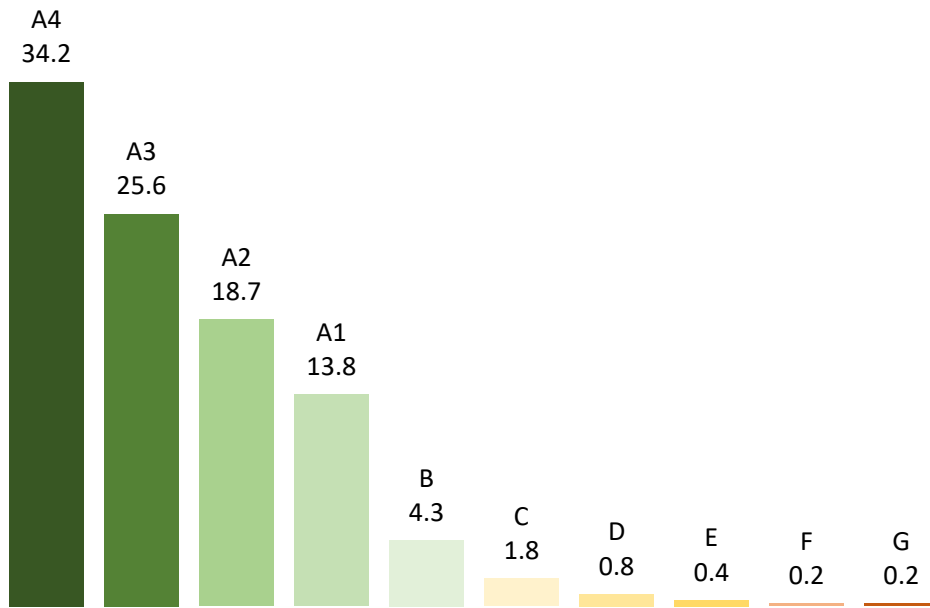98.4% of newly-built properties present an EPC equal or better to the C class, as shown in figure 16.

Figure 16 - Distribution (%) of EPC labels for new residential buildings in 2016-2020
Source: CRIF elaboration on SIAPE data

3. CHEBANCA! PORTFOLIO ANALYSIS

Following the criteria presented in the previous chapter, 2,802 eligible loans in CheBanca! portfolios (following 'Portfolios') weigh on average € 166,000 of outstanding debt, disbursed between the second half of 2019 and the first of 2022. The residual debt of the portfolio as of June 2022 amounts to a total of 466 million euros for 2,832 properties.

The first section will provide an overview of mortgages on a geographical and time of origination. In the second section, the report focuses on the eligible properties, and therefore mortgages, because of their high energy performance certificates (criterion 1, see paragraph 2.1.1) or because they have been recently built (criterion 2, see paragraph 2.1.2).

3.1.   OVERVIEW OF ELIGIBLE BUILDINGS AND CURRENT FINANCING AMOUNT

The following charts show the regional distribution of eligible buildings and the relative current financing amount; all the constructions under assessment are residential.

 Firstly, figure 17 provides the distribution of buildings by the ISTAT area[25]; similarly, figure 18 shows the share in terms of the current financing amount.
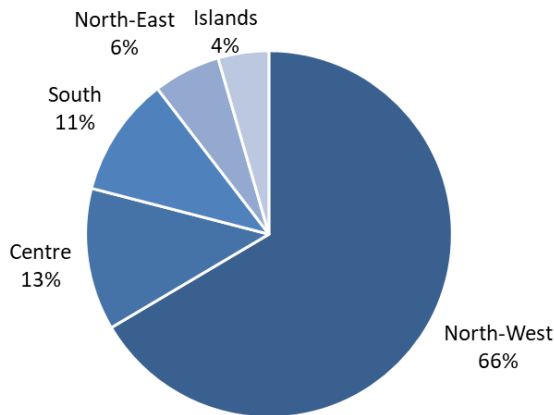

Figure 17 - Share of eligible properties according to the area breakdown
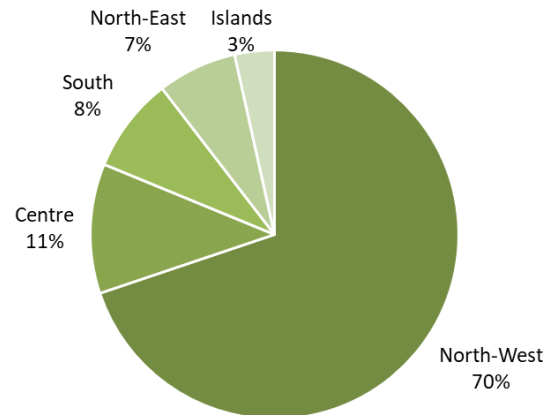
Figure 17 - Share of the current financing amount according to the area breakdown

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[25] *North-West*: Liguria, Lombardia, Piemonte, Valle d'Aosta. *North-East*: Emilia-Romagna, Friuli Venezia Giulia, Veneto, Trentino-Alto Adige. *Centre*: Lazio, Marche, Toscana, Umbria. *South:* Abruzzo, Basilicata, Calabria, Campania, Molise, Puglia. *Islands*: Sardegna, Sicilia

Accordingly, the following figure shows the overview of properties and the current financing amount by region.

	Region	Building	Current amount in mln €
1	Lombardia	1,556	283.5 €
2	Lazio	322	48.2 €
3	Piemonte	321	41.2 €
4	Campania	152	20.1 €
5	Veneto	106	19.3 €
6	Puglia	114	15.4 €
7	Emilia-Romagna	43	8.8 €
8	Sardegna	64	8.4 €
9	Sicilia	63	7.8 €
10	Toscana	23	3.7 €
11	Trentino - Alto Adige	13	2.5 €
12	Friuli - Venezia Giulia	6	1.9 €
13	Calabria	14	1.5 €
14	Abruzzo	13	1.4 €
15	Liguria	6	0.9 €
16	Marche	9	0.9 €
17	Basilicata	3	0.4 €
18	Umbria	1	0.2 €
19	Molise	3	0.1 €
		2,832	466.2 €

Figure 18 - Portfolio regional distribution

3.2. APPLICATION OF ELIGIBILITY CRITERIA

This section applies the eligibility criteria identified in Chapter 2 on the Portfolios, starting from the following table that provides an insight into the eligible financing according to the eligibility criteria.

Table 5 - Overview of eligible financing per Criterion
Source: CRIF elaboration on Portfolio

Criterion	Number of loans	Current financing amount (€)
1 EPC (A, B, C)	1,752 *63%*	304,456,718 € *65%*
2 Construction year (2016-2020)	1,050 *37%*	161,742,671 € *35%*
Grand Total	2,802	466,199,388 €

As shown in paragraph 2.1.2, 98.4% of newly-built properties are eligible because of an EPC equal or better to the C class; for this reason, a haircut of 2.0% is applied to the value of the eligible portfolio under Criterion 2, see table 6.

Table 6 - Overview of eligible financing per Criterion, applying the 2% prudence haircut to criterion 2 -
Source: CRIF elaboration on Portfolio

Criterion	Number of loans	Current financing amount (€)
1 EPC (A, B, C)	1,752 *63%*	304,456,718 € *66%*
2 Construction year (2016-2020)	1,050 *37%*	158,507,817 € *34%*
Grand Total	2,802	462,964,535 €

66% of the Portfolios are eligible due to the attached EPC, corresponding to around € 304 million. Instead, Criterion 2 consists of about € 158 mln. Furthermore, the following table provides the same analysis, including an additional distinction based on the loans' origination date.

Table 7 - Overview of eligible properties per Criterion and financing origination year
Source: CRIF elaboration on Portfolio

Criterion	Loan Origination	Number of loans	Current financing amount (€)
1 EPC (A, B, C)	2019 – Second semester	319	50,817,203 €
	2020 – First semester	205	31,484,833 €
	2020 – Second semester	277	45,212,108 €
	2021 – First semester	303	51,859,674 €
	2021 – Second semester	259	47,594,064 €
	2022 – First semester	389	77,488,835 €
Total criterion 1		1,752	304,456,718 €
2 Construction year (2016-2020) Grand Total	2019 – Second semester	183	24,773,889.12 €
	2020 – First semester	118	16,808,972.81 €
	2020 – Second semester	186	26,095,672.74 €
	2021 - First semester	216	32,101,266.11 €
	2021 – Second semester	149	24,806,905.59 €
	2022 – First semester	198	33,921,110.73 €
Total criterion 2		1,050	158,507,817 €
Grand Total		**2,802**	**462,964,535 €**

3.3. APPLICATION OF ELIGIBILITY CRITERIA: CRITERION 1

The eligible Portfolio under **Criterion 1** consists of 1,752 loans, and the next figure summarises the EPC's distribution of the residential Portfolio. As the Portfolio contains EPCs issued before and after the *Requisiti Minimi* translated into law, bringing a new standardized labeling methodology, EPCs' A', 'A+' are considered labeled as 'A1', as well as 'B+' from EPC' B'.
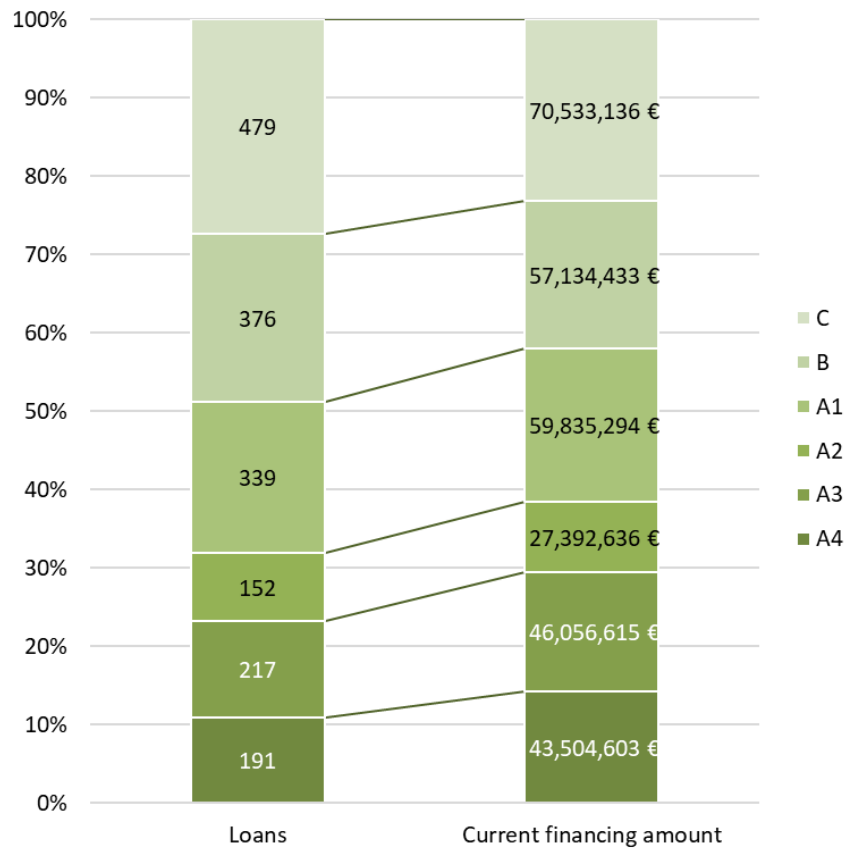

Figure 19 - Distribution of EPCs for eligible loans and current financing amount under Criterion 1
Source: CRIF elaboration on Portfolio

Among the eligible Portfolio, around 27% of buildings are 'C' class properties, but the current residual debt of those loans is around 23%. Conversely, buildings in class 'A' ('A4', 'A3', 'A2', 'A1', 'A' and 'A+') weight 51% of the Portfolio, in particular, 'A4' weight 11%; but the equivalent financing amount is 58% for those buildings in class 'A', with 'A4' at 14%.

3.4. APPLICATION OF ELIGIBILITY CRITERIA: CRITERION 2

CRIF analyzed the Portfolio under Criterion 2, considering the existing law about *Requisiti Minimi* and the Italian residential stock distribution according to the construction year (since 2016). As stated in the present report, the current law prescribes the release of an EPC for new buildings. Figure 27 shows the distribution of the Portfolio's eligible buildings under Criterion 2 (construction year since 2016). Besides, in 2016-2020, following figure 23, 98.3% of the EPCs issued for new residential buildings and uploaded in the SIAPE database range from C to A4.

The chart below represents the distribution of loans and the residual debt for the year of construction of the primary understanding buildings. The Portfolio is equally distributed over the different years of construction of the main building.

Figure 20 - Distribution of EPCs for eligible loans and current financing amount under Criterion 2
Source: CRIF elaboration on Portfolio

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