



Public housing Porto Fluviale: a proposal funded by PINQuA

Innovative housing policy tools: impact indicators in the NRRP Urban Regeneration Programmes

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Abstract: The topic of indicators as measurers of the effectiveness of urban and housing transformations strongly re-emerge because of the performance approach the funding of the National Recovery and Resilience Plan (NRRP) is based on. Within the NRRP specific programmes, the issue of performance measurability of interventions was managed with the application of different indicators and application methods. The research group had the opportunity to work on the construction of a system of indicators for a national urban regeneration programme, financed within the NRRP.

This paper describes the research aimed at the definition of the indicators for evaluating the design proposals applied to the NRRP financed program called PINQuA (Innovative Programme for Housing Quality). The proposed system of indicators proved useful to promote an objective reading of the interventions and to encourage, in the design proposals application, the response to housing quality criteria aimed, among other issues, at improving the cultural condition of the contexts.

Keywords: PINQuA, housing policies, indicators-based evaluation models, social housing, housing quality.

1. Social Housing and housing policies in Italy

In the European context, the term “social housing” describes the activities targeted to providing adequate housing for those who have difficulty in satisfying (by themselves) their housing needs under free market conditions, because of credits unapproachable or other problems (Cecodhas, 2007).

Although the definition clearly detailed the social housing purpose, the term “activities” highlights a very heterogeneous field of lexical interpretations, target audience, operation modes, housing enjoyment types, social housing provider types, and, finally, housing stock size (OECD, 2020). The social housing model is spread throughout Europe: this outreach, expressed as a percentage of the total housing stock, ranges from 1-2 percent in Luxembourg and Estonia, to 24-30 percent in Austria and the Netherlands. Italy stands at about 3.7 percent, far below the European average of 8.3 percent (Figure 1).

However, comparisons in quantitative terms are insignificant when considering the different policy and implementation interpretations of social housing in each country.

Few countries, as Denmark, the Netherlands and Sweden, use a social housing model defined “universalistic” (Kemeny, 2005). This means the full public responsibility over the entire housing policy to lead production and management of social housing.

Using this approach, the interventions are primarily aimed at:

- Calming private market prices and rents.
- Linked rental fees to construction costs.
- Distressed families receive allowances or concessions for housing reserved for them.

In Europe, the prevailing approach is the opposite one, defined “targeted” (Ghekière, 2007): it is an approach that recognizes the market as the one in charge to regulate housing policy, while the Public Procurement acts with social measures only in the presence of inefficiencies, for those individuals to whom the market fails to provide affordable housing.

In the “targeted” approach, the choice of user type defines two criteria: the one defined “generalist”, and the other called “residual” (Ghekière, 2007). The first (pursued by Austria, Finland, and Poland) aims to provide housing

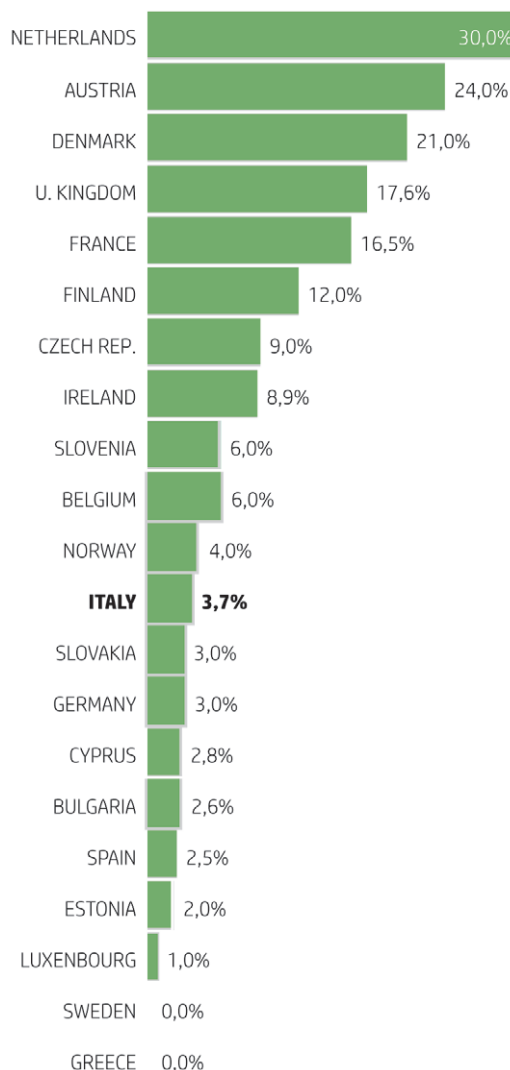


Figure 1 | Percentage of Social Housing out of the total housing stock in each European country. (Source: Authors’ elaboration on Housing Europe data, www.HousingEurope.eu).

for families whose income is below a certain threshold, either through capped rents or income-proportional rent.

On the other hand, the “residual” criterion (predominantly applied in the UK, Ireland, Hungary, Portugal, and Spain) allocate housing or facilities to identifies specific categories of disadvantaged households, such as people with disabilities, single-parent families, the elderly, the unemployed, families with many children, etc. France, Belgium, Germany, and Italy, integrate both criteria with different operational tools. Regardless of approaches and criteria, all European countries, with different weights, aim

for social housing that favour both rents and ownership, with a predominant bias toward the former option.

In the specific Italian case, the locution “social housing” began to circulate in the early 2000s, integrating and overlapping with existing terminologies.

The first locution “public housing” is contained in Law No. 254 of May 31, 1905. These houses are built and managed by public agencies (Autonomous Institutes for Council Housing, Istituti Autonomi Case Popolari – IACP) and rented out to lower income groups. They are also characterized by controlled hygiene standards.

As early as 1908, the Law No. 254 will be supplemented by Law No. 89 of Feb. 27: the term “public housing” would be integrated with “economic and public housing”, allowing private individuals to build such residences of this kind.

The great National Plan for Post-war Public Housing, called “National Insurance Institute for House, Istituto Nazionale Assicurazioni Casa - INA-Casa”, would operate from 1949 to 1963 and introduced the term “homes for workers”. The Plan aimed to boost employment through construction of housing for workers (by Government): over time, they can redeem their assigned dwellings.

During decades, three *modus operandi* would be defined for the construction and management of public housing, of which all can be termed subsidized housing carried out by the public or private sector through three different financial grants and incentives for access by the most vulnerable people: concessions, conventions, and subsidies.

In 1971, it born the definition of “Public Residential Housing” (in Italian “Edilizia Residenziale Pubblica - ERP”): housing built by public agencies at full expense or with the contribution of the State. It only excluded housing built in implementation of subsidized housing programs.

The terms “social housing” enters in common language, replacing and confusing itself with ERP, even though they identify very different parts of public housing stock until, in Law No. 133 of August 6, 2008, ERP will no longer be mentioned, replaced by social housing (in Italian “Edilizia Residenziale Sociale – ERS”).

According to some (AA.VV., 2022), the concept of “public”, progressively replaced with the term “social”, has the semantic ambition of representing the transfer of the positive features of public asset management and control to the private participation (such as real estate funds or

asset management companies) in the production and management of such assets.

For Lungarella (2010), this substitution hides the role of the public through recognition of the social role of the market, which is entrusted with the task of reducing housing hardship.

With social housing, the integration of housing and social services for social cohesion is formalized but, at the same time, its public dimension is lost (Ginelli, 2022).

In Italy, ERP continues to respond to the problems of the poorest population, whereas social housing tends to focus on the so-called “gray bracket”. They are groups endowed with average incomes too high for public ERP housing, but who cannot access the credit system to purchase housing. They are also people that can pay a market rent, probably finding themselves in economic hardship. In fact, in the case of ERP, the housing is public, and the rental fees are based on family’s income and composition, while, in the case of social housing, the building may be private, with fees and prices calibrated to reductions (more or less substantial) in market values.

Social housing explains the more important concept “of giving a home to those in need,” as it refers to the integration of different spheres, i.e., fostering social cohesion, participation, recovery of the housing stock, redevelopment of the target environment, energy conservation, and housing supply aimed at certain population groups (Cecodhas 2007).

In this direction, Romito’s (2019) definition that identifies social housing as “housing practice” is valuable: in this definition, in addition to the building, “a series of tenant inclusionary projects designed to form a self-managed community based on services of various kinds” are included (Romito, 2019).

A new practice of living takes shape that requires innovative tools and policies attentive to an inclusive, equitable and social vision of housing.

2. Housing emergency and public assets

Social housing physically represents a major asset with more than 28 million dwellings and about 6 percent of the total housing stock in OECD and non-OECD European Union countries (OECD, 2020).

In the countries of the European Union, the population spends an average of 20 percent of its income on housing, but, in the case of the most economically

vulnerable people, it reaches percentages between 30 and 40 percent, a condition that can generate situations of marginality (Simioni and Garavalli, 2022).

Housing Europe's 2022 report highlights how the current condition of affordable housing availability is exacerbated by the Covid-19 pandemic and by refugees fleeing the Ukraine invasion (Housing Europe, 2022).

In Italy, according to the Ministry of Economic Development, residential buildings are 12.42 million, with nearly 32 million housing units (MISE, 2020). Of that stock, 750 thousand are public housing and host about 2 million people—a lower percentage than the average for European Union member countries.

Public housing in Italy provides housing for about 2.2 million people, whereas, housing hardship afflicts 1.4 million households, or, 5.7 percent of Italian households (Federcasa, 2020).

This condition of distress is aggravated by the insufficiency of public housing. In 2018, about 650 thousand families were on the waiting list for housing availability (Pasquini, 2018). Moreover, there is evidence of growing and widespread social inequality in metropolitan cities with high unemployment rates.

According to the Italian National Institute of Statistics (ISTAT, 2022), more than 1.9 million households live in absolute poverty for a combined total of 5.6 million people.

In addition to social issues, it is noted that more than 65% of the 12.42 million buildings that constitute the national housing stock are more than 45 years old (MISE, 2020) and, therefore, it is to be considered an obsolescent and vulnerable asset with respect to energy efficiency or seismic retrofitting standards.

The obsolescence of the heritage and the condition of economic and social fragility create the conditions for which, according to some estimates, about 500 thousand public housing units characterized by high energy consumption force households to spend up to 10 percent of their income on indoor space heating (Simioni and Garavalli, 2022).

This condition occurs despite different incentive mechanisms, such that, in 2018, the virtual deep renovation rate was only 0.85%, corresponding to energy savings of only 0.332 Mtoe/year (MISE, 2020).

The existing housing stock is further weakened by the state's failure to plan and implement public and social housing.

However, it should be considered that actions to preserve the existing heritage must take into account the process of tenant replacement that will return, in the future, a more fragile population of new users, if the annual poverty surveys, from the Italian National Statistical Institute, are confirmed (Perobelli and Saporito, 2022).

The above makes it clear that the housing issue must involve interventions with multiple strategic values.

It is necessary, in fact, that the increase of the public and social housing stock, the redevelopment of the existing one and, finally, environmental sustainability declined with the limitation of the use of new land, converging towards aspects of social equity related to the disparity of energy costs.

3. Housing policies in Italy

Incentive policies aimed at improving housing quality in residential typology began to receive more attention from local governments in the 1990s (Clemente, 2012), but they have found an important application in more recent ministerial programmes, in part because of funding through the NRRP and the NRRP Complementary Investments Plan. Italy considers housing policy and urban regeneration to be two major issues to invest in therefore, 25,93 million euros have been allocated from NRRP resources. These resources are spread over several programmes¹ (Figure 2).

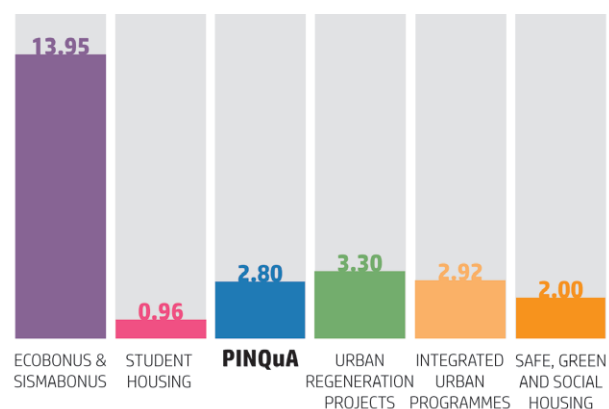


Figure 2 | Distribution of resources in millions of euros of the main programmes of Mission 5 (Authors' elaboration).

Looking in detail at the chronology of the paths of some national programs, such as the Innovative Program for Housing Quality (PINQuA) or the Safe Green and Social Programme it can be highlight that the thought of renewing tools and modes of intervention towards housing matured in Italy before the adoption of the NRRP. The latter provided the economic resources for the operational implementation of already culturally renewed visions.

The new vision of public housing that emerges from the two abovementioned programmes is fully consistent with the concept of social housing as “housing practice”. In fact, the programmes adapt traditional models, not only in terms of regulatory improvement, but also to enable a response to changing social needs, orienting solutions toward the integration of housing and neighbourhood services and undertaking transformative actions at different scales of intervention.

Both programmes are directed to places characterized by physical and social marginality, for which interventions are required that address, indiscriminately, punctual elements or entire urban compartments, with an integrated approach, in full consistency with the “housing practice”, also covering endowments and infrastructure (Baratta, 2022). The goal of the “right to live” was pursued with the broader goal of a right to “quality of living, sustainable living and also public living, which means not only energy efficiency, but also services and facilities, quality of the urban environment, accessibility, attention to the dimension of urbanity.” (AA.VV, 2022). Within the general framework of the complexity involved in the housing issues, the concept of quality also crosses many dimensions: the formal and spatial one concerning the calibrated management of the flexibility and permeability of common spaces and their relationship with individual spaces; the social dimension of the direct involvement of the inhabitants in the issues that affect them; the direct economic one concerning the integration of the public and private resources for the intervention; and the indirect economic one, that is, the one concerning the possibility of improving the economic conditions of the inhabitants through improvements in the management and distribution of services; and finally the environmental one for the protection of the soil resource.

The programmes’ visions also had to consider implementation aspects. In fact, the overall complexity of the NRRP, the need to complete funded projects within the EU timeframe, and a new contractual-performance approach to funds between Europe and member states, imposed a monitoring system based on indicators, broken down into milestones (goals) and targets

(objectives), both of which are subject to quarterly reviews until 2026.

Targets are essentially performance reviews of funded interventions through quantitative indicators, whereas, milestones are a more qualitative, procedural, and time-based component, verifying compliance with administrative and regulatory pathways.

This monitoring-based approach of the NRRP has revived the application scope of indicators in their ability to measure the effectiveness of policies, plans, programmes and projects, including on the urban transformation front: it repurposes analytical practices for measuring effects and impacts.

In the various management and implementation modalities of the NRRP funding lines, in addition to the system of indicators it provides, the various entities have developed tools, themselves based on the indicators, to be used during the various application phases of the programmes.

In some programmes, the indicators have enabled the selection of intervention areas and will be used to monitor projects when fully operational. In the case of the Safe, Green and Social ERP Programme, the indicators have facilitated the distribution of funding among the different regions.

In the case of PINQuA, the Research team had the opportunity to define indicators for design project selection, consistent with the vision of the programme and able, on the one hand, to support the selection of interventions to be funded and, of the other hand, to monitor the project strategies of the interventions.

4. PINQuA: from Home to Living

Pursuing the interpretation of a new form of living that extends the housing quality, and with the aim of financing intervention in socially critical contexts, the Ministry of Infrastructure and Transport (MIT) promoted the PINQuA (Decree D.I. No. 395 of 09/16/2020). The PINQuA, in fact, by making available 3.2 billion euros, aims to extend the scope of interventions that can be financed by considering aspects that give quality to housing and other aspects, including (Baratta et al., 2022):

- Public space.
- The nodes of the mobility system.
- The quality of shared spaces.

- The level of involvement of stakeholders and third sector entities.
- Educational services.
- The level of *mixite* between residences and services.
- Existing social networks.
- Entertainment.
- Culture.
- Innovative inclusive processes.
- All those areas that reflect the quality of urban life.

The proposals submitted (271) and thus subsequently funded (159) have interpreted the programme's objectives well because they have associated redevelopment and increased housing with a complementary set of issues that are fundamental to the goal of housing quality, including accessibility, safety, environmental quality, housing hardship, inclusion, urban well-being and innovative management models based on the involvement of the third sector.

Some numbers summarize this broad approach: thanks to PINQuA, in fact 16,540 housing units and 9.8 million m² of public space are involved, of which about 10 percent is for infrastructure dedicated to cultural activities (museum, exhibition spaces, etc.) and entertainment (cinemas theaters, concert areas, etc.). the spatial distribution also meets a widespread demand throughout the country (Figure 3).

Also, in terms of thematic distribution, the Programme shows an important variety: the dichotomy center-periphery is broken, in fact, the Programme intervenes both on the consolidated city and on the expanding one; several categories of abandonment typical of the main Italian cities are addressed, including functional decommissioning, buildings in areas of environmental, seismic or hydrogeological risk squatter or informal areas, etc.

The research team's approach was to identify a set of measurements that would be, at the same time, easy to detect as early as the Technical and Economic Feasibility Design (PFTE)² (2) first stage, and capable of reflecting, in a concise form, the conceptual extension underlying the Programme, i.e., from housing to living.

This set of measurements is represented by the construction of a complex of indicators, considering each of them constructed in such a way as to be effective for the evaluation of certain design proposal characteristics.

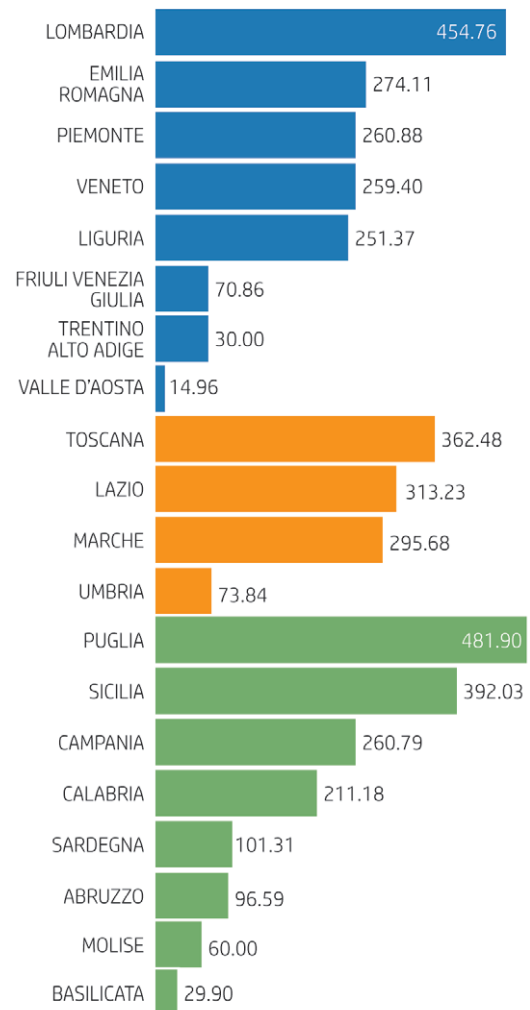


Figure 3 | Funding distribution between regions and macro regions (Authors' elaboration).

5. Indicators-based decision tools

In the field of measurement, indicators are the main tool for quantifying phenomena or relationships between quantities, to simplify and make the phenomenon more understandable. At the same time, they allow the direct evaluation of public activity in terms of efficiency, effectiveness, economy, result, outcome, impact, performance or quality³ (3) (Martini and Sisti, 2002).

The detection of observable and measurable knowledge and behaviours use mostly quantitative methodologies (Tessaro, 2012).

Indicators are tools for complex evaluation of a phenomenon to which a close link is attributed with a conceptual referent that is part of research model or an interpretive scheme (Maggino, 2006).

An indicator must be characterized by its ability to quantify, communicate and simplify, but without the latter leading to a loss of information at the expense of the level of scientific quality of the information itself. According to Wong (1995), the adoption of indicators by public administrations has been in use since the mid-1960s, however the strategic evaluation and control function counts, until the end of the twentieth, few experiences in the Italian public administration (Bassanini, 1999).

Performance indicators, in particular, are a technique for evaluating administrative activity that has experienced considerable success in the 1990s. The reason for such success lies on the possibility, through the use of indicators, for policy actions to be subjected to activities of evaluation first and monitoring later.

This assumes that, to be effective, indicators, must be constructed in a manner consistent with the assumptions on the basis of which the policy they refer to was designed (Azzone and Dente, 1999). In the context of performance indicators, necessary reference must then be made to the specific sustainability indicators whose importance is crucial today.

The nature of such indicators is multidimensional this results in a not insignificant challenge in returning quantitative indicators capable of representing complex measures (Miccoli et al., 2014).

The role of sustainability indicators is also recognized in several applications, some with explicit reference to the possibility that they can revolutionize knowledge in urban and land use planning processes of government agencies (Socco et al., 2002).

Environmental issues, moreover, have led to the development of a further application strand of indicators, for measuring environmental impacts.

Environmental impact indicators allow to represent environmental data in a comprehensive and concise manner and can be used to compare environmental performance over time, with the aim of (Jasch, 2000):

- Highlight potentials for optimization.
- Derive and pursue environmental objectives.
- Evaluate and compare the environmental performance of different case studies.
- Communicate environmental reports.
- Provide information to the product sector.

In any case, it is important to highlight that sustainability indicators differ from environmental impact

indicators because they do not simply reflect pressures on the environment but identify interactions between socioeconomic and ecological systems (Opschoor and Reijnders, 1991).

In the specific fields of urban planning and architecture, two strands of research related to the use of indicators have developed: those aimed at measuring the impacts of urban and architectural transformations and those aimed at measuring the quality of the respective outcomes. In fact, performance indicators are increasingly being adopted to support assessments regarding the achievement of urban regeneration policy objectives and the impact of actions taken (Audit Commission, 2002).

Multidimensional approach, by which a set of indicators allows a transformation to be investigated and measured (Baratta et al., 2021) fits very well with urban regeneration, defined as a comprehensive and integrated vision and action to address urban problems through lasting improvements in the economic, physical, social, and environmental conditions of a specific site (Nassar et al., 2006). The Design Quality Indicators (DQI) are indicators developed at the building scale to measure some aspects of the quality of architectural designs: the application at the building scale aim to map, measure and manage performance improvement in the building sector by measuring building performance as early as the design phase (Gann et al., 2003). Although this type of indicator does not originate explicitly to evaluate the design process (as much as the design proposal itself), over the years, indicators have evolved to address evaluation at different stages of design to contribute to decision making with more information (Gann et al., 2003).

6. A set of indicators to support evaluation in PINQuA

A set of six families of impact indicators, each consisting of five indicators, was designed in PINQuA Programme, structured with a scheme that allows the assessment to be traced from the general criterion through the specific sub-criteria, to define the quantitative parameters expressed by the indicators (Figure 4). The performance measure of the design proposals, outlined by the indicators, was built in line with the Programme's objectives, in relation to improving the housing quality.

The family of environmental impact indicators was constructed with the aim of returning a review of the design proposals in terms of energy improvement, environmental remediation, fulfilment of the Minimum Environmental Criteria both in the component of recycled materials use and of locally sourced material use.



Figure 4 | General outline of the structure of the indicator system designed for PINQuA Programme (Authors' elaboration).

Regarding the family of social impact indicators, the set could produce a reading of the ownership regime of the site or buildings, supporting public choices, an incentive for functional *mixite* to complement the residential fabric, the involvement of associations and third-sector entities in the design process, and in terms of spaces for an ageing society.

The cultural impact family of indicators was aimed at measuring the presence of restricted areas or properties, basic and higher educational services, entertainment facilities or other cultural services.

Urban-territorial impact was measured by the appropriate family of indicators, considering the presence of green areas, pedestrian and bicycle paths, and public roads.

The family of economic-financial impact indicators aimed to verify the presence of additional private resources or funding, parametric costs for the built and outdoor areas, the impact from possible employment growth related to the services activated by the proposal, and the chrono-economic relationship of the time and cost of construction.

Finally, the set of technological and process impact indicators served to quantify the adoption of advanced design technologies (BIM) or virtuous processes (such as innovative participatory processes) or the proposal of innovative management models.

Each set of indicators expressed the performance quantitative value of the sub-criterion to which it referred through three modes:

- a) With quantitative ratios (m^2/m^2 , $\text{€}/m^2$, etc.).
- b) With five-level impact scales reflecting clear performance ranges measured starting from a zero.
- c) With simple dichotomous scales.

This indicator-based evaluation model was introduced in Art. 8 of Interministerial Decree No. 395 of September 16, 2020, and specifically designed by the authors of this paper for the evaluation process by the High Commission.

The High Commission was the group of experts specifically appointed to select the design proposals. The indicators had to facilitate the process and the formulation of a ranking list as objective as possible.

Furthermore, the indicators make possible to assign a numerical weight to each criterion: the sum of the value of each criterion is the total score of each design proposal and allows to build the ranking.

The total score for each proposal to be calculated through a process of numerical values' normalization for each indicator, obtained by linear interpolation.

Normalization is a necessary procedure to convert each criterion values into dimensionless one, to make them comparable, allowing homogeneity of data, to make analyses and produce quantitative results (Vafaei et al., 2016).

7. Conclusions

Acquiring some aggregate data from MIMS (2022) is more evident that indicators drove the composition of proposals. For example, interventions covered more than 15,000 housing units for 1.3 million square meters. The housing units built will provide controlled access to housing such that the average savings per housing unit (compared to the free market) will be 479 Euros per household. On the total intervention amount of 14 million square meters, only 2 percent relates to an area of new construction, and in relation to outdoor areas, 8 million square meters (63 percent of the total) relate to uncovered vegetated areas. An average energy class advancement of about 4 classes and an annual energy performance improvement of 38% was estimated. Finally, about 756 thousand square meters of area will be allocated for educational activities (childhood, secondary education, or university) while, about 788 thousand square meters are allocated for cultural activities (museums, educational spaces, or libraries).

Public administration has been able to accelerate the move beyond best value for money (Marinelli and Antoniou, 2020), considered by many researchers to be obsolete, by planning its operational guidelines as part of a transition to sustainability in a holistic sense.

This orientation will lead to the shelving of green public procurement (Directive 2004/18/EC, 2004), in favour of a more all-encompassing sustainable public procurement, which places social and techno-economic criteria alongside environmental criteria.

After application to PINQuA Programme, intrinsic and extrinsic limitations of the proposed set of indicators can be identified. The first can be found in the rigidity of application: the use of measurement scales articulated in a few steps forced an increase in numerical precision to a degree of accuracy to the fourth significant digit.

The most common extrinsic limitation lies in the contingency of the proposed set: during monitoring, this

may change as the level of design evolves, producing a potential contradiction between the outcome of the ranking and the satisfaction of the performance guaranteed at the preliminary design stage.

The discrepancy between the objectivity typical of the Public Administration and the performance consistency to which the designer and the requesting party are called has to be adjusted by hardening the set of indicators with the aim of satisfying similar alternative performance within an evolutionary design project.

The evaluation process that followed, however, allowed a direct comparison of highly heterogeneous proposals that were difficult to compare in a transparent, rational, and retraceable process.

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Notes

- ¹ Total resources of the main programmes of Mission 5 i.e. Ecobonus and Sismabonus (13.95 bn.); Residences for University Students (960 mil.); PINQuA (2.8 bn.) (Figure 3), Urban Regeneration Projects aimed at reducing marginalization and social decay (3.3 bn.) Integrated Urban Plans (2.92 bn.) and ERP Safe, Green and Social (2.0 bn.).
- ² Only for the funding line related to interventions defined as strategic, with a maximum amount of 100,000,000 euros per project, a minimum level of "definitive design" (defined by the Italian regulatory framework) was required, while, to the other interventions, a "lightened" level of PFTE (i.e., deprived of some specific elaborations) was required with a limit of 15,000,000 euros per intervention.
- ³ The writing refers only to public activity since, according to this approach, the private sector has its own performance measures, effectiveness or efficiency, such as profit, profitability ratios, production time and cost, etc.

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