

ENERGY MANAGEMENT FOR PA: FROM RETROFIT MEASURE TO FINANCIAL SCHEME



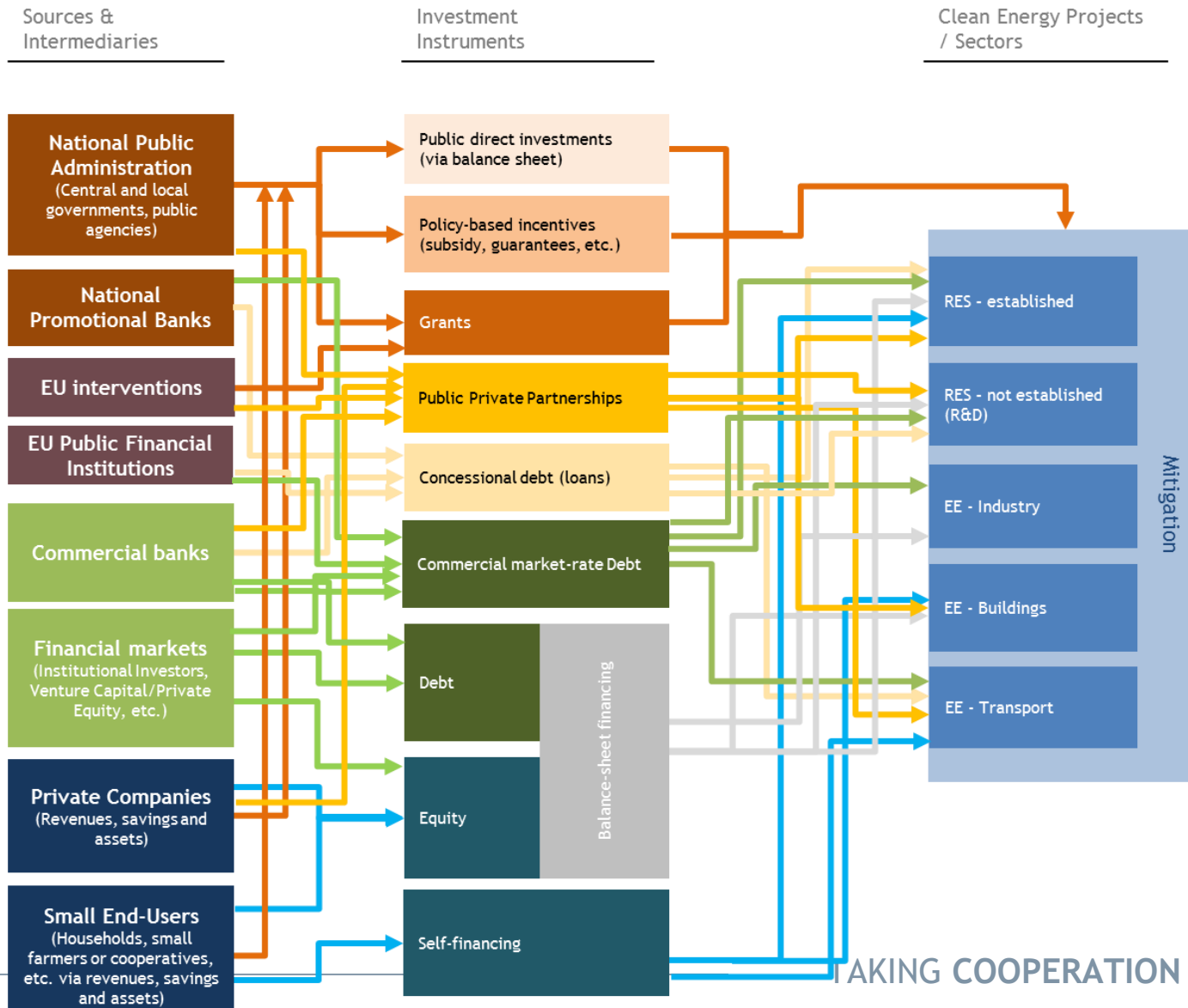
Energy management for PA: from retrofit measure to financial scheme

Silvia Rossi - Clust-ER BUILD – Energy Management Expert

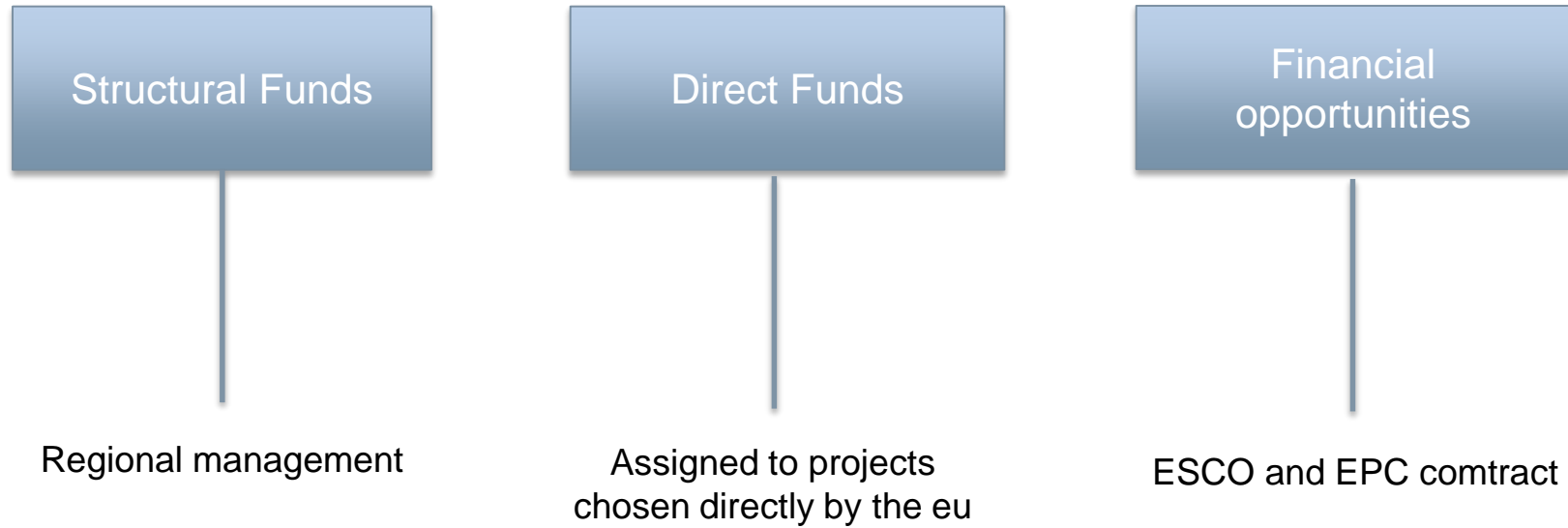
17/18-10-2010 - Hotel Park, Cesta Svobode 15, Bled (Slovenia)



Financial Landscape for clean energy in EU



OVERVIEW EU GRANT SOURCES AND FINANCIAL OPPORTUNITIES



STRUCTURAL FUNDS

- The **European Regional Development Fund (ERDF)** - which promotes balanced development in the different regions of the EU.
- The **European Social Fund (ESF)** - which supports projects on employment throughout Europe and invests in Europe's human capital: in workers, young people and all those seeking a job.
- The **Cohesion Fund (CF)** - which finances transport and environmental projects in countries where the gross national income (GNI) per capita is less than 90% of the EU average. In the 2014-2020 period, these are Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Slovenia.
- The **European Agricultural Fund for Rural Development (EAFRD)** - which focuses on solving specific challenges facing rural areas of the EU.
- The **European Fund for Maritime Affairs and Fisheries (EMFF)** - which helps fishermen to use sustainable fishing methods and coastal communities to diversify their economies, improving the quality of life in European coastal regions.



DIRECT FUNDS

Horizon 2020 is the recent Framework Program for Innovation and Research launched by the EU for the period 2014 - 2020. It groups European funding for research and innovation into a single framework, allowing for greater simplification than the previous programming. The general objective of the new Program is to contribute to building a society and an economy based on knowledge and innovation, thus promoting the implementation of the Europe 2020 strategy, the European Research Area (ERA) and the other European policies.



The **Life Program 2014 - 2020** is aimed at supporting the protection of the environment, the best use of resources and the evolution of European legislation on the subject. The available budget is around 3.4 billion euros for the entire period.

The Life program particularly encourages the development of innovative technologies and good practices capable of producing a positive environmental impact in certain priority areas: water and the marine environment, waste, efficient use of resources, soil, environment and health, air and urban environment, forests.



DIRECT FUNDS

The financing of energy efficiency projects, as well as non-repayable grants, can be done using financial instruments, among which it is useful to remember the **ELENA - European Local Energy Assistance program**.

It is an initiative promoted jointly by the European Commission and the European Investment Bank (EIB) in December 2009 to grant funding to local and regional authorities to carry out large-scale investments in the energy efficiency, renewable energy sources and of sustainable urban transport. A key condition for the eligibility of projects is that they contribute to the CO2 reduction targets set in the "Covenant of Mayors".

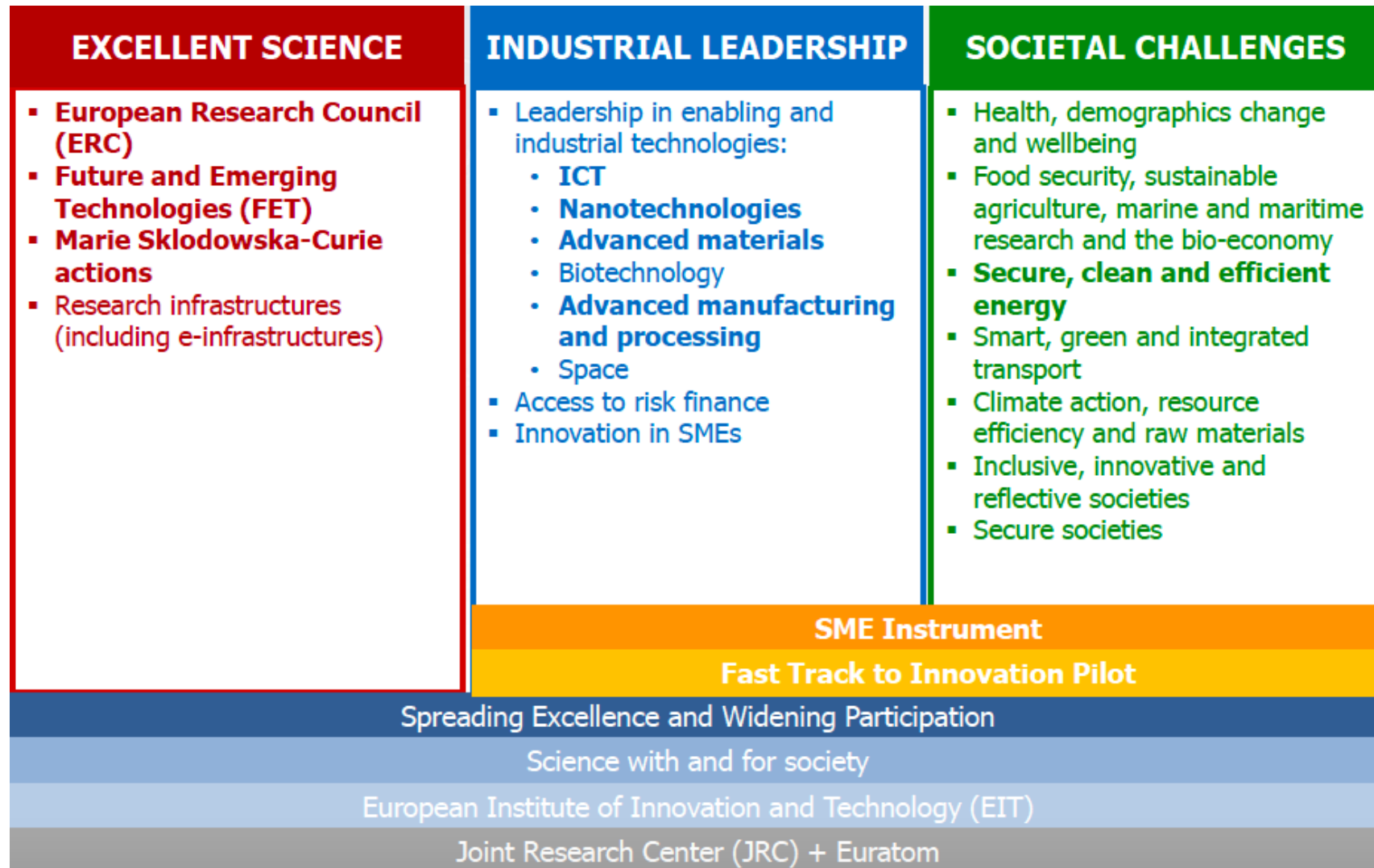
JESSICA – *Joint European Support for Sustainable Investment in City Areas* – is an initiative of the European Commission, implemented in partnership with EIB that promotes sustainable urban development through innovative financial engineering tools.

EBRD – European bank for reconstruction and development

WORLD BANK



DIRECT FUNDS: focus on HORIZON2020



DIRECT FUNDS: focus on HORIZON2020

EXCELLENT SCIENCE

- **European Research Council (ERC)**
- **Future and Emerging Technologies (FET)**
- **Marie Skłodowska-Curie actions**
- **Research infrastructures (including e-infrastructures)**

SPECIFIC OBJECTIVES:

- Strengthening of frontier research, through the activities of the EUROPEAN RESEARCH COUNCIL
- Strengthening of research in the field of FUTURE AND EMERGING TECHNOLOGIES (FET)
- Strengthening skills, training and career development, through the Marie Skłodowska-Curie initiatives (" MARIE CURIE ACTIONS ")
- Strengthening of European RESEARCH INFRASTRUCTURES, including e-infrastructures



DIRECT FUNDS: focus on HORIZON2020

INDUSTRIAL LEADERSHIP

- Leadership in enabling and industrial technologies:
 - **ICT**
 - **Nanotechnologies**
 - **Advanced materials**
 - Biotechnology
 - **Advanced manufacturing and processing**
 - Space
- Access to risk finance
- Innovation in SMEs

SPECIFIC OBJECTIVES

- Reinforcement of Europe's industrial leadership through research, technological development, demonstration and INNOVATION IN THE FIELD OF ENABLING AND INDUSTRIAL TECHNOLOGIES (LEIT)
- Improve access to RISK CAPITAL to invest in research and innovation
- strengthen innovation in SMALL BUSINESSES



DIRECT FUNDS: focus on HORIZON2020

SOCIETAL CHALLENGES

- Health, demographics change and wellbeing
- Food security, sustainable agriculture, marine and maritime research and the bio-economy
- **Secure, clean and efficient energy**
- Smart, green and integrated transport
- Climate action, resource efficiency and raw materials
- Inclusive, innovative and reflective societies
- Secure societies

SPECIFIC OBJECTIVE

priority reflecting the strategic priorities of the Europe 2020 strategy and addresses major concerns shared by European citizens and others

SFIDE

1. Health, demographics change and wellbeing
2. Food security, sustainable agriculture, marine and maritime research and the bio-economy
3. Secure, clean and efficient energy
4. Smart, green and integrated transport
5. Climate action, resource efficiency and raw materials
6. Inclusive, innovative and reflective societies
7. Secure societies



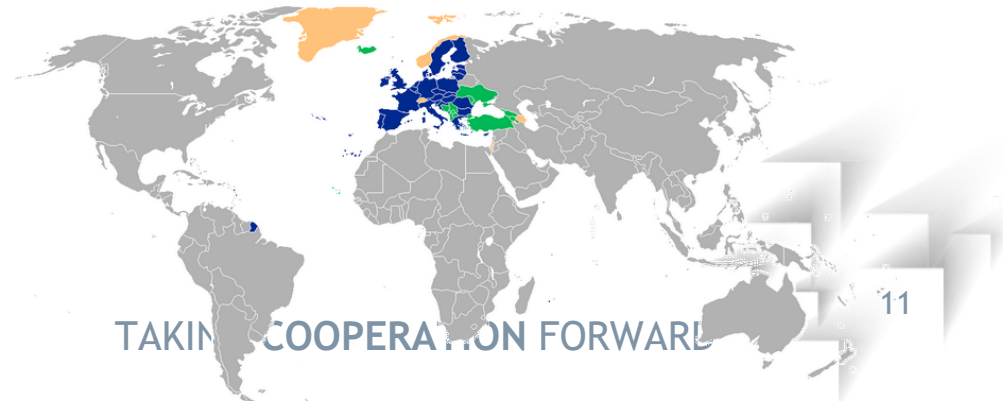
DIRECT FUNDS: focus on HORIZON2020

WHO CAN PARTICIPATE?

- any legal entity established in a member or associated state
- subjects lacking legal personality (as long as with contractual and financial responsibility to the legal representatives) established in a member or associated state *
- Joint Research Center
- international organizations of EU interest (CERN, ESA, etc.)
- international organizations and entities established in Third Countries (in addition to the minimum conditions)
- non-profit legal entities

WHO CAN RECEIVE FINANCING?

- any legal entity established in a member or associated state
- Joint Research Center
- ICPC countries
- international organizations of EU interest
- international organizations and entities established in third countries not ICPC only if provided for in the Work Programs and bilateral agreements or if essential for the action



DIRECT FUNDS: focus on HORIZON2020

MINIMUM CONDITIONS in general:

- at least 3 legal entities
- each of them must be established in a different Member State or associated country
- all three legal entities must be independent of each other

EXCEPTIONS:

- border research actions of the European Research Council (ERC)
- tool for SMEs (with obvious European added value)
- co-financing of research programs
- Support and Coordination Actions
- Marie Skłodowska-Curie
- where indicated by work schedules or work plans



DIRECT FUNDS: focus on HORIZON2020

The European Commission has set up a series of facilities funding **Project Development Assistance (PDA)** to support ambitious public authorities - regions, cities, municipalities or groupings of those - and public bodies in developing bankable sustainable energy projects.

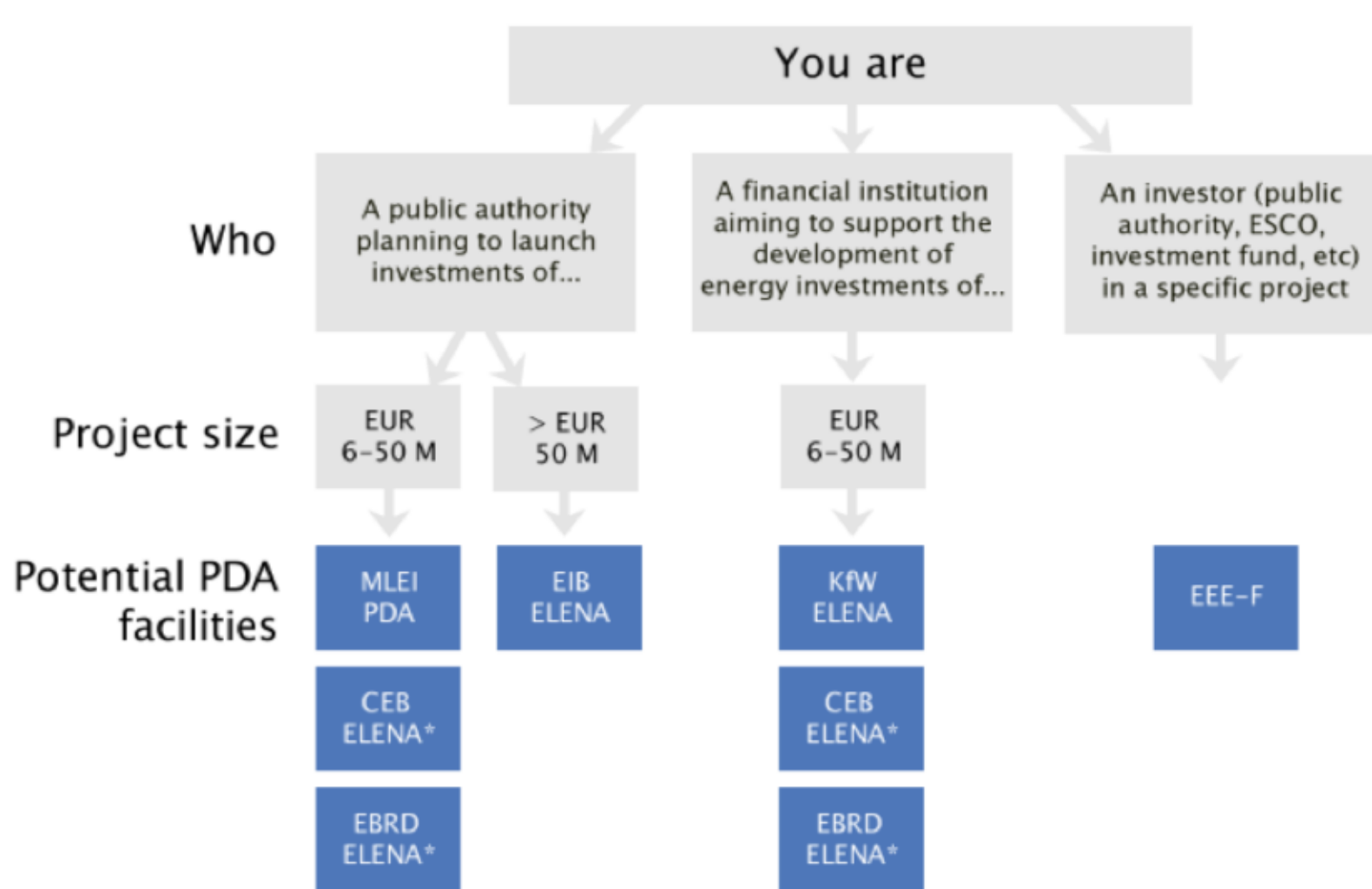
The PDA facilities aim to bridge **the gap between sustainable energy plans and real investment** through supporting all activities necessary to **prepare** and mobilise investment into sustainable energy projects. **These activities can include feasibility studies, stakeholder and community mobilisation, financial engineering, business plans, technical specifications and procurement procedures.**



Project development assistance facilities
under the IEE Programme



DIRECT FUNDS: focus on HORIZON2020



**Country restrictions apply for CEB-ELENA and EBRD-ELENA*



DIRECT FUNDS: focus on LIFE

Private Finance for Energy Efficiency PF4EE

Private Finance for Energy Efficiency (PF4EE) instrument is a joint agreement between the EIB and the European Commission which aims to **address the limited access to adequate and affordable commercial financing for energy efficiency investments.**

The instrument targets projects which support the implementation of National Energy Efficiency Action Plans or other energy efficiency programmes of EU Member States.

Objectives

to make energy efficiency lending a more sustainable activity within European financial institutions, considering the energy efficiency sector as a distinct market segment.

to increase the availability of debt financing to eligible energy efficiency



DIRECT FUNDS: focus on HORIZON2020

The proposed action should:

deepen the demand
side-related
parameters in
existing models

include new
aspects and data
sources

allow to make
better projections
inside energy policy
development

inform policy
making at all levels



DIRECT FUNDS: focus on LIFE

Private Finance for Energy Efficiency PF4EE

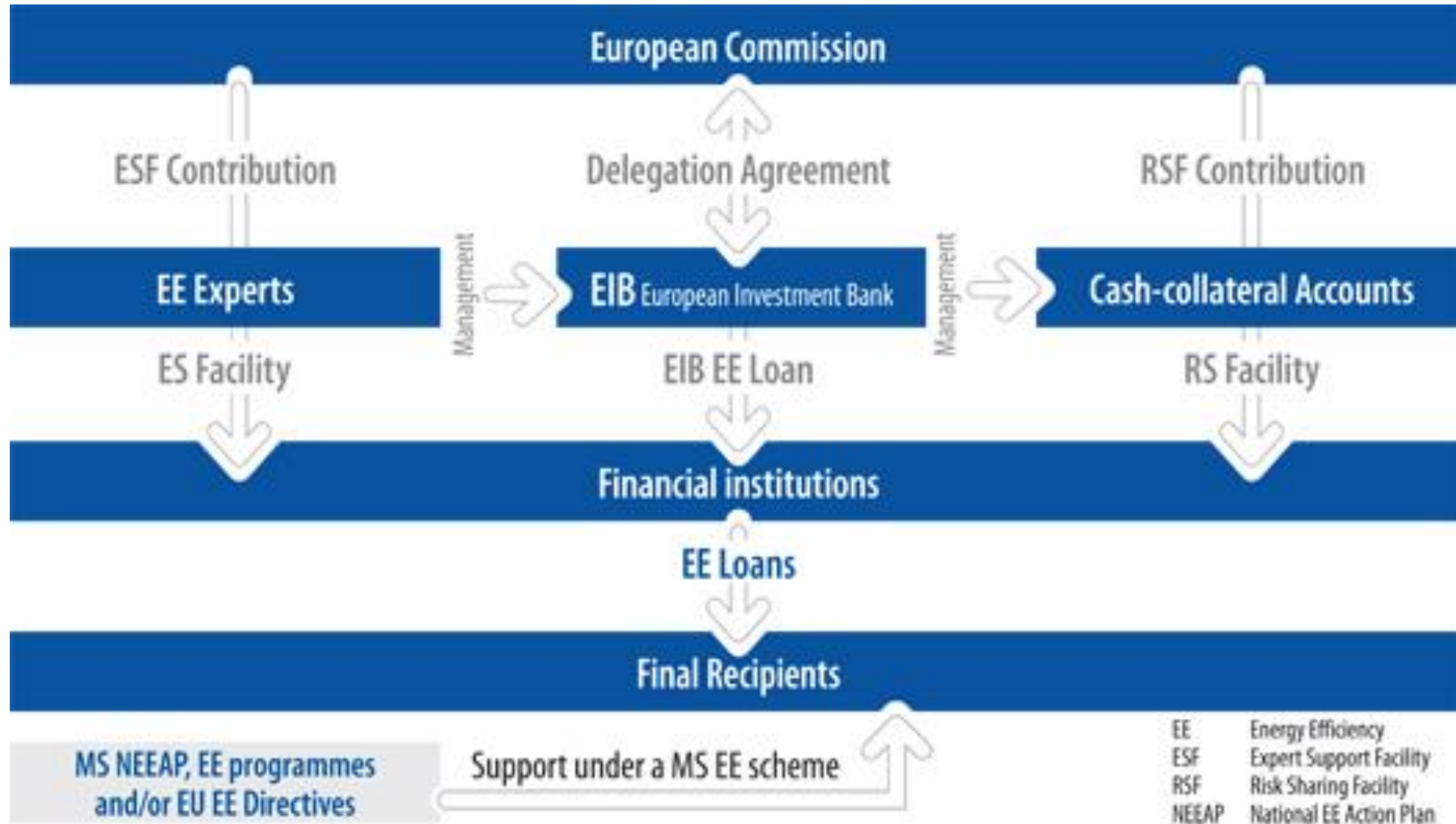
Objectives

- to make energy efficiency lending a more sustainable activity within European financial institutions, considering the energy efficiency sector as a distinct market segment.
- to increase the availability of debt financing to eligible energy efficiency investments.



DIRECT FUNDS: focus on LIFE

Private Finance for Energy Efficiency PF4EE



ACCESSIBILITY

| Programs | Partnership | Projects | | Covering | beneficiary | €/Mil |
|--------------------------|--------------------|---|-----------------|----------|--|---------|
| Horizon 2020 | yes (EU countries) | research and innovation, coordination and support actions | capital account | 100% | Private and Public | 1-20 |
| Horizon PDA | yes (local) | technical assistance for feasibility research | capital account | 100% | Private and Public, Esco and utilities | 0,5 - 2 |
| Life 2014 - 2020 | yes (local) | pilot, demonstrative and innovative projects | capital account | 60% | Private and Public | 1-3 |
| Elena | Yes (local) | technical assistance for feasibility In ELENA the funds necessary to carry out the projects must be made available by the private, but the technical assistance activities financed allow the launching of programs of vast impact on the territory. | capital account | 90% | Private and Public, Utilities | 1-3 |
| Jessica | | technical assistance for feasibility JESSICA aims to make use of the structural funds for urban development in a rotative perspective based on project finance, ensuring the achievement of high performance and the possibility of obtaining new resources in subsequent years. | capital account | 90% | Private and Public, Utilities | 1EE-3 |
| EEEF | No | Energy Efficiency Investment | capital account | 100% | Private and Public, Utilities | 5-25 |
| CTE | Yes (EU countries) | Pilot, demonstrative and innovative projects | capital account | 100% | Public | 2-3 |
| URBACT III | Yes (EU countries) | exchange of knowledge and best practices, pilot projects | capital account | 80 | | |
| Urban Innovative Actions | Yes (local) | innovative actions in urban areas (only for cities more than 50.000 inhabitants) | capital account | | Public | 1-5 |



URBAN INNOVATION ACTION

- **What it is:** the Urban Innovative Actions initiative promotes urban development in the Member States through the financing of innovative solutions in favor of European cities
- **Objective:** to identify and test new solutions to problems related to sustainable urban development and relevant at European level

Themes:

- Air quality
- Circular economy
- Demographic change
- Culture and cultural heritage



Publication: 16 September 2019

Deadline: 12 December 2019

Link: <https://www.uia-initiative.eu/en/call-proposals/5th-call-proposals-launched>



URBAN INNOVATION ACTION



- **RESILIO – Resilience nEtwork of Smart Innovative cLimate-adaptive rOoftops**
- Amsterdam

Amsterdam is experiencing the effects of climate change: flash floods due to heavy rainfall, higher temperatures and increased droughts.

The RESILIO project aims to address critical urban climate challenges related to flooding, heat, water supply, energy consumption and urban livability by repurposing the rooftops of climate-vulnerable neighbourhoods of Amsterdam.

The 10,000m² area of smart blue green roofs is expected to help the city adapt to climate change by reducing impacts of heavy rain, urban heat island effect and drought while improving building insulation, biodiversity and quality of life

The project in numbers

10,000m²

of smart blue green roofs will be built to increase Amsterdam's rainwater resilience and reduce urban heat effect and energy consumption at building level

96

urban areas of Amsterdam are highly vulnerable to flood damage from extreme rain fall

1500

residents of all socioeconomic levels will be engaged in the development of their residential areas

EUR 4,814,248.00

Total ERDF budget granted





- **GBG_AS2C – Blue, Green & Grey_Adapting School to climate change**
- **Barcelona**

The GBG_AS2C project solution relies on a package of measures to adapt schools to climate change. By nature, schools are relevant spaces where actions can be implemented to adapt the city to climate change for the benefit of all. Moreover, not only their spatial distribution in the city ensures great capillarity and penetration in the communities, but they also offer the possibility for continuous use throughout the year.

Therefore, schools playgrounds will be transformed into climate shelters and be open to the wider public in non-school period. Playground transformation will be operated through a threefold intervention - Green, Blue, and Grey - essentially articulated around the introduction of an aquatic (blue) component at the heart of the cities, as accessible municipal recreational point of refreshment. This will be combined with greening and applying traditional solutions (grey) to school facilities in order to combat heat.



URBAN INNOVATION ACTION



Partnership

- Barcelona City Council
- Public Health Agency of Barcelona - sectoral agency
- Barcelona Consortium of Education
- Barcelona Cycle of Water - Public Service Provider
- Barcelona Institute for Global Health - Higher Education Institute
- Institute for Environmental Science and Technology I Institute
- Vila Olimpica School

Partnership

- City of Amsterdam
- Hogeschool van Amsterdam - higher education and research institute
- Vrije Universiteit - higher education and research institute
- Waternet - public water management company
- MetroPolder Company - SME
- Consolidated - SME
- Stadgenoot - social housing company
- De Key - social housing company
- De Alliantie - social housing company
- Rooftop Revolution - foundation



SOME EXAMPLES FOR DIRECT FUNDS



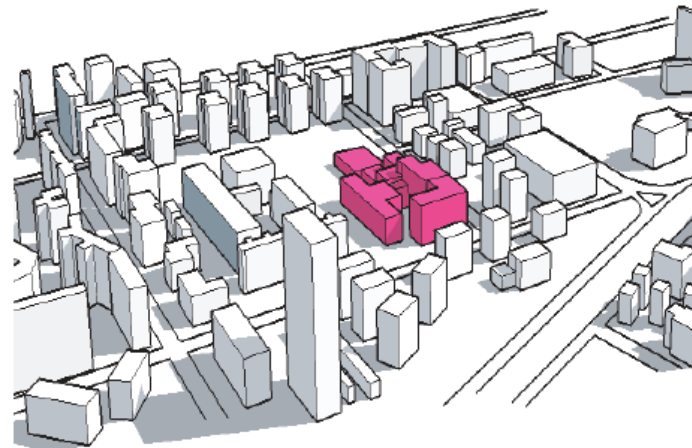
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Project co-financed by the European Regional Development Fund

Integrated Management Support For Energy efficiency in Mediterranean Public buildings

IMPULSE introduces an integrated management support system for planning energy efficiency interventions in public buildings. The transnational approach foresees extensive testing in **pilot MED Cities** in 6 countries, for the conclusion of MED public building typologies, accompanied with **cost-optimal interventions** and **financial plans**. The results are organ-

ized into a transnational purpose **GIS-based information system**, being a user-friendly decision making tool for affordable buildings' **energy efficiency action plans**.



SOME EXAMPLES FOR DIRECT FUNDS



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Buildings Library

Classification criteria:

- Type of use.
- Year of construction.
- Number of floors.
- Gross usable area (m2),
- Construction system
- Heating system.
- Cooling system.

....

| | Region | Construction Year Class | Additional Classification | SFH | TH | MFH | AB |
|---|--|-------------------------|---------------------------|--|--|---|--|
| | | | | Single-Family House | Terraced House | Multi-Family House | Apartment Block |
| 1 | Mediterranean climate (Clima Mediterráneo) | ... 1900 | generic |  0_ME_SF01_Gen |  0_ME_TH01_Gen |  0_ME_MFH01_Gen |  0_ME_AB01_Gen |
| 2 | Mediterranean climate (Clima Mediterráneo) | 1901 ... 1936 | generic |  0_ME_SF02_Gen |  0_ME_TH02_Gen |  0_ME_MFH02_Gen |  0_ME_AB02_Gen |
| 3 | Mediterranean climate (Clima Mediterráneo) | 1937 ... 1959 | generic |  0_ME_SF03_Gen |  0_ME_TH03_Gen |  0_ME_MFH03_Gen |  0_ME_AB03_Gen |
| 4 | Mediterranean climate (Clima Mediterráneo) | 1960 ... 1979 | generic |  0_ME_SF04_Gen |  0_ME_TH04_Gen |  0_ME_MFH04_Gen |  0_ME_AB04_Gen |
| 5 | Mediterranean climate (Clima Mediterráneo) | 1980 ... 2006 | generic |  0_ME_SF05_Gen |  0_ME_TH05_Gen |  0_ME_MFH05_Gen |  0_ME_AB05_Gen |
| 6 | Mediterranean climate (Clima Mediterráneo) | 2007 ... | generic |  0_ME_SF06_Gen |  0_ME_TH06_Gen |  0_ME_MFH06_Gen |  0_ME_AB06_Gen |



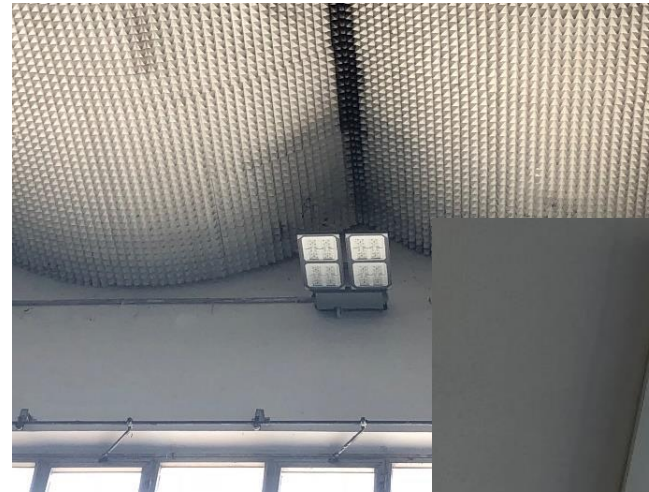
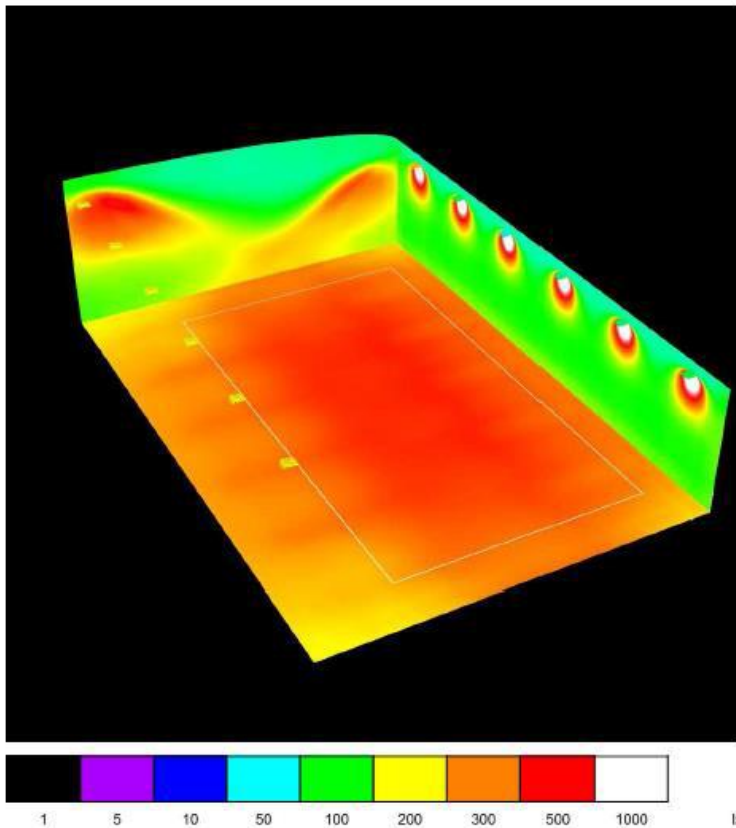
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Energy Diagnosis and Small scale pilot project



SOME EXAMPLES FOR DIRECT FUNDS



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Energy retrofit 20 years plan

| Relative retrofit area annualy | | 3% | % | | | | | |
|--------------------------------|------|-----------------------|--|---|--|--|------------|--|
| Total floor area | | 105.768 | m ² | | | | | |
| Retrofit area annualy | | 3.173 | m ² | | | | | |
| Combination | | Year | | 1 | 2 | 3 | 4 | |
| Minor | 15% | Floor area retrofited | m ² | 3.725,77 | 3.836,63 | 3.234,88 | 3.815,17 | |
| Medium | 30% | Annual investment | NC | 317.270 | 666.853 | 106.646 | 230.532 | |
| Major | 90% | Savings - currency | NC/a | 60.680 | 129.009 | 18.331 | 31.887 | |
| Deep | 100% | Savings - CO2 | tCo2/a | 152 | 294 | 51 | 90 | |
| | | Savings - kWh | kWh/a | 655.994 | 666.608 | 148.804 | 312.386 | |
| | | 1 | PBT6 - Bacino Canottaggio Stadiana - Minor Retrofit | PBT9 - Uffici Circoscrizione Prima - Minor Retrofit | PBT4 - Scuola Secondaria di primo grado Don G. Minzor | PBT4 - Scuola Secondaria di primo grado S. P. Campiano | PBT4 - Scu | |
| | | 2 | PBT6 - Polisportivo Darsena - Minor Retrofit | PBT9 - Palazzo Rasponi "Del Cavaliere" (Palazzo Rasponi | PBT4 - Accademia Di Belle Arti - Minor Retrofit | PBT4 - Scuola Secondaria di primo grado C. Viali - Minor | PBT4 - Acc | |
| | | 3 | PBT6 - Palestra Scuola Secondaria S. Pietro in Vincoli R. | PBT9 - Uffici VV.UU. - Medium Retrofit | PBT4 - Scuola Secondaria di primo grado S. Pietro in Vir | PBT4 - Scuola Primaria V. Randi - Minor Retrofit | PBT4 - Scu | |
| | | 4 | PBT6 - Palestra Scuola Secondaria di primo grado Guido | PBT9 - Residenza Municipale - Medium Retrofit | PBT4 - Scuola Secondaria di primo grado Guido Novello | PBT4 - Scuola Secondaria di primo grado Ricci-Muratori | PBT4 - Scu | |
| | | 5 | PBT8 - Circoscrizione di Mezzano - Minor Retrofit | PBT9 - Uffici Circoscrizione Prima - Medium Retrofit | PBT4 - Scuola Primaria A. Torre - Minor Retrofit | PBT8 - Circoscrizione di Mezzano - Medium Retrofit | PBT4 - Scu | |
| | | 6 | PBT8 - Azienda Ausl S. Pietro in Vincoli - Minor Retrofit | PBT10 - Museo Didattico - Minor Retrofit | PBT4 - Scuola Primaria Goffredo Mameli - Minor Retrofit | PBT8 - Azienda Ausl S. Pietro in Vincoli - Medium Retrofit | PBT4 - Scu | |
| | | 7 | PBT8 - Uffici Circoscrizione Piangipane - Minor Retrofit | PBT10 - Casa Vignuzzi - Minor Retrofit | PBT4 - Scuola Primaria Iqbal Masih - Minor Retrofit | PBT8 - Uffici Circoscrizione Piangipane - Medium Retrofit | PBT4 - Scu | |
| | | 8 | PBT5 - Palestra Scuola Secondaria di primo grado M. Montanari | PBT10 - Biblioteca Guerrini - Minor Retrofit | | PBT4 - Scuola Secondaria di primo grado M. Montanari | | |
| | | 9 | PBT5 - Palestra Scuola Secondaria di primo grado Don G. Minzor | PBT10 - Biblioteca Oriani - Minor Retrofit | | | | |
| | | 10 | PBT5 - Palestra Scuola Primaria A. Torre - Minor Retrofit | PBT10 - Centro Lettura Albergo dei Bimbi (Ex Lucertola) - | | | | |
| | | 11 | PBT5 - Palestra Piangipane - Minor Retrofit | PBT10 - Palazzina Museo Natura - Minor Retrofit | | | | |
| | | 12 | PBT5 - Palestra Scuola Media Statale C. Viali - Minor Retrofit | PBT10 - Biblioteca S. Stefano - Minor Retrofit | | | | |
| | | 13 | PBT5 - Palestra Scuola Elementare Riccardo Ricci - Minor Retrofit | PBT4 - Scuola Secondaria di primo grado M. Montanari | | | | |
| | | 14 | PBT5 - Palestra Scuola Primaria V. Randi - Minor Retrofit | | | | | |
| | | 15 | PBT5 - Palestra Scuola Secondaria di primo grado Ricci-Muratori | | | | | |
| | | 16 | PBT5 - Palestra Scuola Dell'Infanzia Garibaldi - Minor Retrofit | | | | | |
| | | 17 | PBT5 - Palestra Scuola Scuola Primaria G. Garibaldi - Minor Retrofit | | | | | |
| | | 18 | PBT9 - Palazzo Rasponi "Del Cavaliere" (Palazzo Rasponi) | | | | | |
| | | 19 | PBT9 - Uffici VV.UU. - Minor Retrofit | | | | | |
| | | 20 | PBT9 - Residenza Municipale - Minor Retrofit | | | | | |
| | | 21 | | | | | | |
| | | 22 | | | | | | |



SOME EXAMPLES FOR DIRECT FUNDS



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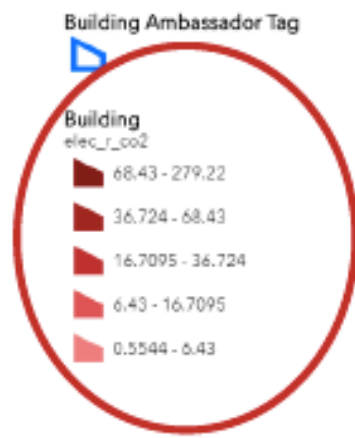
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Energy retrofit 20 years plan

Energy

Environmental

Economy



The values of the indicators are adapted to each type of indicator selected.

The values listed are homogenized for all 6 partner cities (without following the regulations by country).



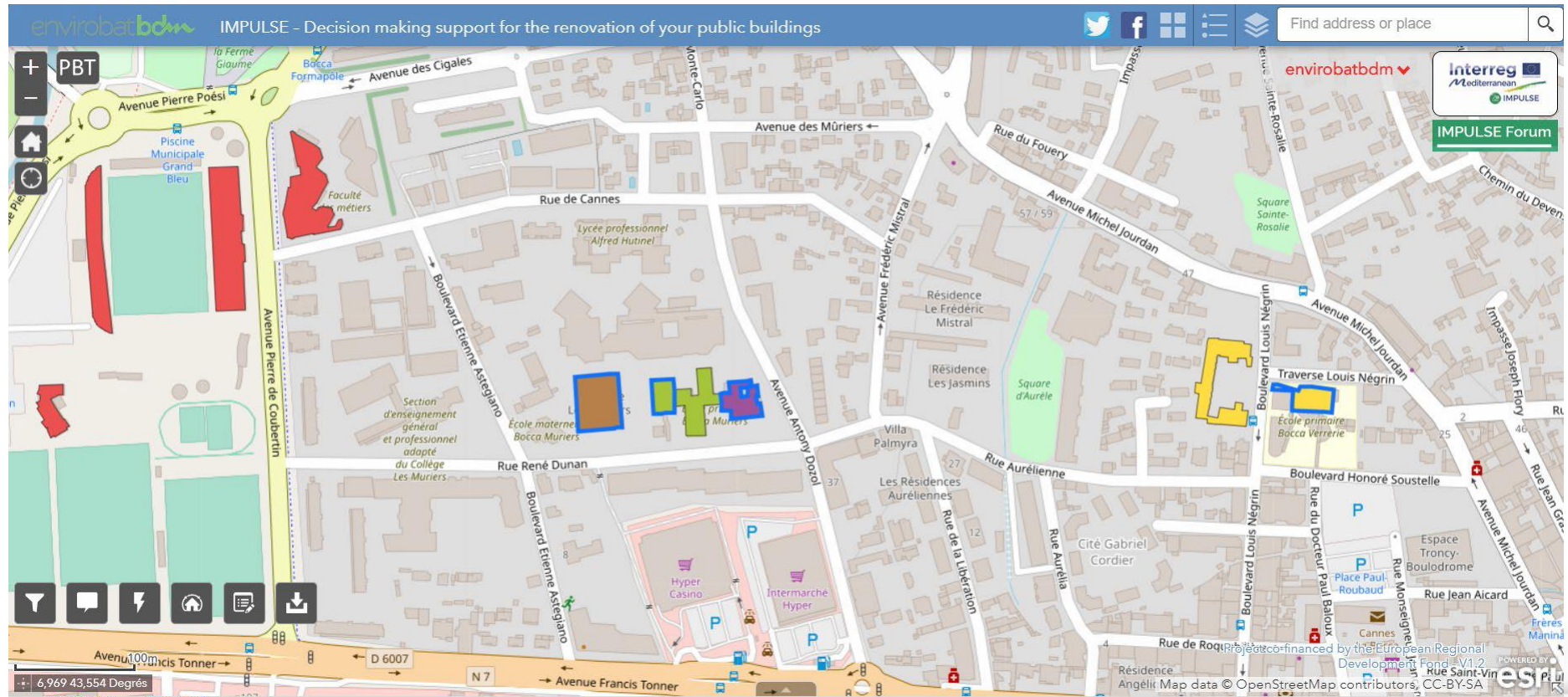
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Fiche descriptive du bâtiment

SCHOOL GROUP LES MURIERS - ELEMENTARY
Av René Dunan, 06150 Cannes, France
Typologie : PBT2
- Usage/typologie de bâtiment : Educational
- Année de construction : 1949-1973
- Etages : 1-3
- Superficie brute (m²) : 1001-16000

Description

| | |
|--|-------------------------------------|
| Superficie de la construction | 1161.62 |
| Adresse (incl. code postal) | Av René Dunan, 06150 Cannes, France |
| Latitude | 43.55145 |
| Longitude | 6.968594 |
| Usage/typologie de bâtiment | School |
| Année de construction | 1972 |
| Nb de niveaux | 3 |
| Superficie brute (m2) | 1161.62 |
| Type de construction - Géométrie de toit | Flat roof |
| Type de construction - Matériaux de toit | Gravel roof |
| Type de construction - Structure/Cadre | Reinforced concrete structure |
| Type de construction - Enveloppe/Façade | Brick factory façade |
| Type de construction - Isolation d'enveloppe | |
| Type de construction - Type de vitrage | |
| Type de construction - Type de menuiserie | Aluminum Thermal Break Windows |
| Système de chauffage | GAS boiler |
| Système de refroidissement | / |

GIS Platform – impulseonline.eu

- Informations Générales
- Préconisations générales
- Rénovation mineure
- Rénovation moyenne
- Rénovation majeure
- Rénovation profonde



SOME EXAMPLES FOR DIRECT FUNDS



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RÉNOVATION MOYENNE

Gain de 25% minimum en conso d'énergie primaire. Budget < 100 000 €

Scénario 1 Scénario 2 Scénario 3

*Reduction of T°C in the night by 1°C and during the week end + replacement of the heating system with new condensing boiler (130kW) + thermostatic valves on radiators + Relamping LED with change of the luminaires and absence detectors + Insulation of the crawl space + insulation of the ceiling in the yard "

Classe énergétique :

Impacts sur les indicateurs de performance énergétique

Economies annuelles totales d'énergie primaire
96436.98 kWh/an | 83.21 kWh/m²/an | 43.69 %

Economies annuelles d'énergie finale pour le chauffage
84799.00 kWh/an | 73.17 kWh/m²/an | 45.66 %

Economies annuelles d'énergie finale pour la climatisation
kWh/an | kWh/m²/an | %
Plus

Impacts sur les Indicateurs environnementaux

Emissions totales de CO2 évitées
20206.84 kg/an | 17.43 kg/m²/an | 45.51 %

Emissions de CO2 évitées liées à la consommation d'électricité
360.48 kg/an | 0.31 kg/m²/an | 39.32 %

Emissions de CO2 évitées liées à la consommation de combustibles fossiles
19846.36 kg/an | 17.12 kg/m²/an | 45.64 %

Impacts sur les indicateurs de coûts

Economies sur le coût opérationnel annuel total lié à l'énergie
5384.35 €/an | 4.65 €/m²/an | 43.49 %

Economies annuelles de coûts liés à l'électricité
719.61 €/an | 0.62 €/m²/an | 33.32 %

Economies annuelles de coûts liés aux combustibles fossiles
4664.74 €/an | 4.02 €/m²/an | 45.64 %
Plus

Scenario choices (if available).

Detailed description of the retrofit scenario selected.

Energy performance impacts

Environmental performance impacts

Economic performance impacts



SOME EXAMPLES FOR DIRECT FUNDS



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In this case, the direct funds have financed the study, the technical toolkits and the definition of policy recommendation.



SOME EXAMPLES FOR DIRECT FUNDS



ABRACADABRA – **Policy Recommendation on Financial Toolkit**
Assistant Buildings' addition to Retrofit, Adopt, Cure And Develop the Actual Buildings up to zeRo energy, Activating a market for deep renovation



SOME EXAMPLES FOR DIRECT FUNDS

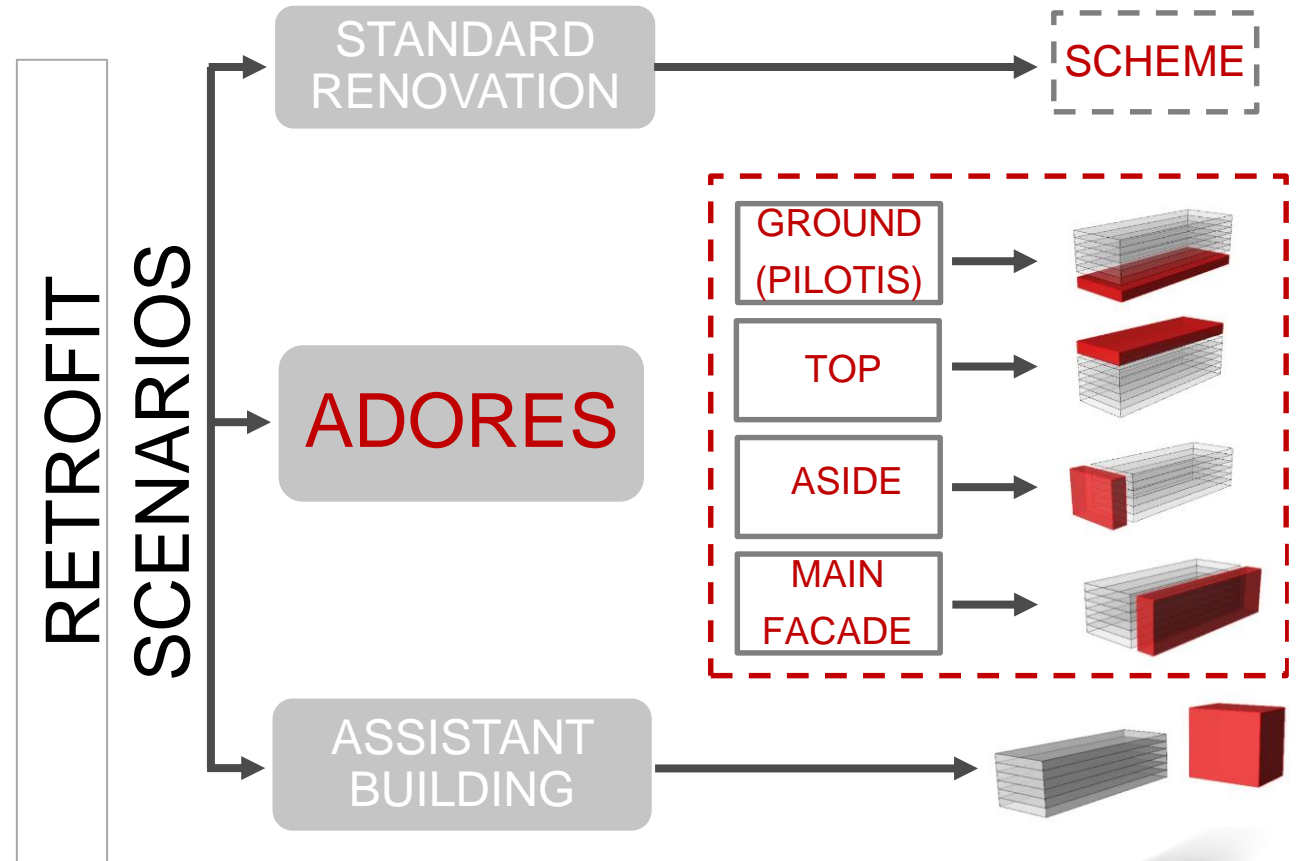
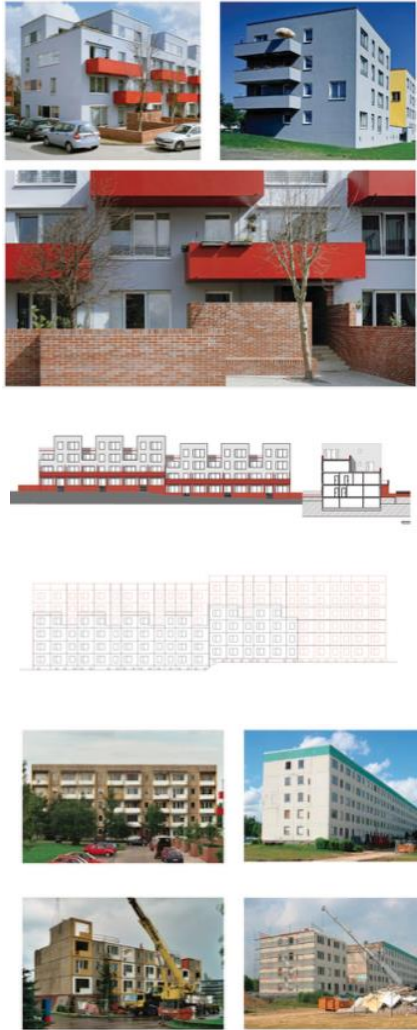
Abracadabra wants to find the sustainable solution to **transform existing buildings into NZEB buildings**. The economic savings generated by the increase in energy efficiency of buildings is not economically sufficient to justify the intervention: the PBP can be over 33 years old. Then I can calculate how much new volume I should create to balance the whole investment.

The Public Administrations can "manage" the energy requalification processes of private developers by granting new volumes, obtaining in exchange a reduction / cancellation of the CO2 emissions, the building requalification (even at the neighborhood level), the "non-consumption of land" and a possible social redevelopment: if the investment pays for itself with the new volume, the tenants receive the restructuring both energy and building free of charge.

In this case, the direct funds have financed the study, the technical toolkits and the definition of policy recommendation.



SOME EXAMPLES FOR DIRECT FUNDS



SOME EXAMPLES FOR DIRECT FUNDS

| ADRES CASE STUDIES | ITALY 4250 m ² | GREECE 2310 m ² | ROMANIA 1160 m ² | THE NETHERLANDS 1000 m ² | BULGARIA 3720 m ² | LATVIA 1650 m ² | NORWAY 1076 m ² | SPAIN 1480 m ² |
|-----------------------|-------------------------------|-------------------------------|--------------------------------|--|---------------------------------|-------------------------------|-------------------------------|------------------------------|
| GROUND | | | | | | | | |
| TOP | ADDED 2100 m ² | ADDED 330 m ² | ADDED 366 m ² | ADDED 1000 m ² | ADDED 446 m ² | ADDED 435 m ² | ADDED 270 m ² | ADDED 756 m ² |
| ASIDE | ADDED 1337 m ² | ADDED 1000 m ² | | | ADDED 945 m ² | ADDED 715 m ² | ADDED 435 m ² | |
| FAÇADE | | ADDED 630 m ² | ADDED 254 m ² M | ADDED 370 m ² | ADDED 416 m ² | ADDED 537 m ² | ADDED 202 m ² | ADDED 270 m ² |
| ASSISTANT BUILDING | | ADDED 1800 m ² | ADDED 600 m ² | ADDED 1000 m ² | ADDED 720 m ² | ADDED 720 m ² | ADDED 900 m ² | |



SOME EXAMPLES FOR DIRECT FUNDS

ADD-ONS

ADORES to support investment in renovation

Add-ons and renewables (ADORES) can be built next to existing buildings in a number of ways, according to different contexts and building types.

- **Additional units** and/or surfaces attached to blind facades or the ground
- **Rooftop extensions**
- **Extra living space in existing units**
- **Additional 'assistant buildings'**

JOIN US

➤ **Join the ABRA community!**
Exchange knowledge with stakeholders from market and financial actors to policy-makers

➤ **Learn and exchange at ABRA events**
Participate in stakeholder community meetings and international workshops

➤ **Let's combine our thinking!**
Policy-led and market-led approaches are needed. ABRA will bring these two frameworks together

www.abracadabra-project.eu

POLICY

Innovation energy renovation initiatives

ABRACADABRA activates market actors and public bodies to support and implement its strategy and achieve:

- **Self financing schemes** with beneficial environmental and societal outcomes for public bodies and citizens
- **Reduced risk in renovation** through standardised procedures based on reduced payback times
- **Increased investors confidence**

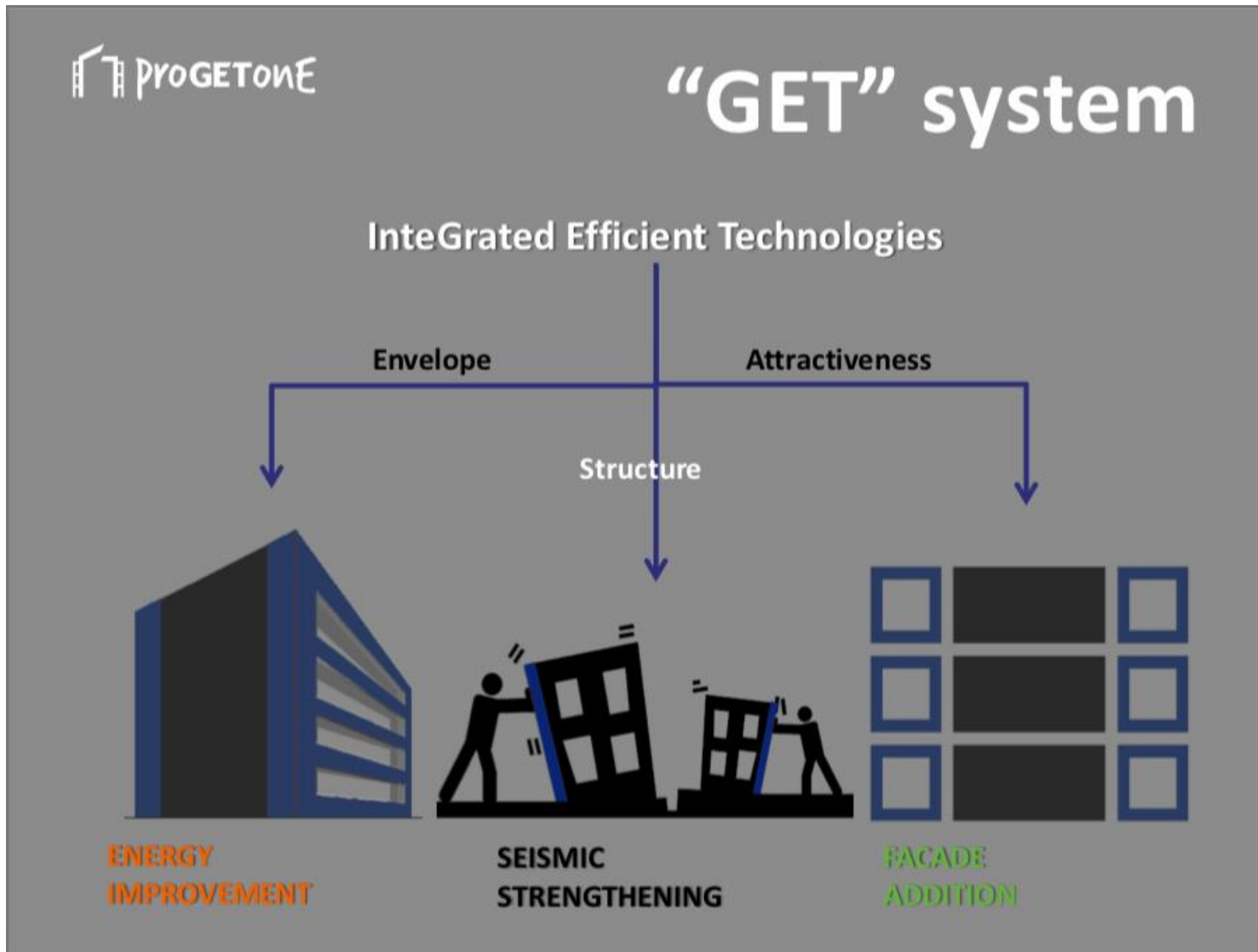
Economic Profit
+
Added value



Energy Efficiency
+
Savings



SOME EXAMPLES FOR DIRECT FUNDS



SOME EXAMPLES FOR DIRECT FUNDS

Time reduction

Energy reduction

Cost reduction

| | TYPICAL DEEP RENOVATION | | | PRO-GET-ONE SYSTEM RENOVATION | | |
|---|--|----------------------------|---|--|----------------------------|------|
| MEET ENERGY REQUIREMENTS | INTERVENTIONS | Cost €/m ² | Days | INTERVENTIONS | Cost €/m ² | Days |
| | External thermal insulation + finishing systems | 60 | 90 | PRO-GET-ONE standard system (structural not included) | 90 | 60 |
| | Windows replacement | 70 | 30 | Windows replacement | 80 | 30 |
| | HVAC and water heating system improvements/replacements | 80 | 90 | HVAC and water heating system improvements/replacements, plug and play | 80 | 60 |
| | Related demolitions and reconstructions | 30 | 30 | Related demolitions and reconstructions | 0 | 0 |
| | Scaffoldings and safety installations | 30 | 240 | Scaffoldings and safety installations | 10 | 0 |
| | New renewable energy systems | 100 | 30 | PRO-GET-ONE standard renewable energy systems | 100 | 30 |
| | TOTAL CONSTRUCTION COSTS AND DURATION | 360 | 240 | TOTAL CONSTRUCTION COSTS AND DURATION | 380 | 60 |
| Maintenance and replacements (25 years cycle, heating/cooling running costs not included) | 135 | --- | Maintenance and replacements (25 years cycle, heating/cooling running costs not included) | 115 | --- | |
| MEET SAFETY REQUIREMENTS | INTERVENTIONS | Unit Cost €/m ² | Days | INTERVENTIONS | Unit Cost €/m ² | Days |
| | New reinforced concrete structures (e.g. shear walls) + foundations | 350 | 180 | PRO-GET-ONE steel and wood structure + foundations. | 320 | 60 |
| | Demolitions and reconstructions related to new structures (e.g. floor replacement) | 40 | 60 | Demolitions and reconstructions related to new structures | 10 | 10 |
| | TOTAL CONSTRUCTION COSTS AND DURATION | 390 | 240 | TOTAL CONSTRUCTION COSTS AND DURATION | 330 | 70 |
| | Maintenance and replacements (25 years cycle) | 5 | --- | Maintenance and replacements (25 years cycle) | 25 | --- |
| MEET USER REQUIREMENTS | INTERVENTIONS | Unit Cost €/m ² | Days | INTERVENTIONS | Unit Cost €/m ² | Days |
| | Inhabitants relocation (no tailored design) | 100 | 360 | Inhabitants relocation (user-oriented design) | 0 | 0 |
| ALL REQUIREMENTS | TOTAL CONSTRUCTION COSTS | 850 | | TOTAL CONSTRUCTION COSTS Per m² of existing UFA | 710 | |
| | | | | TOTAL CONSTRUCTION COSTS Per m² of existing UFA plus extra surface (+20% of UFA) | 560 | |
| | LIFE CYCLE COSTS (after 25 years, excluding energy running costs) | 990 | | LIFE CYCLE COSTS (after 25 years, excluding energy running costs) | 850 | |
| | EXPECTED REAL ESTATE VALUE AFTER INTERVENTION | +15% | | EXPECTED REAL ESTATE VALUE AFTER INTERVENTION | +50% | |

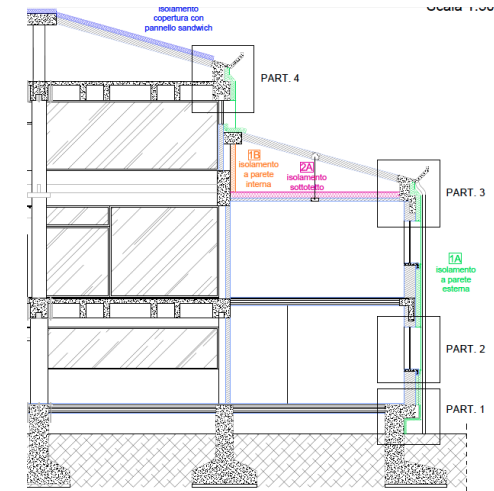
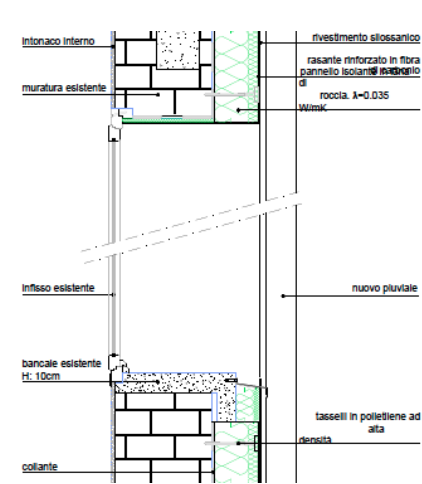
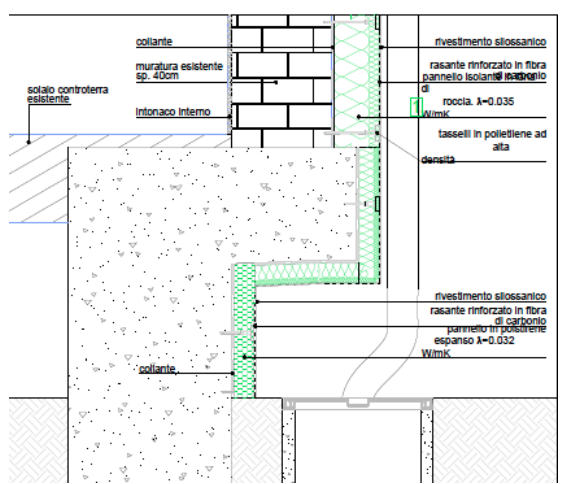
[1 - (710/850)] = 16%. If we include the value of extra surface by 50%, the reduction will be [1 - (560/850)] = 34%.

SOME EXAMPLES FOR STRUCTURAL FUNDS

Project: transformation of an existing school building into a NZEB school building

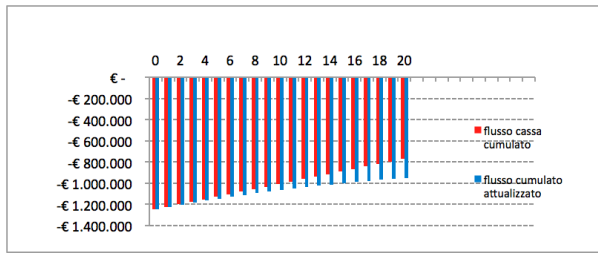


SOME EXAMPLES FOR STRUCTURAL FUNDS



SOME EXAMPLES FOR STRUCTURAL FUNDS

Business plan:
 Investment € 1.248.000
 Energy saving €/year 23.861
 PBP: infinity



| | | |
|----------------------------|----|---------|
| VAN | -€ | 950.639 |
| TIR | | -8% |
| VAN/Investimento | | -0,76 |
| Tempo di rit. semplice | | - |
| Tempo di rit. attualizzato | | - |

ANALISI FLUSSI DI CASSA (inserire i valori dei benefici economici e dei costi attesi)

| T (anni) | Benefici economici attesi | INVESTIMENTO | Costi attesi | FLUSSO DI CASSA NETTO | FLUSSO DI CASSA CUMULATO | FLUSSO NETTO ATTUALIZZATO | FLUSSO CUMULATO ATTUALIZZATO |
|----------|---------------------------|--------------|--------------|-----------------------|--------------------------|---------------------------|------------------------------|
| 0 | | -€ 1.248.000 | | -€ 1.248.000 | -€ 1.248.000 | -€ 1.248.000 | -€ 1.248.000 |
| 1 | € 23.861 | € - | | € 23.861 | -€ 1.224.139 | € 22.725 | -€ 1.225.275 |
| 2 | € 23.861 | € - | | € 23.861 | -€ 1.200.278 | € 21.643 | -€ 1.203.633 |
| 3 | € 23.861 | € - | | € 23.861 | -€ 1.175.417 | € 20.612 | -€ 1.183.021 |
| 4 | € 23.861 | € - | | € 23.861 | -€ 1.152.556 | € 19.631 | -€ 1.163.390 |
| 5 | € 23.861 | € - | | € 23.861 | -€ 1.128.695 | € 18.695 | -€ 1.144.694 |
| 6 | € 23.861 | € - | | € 23.861 | -€ 1.104.834 | € 17.805 | -€ 1.126.889 |
| 7 | € 23.861 | € - | | € 23.861 | -€ 1.080.973 | € 16.958 | -€ 1.109.931 |
| 8 | € 23.861 | € - | | € 23.861 | -€ 1.057.112 | € 16.150 | -€ 1.093.781 |
| 9 | € 23.861 | € - | | € 23.861 | -€ 1.033.251 | € 15.381 | -€ 1.078.400 |
| 10 | € 23.861 | € - | | € 23.861 | -€ 1.009.390 | € 14.649 | -€ 1.063.752 |
| 11 | € 23.861 | € - | | € 23.861 | -€ 985.529 | € 13.951 | -€ 1.049.801 |
| 12 | € 23.861 | € - | | € 23.861 | -€ 961.668 | € 13.287 | -€ 1.036.514 |
| 13 | € 23.861 | € - | | € 23.861 | -€ 937.807 | € 12.654 | -€ 1.023.860 |
| 14 | € 23.861 | € - | | € 23.861 | -€ 913.946 | € 12.051 | -€ 1.011.809 |
| 15 | € 23.861 | € - | | € 23.861 | -€ 890.085 | € 11.478 | -€ 1.000.331 |
| 16 | € 23.861 | € - | | € 23.861 | -€ 866.224 | € 10.931 | -€ 989.400 |
| 17 | € 23.861 | € - | | € 23.861 | -€ 842.363 | € 10.410 | -€ 978.990 |
| 18 | € 23.861 | € - | | € 23.861 | -€ 818.502 | € 9.915 | -€ 969.075 |
| 19 | € 23.861 | € - | | € 23.861 | -€ 794.641 | € 9.443 | -€ 959.632 |
| 20 | € 23.861 | € - | | € 23.861 | -€ 770.780 | € 8.993 | -€ 950.639 |



SOME EXAMPLES FOR STRUCTURAL FUNDS

Business plan:

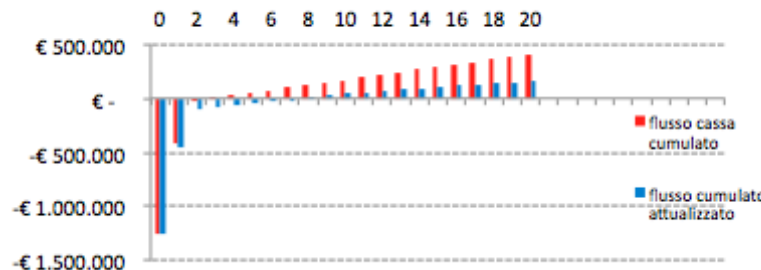
Investimento € 1.248.000

Energy saving €/year 23.861

Regional funds (POR FESR): 389.261 €

State funds (conto termico): 835.261 €

PBP: 3 years



| | | |
|----------------------------|---|---------|
| VAN | € | 153.551 |
| TIR | | 10% |
| VAN/Investimento | | 0,12 |
| Tempo di rit. semplice | | 3 |
| Tempo di rit. attualizzato | | 8 |

| T (anni) | Benefici economici attesi | INVESTIMENTO | Costi attesi | FLUSSO DI CASSA NETTO | FLUSSO DI CASSA CUMULATO | FLUSSO NETTO ATTUALIZZATO | FLUSSO CUMULATO ATTUALIZZATO |
|----------|---------------------------|--------------|--------------|-----------------------|--------------------------|---------------------------|------------------------------|
| 0 | | € 1.248.000 | | € -1.248.000 | € 1.248.000 | € 1.248.000 | € -1.248.000 |
| 1 | € 835.261 | € - | | € 835.261 | € -412.739 | € 795.487 | € -452.513 |
| 2 | € 389.261 | € - | | € 389.261 | € -23.478 | € 353.071 | € -99.442 |
| 3 | € 23.861 | € - | | € 23.861 | € 383 | € 20.612 | € -78.830 |
| 4 | € 23.861 | € - | | € 23.861 | € 24.244 | € 19.631 | € -59.200 |
| 5 | € 23.861 | € - | | € 23.861 | € 48.105 | € 18.696 | € -40.504 |
| 6 | € 23.861 | € - | | € 23.861 | € 71.966 | € 17.805 | € -22.698 |
| 7 | € 23.861 | € - | | € 23.861 | € 95.827 | € 16.958 | € -5.741 |
| 8 | € 23.861 | € - | | € 23.861 | € 119.688 | € 16.150 | € 10.409 |
| 9 | € 23.861 | € - | | € 23.861 | € 143.549 | € 15.381 | € 25.790 |
| 10 | € 23.861 | € - | | € 23.861 | € 167.410 | € 14.649 | € 40.439 |
| 11 | € 23.861 | € - | | € 23.861 | € 191.271 | € 13.951 | € 54.390 |
| 12 | € 23.861 | € - | | € 23.861 | € 215.132 | € 13.287 | € 67.677 |
| 13 | € 23.861 | € - | | € 23.861 | € 238.993 | € 12.654 | € 80.331 |
| 14 | € 23.861 | € - | | € 23.861 | € 262.854 | € 12.051 | € 92.382 |
| 15 | € 23.861 | € - | | € 23.861 | € 286.715 | € 11.478 | € 103.859 |
| 16 | € 23.861 | € - | | € 23.861 | € 310.576 | € 10.931 | € 114.790 |
| 17 | € 23.861 | € - | | € 23.861 | € 334.437 | € 10.410 | € 125.201 |
| 18 | € 23.861 | € - | | € 23.861 | € 358.298 | € 9.915 | € 135.116 |
| 19 | € 23.861 | € - | | € 23.861 | € 382.159 | € 9.443 | € 144.558 |
| 20 | € 23.861 | € - | | € 23.861 | € 406.020 | € 8.993 | € 153.551 |



SOME EXAMPLES FOR FINANCIAL OPPORTUNITIES

ESCO AND EPC CONTRACT



600
MWh/a



Before

ESCO



600
MWh/a



After

50 % = 300
MWh/a

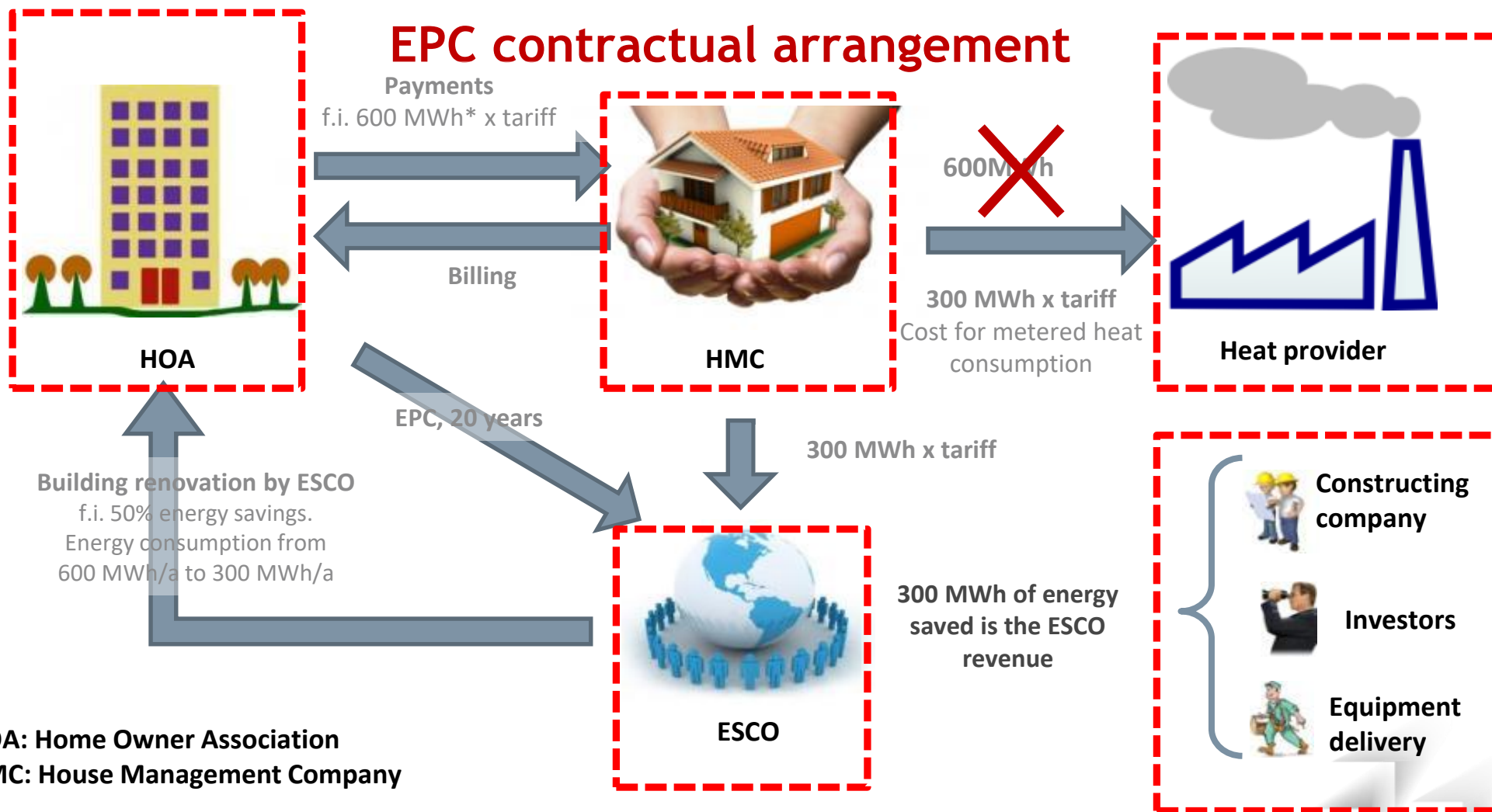
+ =

600
MWh/a

50 % = 300
MWh/a



SOME EXAMPLES FOR FINANCIAL OPPORTUNITIES



2006/32/CE Directive

Energy Performance Contract (EPC)

The main types of contracts:

- **First out:** global sale
- **Shared savings:** shared savings
- **Guaranteed savings:** shared savings

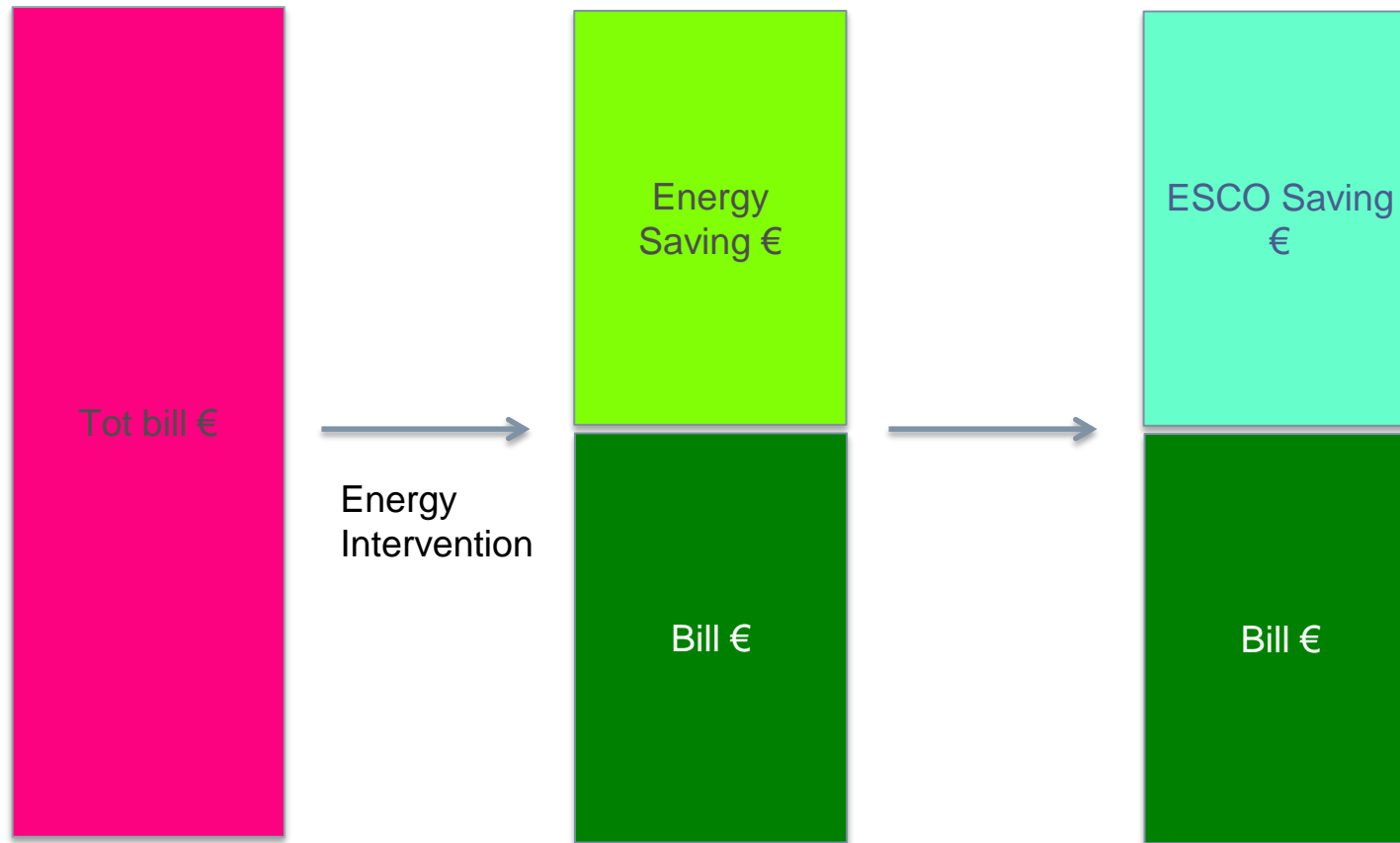


First Out Contract - EPC

- the ESCo itself provides the capital or uses third party lenders.
- The energy savings achieved are entirely used to repay the financing of the intervention and remunerate the activity of the ESCo;
- the contract usually lasts about **3-5 years**.
- On expiry of the contract, the savings go entirely to the customer who becomes the owner of the plants and the works performed.
- With this type of contract, the ESCo collects 100% of the savings actually obtained up to the contractual expiry; all costs and profits are declared in advance and the savings are used first of all for the complete coverage of these costs.
- The ESCo retains ownership of the plant until the expiry of the contract, after which it transfers to the customer's ownership;



First Out Contract - EPC

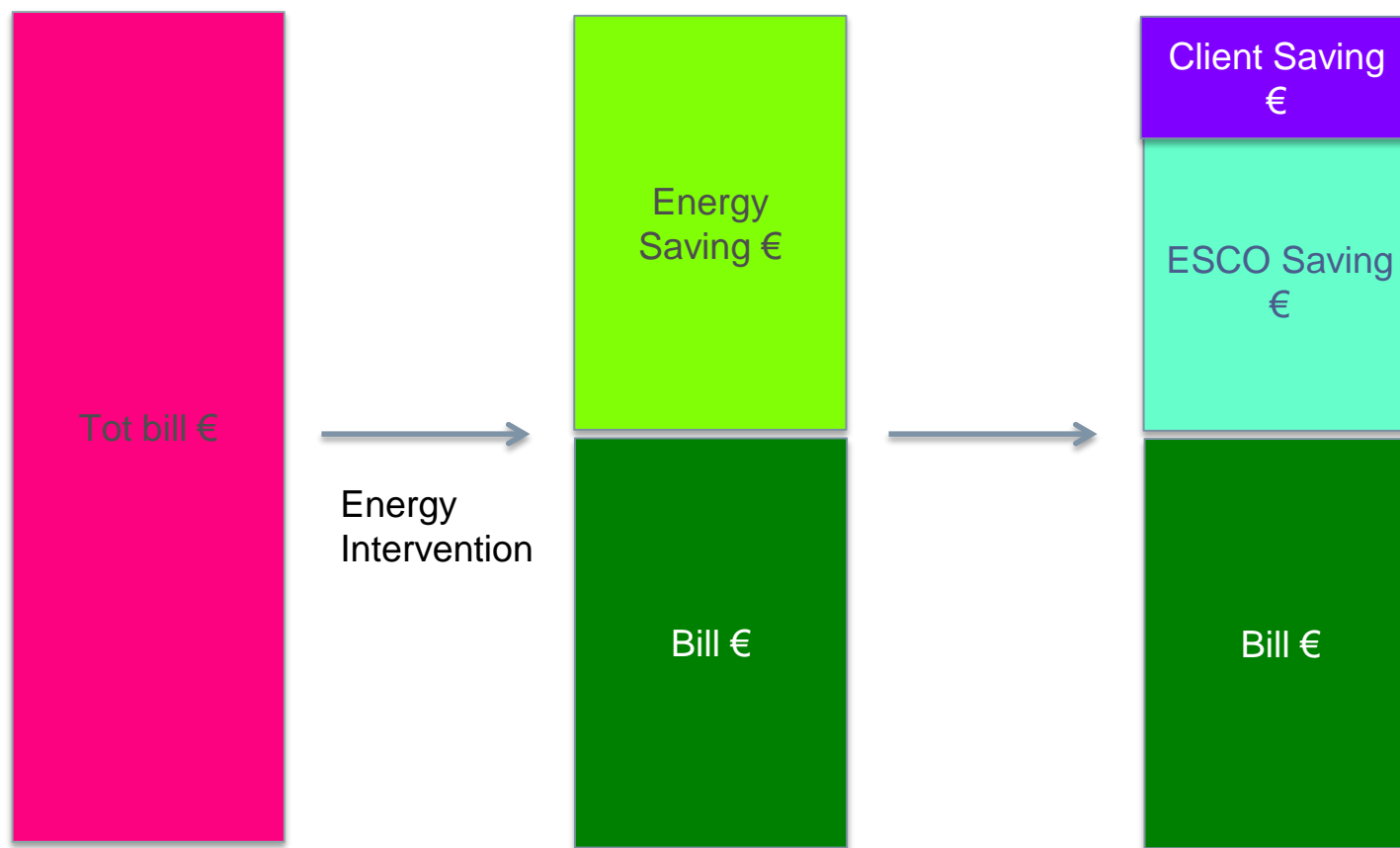


Shared Savings Contract - EPC

- the ESCo supplies the capital with its own sources or through third party financiers;
- the parties agree on the division of the proceeds of savings.
- The contracts have a duration of about 5-10 years in consideration of the fact that only a portion of the savings contributes to the recovery of the initial investment.
- During the execution of the contract, the ownership of the plants and works remains with the ESCo and at the contractual expiry it is transferred to the customer.
- In a contract with shared savings, therefore, the investment is repaid on the basis of an agreement, between the ESCo and the end user, to divide the savings amount determined by the feasibility study.
- As in the First Out model, the ESCo, in addition to the technical risk inherent in the performance to which its remuneration is linked, also assumes the financial risk;



Shared Savings Contract - EPC

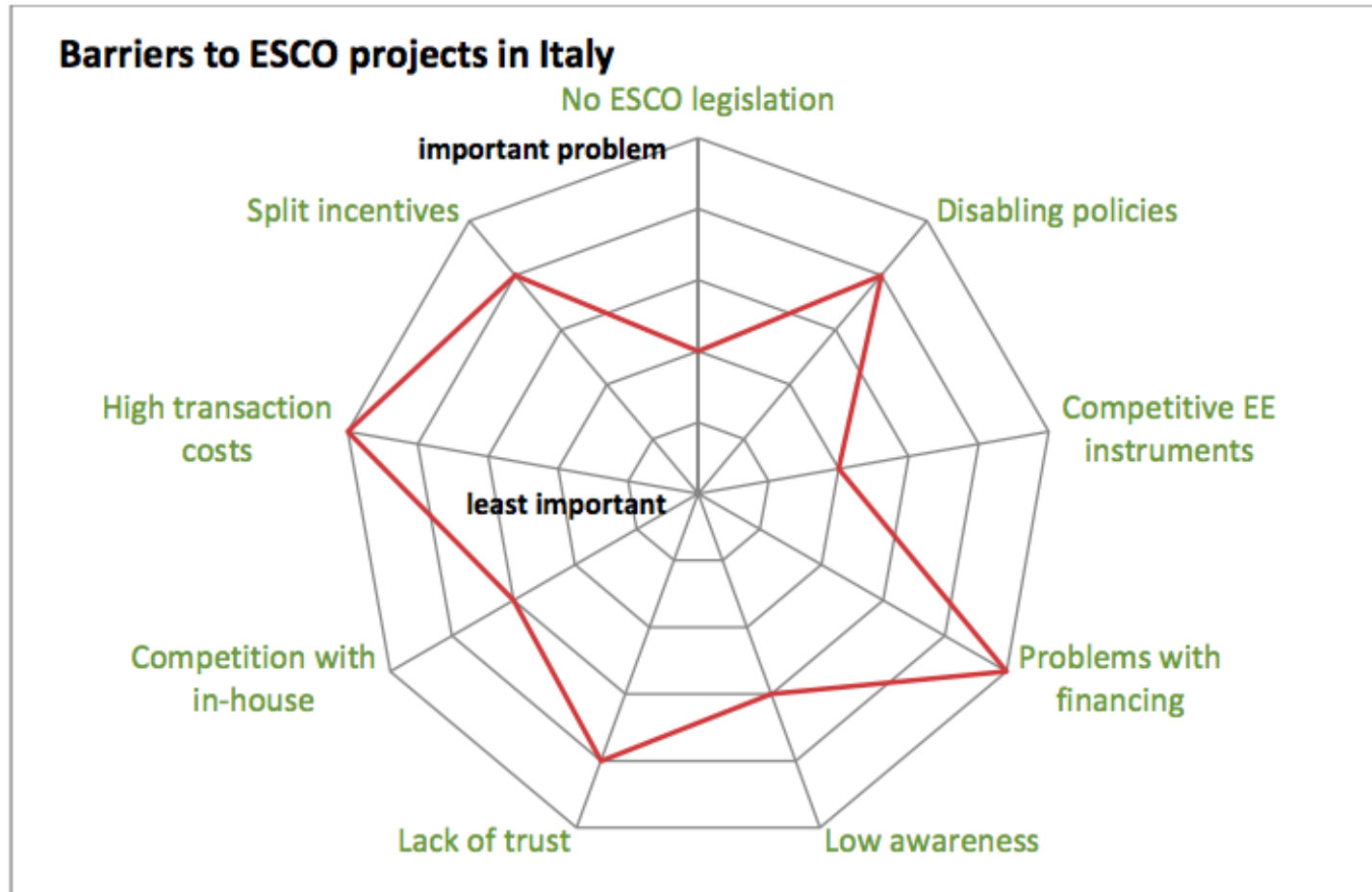


Guaranteed Savings Contract - EPC

- the lender is a third party other than the ESCo and the customer
- it is the customer who signs the loan, while the ESCo normally assumes the role of finding and organizing the loan, as well as guaranteeing a certain level of return based on which it receives the compensation from the customer.
- The contract normally lasts about 4-8 years.
- the ESCo undertakes essentially to guarantee that the savings are not lower than an agreed minimum, established on the basis of the feasibility analysis.
- The savings guarantee is expressed through formulas that provide for compensation in favor of the customer in the event of greater consumption than those guaranteed; if, on the other hand, savings are achieved that exceed those expected, these will normally benefit the customer.



Italian Situation - ESCO and EPC



Italian Situation - ESCO and EPC



The credit assignment: some interventions of energy restructuring of existing buildings give the right (in Italy) to a tax relief up to 65%. In this way, whoever supports the energy renovation of the building, can take advantage of a tax discount of up to 65% in 10 years. Some ESCOs are offering the energy redevelopment of buildings by "anticipating" the tax credit of the tenant who assigns this credit to the ESCO.

By this way, the tenant can take advantage of the entire tax credit at the beginning of the entire tax credit, with a lower initial cost. The rest of the investment (reduced by over 50%) can be supported by the tenant or anticipated by the ESCO in the form of an EPC contract.

Thanks to this "financial" mode, it is also possible to propose all those interventions, above all of a building nature, which would have very long PBPs but which nevertheless contribute to increasing the value of the building (for example, the replacement of windows or coats).



Europe – Regions – Municipalities

Energy management: figures with similar skills are needed at European level, as envisaged for the figure of Energy Management Expert by CEI UNI 11339. Similar figures speak a similar language and analyze the issue of energy efficiency in a similar way. For example, energy audits must comply with UNI 16247.

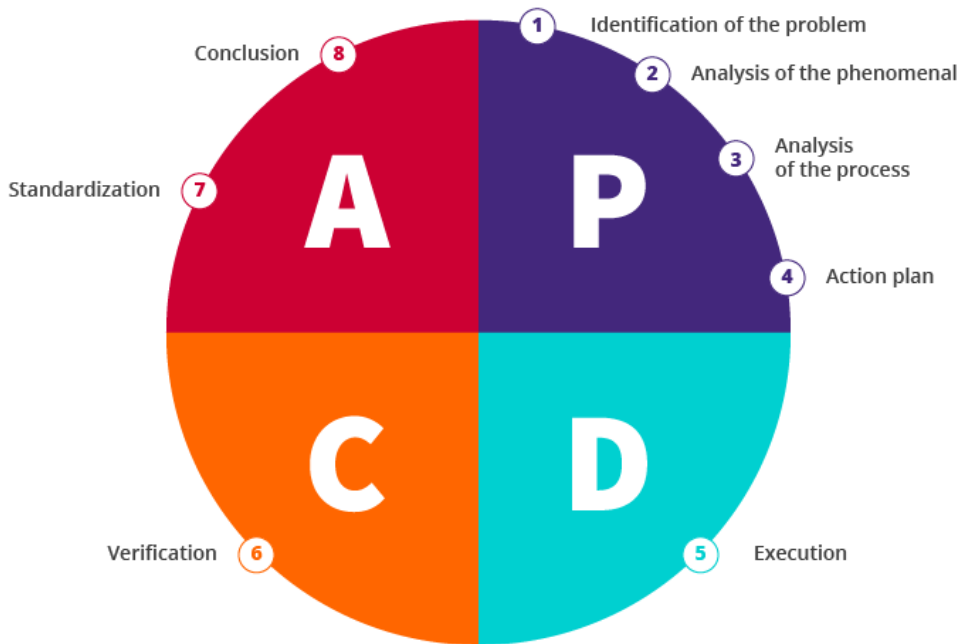
By December 2015, all energy-intensive companies or large companies (over € 50,000,000/years and more than 250 employees) will have to deliver energy audits while Public Administrations are not required to do so. Why? There Public Administrations (for example Paris Habitat that manages 125238 accommodations) that have Quality Management System (ISO 9001) and an Energy Management System (ISO 50001).

What do you think if the PAs adopted an EMS?
Can't find the EMS similar to the Sustainable Energy Action Plan?

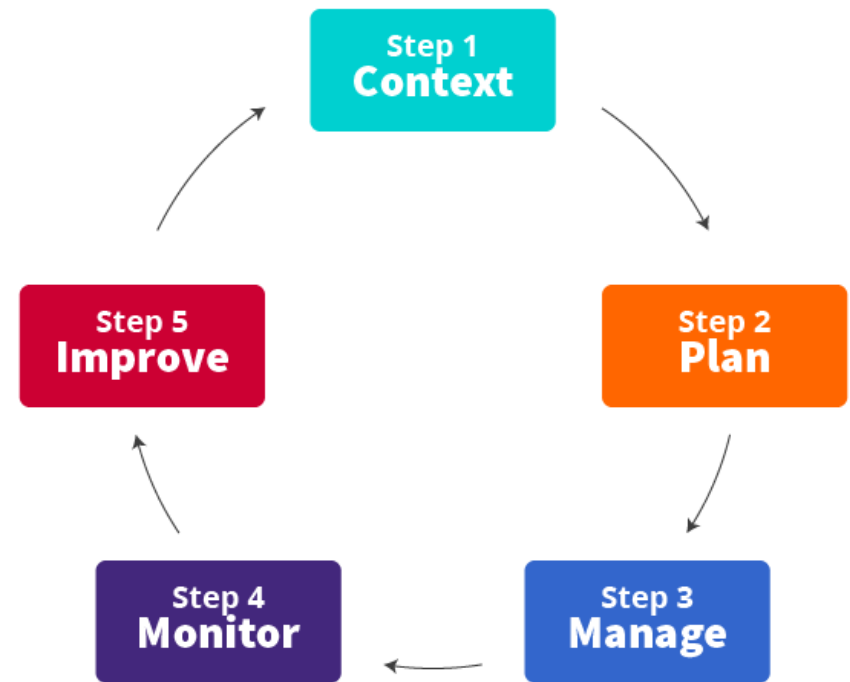


Europe – Regions – Municipalities

PDCA Cycle



Source: Falconi, 2015



Source: Guide for applying the ABNT ISO 50001 standard - Procobre



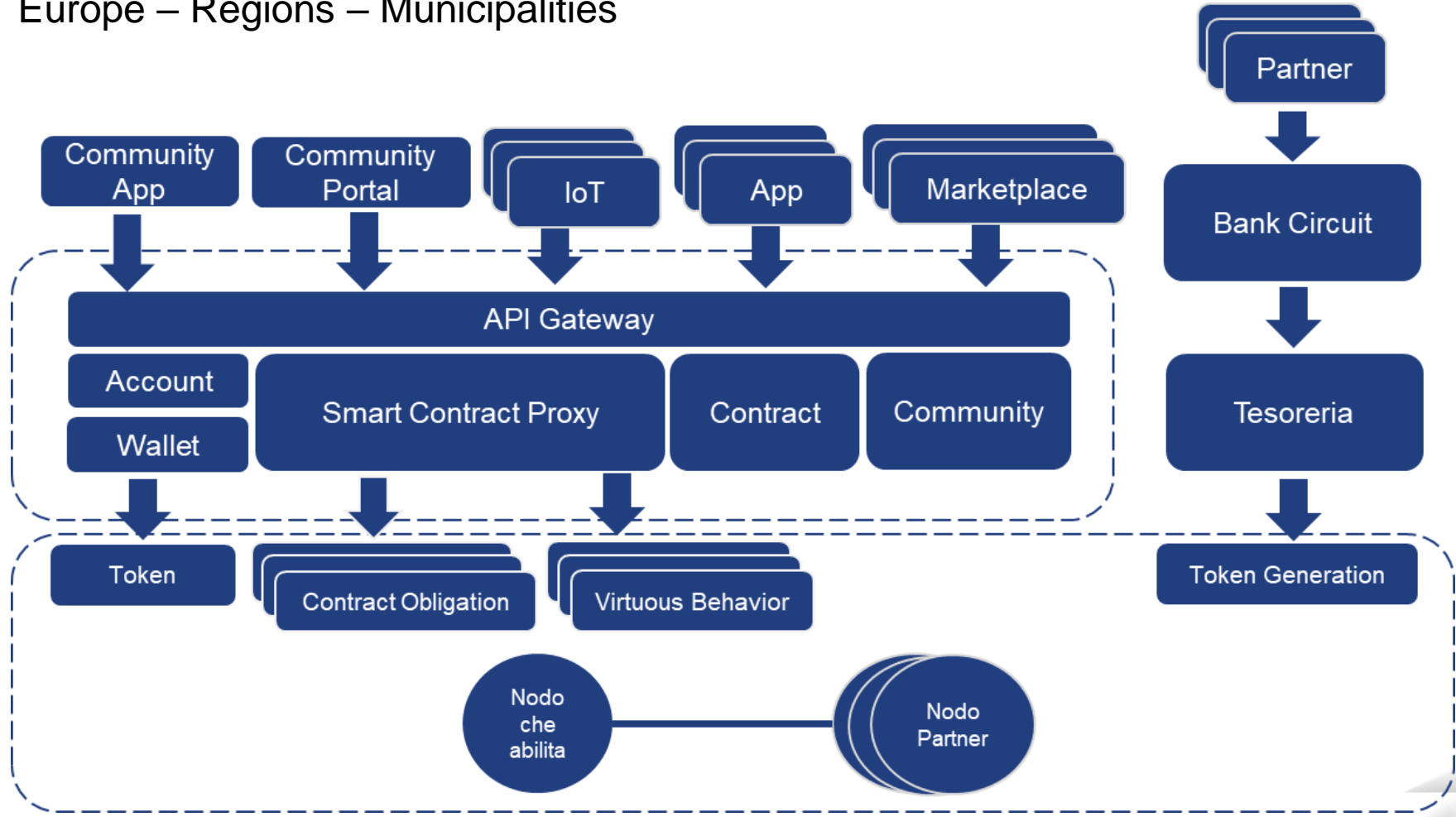
BLOCKCHAIN FOR BUILD

Europe – Regions – Municipalities



BLOCKCHAIN FOR BUILD

Europe – Regions – Municipalities



Thanks for your attentions

