



Italian National Agency for New Technologies,
Energy and Sustainable Economic Development

Energy Renovation of Buildings Experience across the EU

Malta – 6 June 2019

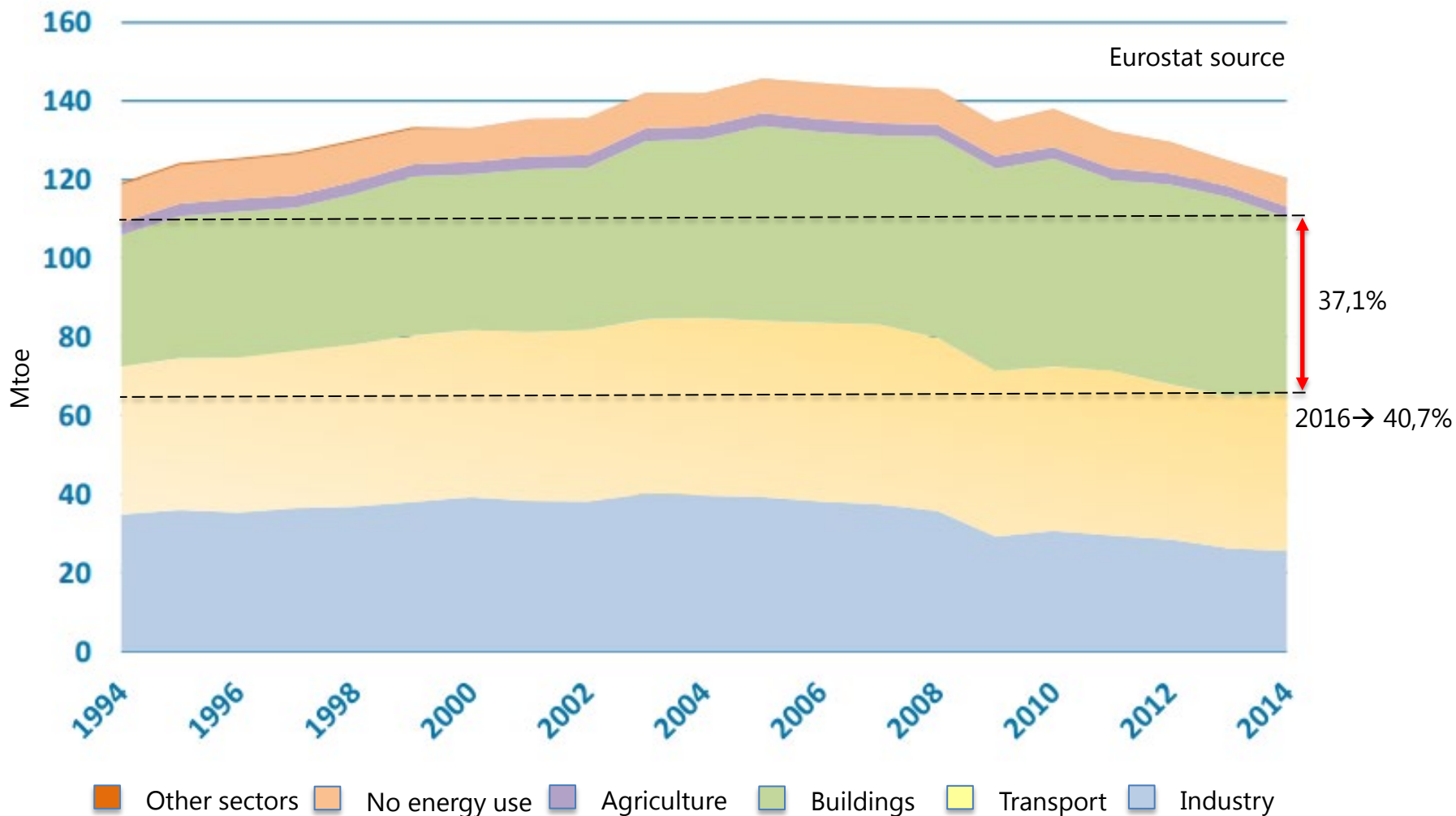
ing. Domenico Palladino - Department of Energy Efficiency Unit (DUEE)



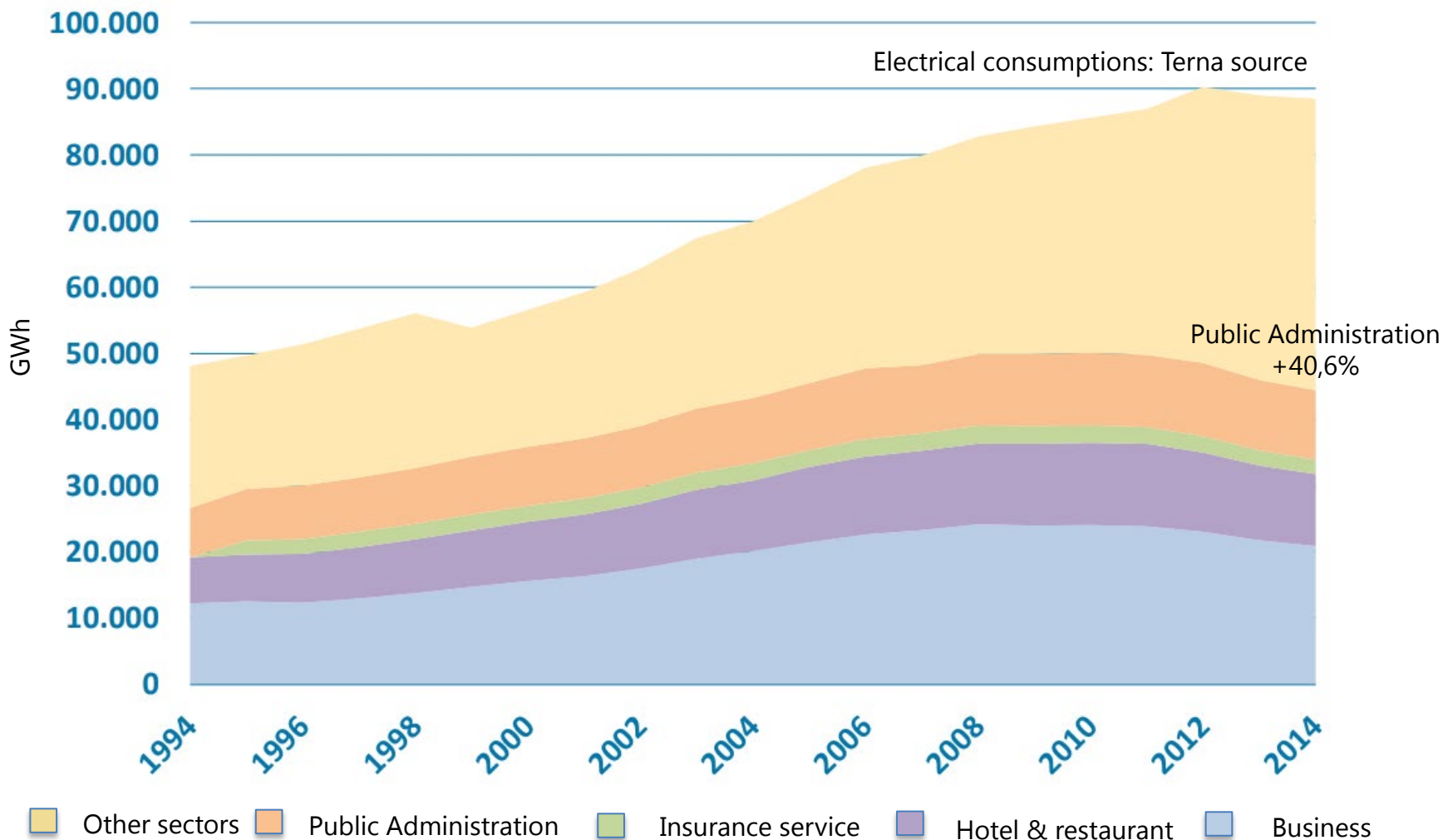
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Energy Renovation of Buildings



Energy Renovation of Buildings



Energy Renovation of Buildings

Energy savings (Mtoe/year) – D.Lgs 192/05 & D.M. 26/06/2015 Minimum Requirements. ENEA source

	2011	2012	2013	2014	2015	2016	2017	Total
New Residential Buildings	0,027	0,021	0,017	0,016	0,015	0,00004	0,00030	0,096
New No-Residential Buildings	0,035	0,027	0,018	0,017	0,018	0,000003	0,00002	0,115
Heating system replacement	0,166	0,155	0,142	0,116	0,111	0,020	0,022	0,732
	0,228	0,203	0,177	0,149	0,144	0,020	0,022	0,943

New Residential Buildings + New No-Residential Buildings = 0,211 Mtoe

Primary Energy savings = 0,943 Mtoe

Sector	Achieved - 2015	Target - 2020	%
Residential	2,24	3,67	61,0%
Tertiary	0,15	1,23	12,2%
Industry	1,57	5,1	30,8%
Transport	1,05	5,5	19,1%
Total	5,01	15,5	32,3%

Energy Renovation of Buildings

National Strategies

- ❑ a 40% cut in greenhouse gas emissions compared to 1990 levels
- ❑ at least a 32% share of renewable energy consumption, with an upward revisions clause for 2023
- ❑ indicative target for an improvement in energy efficiency at EU level of at least 32.5%, following on from the existing 20% target for 2020
- ❑ support the completion of the internal energy market by achieving the existing electricity interconnection target of 10% by 2020, with a view to reaching 15% by 2030



Framework of Italian Measures: Incentive Systems

Legislative Decree n. 102 – 4 July 2014 – Implementation of Directive 2012/27/ EU on energy efficiency

Ministerial Decree 28 December 2012 - Ministerial Decree 16 February 2016

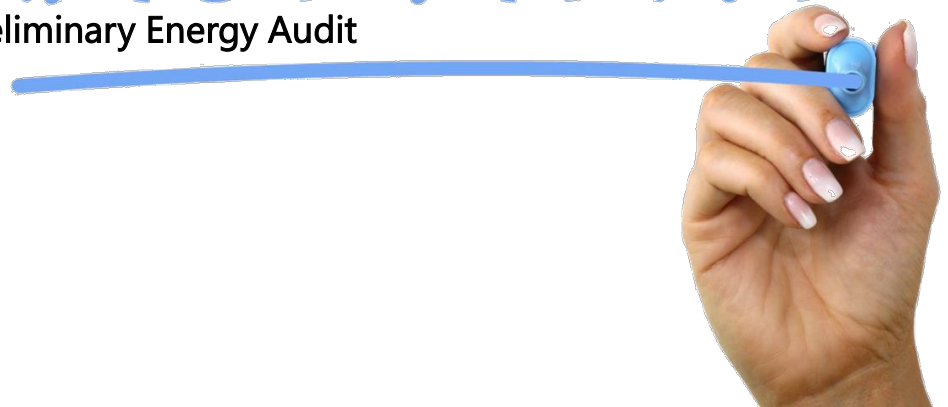
Energy Renovation of Buildings

National Strategies

Incentive Systems for Public Administration and Buildings

- ❑ Energy Renovation Programs of the Building of Central Public Administration – PREPAC
- ❑ Conto Termico 2.0 - GSE
- ❑ Apps for Smartphone and tablet for preliminary Energy Audit

INCENTIVE



Energy Renovation of Buildings

Legislative Decree n. 102, 4 July 2014

Measures for the promotion and energy efficiency improvement in order to achieve the National energy saving target of 20 Mtoe of the Primary Energy in 2010-2020 period



The Public Administration should be the driving sector for:

- Transformation of Buildings in efficient Buildings
- Inducing behavioral changes of the citizen and the companies about energy consumption, energy savings and energy efficiency



Art. 5: Energy performance improvement of Public Administration Buildings

Target: Renovation of PA Buildings - 3% of air-conditioned and covered area per annum about 400-500.000 m²/annum (at least)

Energy Renovation of Buildings

PREPAC: Energy Renovation Programs of the Building of Central Public Administration

Central Public Administration: government authorities (Ministry)  about 14 million of m²



355 M€ available for the 2014-2020 period  Excluded Building: Covered area <250 m², Listed Building, National Defence Buildings, and Church



Coordination and Control Body of the energy efficiency measures

1. MISE: Ministry of Economic Development
2. MATTM: Ministry of the Environment, Land and Sea Protection
3. ENEA: National Agency for new Technologies, Energy and Sustainable Economic development
4. GSE: Energy Service Manager

Measures Implementation Control: Ministry of Infrastructures and Transport

Energy Renovation of Buildings

D.M. 16 September of 2016

Intervention type

- Measures on opaque and transparent surfaces
- Solar shading
- Energy measures on HVAC systems
- Energy measures on hot water production
- Energy measures on renewables systems
- Energy measures on lighting systems

Other intervention type

- Other energy solutions which allow to reduce the energy consumption
- Electrical and thermal energy production: only for the real energy demand

Eligible spending

- All the one strictly correlated to the implementation of the energy efficiency measures

Energy Renovation of Buildings

D.M. 16 September of 2016: Method

Proposal Minimal context

- Energy Performance Certificate
- Energy Audit of Building
- Technical Relation
- Energy improvement description and checking in compliance of Minimum Requirements
- Method and calculation model description
- Total cost of all the proposed energy measures (site measuring)
- Financing procedure
- Time required for the energy measures realization
- Technical and Economic Analysis (pay-back)
- Environment impact and innovation degree
- GANTT
- Summary sheet in compliance with annex 1
- even more

Energy Renovation of Buildings

D.M. 16 September of 2016: Method

Exemplary project (financing priority until 20% of the resources)

- Measures on both opaque and transparent surfaces and HVAC systems
- Energy saving $\geq 50\%$

Project selection

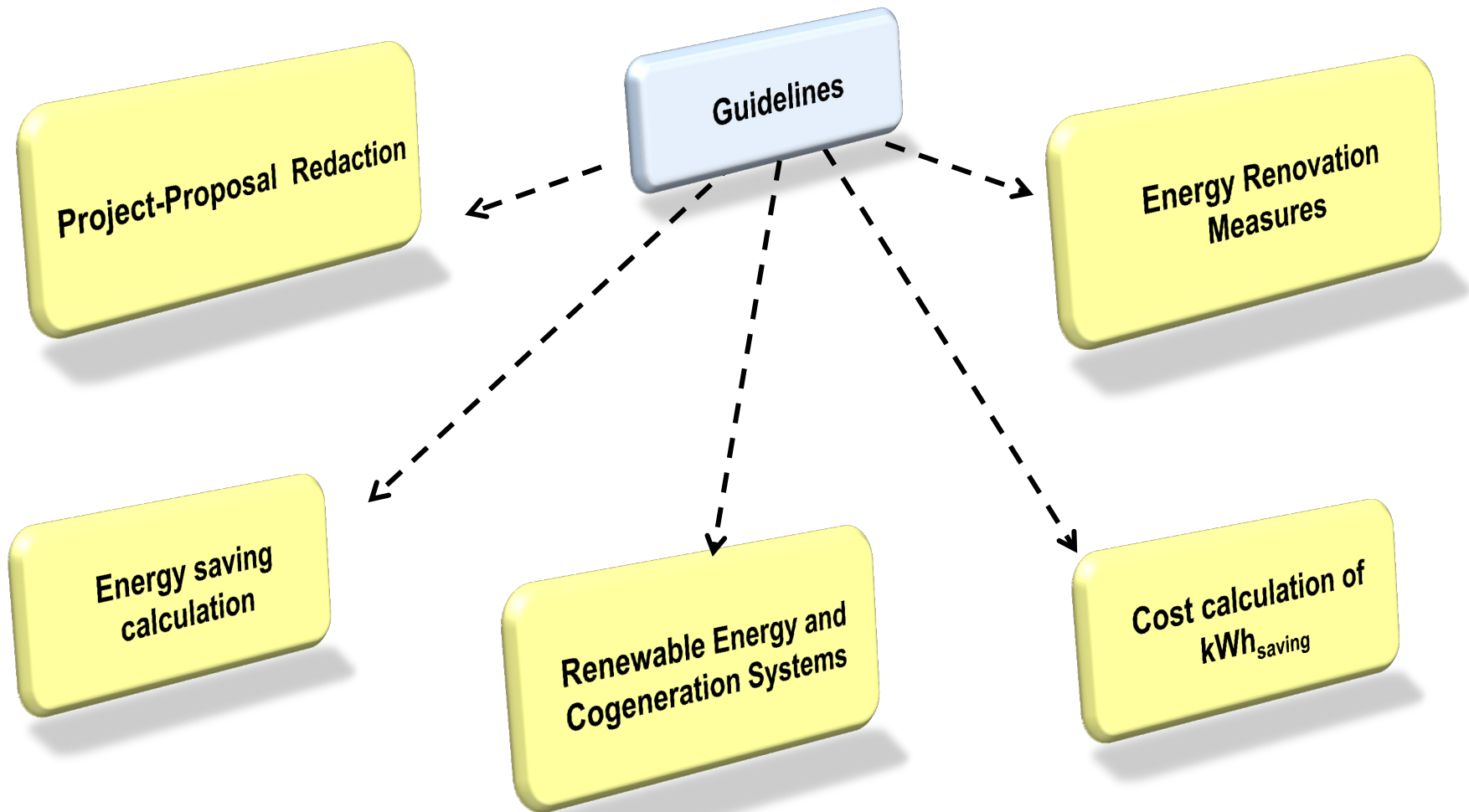
- Lower value of the total eligible spending (€) and energy saving (kWh) ratio – 60%
- Maximum value Co-financing solutions and total financing solutions (€) ratio – 30 %
- Lower time required for the measures

Guidelines by ENEA and GSE



Submission of the proposal project by the 30th of June of each year.

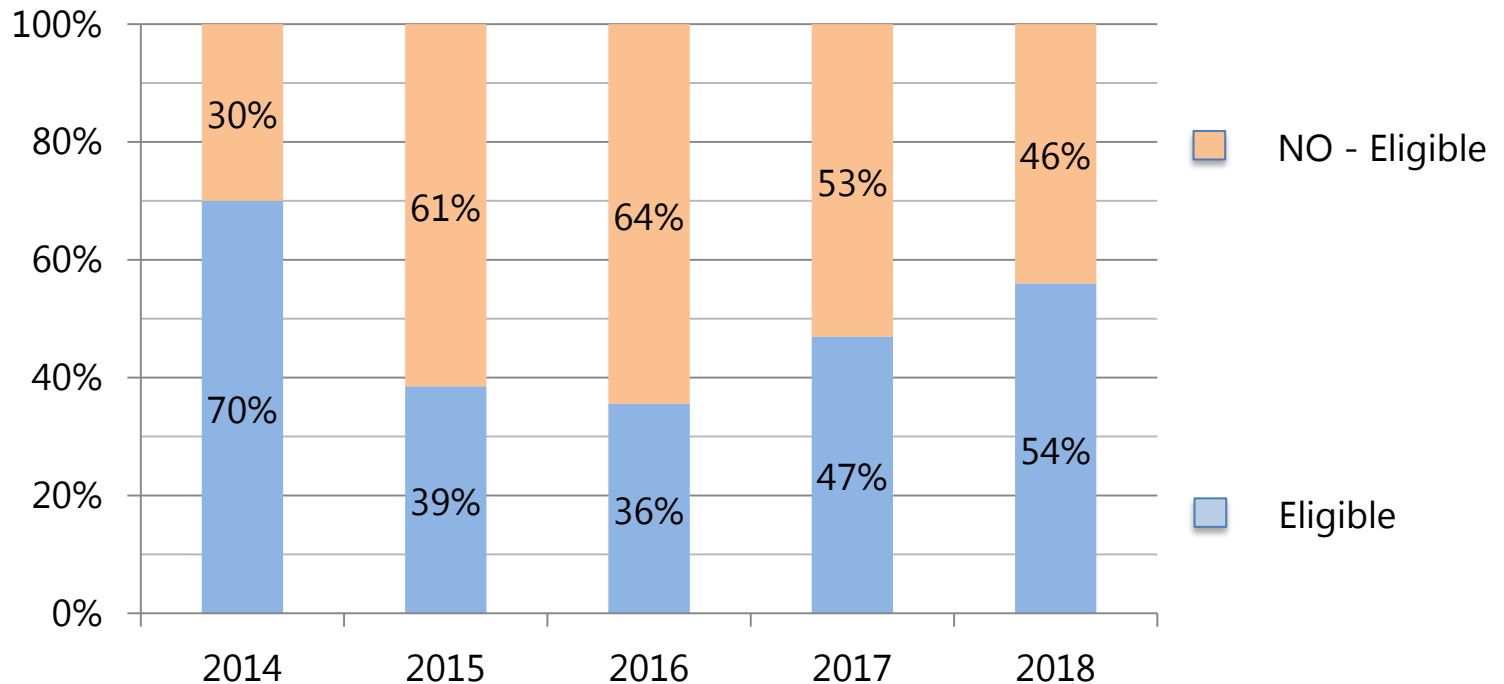
Energy Renovation of Buildings



Energy Renovation of Buildings

PREPAC Project in 2014-2018 period

Number of project: 425



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PREPAC Project in 2014-2018 period

year	Project proposal	Eligible project	Resources	Available Resources
2014	30	22	10.769.620 €	10.769.620 €
2015	122	47	62.228.613 €	62.228.613 €
2016	90	32	60.207.917 €	60.207.917 €
2017	83	39	37.412.007 €	37.412.007 €
2018	100	56	96.895.700 €	In progress

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PREPAC Project in 2014-2018 period – the mainly energy measures

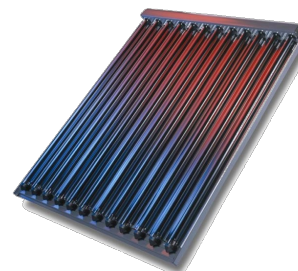
1. Measure on the Building Envelope: Thermal coats and windows replacement



2. Measures on the lighting systems – LED



3. Solar collector and Photovoltaic panels



4. Condensing Boiler

5. Heat Pump





6. Cogeneration systems



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D.M. December 2012 and D.M. 16 February 2016

Incentives for small-scale interventions to increase

- ✓ energy efficiency in existing buildings  only for PA
- ✓ thermal energy production from renewable sources  both PA and Private

Resources for **900 M€**:

1. 200 M€ only for the PA
2. 700 M€ for Private

It is a contribution (**varied between 40-65%**) of the incurred cost in annual rate (2 -5 years) based on the kind of interventions.

Energy Renovation of Buildings

CONTO TERMICO 2.0 – Both for PA and Private

1. **up to 65%** for the demolition and reconstruction of nearly zero-energy buildings (nZEB);
2. **up to 40%** for interventions on wall and roof, for the replacement of windows with more efficient ones, for the installation of solar shading, for the replacement of lighting bodies, for the installation of building automation technologies and for replacing traditional boilers with condensing boilers;
3. **up to 50%** for thermal insulation interventions in E / F climate zones but up **to 55%** in the case of thermal insulation and replacement of windows, if combined with another system (condensing boiler, heat pumps, solar thermal);
4. **up to 65%** for the replacement of traditional systems with heat pump systems, boilers and biomass appliances, hybrid heat pump systems and solar thermal systems.

In addition, it can be combined with other non-state incentives within the scope of the interventions previously indicated.

Energy Renovation of Buildings

CONTO TERMICO 2.0 – Both for PA and Private

Public Administration: Energy Audit and Energy Performance Certificate (APE) are funded at 100%

Private: Energy Audit and Energy Performance Certificate (APE) are funded at 50%



- Increase the volume of building until 25%
- Seismic intervention
- Demolition and new building construction

NZEB

Energy Renovation of Buildings

CONTO TERMICO 2.0 – Both for PA and Private

Energy efficiency incentive systems for PA

- ✓ Thermal coatings insulation
- ✓ Windows replacement
- ✓ Heating systems replacement with condensing boiler
- ✓ Shading systems installation
- ✓ Lighting replacement
- ✓ Building automation
- ✓ Transformation in NZEB

1. Until **40%** of eligible cost
2. Until **55%** for combined interventions
3. Until **65%** for NZEB

Renewable Energy producing - incentive systems for PA and Private

- ✓ Heating systems replacement with Heat Pump
- ✓ Heating systems replacement with Biomass boiler
- ✓ Solar collector
- ✓ Hot water production system replacement with heat pump
- ✓ Heating systems replacement with Hybrid systems

1. No more than **65%** of Eligible cost

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CONTO TERMICO 2.0 – Both for PA and Private

Two kind of Application Submission:

1. Direct: the demand is required after realization of the energy measures

Incentive Payment Solution: only payment by 2 months

2. Booking: the incentive is required before starting the realization for the energy measures (with an energy audit)

Incentive payment solutions: two rates

1. 40% or 50% by 60 days
2. 60% or 50% at the end of the realization of the energy measures

Two kind of Submission:

1. Public Administration (A)
2. ESCO for Public Administration

CONTO TERMICO 2.0



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CONTO TERMICO 2.0 – Both for PA and Private

Public Administration

Energy Audit

+

administrative commitment to realize one energy interventions indicated in the energy audit

ESCO - EPC

Private

Technical Relation on the energy consumption of building + data sheet + environmental certificates + even more

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Energy Audit

1. Evaluation of the real energy consumptions of buildings:
 - Real outdoor conditions
 - Real use
 - Measurement instrumentations
 - Energy bills
2. Energy vector identification and subdivision
3. Model simulation implementation and validation (real and standard conditions)
4. Energy saving measures identification
5. Energy saving measures simulation (Standard conditions)
6. Economic Analysis



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APPs for Energy Audit

Do not replace the Energy Audit - They allow to collect all the data required for the Energy Audit elaboration



Energy Renovation of Buildings

APP for Energy Audit – SafeSchool and Condomini+ 4.0

They allow to collect all the data required for the Energy Audit elaboration and for the Seismic Analysis



Energy Renovation of Buildings

APP for Energy Audit – SafeSchool and Condomini+ 4.0

They allow to collect all the data required for the Energy Audit elaboration and for the Seismic Analysis

The image displays the 'INDAGINE ENERGETICA' (Energy Survey) application interface. On the left, a grid of icons represents various energy audit categories: Consumi (highlighted with a red circle), Involucro, Climatizzazione invernale, Climatizzazione estiva, ACS, Ventilazione, Energia elettrica e illuminazione, Solare termico, Solare fotovoltaico, Gestione del verde, Valutazioni, and Interventi. A red arrow points from the 'Consumi' icon to a detailed data entry screen titled 'Consumi'. This screen is divided into two sections: 'RISCALDAMENTO' (Heating) and 'ENERGIA ELETTRICA' (Electricity). Both sections include a toggle switch for residential consumption, a percentage input field for the residential quota, and three input fields for annual average consumption in kWh. The 'Consumi' menu is also labeled 'Energy survey' at the bottom.

Energy Renovation of Buildings

APP for Energy Audit – SafeSchool and Condomini+ 4.0

They allow to collect all the data required for the Energy Audit elaboration and for the Seismic Analysis

The screenshot displays the 'INDAGINE ENERGETICA' (Energy Survey) application interface. On the left, a grid of icons represents various energy audit categories: Consumi, Involucro (circled in red), Climatizzazione invernale, Climatizzazione estiva, ACS, Ventilazione, Energia elettrica e Illuminazione (circled in red), Solare termico, Solare fotovoltaico, Gestione del verde, Valutazioni, and Interventi. Two red arrows originate from the 'Involucro' and 'Energia elettrica e Illuminazione' icons, pointing to two detailed data entry screens on the right. The 'Involucro' screen includes fields for 'Zona climatica' (set to 'A'), 'Numero dei gradi giorno della località', 'Quota dal livello del mare', 'Temperatura minima di progetto (°)', 'Temperatura media del volume riscaldato (°)', and 'Umidità relativa esterna (%)'. The 'Energia elettrica' screen includes a toggle for 'Esiste un'altra tipologia di illuminazione rilevante', a dropdown for 'Tipologia di illuminazione' (set to 'Lampade ad incandescenza'), a field for 'Percentuale di incidenza (%)', and a dropdown for 'Controllo della luce artificiale' (set to 'Manuale').

Energy survey

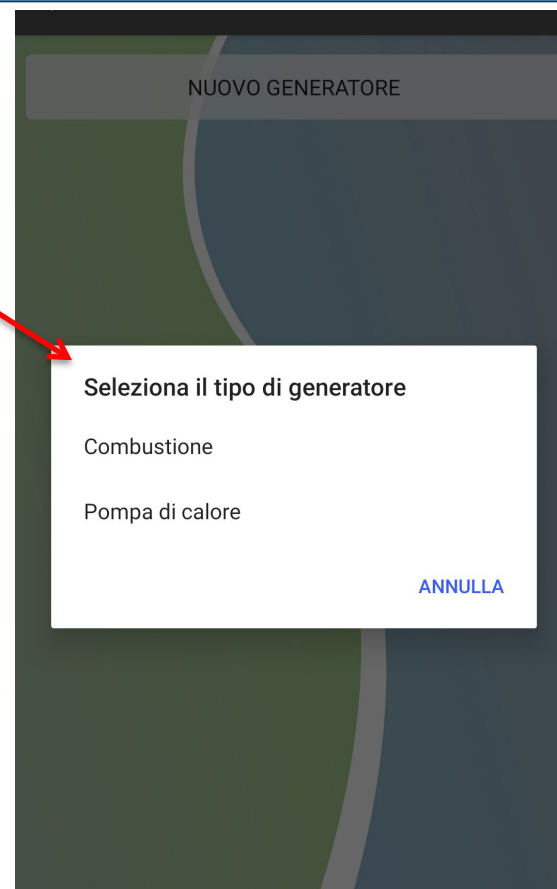
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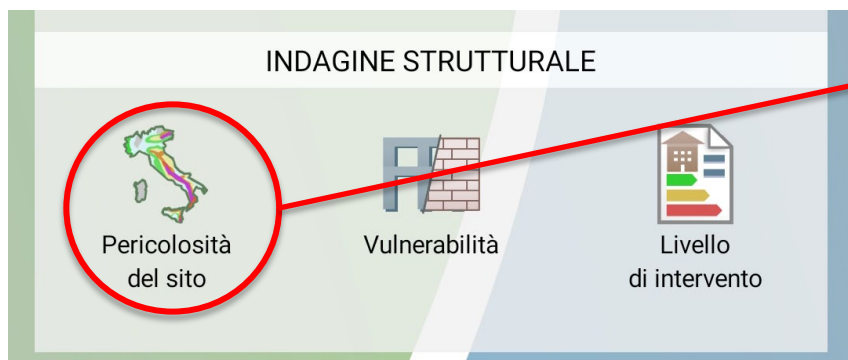
Energy survey



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Seismic survey

PERICOLOSITA' SITO [Close] [Save]

Zona sismica
Zona 1

Sono disponibili informazioni geologiche

Categoria di Sottosuolo
B

Categoria Topografica
T3

Morfologia del sito
Pianura

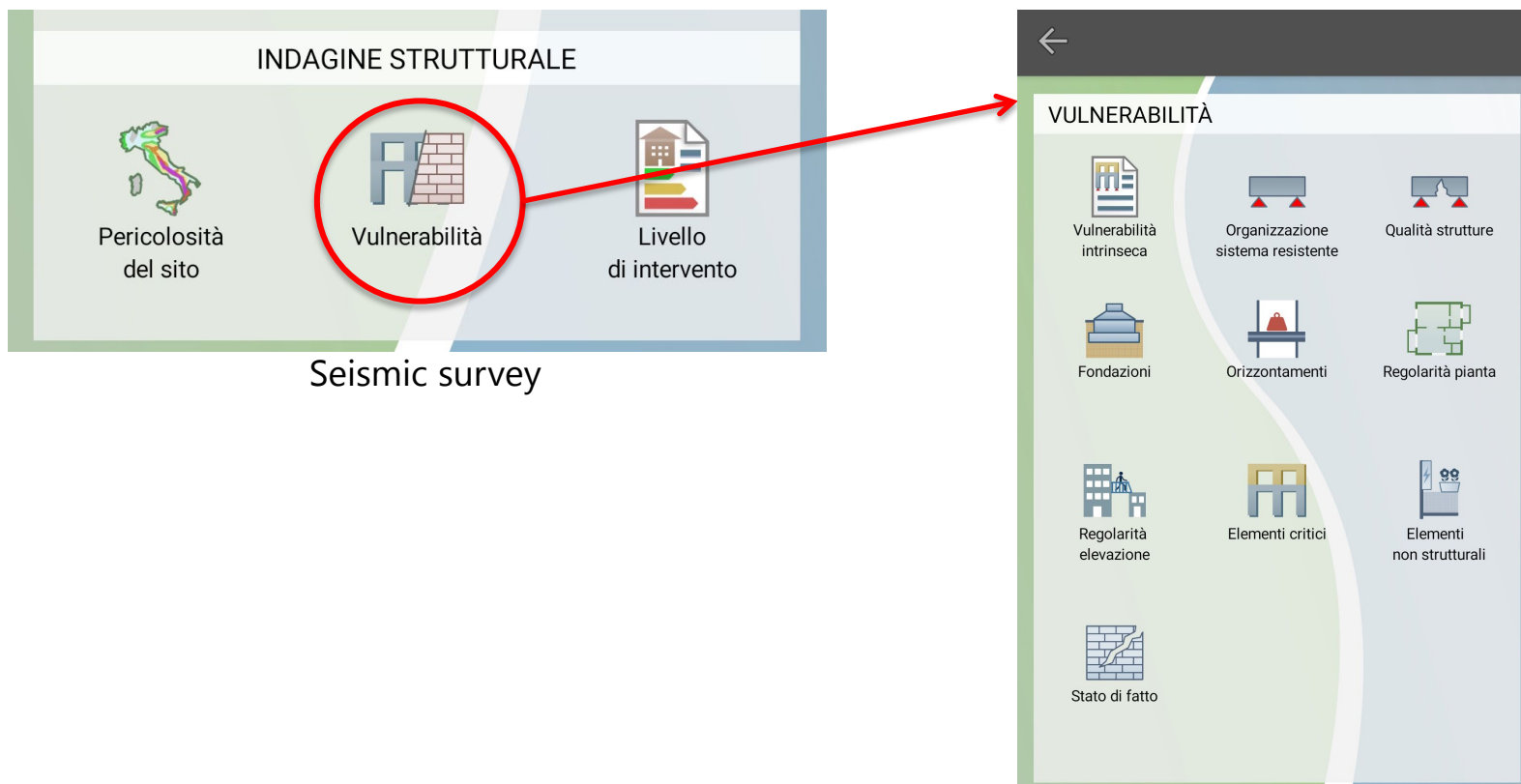
Fenomeni franosi

Perimetrazione ai sensi del D.L.180/1998
Non presente

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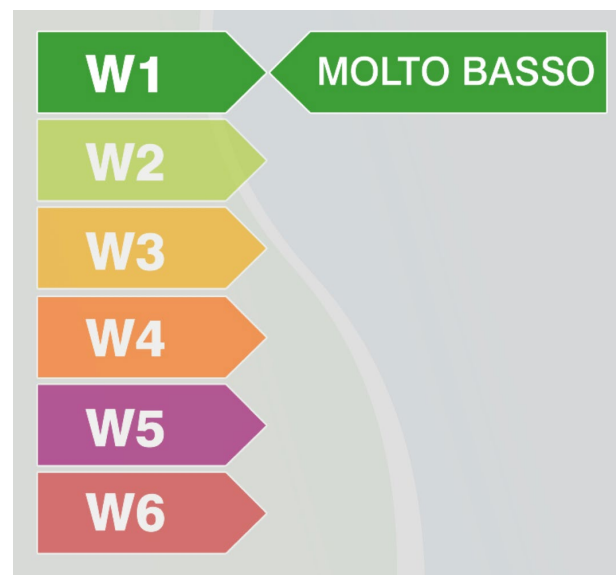
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LIVELLO DI INTERVENTO ✕ 📄

	Vulnerabilità	Livello
<input type="checkbox"/>	Vulnerabilità intrinseca	4
<input type="checkbox"/>	Strutture	2
<input type="checkbox"/>	Qualità strutture	4
<input type="checkbox"/>	Fondazioni	3
<input type="checkbox"/>	Orizzontamenti	4
<input type="checkbox"/>	Regolarità pianta	4
<input type="checkbox"/>	Regolarità elevazione	4
<input type="checkbox"/>	Distanza murature	4
<input type="checkbox"/>	Coperture	4
<input type="checkbox"/>	Elementi non strutturali	3
<input type="checkbox"/>	Stato di fatto	3

CALCOLA IL LIVELLO DI INTERVENTO



Energy Renovation of Buildings

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LIVELLO di INTERVENTO ✕ 📄

	Vulnerabilità	Livello
<input type="checkbox"/>	Vulnerabilità intrinseca	1
<input type="checkbox"/>	Strutture	3
<input type="checkbox"/>	Qualità strutture	3
<input type="checkbox"/>	Fondazioni	2
<input type="checkbox"/>	Orizzontamenti	1
<input type="checkbox"/>	Regolarità pianta	2
<input type="checkbox"/>	Regolarità elevazione	1
<input type="checkbox"/>	Bassa duttilità	3
<input type="checkbox"/>	Elementi non strutturali	1
<input type="checkbox"/>	Stato di fatto	3

CALCOLA IL LIVELLO DI INTERVENTO



Energy Renovation of Buildings

APP for Energy Audit – SafeSchool

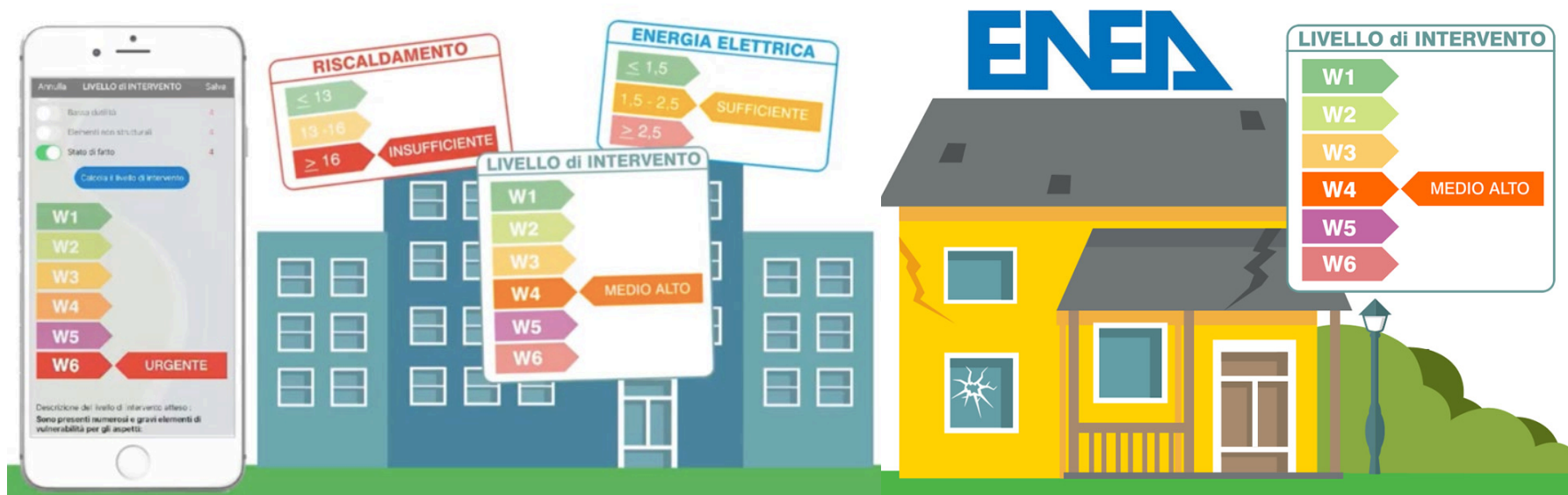
1. Survey Report
2. Energy Class Level of Buildings
3. Energy Class Level of the Energy Measures in order to improve the energy performance
4. Vulnerability of the structure
5. Priority Level to improve the building security



Energy Renovation of Buildings

APP for Energy Audit –Condomini+ 4.0

1. Survey Report
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Ing. Domenico Palladino
domenico.palladino@enea.it

