Single owner building stock management
and technical economical analysis

Marco Castagna
Renovation strategy

- Step 1 --> Extra costs
- Step 2 --> Overall benefits
- Step 3 --> Building stock

Feasibility study on the Plaza building

- Renovation cost proposed: 2,247,500 €
- “Conto energia” incentives: 336,000 €
- Bills savings: 18,281 €
- Return on investment: 105 years
Perform a maintenance intervention;
Step 1 - Detect synergies

- Detect synergies with ordinary and extraordinary maintenance;

Costs  ➔  Extra costs

Step 2 - Consider all the benefits

- Consider all the benefits of the requalification process:
  - reduction of the bills;
  - reduction or increase of maintenance costs;
  - increase of the value of the buildings;
  - increase of indoor comfort;
Step 3 - Planning requalification at the level of building stock

- Planning at the level of building stock, not at the level of building;

Development of CERPLAN

We developed an excel tool to plan the energy renovation of a building stock:

- Building Data Sheet - In this file are collected all the necessary information (often stored in different offices);
- A database of Data Sheets - It collects all the buildings and allows to define priorities;
Building data sheet - building data

- General information;
- Geometric data;
- Envelope data;
- Energy consumption data;
- HVAC information (Heating, cooling, ventilation);
- Lighting information;
- Security systems and communication;
- Accessibility;
- Architectural barriers;
- Renewable energies;

Building data sheet - Savings estimation

- Control heating systems;
- Insulation opaque surfaces;
- Replacement of windows;
- Solar thermal panels for hot water;
- Photovoltaic solar panels;
- Condensing boiler;
- Heat pump;
- Biomass boiler;
- Refrigeration unit;
- Lighting;
- Replacement of the transformer;
- Maintenance costs;
- Increase of the value of the building;
Sintesi output economico con extracosti con incentivi:

<table>
<thead>
<tr>
<th></th>
<th>Valore attuale netto 10 anni (VAN)</th>
<th>Valore attuale netto 20 anni (VAN)</th>
<th>Valore attuale netto 30 anni (VAN)</th>
<th>Tasso interno di rendimento 10 anni (TIR)</th>
<th>Tasso interno di rendimento 20 anni (TIR)</th>
<th>Tasso interno di rendimento 30 anni (TIR)</th>
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<tbody>
<tr>
<td></td>
<td>€ 77.807,32</td>
<td>€ 86.486,67</td>
<td>€ 262.433,96</td>
<td>2,79%</td>
<td>8,87%</td>
<td>10,40%</td>
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Flusso di cassa cumulato
Database of all building stock

Typologies of intervention

- Interventions on control of the plants;

- Interventions attractive only for the owner;

- Interventions attractive for the owner and for an ESCO;
Interventions on control of the plants

- Reducing of waste energy
- Return of investment almost zero;

Interventions attractive only for the owner

- Return of investment attractive only to the owner;
- Problems of indoor comfort;
- Representation intervention;
Interventions attractive for the owner and for an ESCO

- return of investment attractive for ESCO and the owner;

It allows the owner to give the interventions to the ESCO. This will maximize the investment achievable.

Feasibility study on the Plaza building

<table>
<thead>
<tr>
<th></th>
<th>original proposal</th>
<th>new proposal</th>
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<tbody>
<tr>
<td>Renovation cost</td>
<td>2,247,500 €</td>
<td>66,700 €</td>
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<tr>
<td>“Conto energia”</td>
<td>336,000 €</td>
<td>81,300 €</td>
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<td>incentives</td>
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<td>bills savings</td>
<td>18,281 €</td>
<td>670 €</td>
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<td>Return on</td>
<td>105 Years</td>
<td>4 Years</td>
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<td>investment</td>
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</table>
Feasibility study on the Plaza building

Future developments

- Validation in TRNSYS;
- Web database;
- Study intervention in elevators;
- Synergies with seismic requalification of buildings;
Thank you

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