NEARLY ZERO ENERGY HOUSING IN DIVIDED OWNERSHIP

International workshop

Legal & organizational framework focus on divided and cooperative ownership multifamily buildings

12 – 13 June 2014 – Tallin ESTONIA

Contractual and decision making aspects with homeowners of an energy renovation project: the experience of Factor 20

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With the contribution of the LIFE financial instrument of the European Community

LODI signed the Covenant of Mayors

- LODI north Italy
- 44.000 inhabitants
- signed the Covenant of Mayors in 2008

SEAP - Sustainable Energy Action Plan

This action plan, approved by the city council, identifies the targets and the measures to fulfill the commitments on CO2 emission reduction, with the corresponding times and responsibilities.

Lodi SEAP approved in November 2011

SEAP the steps

November 2008

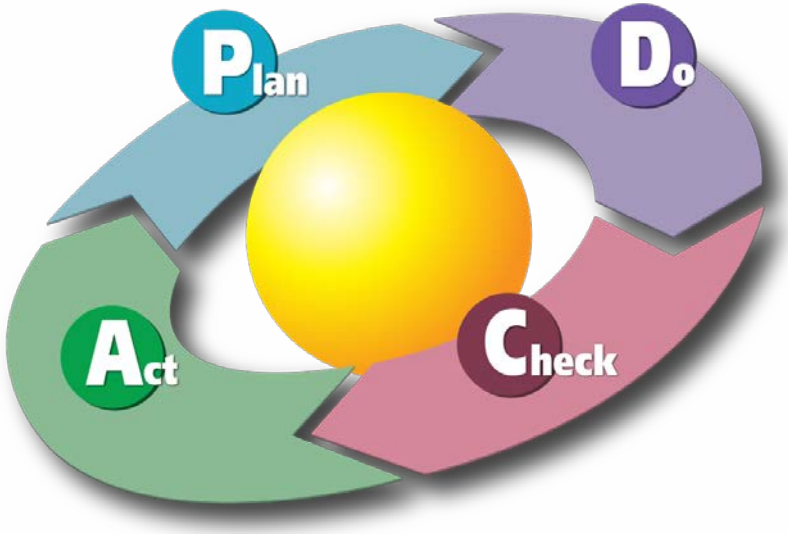
December 2010

February 2011

2011 – 2020

2013 – 2015 ...

SEAP the steps



1. Emission inventory. Baseline 2005
2. Analysis of energy consumptions
3. SWOT analysis
4. Objectives and targets
5. measures
6. Measuring and verification

MUNICIPALITY ENERGY CONSUMPTIONS REDUCTION

- MB 1 – heating and cooling savings
- MB 2 – rational use of energy in final uses
- MB 3 – district heating
- MB4 – street lighting savings
- T–M 1 –energy savings in the municipal vehicles fleet consumptions
- REN 1 - increase the share of energy produced from renewable sources of buildings and land owned by the city
- GPP 1 – green energy supply
- GPP 2 – GPP of products and services

SEAP measures involving the municipality and its policies

TOWN PLANNING

- REG 1 incentives for energy efficiency in new urbanization
- REG 2 new public building NZEB
- REG 5 building code
- REG 3 traffic control; park and ride services
- REG 4 bike lines, parking, bike services infrastructures

CITIZENS AWARENESS

- TR 1 – environmental education
- AW 1 energy agency creation
- AW 2 awareness events
- AW 3 distribution of energy-efficient lamps, energy-saving kit, standby control
- AW 4 competitions for the reduction of energy consumption and the creation of a network of promoters of sustainable energy
- AW 5 suppliers and installers capacity building and vocational training

SEAP measures involving the tertiary sector

TERTIARY BUILDINGS SAVINGS

- T 1 program to reduce energy consumption for lighting and air conditioning of large utilities (non-municipal public offices, supermarkets, major private users)
- T 2 program to upgrade and optimize energy consumption for heating of large tertiary buildings; systems (generation, distribution, and emission control)
- T 3 winter room temperatures control
- T 4 Adaptive Comfort

DISTRICT HEATING

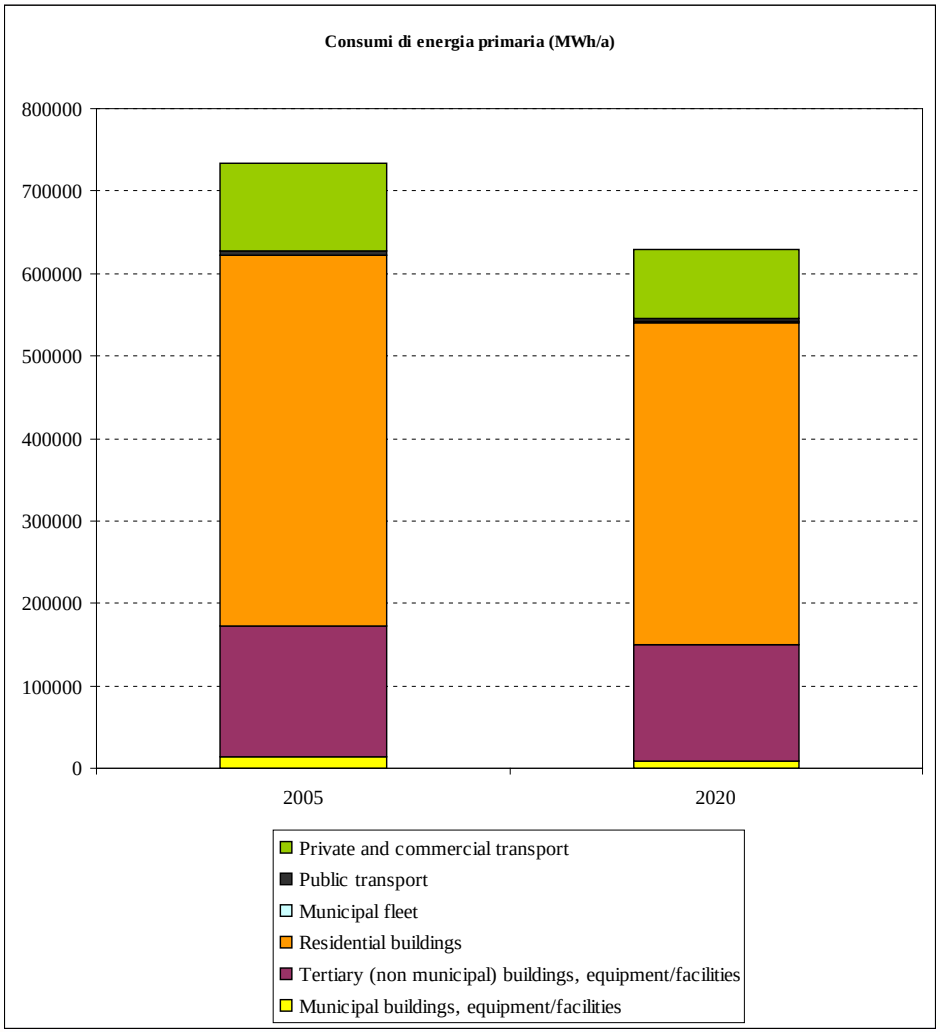
- T 6 cogeneration/trigeneration cooling with absorption chillers connected to the district heating network

SEAP measures involving the residential sector

PROMOTING THE REDUCTION OF ENERGY CONSUMPTION OF CITIZENS

- RB 1 census and replacement of diesel-fired plants with natural gas or district heating plants
- 2 RB incentives for the replacement of old "boilers"
- RB 3 **program for upgrading and optimization of energy consumption for heating of large residential users (multi families buildings with centralized systems) - plants (generation, distribution, and emission control)**
- RB 4 room temperatures measure and control
- RB 5 **energy refurbishment of buildings (building envelope)**

SEAP FIGURES



Primary energy consumptions

Residential buildings

FACTOR 20 the case test of Lodi

Lombardy Region has worked with the City of Lodi assigning to an ESCO a feasibility study on the refurbishment of multifamily buildings, through third party financing

CITTA' DI LODI

ESCO tasks

SEAP measures on private residential buildings

Preliminary phase of the study and analysis: an energy audit of a specific building, representative of several buildings of Lodi Building stock, aiming at:

Identifying the best intervention or the mix of interventions for energy saving in a specific case study (multifamily building), with reasonable PBT and IRR

To set up a contract widely applicable for energy renovation in multifamily buildings

The ESCO in charge of the study WON'T participate to the bidding process

THE PHASES OF THE TEST CASE

First phase - assessing opportunities for intervention aimed at improving energy efficiency for the selected users

Second Phase- Discussion WITH owners on the possible introduction of an energy performance contract for the utilities selected (type contracts, financing, guarantees)

Third phase - definition of the contract (the economic / financial aspects)

ESCO repayment

The Bidding ESCOs' Obligations:

To perform directly or coordinate all the activities for the design, construction, operation and maintenance of the interventions
Management and maintenance of the facilities

The remuneration is based on real savings during a certain period of time

Different possible models or mix:

- First out o Duration Model -> 100% to ESCO
- Shared Savings
- Guaranteed Savings
- Energy performance contracting -> according to the Italian Decree No. 115/2008

THE ENERGY DIAGNOSIS
The selected building is a private residential condominium built in the 60s. 98 apartments with gas-fired central heating with autonomous hot water generation

FIGURA 16: LOCALIZZAZIONE DELL'IMMOBILE

5.3.2 Lo stato di fatto

EPOCA COSTRUTTIVA EDIFICIO	SUPERFICIE NETTA RISCALDATA [m^2]	VOLUME LORDO RISCALDATO [m^3]	SUPERFICI VETRATE RESIDENZA [m^2]	COMBUSTIBILE RISCALDAMENTO [m^3]	CALDAIA Pn [kW]	ANNO CALDAIA
1960	8'480	34'350	1'615	gas	755.7	1976

LODI test case

Prospetti CORTE: Nord, Ovest, Sud

the selection of the best intervention

N°	TIPOLOGIA INTERVENTI	INTERVENTO PROPOSTO	Investimento [€]	Risparmio annuo di gas metano [m³]	Riduzione % consumi termici	Risparmio annuo di energia elettrica [kWh]	% di riduzione dei consumi elettrici	Risparmio economico annuo sulla spesa di combustibile ed energia elettrica [€]
1	IMPIANTO	MODIFICA SISTEMA DI REGOLAZIONE ED EQUILIBRATURA. CONTABILIZZAZIONE, VALVOLE TERMOSTATICHE E POMPE INVERTER	61.550	18.046	13,5	4.659	33,6	15.369
2	IMPIANTO	SOSTITUZIONE CALDAIA CON CALDAIA A CONDENSAZIONE CON CONTABILIZZAZIONE, VALVOLE TERMOSTATICHE E POMPE INVERTER (detr.55%)	161.550	32.791	24,6	3.139	22,7	26.861
3	INVOLUCRO	COIBENTAZIONE CHIUSURA VERTICALE A CAPPOTTO 8cm, PARETE INTONACATA (compreso intervento VT+POMPA INVERTER+CONTABIL.)	207.535	26.088	19,5	5.146	37,2	21.900
4	INVOLUCRO	COIBENTAZIONE PARTE INTONACATA A CAPPOTTO 12 cm, (compreso intervento VT+POMPA INVERTER+CONTABIL.) (detr.55%)	218.027	27.110	20,3	5.208	37,6	22.730
5	INVOLUCRO	COIBENTAZIONE SOLAIO VERSO SOTTOTETTO (compreso intervento VT+POMPA INVERTE+CONTABIL.) (detr.55%)	78.946	30.356	22,7	5.405	39,0	25.365
6	MIX INVOLUCRO	MIX INVOLUCRO: CAPPOTTO 12 cm, COIBENT. SOTTOTETTO 16 cm (VT+CONTABILIZZ+POMPA INVERTER) (detr.55%)	235.423	39.472	29,6	5.958	43,0	32.769
7	MIX IMPIANTO-INVOLUCRO	MIX IMPIANTO-INVOLUCRO: RIQUALIFICAZIONE CENTRALE, VT, CONTABILIZZ., COIBENTAZIONE A CAPPOTTO E ISOL. SOTTOTETTO (detr.55%)	335.423	52.403	39,3	4.980	36,0	42.919
8	INVOLUCRO	SOSTITUZIONE SERRAMENTI	255.155	16.119	12,1	1.411	10,2	13.177
9	INVOLUCRO	SOSTITUZIONE SERRAMENTI (compreso intervento VT+POMPA INVERTE+CONTABIL.) (detr. 55%)	316.705	28.298	21,2	5.280	38,1	23.694
10	MIX INVOLUCRO	MIX INVOLUCRO: SOST. SERRAMENTI, COIBENT. SOTTOTETTO 16 cm (VT+CONTABILIZZ+POMPA INVERTER) (detr.55%)	334.101	40.653	30,5	6.029	43,5	2.349
11	MIX IMPIANTO-INVOLUCRO	MIX IMPIANTO-INVOLUCRO: RIQUALIFICAZIONE CENTRALE, VT, CONTABILIZZ., ISOL. SOTTOTETTO E SOST. SERRAMENTI(detr.55%)	434.101	52.881	39,6	5.051	36,5	43.315
12	MIX IMPIANTO-INVOLUCRO	MIX IMPIANTO-INVOLUCRO: RIQUALIFICAZIONE CENTRALE, VT, CONTABILIZZ. E ISOL. SOTTOTETTO (INTERVENTO ESCO, NO DETR.)	178.946	43.736	32,8	4.180	30,2	35.824
13	MIX IMPIANTO-INVOLUCRO	MIX IMPIANTO-INVOLUCRO: RIQUALIFICAZIONE CENTRALE, VT, CONTABILIZZ., ISOL. SOTTOTETTO E SOST. SERRAMENTI (INTERVENTO ESCO, NO DETR.)	434.101	52.881	39,6	5.051	36,5	43.315

LODI test case

The optimal mix of interventions corresponds to the following:

- Refurbishment of the boiler with condensing boilers and pumps (inverter)
- Thermostatic Valves and separate consumption accounting
- Attic insulation
- Double glazed low-e windows (each owner/tenant; a centralized procurement, in order to get low prices).

CASH FLOW

TABELLA 5: FLUSSI DI CASSA MIX OTTIMALE SENZA (20% DI "SHARED SAVINGS" AL CLIENTE)

	senza TEE		con TEE	
Anno	*flussi annui di cassa*	*flussi cumulati*	*flussi annui di cassa*	*flussi cumulati*
0	-178946	- 178.946	- 178.946	- 178.946
1	27260	- 151.687	29787	- 149.160
2	27260	- 124.427	29762	- 119.398
3	27260	- 97.168	29737	- 89.661
4	27260	- 69.908	29712	- 59.949
5	27260	- 42.648	29688	- 30.260
6	27260	- 15.389	29664	- 596
7	27260	11.871	29640	29.044
8	27260	39.131	27260	56.304
9	27260	66.390	27260	83.563
10	27260	93.650	27260	110.823
11	27260	120.910	27260	138.083
12	27260	148.169	27260	165.342
13	27260	175.429	27260	192.602
14	27260	202.689	27260	219.861
15	27260	229.948	27260	247.121
16	27260	257.208	27260	274.381
17	27260	284.467	27260	301.640
18	27260	311.727	27260	328.900
19	27260	338.987	27260	356.160
20	27260	366.246	27260	383.419

THE PROPOSED EPC

It is an energy performance contract with guaranteed results and third-party financing.

The energy service contract includes:

- The supply of thermal energy for space heating;
- Energy measurement: total (out of the boiler) and in each apartments, with certified meters;
- The heating system operation and maintenance;
- Heating system and envelope refurbishment before the beginning of the second heating season (after a year of energy measurement)
- Files preparation for incentives

SAVINGS GUARANTEE

The ESCO guarantees 30% energy savings compared to the baseline (normalized considering the heating degrees)

In the contract is established whether the savings are all up to the ESCO or are shared between the ESCO and the owners

REPAYMENT

The actual annual remuneration is composed of two components:

- Remuneration of energy (variable)
- Remuneration of the conduction (fixed, as detailed in the contract)

The remuneration of the energy is given by:

- **fuel costs**
- **savings share for the ESCO (as established in the contract)**
- **penalty for failure to achieve the savings target**

LODI test case: the stakeholders

We met several times the representatives of the owners and the building manager.

But something went wrong…

- The owners
- The building manager
- The tenants
- The plant manager (O&M)
- The energy provider

- LODI Municipality
- The ESCO contracted for the study
- The ESCOs that would participate to the bid

LODI test case: the stakeholders

A win win situation

Resulting in a loose loose outcome

The owner and tenants decided that they don't want to give the remuneration to the ESCO; they would prefer to keep all the gain themselves. But they can't do the investments. So they loose the savings.

As a whole:
The community looses
The ESCOs loose
The owners loose

LODI test case: the lesson learned

- To increase the final beneficiaries trust is crucial
- To involve the local provider of services, in order to avoid their opposition
- To showcase existing best practices in order to build up the confidence

- A winning solution, and the experience of several Countries across EU confirm this, is to set up a national or at least regional scheme, in order to limit the perception that some private interest is pursued by the action, with a potential beneficiaries detriment

A WIDER PERSPECTIVE: IEE POWER HOUSE EUROPE on Italy

- The role of Condominium property manager: energy renovation perceived as «extra work»
- ANACI (the Italian national association of professionals property managers) in a survey on energy renovation found that the main disputes among owners and tenants are: high costs; credit constraints; lack of information and trust; uncertainty about incentive regulation

- Cooperative property: easier decision making process, but important the involvement for renovation effectiveness (behavior)
- Divided property, crucial the involvement and trust of owners through the assembly of condominium throughout the renovation process; important the correct households' energy behavior

A WIDER PERSPECTIVE: IEE POWER HOUSE EUROPE on Italy

ASSEMBLY RULES FOR ENERGY RENOVATION WORKS APPROVAL

ISSUE**	Quorum of owners requested (persons)	Quorum of property
Energy renovation and renewable energy systems (energy audit available)	Majority of the participants (50% + 1)	At least 1/3 of the property
Energy renovation and renewable energy systems (no energy audit available)	Majority of the participants (50% + 1)	At least 1/2 of the property

** *Deliverable 3.5 IEE POWER HOUSE EUROPE*

Thank you for your attention

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