

TAKING
COOPERATION
FORWARD



Jihlava, 22.05.2017



Treviso's Energy Performance Contract and the enhancement of the social component



Antonio Zonta - Provincia di Treviso

THE PROVINCE OF TREVISO

- Population: 884.353 (2016)
- Area: 2.476,68 kmq
- Density: 356,62 ab/kmq
- 8th most populous and 10th most densely populous province in Italy
- 95 municipalities (in 12 are located buildings managed by the Province Administration)



ESTATES AND USERS

Size of Estates and Users					
Tipology of buildings	Edifici	Total size [m ²]	Total size [m ³]	Thermal Energy Consumption [GWh/year]	Users
School	120	415.000	1.467.000	24,0	45.000
Institutional	18	35.000	122.000	1,5	500
Total	146	439.600	1.589.000	26,5	45.500

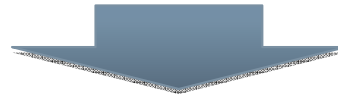


Typologies

- **School buildings**, related to **38 Schools**, distributed in **12 municipalities of the province of Treviso**;
- **Institutional buildings** mainly belonging to the Province Administration Headquarter



- Need to save money
- Lack of funds for technological investments



- **Energy performance contract :** (from EPC Watch guide)
 - A performance-based procurement method and financial mechanism for building renewal whereby utility bill savings that result from the installation of new building systems (reducing energy use) pay for the cost of the building renewal project.
 - A "Guaranteed Energy Savings" Performance Contract includes language that obligates the contractor, a qualified Energy Services Company (ESCO), to pay the difference if at any time the savings fall short of the guarantee.



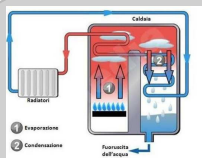
SCHOOL BUILDINGS ARE NOT ONLY TECHNOLOGY, THEY ARE ALSO MADE UP BY PEOPLE...



The green schools project

The Green Schools Project basic idea is that of a program for sustainable school buildings based upon an **Energy Performance Contract** in which **efficiency obtained through a virtuous behaviour of users plays the same role as that of efficiency obtained with technological investments.**

The bid specifications for the contract awarding after public competition were thus adapted in order to obtain efficiency goals through a combination of **Technological Innovation and Social Innovation**



TECHNOLOGICAL INNOVATION

Financially sustainable technological interventions and installations in the belief that even without significant resources available one can do much.



SOCIAL INNOVATION

Approach to new technologies and new forms of organization in which students/teachers do not merely play a passive role, but are ready to take an active part in building management and evolution.

Students participation also represents an educational added value, with a consequent future production of new sustainable actions and further energy efficiency.



TECHNOLOGICAL INNOVATIONS



RENEWABLE ENERGY SYSTEMS

4 SOLAR THERMAL SYSTEMS, STOT=300 sq.m
1 GEOTHERMAL HEAT PUMP SYSTEM
6 PHOTOVOLTAIC SYSTEMS (120 kW)
2 COGENERATION SYSTEMS (EP = 465 kW_e ThP= 670 kW_t)



THERMAL SYSTEMS RENOVATION

CONDENSING BOILERS INSTALLED IN 19 BUILDINGS,
RECONSTRUCTION/INSULATION OF PIPINGS IN 7 BUILDINGS, NEW
TEMPERATURE CONTROL SYSTEMS IN 23 BUILDINGS, 8
CONVERSIONS FROM OIL TO NATURAL GAS SYSTEMS



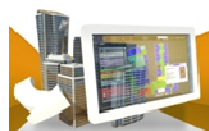
INSTRUMENTS TO REDUCE CONSUMPTIONS

LIGHT FLOW REGULATOR IN ONE SCHOOL BUILDING
4300 THERMOSTATIC VALVES IN 28 SCHOOL BUILDINGS
1700 WATERTAPS WITH TIMER OF CLOSURE



SMART METERING

ELECTRIC-ENERGY METER
THERMAL-ENERGY METER
SURVEY OF WATER CONSUMPTION



ICT

SUPERVISION OF THE SMART METERING ACCOUNTING
IMPROVEMENT OF THE EXISTING MAINTENANCE MANAGEMENT SW

**Approximately
4.000.000,00 €
invested by the
contractor**

Expected Results

**-12% heat
consumption**

**-70,8 % use of
heating oil**



GOALS:

Spreading the culture of energy saving and sustainability

Enhance participation for the improvement of energy performance in school buildings

TOOLS:

Promoting the establishment of an Energy Team in each school to promote virtuous behaviors

Web portal to support best practices dissemination

Smart metering to measure at any time the level of consumption and thus the efficiency of the actions undertaken

Competition among schools to reward virtuous behaviors

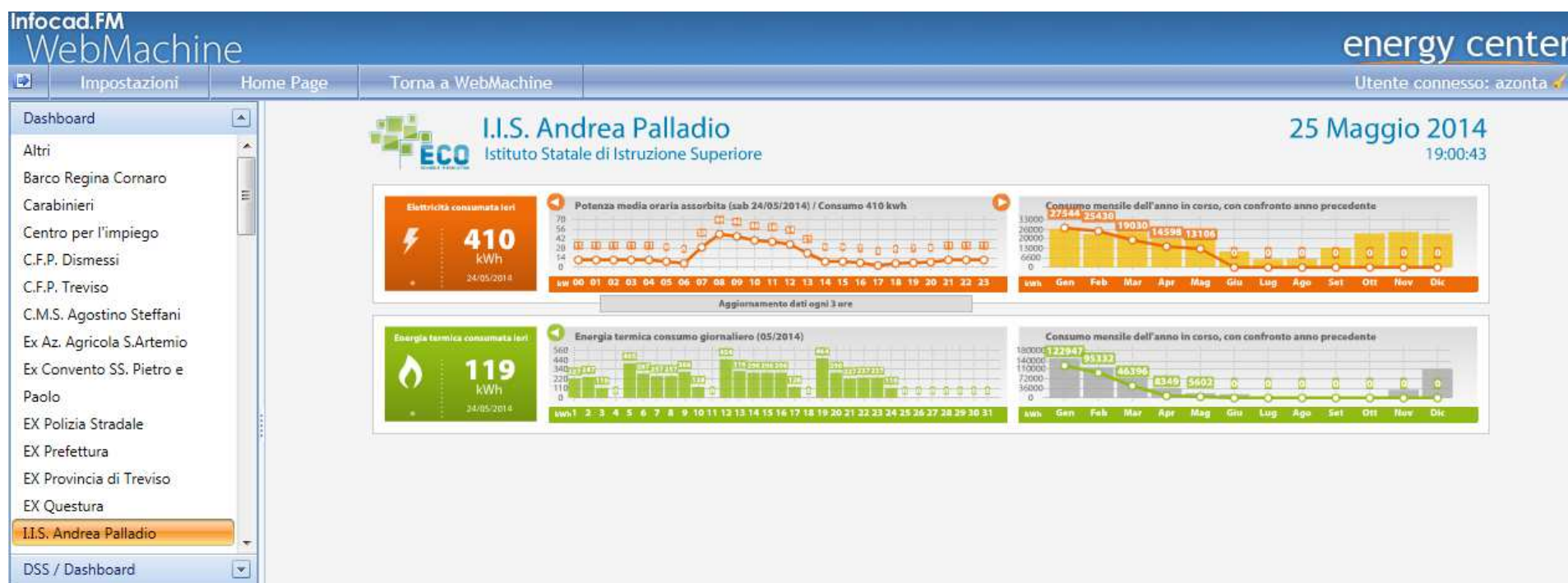
Expected Results

undefined



DASHBOARD SHOWING ENERGY CONSUMPTION

- In each school entrance hall a dashboard displays in real time the energy consumption level recorded by the IT system



MORE DETAILED INFORMATIONS CAN ALSO BE OBTAINED FROM IT

- The IT system can also provide more detailed information to help the EE management process



A SMART COMMUNITY AIMING TO SAVE ENERGY THROUGH ENERGY METERING

- Spreading the culture of energy saving
- Spreading the culture of energy metering
- People (users) participate, with the public owner, in the process of building management, aiming towards maximum efficiency
- Co-creation of value (principle of the «living labs»)
- Participation in Energy ViLLab project
www.energyvillab.eu



ENERGY ViLLab 
LIVING LAB FOR SUSTAINABLE DEVELOPMENT



ENERGY METERING PROMOTES COMPETITIVENESS

Use of «gamification» techniques:

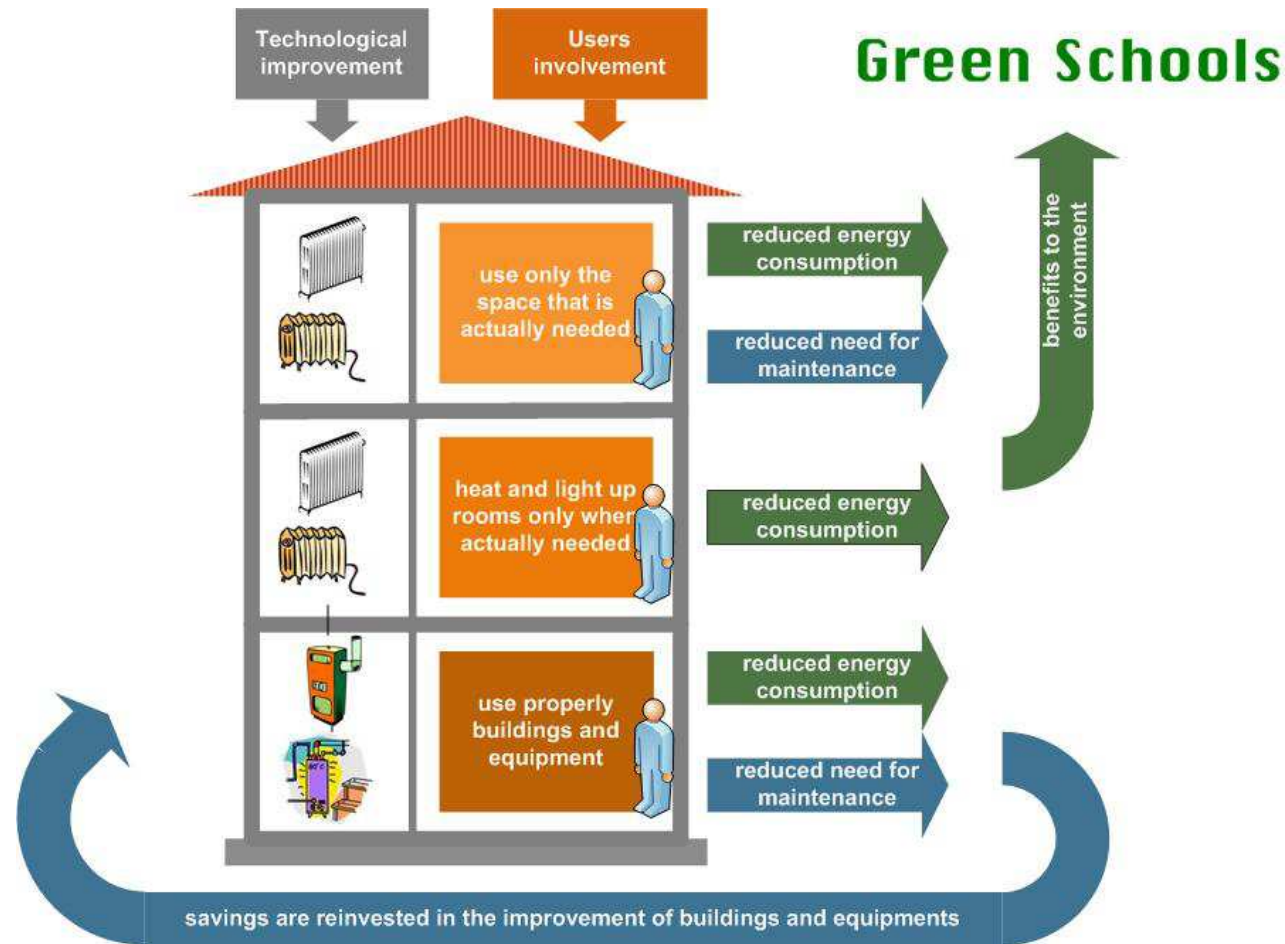
- A competition among schools (Green Schools Competition) has been promoted to enhance the involvement of schools (students, teachers, staff) in ES and EM activities.
- Schools are rewarded with a percentage of energy bill savings amount



Study area for redistribution bonus	Participation	Sustainability Oscar
		Dissemination of Best Practices
	Additional sustainability criteria	Sharing school space
		The Sustainable Inventor
		Using green products
	Consumption reduction	Reduction of kWh electric (baseline average consumption reference year 2008/2009 -2009/2010)
		Reduction of thermal kWh (average consumption baseline reference year 2008/2009 -2009/2010)
		Reduction of water consumption (average consumption baseline reference year 2008/2009 -2009/2010)

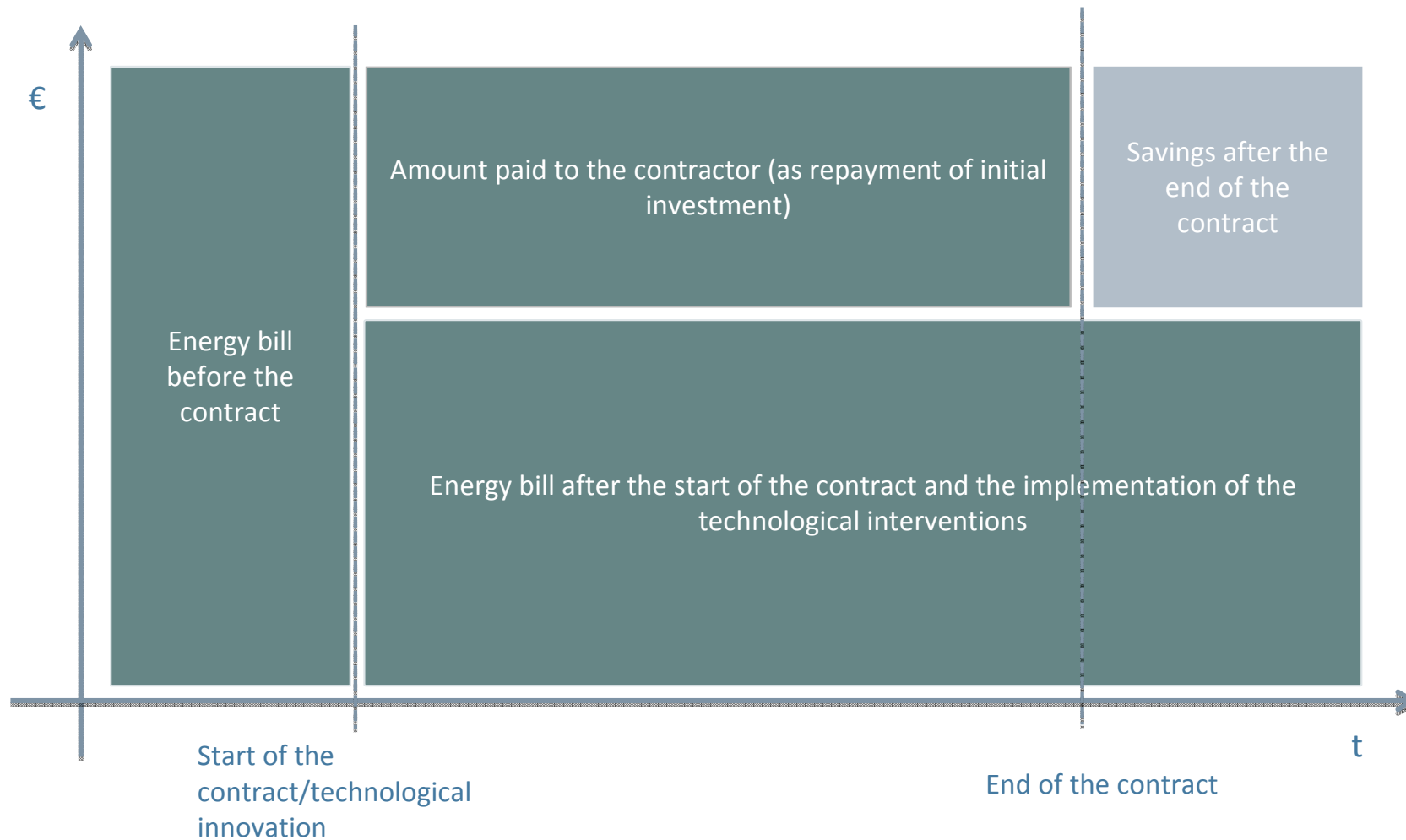


THE GREEN SCHOOLS SUSTAINABILITY MAP



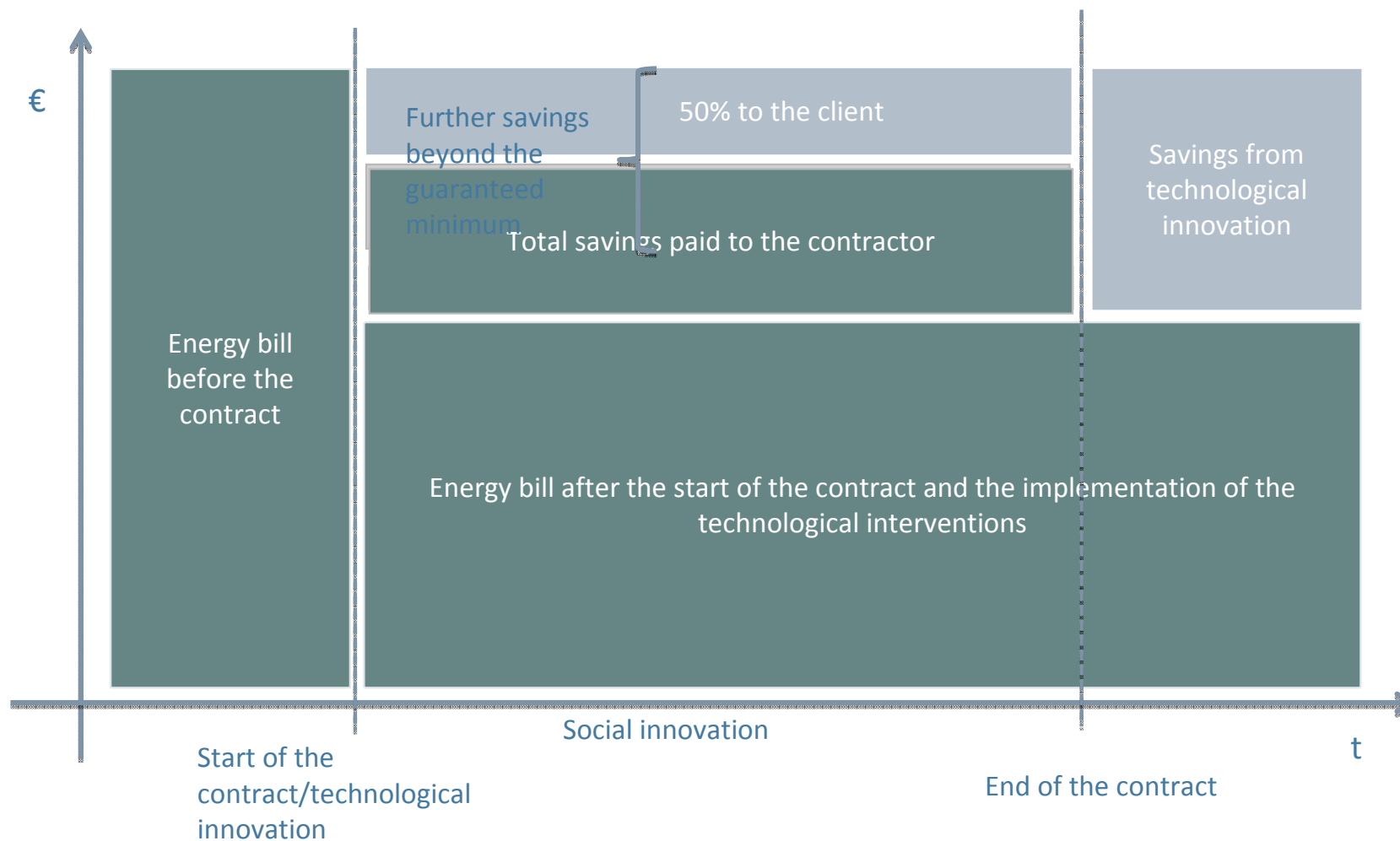
CLASSIC EPC MODEL

Energy Efficiency measures adopted for energy reduction in public buildings at the province of Treviso : the Energy Performance Integrated Contract



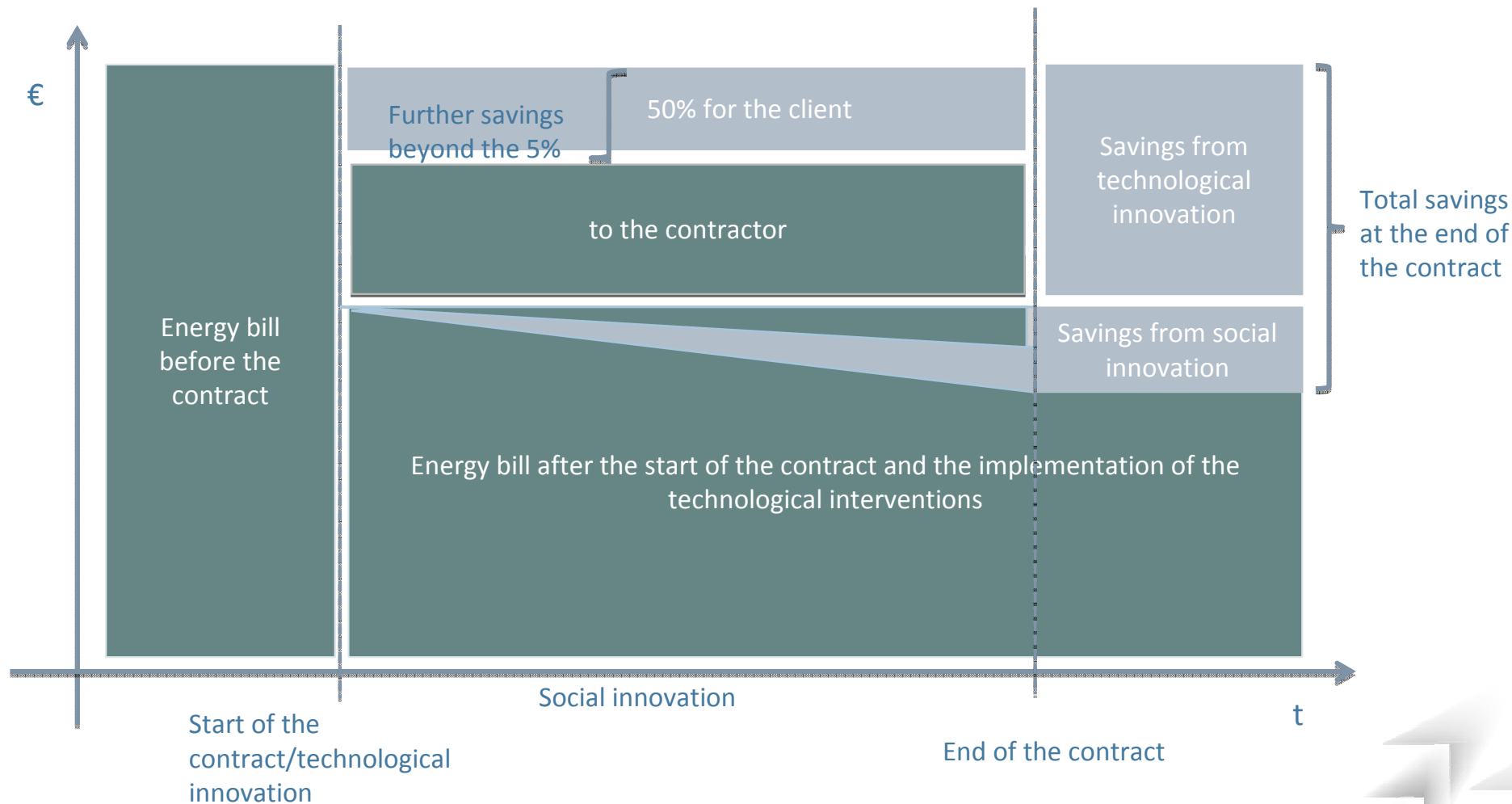
SHARED SAVINGS WITH MINIMUM GUARANTEED EPC MODEL

Energy Efficiency measures adopted for energy reduction in public buildings at the province of Treviso : the Energy Performance Integrated Contract



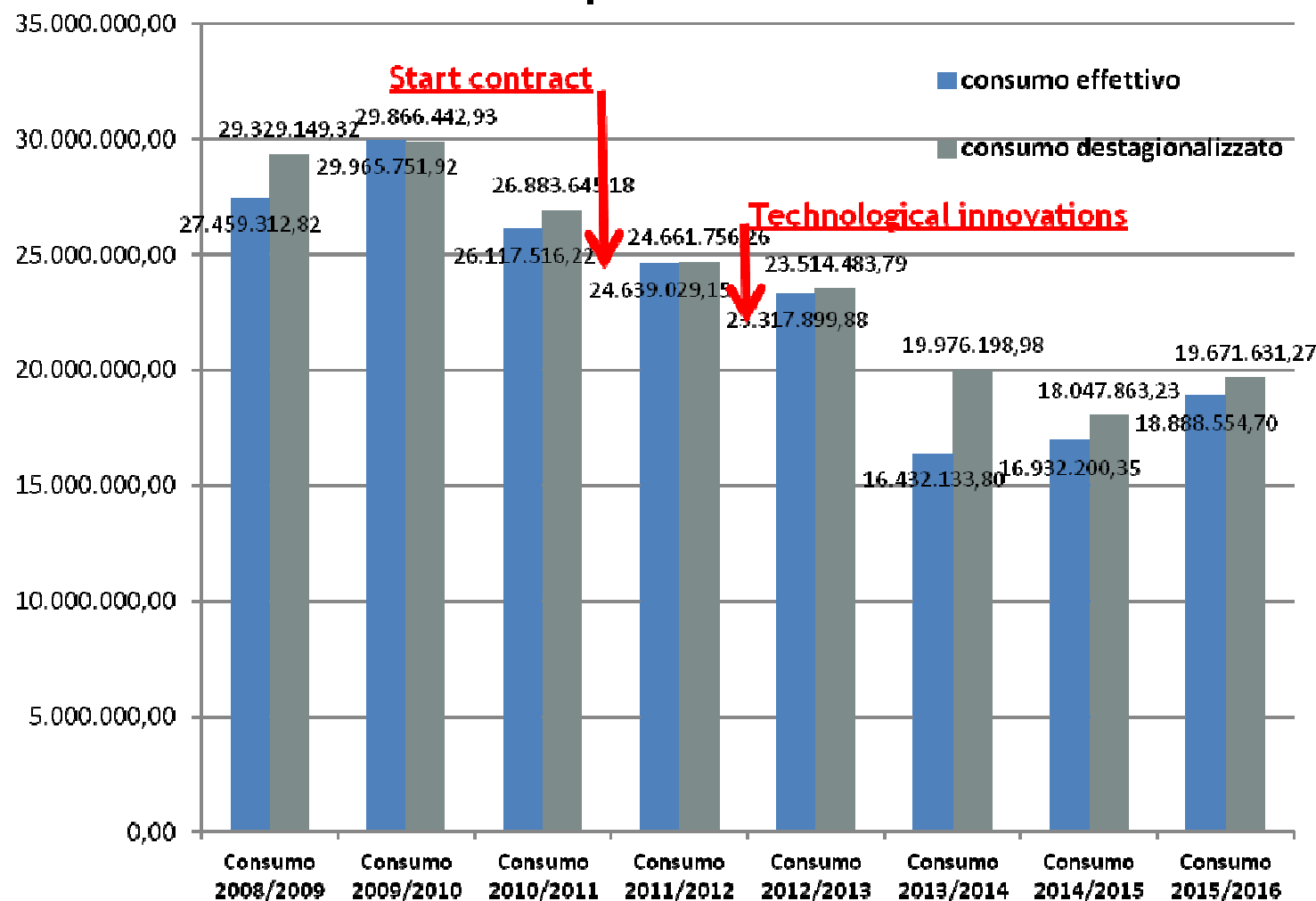
EPIC MODEL AT THE PROVINCE OF TREVISO : BEHAVIOURAL DSM

Energy Efficiency measures adopted for energy reduction in public buildings at the province of Treviso : the Energy Performance Integrated Contract



HOW TOTAL THERMAL ENERGY CONSUMPTION DECREASED

Total thermal energy consumption Ej (Kwh) before and after the implementation of the EPIC

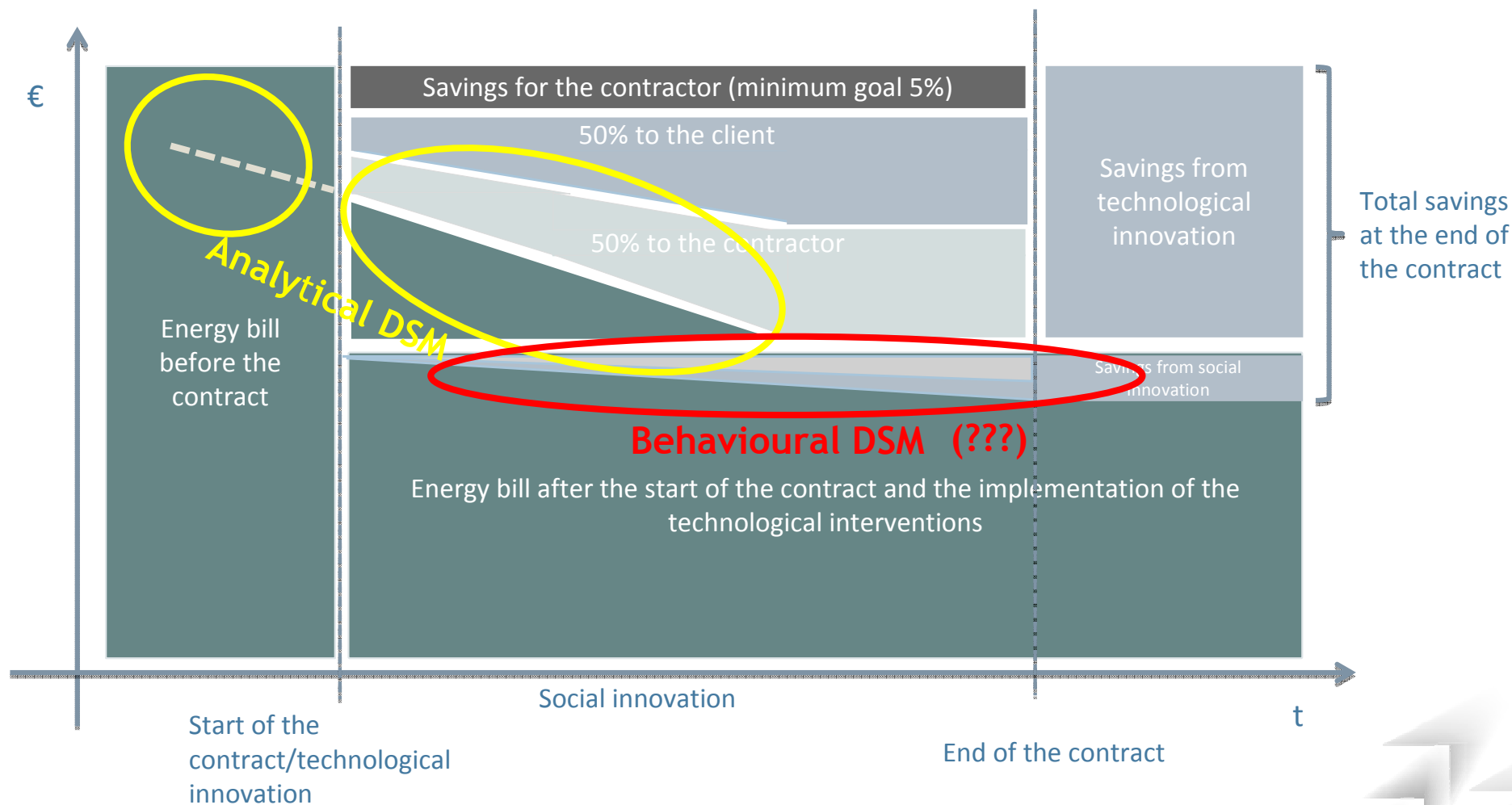


RIDUZIONE PROGRESSIVA DEI CONSUMI									RIDUZIONE ANNUA DEI CONSUMI					INTERVENTI TECNOLOGICI										INTERVENTI SOCIALI (PUNTEGGIO GSC)		
N°	Cod. Imp.	Complesso Edificio-Implanto (Bene)	Risparmio/Perdita 2009/2010	Risparmio/Perdita 2010/2011	Risparmio/Perdita 2011/2012	Risparmio/Perdita 2012/2013	Risparmio/Perdita 2013/2014	Risparmio/Perdita 2014/2015	performance stagionale 1011/0910	performance stagionale 1112/1011	performance stagionale 1213/1112	performance stagionale 1314/1213	performance stagionale 1415/1314	volume riscaldato	emergia/m3	generatore a condensazione	installazione valvole termostatiche	metanizazi one	raffaldamento piping c.T.	adeguamento sistema d term regolazione	altro	1ed	2ed	3ed		
32	ML037_01	SSSS "Scarpa" Motta di Livenza	6.33%	24.91%	13.66%	39.83%	51.26%	58.21%	19.84%	11.63%	9.31%	32.33%	2.20%	9879.88	38,21	condensazione	termostatiche	metano	piping	termoregolazione	FV	15,39		63,99		
33	TV116_01	ITCS Bada	-1.26%	14.90%	19.30%	18.00%	48.90%	54.00%	11.48%	5.09%	-0.80%	40.00%	6.00%	2899.69	16,46	condensazione	termostatiche	metano	piping	termoregolazione		0,00		0		
34	CN028_01	ITAS Carletti Aule/Direz.	-3.90%	13.15%	18.02%	16.00%	52.31%	50.76%	16.61%	5.61%	10.40%	6.90%	5112.69	25,65		termostatiche		piping	termoregolazione		54,42	13	67,42			
58	CN763_01	ITCS Fanno	0.00%	24.41%	25.30%	41.13%	58.14%	46.30%	24.41%	1.25%	23.81%	26.40%	71.00%								FV	0		0		
35	TV041_01	ITG Palladio	3.79%	16.36%	26.77%	37.68%	44.90%	40.00%	13.00%	12.45%	14.90%	11.19%	4.62%	5114.01	11,58	condensazione	termostatiche	piping	termoregolazione	cogenerazione +FV	66,39	86	59	211,39		
36	VV150_01	Liceo Sc. Flaminio Vittorio V lo	0.35%	21.34%	12.47%	10.21%	34.94%	46.94%	17.77%	-11.28%	-2.59%	27.52%	17.71%	13201.17	14,88							7,89		7,89		
37	TV043_01	ITCS Gallie Vittorio V lo	1.71%	11.99%	32.29%	37.08%	48.71%	47.68%	10.40%	20.08%	7.07%	18.54%	-4.05%	20411.38	33,15	condensazione	termostatiche	piping	termoregolazione		0,00	62	62,4	124,4		
38	VV039_01	ITCS Gallie Vittorio V lo	-0.04%	25.20%	27.01%	20.50%	53.66%	47.76%	12.70%	4.77%	26.78%	4.09%	16181.01	22,17							15,39		15,39	0		
39	TV096_01	Liceo Canova - Suzzursale	7.67%	13.94%	22.77%	27.04%	30.01%	30.52%	6.79%	10.03%	3.30%	14.64%	9.47%	21331.61	8,46							0,00		0		
40	CN042_01	SSISS F. da Collo	-3.14%	19.81%	23.74%	34.30%	44.76%	45.90%	22.24%	4.91%	19.09%	18.91%	-6.08%	20562.06	46,17						rid flusso luo	0,00		0		
41	CN130_01	IP.S.I.A. "Pittori" - Aule + Officine	3.43%	15.99%	6.14%	27.83%	46.40%	45.32%	13.01%	-11.73%	23.11%	26.01%	-5.50%	4740.54	119,08	condensazione	termostatiche	metano	piping	termoregolazione		28,17		28,17		
36	CV1747_01	IPSS NITINGALE - Nuova sede	-10.34%	12.05%	29.16%	36.81%	49.27%	44.50%	20.20%	19.46%	10.80%	19.71%	-0.33%	5798.52	26,79						solare termico + FV	0,00	32	32		
37	VV114_04	IPSSAR Belframe	3.98%	8.07%	20.53%	26.07%	46.10%	44.07%	4.26%	13.55%	6.97%	25.87%	-4.72%	68692.93	5,33							0,00		31,4		
38	VV127_01	IPSA Vittorio V lo	-1.79%	17.08%	27.80%	34.18%	49.84%	44.34%	18.54%	12.93%	6.00%	22.60%	-3.91%	22104.78	19,93		termostatiche	piping	termoregolazione		15,39	65	7,2	87,59		
39	VB049_01	ISIS VERDI (Ex-Liceo Valmigrigi aule)	-1.10%	6.73%	8.09%	19.94%	41.60%	42.11%	7.75%	1.45%	12.89%	29.55%	-1.80%	12960.56	29,30	condensazione	termostatiche	piping	termoregolazione		53,58	63	33,4	149,98		
40	CN048_03	Liceo "Marconi" Ampliamento	1.94%	3.60%	11.39%	35.17%	41.71%	41.70%	1.69%	8.09%	26.84%	13.16%	-4.85%	8022.42	10,55							45,12		45,12		
36	OD029_01	ITG/ITCS Sansovino	-2.77%	3.20%	28.24%	31.62%	36.02%	41.34%	5.80%	25.87%	7.49%	6.64%	8.86%	11134.75	38,04	condensazione	termostatiche	metano	piping	termoregolazione		9,00		9		
24	MB030_01	ITG Einaudi	4.08%	7.57%	19.93%	29.95%	30.95%	41.00%	1.64%	13.17%	12.51%	1.44%	12.20%	5764.01	20,82	condensazione	termostatiche	metano	piping	termoregolazione	FV	15,39	33,4	48,79		
25	TV137_02	Liceo Classico Canova - Succ. Ex Liceo	-3.55%	7.45%	6.97%	29.06%	46.86%	46.86%	10.62%	-4.52%	23.70%	20.88%	-2.64%	24971.73	9,13	condensazione	termostatiche	metano	piping	termoregolazione		0,00		0		
4	CV046_01	Liceo Clab.Sc. Giorgione	0.26%	0.99%	9.17%	17.80%	30.53%	40.23%	6.73%	8.26%	10.30%	2.74%	1.44%	56790.90	3,34	condensazione	termostatiche		piping	termoregolazione		0,00		0		
5	TV034_01	ITCS Riccati	0.00%	16.06%	23.80%	22.82%	31.59%	39.41%	16.06%	9.29%	-1.36%	11.37%	11.40%	16679.72	33,13							0,00		0		
37	OD106_01	IP.S.A.A. "Corazzini"	8.32%	7.05%	18.55%	28.68%	31.59%	39.37%	-1.38%	12.38%	12.43%	3.47%	2.18%	16925.90	6,65							54,42		54,42		
38	TV047_01	Liceo Da Vinci e palestra	7.44%	19.92%	28.80%	22.37%	35.07%	37.86%	13.48%	11.10%	-9.04%	16.36%	-0.04%	6224.57	143,04					termoregolazione		12,00		12		
34	MV045_01	Liceo Berto	7.27%	3.62%	15.57%	19.51%	31.85%	37.17%	-3.94%	12.40%	4.67%	15.32%	1.84%	16402.07	12,44	condensazione	termostatiche		piping	termoregolazione		9,00		9		
35	TV137_01	Liceo Classico Canova	0.84%	10.71%	26.28%	24.25%	37.43%	36.66%	9.87%	17.44%	-2.76%	17.44%	7.28%	10537.39	18,00		termostatiche		piping	termoregolazione		0,00		0		
36	TV032_02	ITIS Fermi - laboratori	4.09%	14.82%	13.33%	8.93%	34.04%	36.98%	11.19%	-1.75%	-5.08%	22.77%	1.59%	26976.09	53,22	condensazione	termostatiche	metano	piping	termoregolazione	pompa geotemica	9,00		9		
40	TV086_01	IPSA Giorgi	10.89%	16.13%	34.46%	21.89%	35.95%	35.11%	6.11%	10.27%	-12.68%	14.51%	-5.63%	10507.46	45,36							57,00	82	47,8	186,8	
41	CV119_01	IPSC Rosselli	-5.75%	27.46%	30.93%	18.69%	41.42%	34.75%	10.14%	4.79%	-17.72%	27.60%	-7.08%	5368.89	63,03		termostatiche	metano	piping	termoregolazione		0,00	22	22		
42	CN048_01	Liceo "Marconi"	0.61%	11.20%	19.20%	25.76%	35.50%	34.74%	11.16%	8.50%	8.12%	13.16%	-1.56%	11377.70	55,38							45,12		45,12		
44	VL005_04	ITIS Pianek	1.74%	3.22%	11.71%	10.16%	26.67%	31.31%	1.50%	8.27%	-1.36%	18.02%	8.85%							termoregolazione		15,39		15,39		
46	VV085_01	Liceo Flaminio	0.11%	-1.13%	-1.13%	21.32%	31.69%	28.06%	2.80%	-4.16%	24.88%	5.34%	24.88%	11778.08	33,84							46,11		46,11		
38	OD120_01	IS.I.S.S. "Obici" - sede coordinata	-0.65%	12.91%	21.08%	23.52%	32.16%	30.71%	13.48%	9.38%	3.10%	11.30%	-1.85%	29919.08	11,19							33,39		33,39		
3	CV035_01	ITIS Barsanti	1.87%	12.30%	16.15%	10.96%	30.61%	30.61%	10.61%	4.39%	-6.19%	16.28%	6.15%	13646.74	63,66		termostatiche	metano	piping	termoregolazione	FV	1,40	57	58,402833		
41	PS040_01	ITG Liceo Casagrande	0.91%	6.06%	11.14%	18.70%	31.69%	29.57%	5.19%	5.41%	8.51%	15.91%	-1.43%	51311.76	10,08							29,55		29,55		
42	VV135_01	Ist. St. d'Arte Vittorio V lo	-8.75%	-2.11%	-2.01%	1.85%	29.09%	28.94%	5.92%	0.27%	3.81%	22.75%	1.37%	10866.09	30,75		termostatiche		piping			0,00		0		
5	CV067_01	IPSA Galvani	6.12%	10.63%	13.41%	15.30%	17.75%	27.10%	4.80%	3.11%	2.18%	2.89%	9.49%	26791.42	26,51		termostatiche		piping	termoregolazione		0,00	70	34,8	150,98	
1	CV031_01	ITCS Martin aule e Palestra	2.02%	11.05%	14.24%	23.18%	32.86%	27.13%	9.22%	3.98%	10.42%	12.60%	-9.34%	61616.06	68,81							0,00		33,6	32,6	
7	CV091_01	Ist. Alberghiero Maffioli	4.21%	6.87%	17.96%	29.97%	33.83%	26.45%	2.78%	11.91%	14.64%	5.52%	-12.83%	38570.16	8,71		termostatiche		piping	termoregolazione	solare termico	0,00		0		
8	MB030_02	ITCS Einaudi	-3.27%	4.64%	14.20%	3.12%	25.74%	25.74%	7.66%	10.03%	-12.91%	17.52%	8.12%	33458.14	9,70	condensazione	termostatiche		piping	termoregolazione		15,39	33,4	48,79		
9	VL005_01	IPSSAR Alberici	-2.24%	-4.33%	18.30%	11.13%	24.31%	25.13%	-2.00%	22.00%	-9.21%	14.82%	1.83%	17012.49	29,26		termostatiche		piping	termoregolazione	solare termico	0,00		0		
10	TV095_01	Ist. Magistrale Duca degli Abruzzi	0.78%	12.61%	24.71%	11.84%	25.77%	24.50%	13.94%	11.83%	-12.11%	15.76%	-9.92%	28697.57	18,82							33,90	65	47,8	146,7	
8	CV104_01	IPSA Sartori + Palestra + convitto	6.27%	0.92%	15.72%	21.87%	19.62%	24.18%	-5.71%	14.94%	7.42%	-3.02%	3.79%	7277.84	65,99		termostatiche		piping	termoregolazione	solare termico	44,64	83	55,2	182,18	
11	TV044_01	Liceo Artistico	1.69%	0.38%	4.16%	7.55%	15.86%	21.06%	-1.34%	3.80%	3.54%	8.98%	5.77%	30925.71	10,04		termostatiche		piping	termoregolazione		0,00		0		
12	MB121_01	IP.S.I.A. "Scarpa" aule	-4.17%	11.01%	8.96%	17.28%	19.67%	15.67%	14.57%	-2.30%	-3.38%	12.10%	3.88%	12314.48	19,64							9,00		9		
13	MB038_02	IP.S.I.A. succ.+ Ist. Mag "Veronese"	2.39%	8.11%	12.14%	1.36%	12.81%	12.21%	5.86%	4.38%	-12.27%	13.61%	-1.01%	11231.28	25,15							0,00		0		
59	CN038_03	ITIS Galvani + officine	-14.16%	-16.07%	-16.90%	-10.97%	-1.82%	-7.52%	-17.39%	0.07%	9.17%	23.16%	-7.80%			condensazione	termostatiche		piping	termoregolazione		0,00		0		
60	MB083_01	Ist. Mag. "Veronese"	3.55%	2.52%	1.16%	3.74%	6.47%	-11.84%	-1.07%	-1.39%	2.61%	2.84%	-28.54%	11790.82	10,86							0,00		0		
TOTALE			-1.32%	8.92%	16.31%	20.78%	34.63%	35.30%	10.10%	8.12%	5.94%	17.48%	1.74%													
%																										
oltre - 20%																										
tra -20% e -10%																										
tra -10% e 0																										
tra 0 e 10%																										
tra 10% e 20%																										
tra 20% e 30%																										
tra 30% e 40%																										
tra 40% e 50%																										
oltre 50%																										



EPIC MODEL AT THE PROVINCE OF TREVISO : HOW IT REALLY WORKED

Energy Efficiency measures adopted for energy reduction in public buildings at the province of Treviso : the Energy Performance Integrated Contract



THANK YOU FOR YOUR ATTENTION



Antonio Zonta
Province of Treviso - Buildings, Estates and
Public Procurement Department
TOGETHER



www.interreg-central.eu/TOGETHER



info@together.com

