

Regional Evaluation Report



GRACE

Grants and other incentives for cost and energy efficiency

Sub-Project-Participant:

Agenzia per l'Energia e lo Sviluppo Sostenibile di Modena

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Introduction: EnercitEE and the sub-project GRACE

EnercitEE project

European networks, experience and recommendations helping cities and citizens to become Energy Efficient. The EU Climate and Energy Package is considered key to an energy-efficient and low-carbon Europe. The three overall objectives have become generally known as the 20-20-20 targets: a 20% cut in emissions of greenhouse gases by 2020, compared with 1990 levels; a 20% share of renewables; and a 20% cut in energy consumption.

EnercitEE seeks to implement the EU targets on Energy Efficiency practically. The project, which is carried out under the EU programme INTERREG IVC, builds upon experiences and existing networks from the forerunner project energy'regio.

EnercitEE will identify, analyse and transfer good practices, foster the exchange of experience and carry out light pilot implementation to increase the level of Energy Efficiency of local authorities and their citizens.

Practical guidelines and policy recommendations produced within EnercitEE will provide valuable assistance for European regions aiming to improve their energy performance and policies.

GRACE sub project – Grants and other incentives for cost and energy efficiency

Aim

The main aim of GRACE was to analyse the costs and real impact on energy efficiency of public and private funding schemes for citizens and communities in the participating regions Saxony, Lower Silesia and Emilia-Romagna.

Approach

Each sub-project partner developed a regional overview on available funding programmes for the target groups, consolidated within a joint comparative table. All partners searched for relevant data from their funding institutions. This aspect of the project was the most challenging one as collecting the data on funding programmes (e. g. beneficiaries, energy savings, CO₂ emission reductions, etc.) often meant requesting highly protected or sensitive data in all of the regions. The partners also carried out an interregional comparison between the participating regions in order to gain an insight into the different funding modalities and to learn from each other. Furthermore, a joint methodology was developed and updated, defining the mode for analysis of a minimum of three funding programmes per region.

Results

The participating regions of GRACE gained an overview of the programmes which support the EU 2020 strategy and their national strategies. All partners will use this overview for future activities, including energy advisory services. The evaluation report containing the project results describes ²

the effectiveness of the different funding programmes using indicators such as “kg of CO₂-emissions reduced with €1,000 of governmental funding” or “energy saved with €1,000 of governmental funding.” This allows a direct comparison of programmes and facilitates the formulation of policy recommendations for policy makers. Thereby, GRACE can serve as a guide in deciding on how to improve existing funding programmes and how to set up new programmes.

Future prospects

GRACE contributed to improving the capacity to deliver advisory services for citizens and municipalities, especially for the future activities of the Bautzen Innovation Centre (TGZ-Bautzen) and the Energy and Sustainable Development Agency (AESS) of Modena. Furthermore, the policy recommendations can be a good basis to initiate cooperation on a regional and national basis.

Project partners

- Lead Sub-Project Participant: Bautzen Innovation Centre, Technologie- und Gründerzentrum Bautzen GmbH
- Sub-Project Participant 2: Wrocław Research Centre EIT+ Ltd., Wrocławskie Centrum Badań EIT+ sp. z o.o.
- Sub-Project Participant 3: Energy and Sustainable Development Agency of Modena (AESS), Agenzia per l'Energia e lo Sviluppo Sostenibile (AESS)

Additionally, relevant work was carried out by subcontractors:

- in Italy by Nomisma spa
- in Poland by EKO-BIEGŁY Association

Webpages

- EnercitEE: <http://enercitee.eu/Sub-Projects/GRACE---Grants-and-other-incentives-for-cost-and-energy-efficiency,53/>
- Bautzen Innovation Centre: <http://www.tgz-bautzen.de/projekte/laufende-projekte/grace.html>
- Wrocław Research Centre EIT+: http://www.eitplus.pl/en/enercitee_grace/2338/
- AESS Modena: <http://www.aess-modena.it/it/component/content/article/34-istituzionali/334-grace-en.html>

Part I. Regional Context

General

1 Regional overview

1.1 Country context

According to Eurostat, in 2011 Italy had an energy dependence rate of 81.29%, down from a high of 87.01% in 2006, thanks to the increase in the share of renewables in gross final energy consumption from 4.9% in 2004 to 11.5% in 2011.¹ Italy was the fourth largest producer of renewable electricity in Europe in 2011, with a total installed capacity of 41,399 MW and a new record output of 82,961 GWh, registering an increase of 8% over 2010. Total national inland consumption of primary energy was 172,940 ktoe. Italy's gross inland energy consumption of natural gas in 2011 reached 63,814 ktoe (37% of total consumption), down from 70,651 ktoe in 2005; whereas consumption of petroleum products was 48,485 ktoe (28% of total consumption) in 2011, down from a peak of 59,506 ktoe in 2004.²

The country is the EU's second largest importer of natural gas after Germany and the largest importer of electricity by far (44,959 GWh in 2009) -- linked to Italy's decision to abandon the nuclear option. Italy is well located to take advantage of gas streams coming from the north, east and south and now has two LNG regassification facilities on line (as opposed to only one until 2009), with others in various stages of planning or realisation. The National Action Plan for Renewable Energies (*Piano di Azione Nazionale (PAN) per le Energie Rinnovabili* (2010)) calls for RES to contribute 28.97% of electricity generation by 2020.

The Enerdata Yearbook 2012 reports that in 2011, Italy's total primary energy consumption dropped to **165.5 Mtoe** from a high of 183.9 Mtoe in 2005, while the energy intensity of the economy was reported at 123.645 Ktoe/€1000 in 2010. Final energy consumption was 126.1 Mtoe in 2010, an increase over 2009, though in general final energy consumption has been decreasing. ODYSEE data show that energy efficiency of the Italian economy overall increased 8.6% (vs. 11.% in EU) during the period 2000-2010, with gains in the household sector registering an improvement of 15.1% (vs. 15.3% in EU). In recent years, however, energy efficiency progress has been slower: 0.5%/year during 2005-2010 compared with 1.8%/year during 1990-2005.³

The latest **ODYSEE** data <http://www.odyssee-indicators.org/online-indicators/> for Italy show that:

¹ Eurostat, Main tables, tsdcc110.

² Eurostat, Main tables.

³ ODYSEE-MURE, Italy Energy Efficiency Profile.

- Energy consumption of households per permanently occupied dwellings, calculated at normal climate was **1.18 toe/dwelling** in both 2009 and 2010 (vs. 1.42 toe/dw in EU in 2010), down from 1.21 toe/dw in 2006;

- Consumption per dwelling for electrical appliances and lighting per permanently occupied dwellings (apart from space heating, water heating and cooking) was **1966 Kwh/dw in 2009 and dropped to 1946 Kwh/dw in 2010** (vs. 2536 Kwh/dw in EU), down from 2067 Kwh/dw in 2006;

--Energy consumption of households for space heating at normal climate per permanently occupied dwellings was **0.81 toe/dw in 2009 and rose to 0.83 toe/dw in 2010** (vs. 0.94 toe/dw in EU), higher than the 0.81 toe/dw in 2006.

-- adjusted for dwelling sizes, energy consumption of households **per m²** for space heating, calculated at normal climate was **8.511 koe/m² in 2009, but rose to 8.786 koe/m² in 2010 (vs. 10.973 koe/m² in EU)**, which is even higher than the 8.52 koe/m² recorded in 2006.

-- Finally, consumption per dwelling scaled to EU average climate was **1.39 toe/dw in 2009** and rose to **1.48 toe/dw in 2010** (vs. 1.42 toe/dw in EU).

Energy efficiency policy is formulated at the national and regional levels (and in some cases at local levels), while incentive/support measures are implemented at national, regional or local levels. The Ministry of Economic Development (MSE) in collaboration with the Ministry of Environment and the Ministry of Infrastructure are responsible for developing the regulation on the Energy Conservation of Buildings (ECB). The Agency for Electrical Energy and Gas (AEEG) monitors and regulates gas and electricity markets. ENEA, the national entity for energy and environment, tracks RES and EE developments and operates the website for access to the 55% tax rebate for energy-efficiency investments; The Tax Administration (*Agenzia delle Entrate*) processes the applications and awards the tax rebates.

The National Legal framework in Italy governing energy efficiency is composed of the following:

--National Energy Plan

--National Energy Efficiency Plan

--Regulation on Energy Conservation of Buildings

--Energy Certification of Buildings

-- Laws n. 296/06, n. 244/07, and L.D.115/2008 govern the energy efficiency of households. L.D. 16 Feb 2011 and 16 Nov. 2010 regard the energy-related products directive.

Italy's first National Plan of Action for Energy Efficiency (NEEAP) was introduced in 2007. The second NEEAP was in public consultation until 15 July 2011 and on 27 July 2011 received 5

approval of the *Conferenza Stato-Regioni* and is to be in effect until 2014. In the **NEEAP of 2011** the residential sector is considered the most important for energy savings—it is to contribute to an energy savings of 56,830 GWh/year, accounting for **45%** of a total National objective of 126,327 GWh/year expected through 2016. According to ENEA's Annual Report on Energy Efficiency (RAEE) 2011, the residential sector has played the most important role in contributing to energy efficiency objectives foreseen in the NEEAP of 2007 in transposing the Directive 2002/91/CE. In the period 1990 – 2010, the residential sector is the sector that has registered the best results in terms of increasing Energy efficiency: in 2010 the ODEX index was 71.4 and thus the increase in overall efficiency compared to 1990 was 28.6% (RAEE 2011, p 26).

Investments in renewables (especially solar) and energy efficiency have risen sharply since 2007, following the introduction of strong fiscal incentives (55% tax rebates) for investment by households and companies. Recent budget saving measures have increased the time period for tax rebates to 10 years for specific EE measures. The Monti government confirmed in January 2012 that the 55% tax rebate will continue unmodified through Dec. 31, 2012, with the addition of rebates for substitution of traditional boilers with heat pumps. It was later confirmed that the incentive would be extended through June 30, 2013 and possibly even later.

The Emilia-Romagna region is located in north-eastern Italy. Its main energy source is natural gas (62.6%), now mostly imported, with renewables accounting for 5.3% of the 2008 energy balance. The second Triennial Implementation Plan 2011-2013 of the Regional Energy Plan calls for a 10% reduction in energy consumption over trend levels by 2020, signifying energy savings of ca. 1.57 Mtoe per year (of which 47% or 0.738 Mtoe/year is in the residential sector). The renewables share is to rise to 17-20% of final consumption, with solar and biomass playing key roles. By 2011 the share of renewables in power generation had risen to 12.3%.

Figure 1: map of Emilia-Romagna region



In 2010, the region accounted for 11.7% of applications for the national 55% tax rebate programme for energy-efficiency interventions in buildings; whereas in 2011 this share increased to 12.4%. Subsidies for energy-efficient boilers have been implemented at the provincial level, and new incentives involving rotating funds that subsidise interest payments were introduced (Kyoto Fund supported by the Cassa Depositi e Prestiti in 2012; Green Economy funds supported by the Programme ROP ERDF 2007-2013 priority 3 "energy-environmental upgrading and sustainable development" in 2013). Emilia-Romagna is a leader in energy certification requirements for buildings.

1.2 Socio-economic and cultural context

From a socio-economic perspective, the region is among the most prosperous in Italy, despite a recent stagnation in economic growth. According to ISTAT, the region's GDP in 2011 was €128,305.6 million, down from €133,034.6 million in current euro in 2009 (evidence of the economic crisis), while GDP per capita rose to €31,688.9 at market prices from €30,493 in 2009. Average unemployment in 2011 had dropped to 5.3%, from 5.7% in 2010. Despite the decline, this rate is still much higher than in the past (for example, 2.9% in 2006), but remains substantially below the national average (8.4%) in 2011. A large share of people over the age of 65 (22.3% in 2010) is accompanied by a low birth rate, with only 13.3% of the population under 15. Emilia-Romagna has the highest share of immigrants in its population (11.9% in 2011) of any region in Italy. The incidence of poverty among families reached 5.2% in 2011, up from 3.9% in 2008 and only 2.5% in 2005, though substantially lower than that in the rest of Italy (11.1%). It is expected that real poverty has worsened as a result of the continuing and deepening economic crisis. In 2009, 55.5 of 100 families in the region judged that their economic resources were optimal or adequate—representing a substantial drop since 2002, when 69.2 of 100 families felt this way. Conversely, in 2009 38.7 of 100 families judged their economic resources to be constrained, up from 28.2 in 2002. According to ISTAT, the number of families per 100 resident families “in conditions of deprivation” has risen steadily over the past several years: from 6.2 in 2004 to 7.9 in 2006, to 9.5 in 2009 and finally to 13.2 in 2011—which however is half the level of Italy (22.4) and about 35% of the level in southern Italy (37.5) for that year.

The region has an average monthly spending level that is higher than the national average: In 2008, Emilia-Romagna's families spent an average of €2854.02 (current €), compared to the national average of €2484.64 (current €). In 2008 residents also tended to spend substantially more on fuels and energy per month (€155.97 in current €) than Italians as a whole (€130.36 in current €) and slightly more than the average for the north-eastern part of Italy. Such spending peaked in 2006 (€162.74), before dropping sharply to €132.64 in 2007 and then rising again in 2008. If compared to overall average monthly spending, this represented close to 5.5% of the total in 2008. More recent data from ISTAT shows that average monthly spending in the region has declined to €2770, with the spending on fuels and energy dropping to €146 per month and representing 5.28% of monthly spending (see Table 3 in next section).

Domestic gas prices have fluctuated substantially in Italy. Recent data on domestic prices of energy indicate that in the second semester of 2010 natural gas and electricity prices reached €13.8350/gigajoule (excluding taxes) and €0.1387/kwh, respectively, higher than in Poland and Germany for that period. Data reported in Europe's Energy Portal (June 2011) on retail prices for households showed gas prices in Italy at €0.0796 per kWh for consumption levels at 15,000 kWh/year, while electricity prices were €0.2041 per kWh electricity at a consumption level of 3,500 kWh/year. In late 2011 fuel prices increased sharply due to an increase in the excise tax as one of

the austerity measures of the new technical government under Prime Minister Monti. In January 2011 the price of heating oil reached €1.457/litre.

1.3 Energy context

Emilia-Romagna remains heavily dependent on natural gas imports, though it does have its own declining indigenous production. In 2008, the last year for which comprehensive and validated data are available, the Region required circa 16.4 million tonnes of oil equivalent (Mtoe) of primary energy, of which 62.6% was derived from natural gas (mainly methane), 30.6% from petroleum products, 5.3% from renewable energy sources (RES), 1% from electricity imports and a minimal share of solid combustibles (0.1%).

While there have been major investments in non-combustible renewable energy sources for electricity generation (particularly solar), thermal generation still overwhelmingly represents the main source of power in Emilia-Romagna. In the power production balance as of 31 December 2010, thermal sources (including biomass) represented 94.4% of output, hydro 4.9% and wind 0.1%. Over the past decade there has been a shift from fuel oil to natural gas as well as to biomass and urban wastes in power generation. In 2009 biomass accounted for the largest renewable source for power generation, yet by 2011, as seen below, solar energy became the largest single source of renewable energy in the region—though as a group bio-energies represent a far larger share.

Figure 2. Primary energy supply, 2008

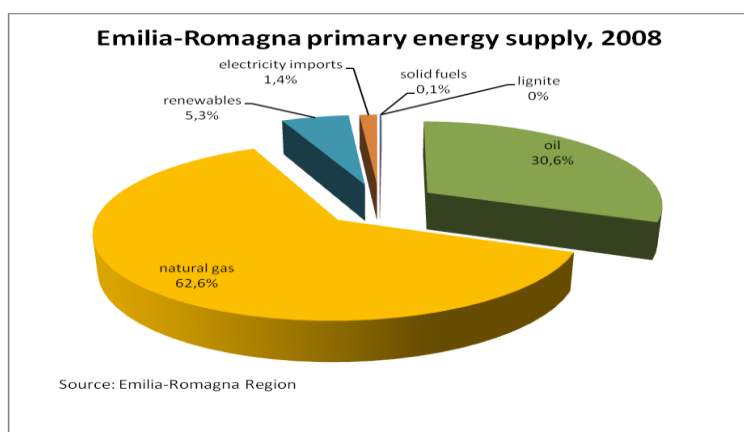
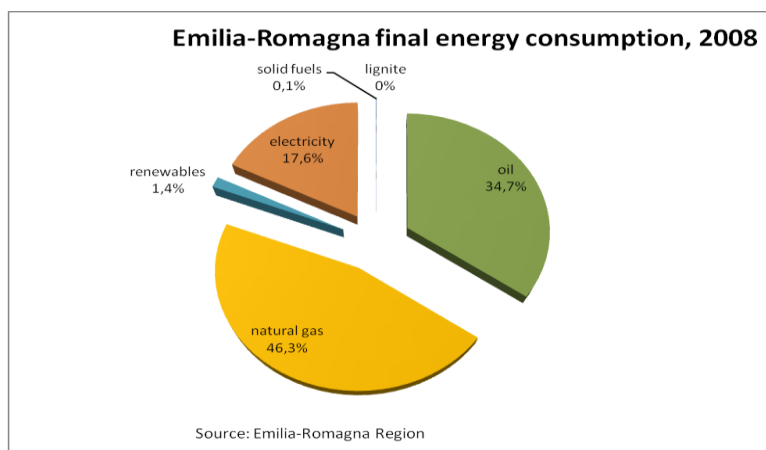


Figure 3. Final energy consumption, 2008



In the cities most residences are heated by gas, whereas in rural areas and in the mountains, biomass or fuel oil might also be used. The use of wood pellets has become more popular. In 2008, the residential sector was responsible for nearly 20% of final regional energy consumption.

According to the Triennial Action Plan 2011-2013 of the Regional Energy Plan, production of renewable electricity in Emilia-Romagna in 2009 totalled 779 MW: comprised of wind (16 MW); solar PV (95 MW); biomass (371 MW); and hydro (297 MW). The Objectives for 2020 are to reach a total RES power capacity of 4500-5060 MW or 1,457.1-1,517.4 ktoe with investments of €12,083-13,989 M foreseen. Recent data from the GSE Statistical Report 2011 on renewable energy facilities indicate that in 2011 the region had a total of 31,298 installed renewable energy systems with a combined capacity of 2070.3 MW, the largest share comprised of solar collectors (31,010 systems with 1267 MW capacity, 61.2% of installed RES capacity).⁴ The region accounted for 5.0% of Italy's total installed RES capacity, yet its shares are even higher in terms of number of installed solar energy systems (9.4%) and capacity of installed systems in MW (9.9%).

In terms of renewable energy power output, the region produced a total of 3,527.4 GWh in 2011 (solar 31%, hydro 24.7%, biomass 22.1%, biogas 15.4%, etc.), representing 4.3% of total national electricity production. The region was second in Italy in terms of generating solar power-- 1,092.2 GWh or 10.1% of country solar electricity output. The region is also a major player in bio-energies, accounting for 12.8% of Italy's installations and 16.9% of installed capacity with a total output of 1542.7 GWh, 14.2% of the country total. The RES profile reflects the dramatic increase in investments in solar energy systems benefitting from strong government incentives through 2011. In 2011 RES accounted for 12.3% of power consumption in Emilia-Romagna, up from 9.4% in 2010, though this is far lower than the rate for Italy as a whole, 23.5%.

⁴ The statistical office of GSE counts all solar Energy systems and all other systems with a capacity less than or equal to 200 kW.

Natural gas remains the most important energy resource for households, both for direct use in domestic heating and cooking and for indirect use by generating electricity in thermal power plants. Data provided by the Ministry for Economic Development (MiSE) show that in 2010 Emilia-Romagna accounted for 11,896.7 million m³ or 14.9% of the natural gas distributed in Italy, second after Lombardy. This amount is slightly less than the 11,990.19 million m³ distributed in 2007, when the region represented 14.7% of the total. While the amount of gas distributed in the region has declined since 2007, the share that went to secondary networks, which includes residences and tertiary customers as well as smaller industrial and thermoelectric users, increased from 4,589.97 million m³ in 2007 to 5,053.30 million m³ in 2010—reflecting a decline in major industrial and thermoelectric power plant consumption during the period under observation and higher demand of households and the service sector.

Natural gas accounts for close to 62% of the consumption in the residential sector—used primarily for space heating, hot water and cooking. Given that in 2009 94.2% of the families in the region were connected to the natural gas network (versus 77.7% in Italy), energy-efficiency incentives in the residential sector particularly concern the energy savings of families associated with the reduced consumption of natural gas—or with the substitution of oil-fuelled boilers with more efficient gas boilers. In urban areas, most residences are heated by natural gas, whereas in rural areas and in the mountains, biomass or fuel oil might also be used. The use of wood pellets has become more popular. In 2008, the residential sector was responsible for nearly 20% of final regional energy consumption.

The 2001 Census indicated that the majority of heating systems were autonomous systems for individual home use as opposed to centralised heating systems. While the 2011 census has been completed, the results for types of housing and heating systems have not yet been published as of March 2013.

In terms of gas consumption per capita, Parma province has the highest level, and far higher than the neighbouring Piacenza province. By 2010 there were district heating programmes present in all provinces of the region. Gas consumption for heating has declined since the regional peak in 2003, though in some provinces gas consumption increased in 2011. Most of the Emilia-Romagna region is in climate zone E, while some mountainous areas are in climate zone F. While winters are cold and snow is common in many parts of the region, the provinces on or near the coast tend to have a milder climate (Ravenna, Forlì and Rimini), though Ravenna has the second highest level of gas consumption per inhabitant.

Table 1 – Consumption of methane gas for domestic use and for heating in the provincial capitals of Emilia-Romagna (a) - 2000-2011 (m³ per inhabitant)

Municipalities	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Emilia-Romagna	667.7	685.4	685.1	735.2	735.0	722.8	708.1	636.8	648.9	656.6		
Piacenza	621,8	611,7	588,2	592,3	615,9	568,7	569,0	502,8	507,9	514,1	587,9	523,8
Parma (b)	923,8	992,0	1.002,4	1.103,2	1.103,0	1.083,2	1.075,3	887,4	896,4	952,3	992,7	923,6
Reggio nell'Emilia	704,2	564,0	656,8	695,3	706,0	646,4	664,8	520,7	610,5	589,8	612,7	530,0
Modena (b)	609,7	637,9	635,8	673,9	673,8	661,7	656,9	574,7	607,2	614,6	640,7	596,1
Bologna	642,1	686,6	664,2	706,1	704,2	688,0	642,5	630,0	579,0	624,1	571,7	613,4
Ferrara	609,6	637,7	624,4	661,9	661,8	649,9	624,4	602,9	542,1	571,3	520,4	486,7
Ravenna	702,1	732,9	764,9	810,8	810,7	796,1	833,3	775,4	792,4	774,0	817,7	732,6
Forlì	625,9	662,9	630,1	712,4	694,3	745,0	770,1	671,4	720,0	700,4	776,8	714,9
Rimini	539,8	559,3	536,1	602,3	581,7	607,7	524,4	496,7	601,4	509,8	583,8	594,9

Source: Istat, Dati ambientali nelle città
 (a) provisional Data.
 (b) Data for 2011 estimated

Source: Istat—data for region as a whole only through 2009

Bologna province has the highest per capita consumption of electricity, perhaps also explained by its role as the regional capital and the location of the leading university, several research centres and ICT clusters—as well as a high propensity for use of electronic products.

Table 2. Consumption of electricity for domestic use by provincial capital - 2000-2011 (kWh per inhabitant)

Municipalities	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Emilia-Romagna	1,174.5	1,206.1	1,228.5	1,275.8	1,269.9	1,237.7	1,232.7	1,219.2	1,255.5	1,241.2		
Piacenza	1.148,5	1.193,0	1.227,7	1.203,6	1.231,2	1.178,5	1.209,2	1.152,1	1.183,6	1.191,3	1.185,8	1.164,3
Parma	1.191,1	1.204,8	1.220,3	1.299,6	1.229,0	1.163,6	1.211,6	1.161,4	1.196,6	1.132,9	1.119,8	1.071,6
Reggio nell'Emilia	1.187,8	1.260,9	1.251,1	1.302,6	1.296,3	1.237,1	1.220,9	1.202,8	1.217,6	1.212,7	1.180,4	1.151,9
Modena	1.077,6	1.127,9	1.138,7	1.164,3	1.178,6	1.199,1	1.223,8	1.130,8	1.271,7	1.240,6	1.189,3	1.214,3
Bologna	1.262,3	1.287,3	1.317,5	1.375,2	1.373,3	1.329,6	1.266,8	1.331,8	1.347,5	1.332,4	1.304,5	1.272,4
Ferrara	1.240,0	1.209,9	1.253,5	1.322,8	1.340,9	1.321,8	1.315,0	1.287,7	1.315,5	1.318,2	1.299,7	1.314,7
Ravenna	1.207,5	1.266,7	1.307,0	1.339,2	1.309,3	1.304,3	1.253,4	1.264,6	1.283,5	1.286,1	1.278,4	1.269,1
Forlì	1.032,4	1.065,3	1.057,8	1.109,2	1.129,5	1.100,0	1.151,0	1.101,7	1.118,5	1.117,4	1.117,6	1.107,0
Rimini	1.049,0	1.077,1	1.116,8	1.163,6	1.158,1	1.134,4	1.173,9	1.153,8	1.185,1	1.188,5	1.182,6	1.162,7

Source: Istat—data for region as a whole only through 2009

The table below shows the average monthly spending by families in Emilia-Romagna between 2002 and 2011. Spending on fuels and energy peaked in 2006 and was at high levels in 2009 and 2010, yet dipped sharply in 2011—during this time consumer spending essentially remained stagnant, paralleling the erosion of purchasing power as the economic crisis has continued and intensified. The dip in spending on fuel and energy may also be linked to the fact that families are driving less and are turning the heat down. It is not clear how much of the reduction in spending may be associated with energy-efficiency investments. The share of fuels and energy in monthly spending remains between 5% and 6%.

Table 3 Average monthly spending by families in Emilia-Romagna

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Food and beverages	388	423	431	442	455	417	428	442	446	459
Tobacco	17	18	20	20	21	18	19	20	20	17
Clothing and footwear	149	170	164	153	158	153	142	155	151	137
Housing (principal and secondary)	647	699	751	749	783	797	829	782	814	795
Fuels and energy	131	143	138	146	163	133	156	160	161	146
Furniture, appliances and services for the home	158	155	152	159	175	170	180	166	162	159
Health	104	114	113	114	108	109	117	108	118	105
Transport	362	357	434	446	417	419	430	416	435	416
Communication	50	53	56	57	61	54	55	54	56	52
Education	26	23	32	24	27	26	28	28	41	30
Leisure time, culture and games	118	131	130	123	140	123	127	121	138	133
Other goods and services	303	347	342	346	372	343	343	348	341	320
total	2.453	2.631	2.762	2.778	2.880	2.762	2.854	2.799	2.885	2.770
share of fuel & energy of total	5,36%	5,42%	4,98%	5,25%	5,65%	4,80%	5,46%	5,72%	5,59%	5,28%

Source: ISTAT

1.4 Framework conditions and Legal requirements in Emilia-Romagna

Emilia-Romagna is subject to the national laws and policies governing energy, the use of renewables and energy efficiency, including the Energy Performance of Buildings. As one of the first Italian regions with a Regional Energy Plan (2004), Emilia Romagna adopted a law on energy certification of buildings which requires all buildings that are sold or rented under a new contract to have an energy certificate provided by an authorised certifier (2008). Currently the region is implementing the Triennial Implementation Plan (*Piano Triennale di Attuazione* (PTA)) of the Regional Energy Plan (PER) 2011-2013, adopted in April 2011. The PTA indicates energy savings targets of 470 ktoe for 2013 and 1,565 ktoe for 2020 to be achieved in the region, of which around **47% concerns the residential sector**. The main elements of the legal framework are the Regional Law of 23 December 2004, n. 26, L.R. 26/2004 *Disciplina della Programmazione Energetica Territoriale*, Art. 25 implementation of directive 2002/91/CE; the Regional Energy Plan Nov. 2007; DAL 156/2008 Act on Energy Performance and energy certification procedures; Triennial Plan 2011-2013 of the Regional Energy Plan; and the recent DGR 1366 of 26/09/2011 regarding energy performance of buildings.

1.5 SWOT Analysis summary

The main SWOT analysis patterns of the Emilia Romagna region with regard to energy-efficiency investments are as follow:

Strengths

12

- High level of per capita income and spending capacity and relatively low unemployment;
- Well developed business structure—mechanical, motor and metalworking industries, ceramic tiles, ICT, construction as well as “green businesses”
- Strong public interest in EE and environment—Increasing acceptance of green concepts, use of bicycles
- Important Universities and research institutes
- Favourably located for access to natural gas—new LNG regassifier (Rovigo) and gas pipelines

Weaknesses

- Government budget crisis has reduced public propensity for spending
- Difficulty in enforcing standards—use of “auto-certification”
- Difficulty for companies and individuals to get bank loans
- High propensity for purchasing electronics and new items (for Italy) like air conditioners and clothes dryers
- Large share of older energy-inefficient housing, particularly buildings with centralised heating and/or old boilers
- Rigid winters require increased heating, hotter summers have led to rising use of air conditioners

Opportunities

- Business opportunities for local companies providing EE products and services
- Opportunity to improve the value and energy performance of residential property
- Chance to realise greener lifestyle and change attitudes toward energy consumption
- sustainable effects of EE interventions in residential sector on income, comfort and employment

Threats

- Budget cuts set limits to the tax rebate programme from 2013
- Economic crisis erodes financial resources of citizens and propensity for investment
- Banks no longer provide small loans for EE to homeowners
- Time required for effects of EE intervention to be felt.
- Serious air pollution problems of the region may only be partially addressed by interventions in the residential sector
- Tax increases on energy have masked effects of greater energy efficiency

Part II. Programme data and analysis

Programme 1

1. Analysed programme details

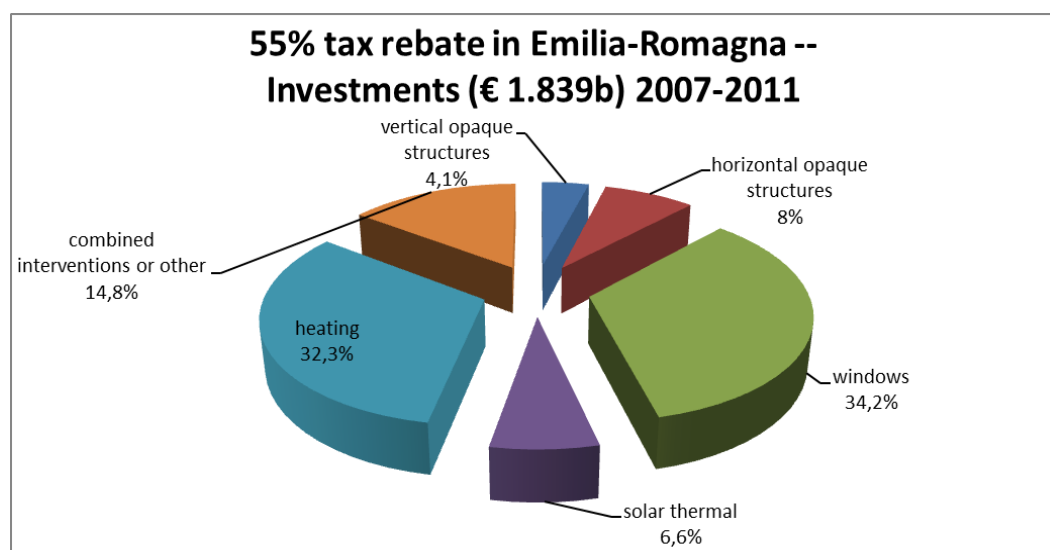
Region: Emilia-Romagna

Programme type (range: national/regional): national

Programme name: 55% tax rebate programme for energy-efficiency interventions in buildings (windows, solar thermal, horizontal opaque structures/floors/roofs, vertical opaque structures/walls, heating, combined interventions or others)

Budget (in €): around €1.839 billion disbursed within region during 2007-2011; ongoing through 30 June 2013

Figure 4. shares of investment by type of intervention



Timeframe: start 01/01/2007 , finish 30/06/2013

Source of funding: National Government

Beneficiaries: citizens or enterprises paying IRPEF or IRES taxes

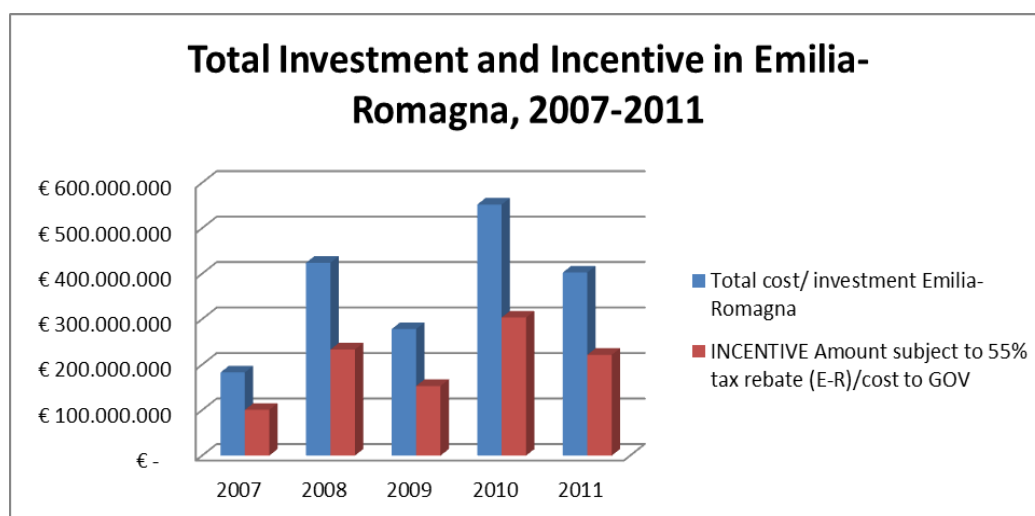
Assessment of project data availability: the availability of data up to 2011 is good and well illustrated in several reports (i.e. ENEA, CRESME, etc). Data for 2011 regarding the number of interventions, the cost and energy savings have recently become available in ENEA's second Annual Report on Energy Efficiency (RAEE 2011) and the accompanying report on the effect of the 55% tax rebate. However, it has been challenging to compare the information in this report and the previous one with regional energy data, since Emilia-Romagna's most recent regional energy balance refers to 2008. As a consequence, it has been necessary to collect data from other sources, such as the Ministry for Economic Development's Department for Energy and Eurostat. However, the data required for a detailed assessment of the impact of the incentive on the energy balance of the region is not yet available at the regional level.

2. Programme description

The main energy efficiency measure used in the region is the 55% tax rebate programme introduced in 2007. As a result of this programme, participants in Emilia-Romagna accounted for¹⁴

a total of 146,719 interventions aimed at energy efficiency in the period 2007-2011. In 2010, a record number of 47,317 interventions (in anticipation of the ending of the tax rebates in 2011) was undertaken, with total investment reaching around €552 million (suggesting an average investment of €13,418). Yet in 2011, only 34,803 interventions with a total investment of €402,532,282 were undertaken. This represents a 26.4% drop in the number of interventions and a 27% drop in total investment as the participation in the incentive dipped below the 2008 level. In late 2012, the incentive was extended to 30 June 2013.

Figure 5. Total investment and incentive amount by year



ENEA, the national entity for energy and environment, tracks RES and EE developments and operates the website for application to the 55% tax rebate; the Tax Administration (*Agenzia delle Entrate*) processes the applications and awards the tax rebates.

Among the main benefits of the incentive programme (based on CRESME (2010) estimates for Italy, divided by the ER share of total investment value):

- Stimulus to economy -- ER=11.8% of total investment value
- est. 4979.6 jobs/year
- Energy cost savings €369.8 million
- Fiscal returns €383.5 million
- Increase in rents for improved property €580.58 million
- Support to productive fabric
- Incentive to technological innovation

- Improvement of Energy mix

In terms of tangible benefits during 2007-2011, the initiative has nominally saved a cumulative total of 951 GWh per year of energy (mostly natural gas) and avoided emitting a total of 202.56 kt of CO₂ into the atmosphere.

Figure 6. Energy savings

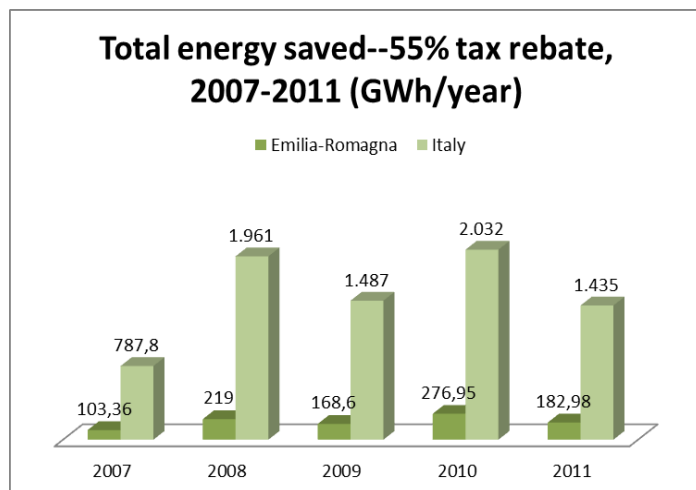
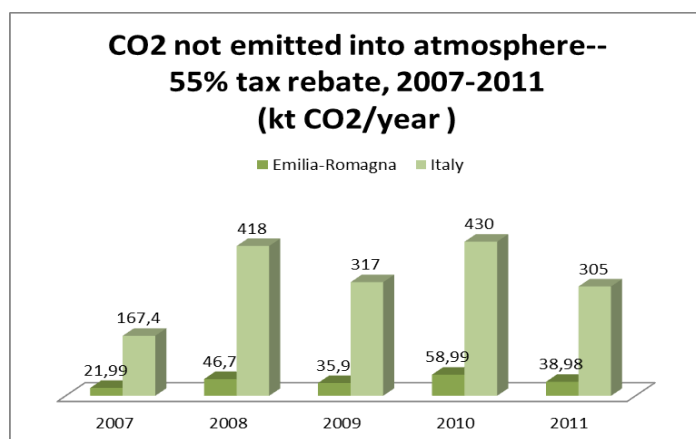


Figure 7. CO₂ avoided



3. Effects of assessed programme on regional SWOT analysis

Essentially the 55% tax rebate can be considered effective both in terms of energy efficiency gained, CO₂ emissions avoided and new/green jobs creation.

The SWOT aspects it addresses can be summed up as following:

- Business opportunities for local companies providing EE products and services
- Opportunity to improve the value and energy performance of residential property
- Chance to realise greener lifestyle and change attitudes toward energy consumption

- sustainable effects of EE interventions in residential sector

Still, the threats faced by 55% tax rebate are:

- Budget cuts set limits to the tax rebate programme from 2013 and there is some confusion regarding the amount of the rebate during the first 6 months of 2013 (55% vs 36%)
- New building renovation regulations do not reward energy-efficient investments
- Economic crisis erodes financial resources of citizens and propensity for investment
- Banks no longer provide small loans for EE to homeowners
- Time required for effects of EE intervention to be felt.

4. Benchmark assessment

Hard benchmarks

Item	2007	2008	2009	2010	2011	2007-2011
Total cost/ investment Region	€ 182.731.836,00	€ 423.994.454,00	€ 278.093.815,00	€ 552.000.000,00	€ 402.532.282	€ 1.839.352.387
N° of approved applications	11.741	27.124	25.734	47.317	34.803	146.719 (some families have made multiple interventions)
Ave. cost of intervention	€ 15.563	€ 15.631,00	€ 10.806,00	€ 11.673,00	€ 11.566,00	€ 13.047,80
Incentive subject (cost to GOV)	€ 100.502.510,00	€ 233.196.949,00	€ 152.952.589,51	€ 303.600.000,00	€ 221.392.755	€ 1.011.644.803
Total Energy saved GWh/year	103,36	219,00	168,60	276,95	182,98	951
CO2 not emitted into atmosphere kt CO2/year	21,99	46,70	35,90	58,99	38,98	202,56
total Cost per 1 MWh/yr	€ 1.767,92	€ 1.936,05	€ 1.649,43	€ 1.993,14	€ 2.199,87	€ 1.934,12 (ave)
total cost per 1 kWh/yr energy saved	€ 1,77	€ 1,94	€ 1,65	€ 1,99	€ 2,20	€ 1,93
Gov't cost per 1 MWh/yr	€ 972,35	€ 1.064,83	€ 907,19	€ 1.096,23	€ 1.209,93	€ 1.063,77
Gov't cost per 1 kWh/yr	€ 0,97	€ 1,06	€ 0,91	€ 1,10	€ 1,21	€ 1,06

total cost per 1kt CO2 saved	€ 8.309.769,71	€ 9.079.110,36	€ 7.746.345,82	€ 9.357.518,22	€ 9.080.531,14	€ 9.080.531,14
Gov't cost per 1 kt CO2 saved	€ 4.570.373,35	€ 4.993.510,69	€ 4.260.517,81	€ 5.146.635,02	€ 4.994.297,01	€ 4.994.297,01
Cost of natural gas (annual average) €/kWh w/out taxes	€ 0,0401	€ 0,0461	€ 0,0430	€ 0,0437	€ 0,0502	€ 0,0446
total cost of energy saved by consumers (assuming fuel mostly used in the region) w/out taxes	€ 4.144.736	€ 10.095.900	€ 7.249.800	€ 12.102.715	€ 9.185.596	€ 42.778.747
total cost per kg CO2 avoided	€ 8,31	€ 9,08	€ 7,75	€ 9,36	€ 10,33	€ 9,08
cost to government per kg CO2 avoided	€ 4,57	€ 4,99	€ 4,26	€ 5,15	€ 5,68	€ 4,99

averages
totals

5. Conclusions

The 55% tax rebate has shown to be one of the most effective incentive schemes for energy efficiency measures in buildings. The main benefits are represented by the:

- Simplified Internet-based application procedure for the tax rebate;
- available to individual citizens;
- Possibility to make small investments (i.e. boilers, windows);
- Based on the cost of the intervention—not on savings obtained, Energy Performance Certificate required only for major measures;
- The requisites for the interventions are more stringent than those required by law;
- Contributed to consolidating the culture of energy efficiency among consumers as well as suppliers;

- Incentivised investments in buildings, systems and RES production.

On the other hand, the most negative aspect of the incentive programme was the fact that every year the Ministry of Finance has been wavering on its decision to renew the incentive, thus creating uncertainty in the market. Another negative aspect is that since many of the interventions were relatively small in scale, not requiring verification or monitoring of actual energy savings, there is no effective way to identify the direct effects of the incentive as opposed to the effects of other behavioural or structural effects (i.e. turning down the heat, wearing warmer clothing indoors, warmer winter, etc.). Further issues are the fact that the incentive return period has a duration of 10 years, high cost of average kWh saved, eliminated cumulativeness with the so-called white certificates (TEE). The on-line application system required inputs relating to the expected energy savings of the intervention—which is not always clear, since suppliers/installers/construction companies do not always provide this information to the consumer.

Programme 2

1 Analysed programme details

Region: Emilia-Romagna

Programme type (range): Provincial

Programme name: Grants by the Province of Modena for solar-thermal systems (covering around 25% of the overall costs)

Budget (in €): € 2,091,288

Timeframe: start 2003, finish 2005

Beneficiaries: citizens and SMEs

Assessment of project data availability: the Province of Modena has monitored all of the programme's results and therefore it was quite easy to develop relevant indicators.

2. Programme description:

Between 2003 and 2005 the Province of Modena operated a call for grants for solar-thermal systems, covering 25% of overall system costs.

3. Effects of assessed programme on regional SWOT analysis

The Province of Modena call addresses two main concerns at the regional level, reported in the regional SWOT analysis:

- Stimulus to the local economy/ Business opportunities for local companies providing EE products and services
- Contribution in the expansion of renewable energy use at the local level.
- Chance to realise greener lifestyle and change attitudes toward energy consumption

4. Benchmark assessment

Hard benchmarks

analysis period	2003-2005
Total investment cost	€ 2.091.288,00
grant/funding (cost to Government)	€ 522.822,00
n° of approved applications	319
share of beneficiaries	
average total cost	€ 6.555,76
average cost to Government	€ 1.638,94
Total Energy saved (GWh/year)	1,84
Total Energy saved (MWh/year)	1.839,66
CO ₂ not emitted into atmosphere (kt/year)	0,44
CO ₂ not emitted into atmosphere (t/year)	436,00
total cost per 1 MWh/year energy saved	€ 1.136,78
total cost per 1 kWh/year energy saved	€ 1,14
Cost to Government per 1 MWh/year energy saved	€ 284,19
Cost to Government per 1 kWh/year energy saved	€ 0,28
total cost per 1kt CO ₂ saved	911.801,57
total cost per 1t CO ₂ saved	€ 911,80
total cost per kg CO ₂ saved	€ 0,91
Cost to Government per 1 kt CO ₂ saved	€ 1.199.133,03
Cost to Government per 1 t CO ₂ saved	€ 1.199,13
Cost to Government per kg CO ₂ avoided	€ 1,20
Cost of natural gas (annual average) in €/kWh (without taxes)	0,0342
total cost of energy saved by consumers (assuming nat. Gas and without taxes)	€ 62.916,46

averages

totals

5. Conclusions

The call launched by the Province of Modena was characterised by several positive features. Among them:

20

- The procedure for obtaining the grants was very simple;
- Grants were disbursed in same year as investment, rather than over a longer period.

On the other hand, aspects that could be improved were recognised as the following:

- There was a higher success rate of grant applications for autonomous (less energy efficient) systems than centralised systems, linked to difficulties in reaching agreement in condominiums.
- Since the call was addressed to citizens and enterprises at the provincial level, expected impacts on energy efficiency/reduced GHG are rather limited compared to regional/national initiatives.

Programme 3

1. Analysed programme details

Region: Emilia-Romagna

Programme type (range): provincial

Programme name: Grants by the Province of Modena for new high-efficiency boilers (covering 25% of the overall costs)

Budget (in €): € 3,769,712

Timeframe: start 2003 , finish 2005

Beneficiaries: citizens and SMEs

Assessment of project data availability: the Province of Modena has monitored all of the programme's results and therefore it was quite easy to develop relevant indicators.

2. Programme description

The Province of Modena in 2003 launched a call for grants for replacing old boilers with new high-efficiency boilers, covering 25% of the overall costs.

3. Effects of assessed programme on regional SWOT analysis

The main strengths of the initiative addressing the regional SWOT analysis are:

- Stimulus to local economy/ business opportunities for local companies providing EE products and services
- Contribution to the reduction of air pollution
- Chance to realise greener lifestyle and change attitudes toward energy consumption

21

4. Benchmark assessment

Hard benchmarks

analysis period	2003-2005
Total investment cost	€ 3.769.712,00
grant/funding (cost to Government)	€ 942.428,00
n° of approved applications	1.388
average total cost	€ 2.715,93
average cost to Government	€ 678,98
Total Energy saved (GWh/year)	2,16
Total Energy saved (MWh/year)	2.160,34
CO ₂ not emitted into atmosphere (kt/year)	0,51
CO ₂ not emitted into atmosphere (t/year)	512,00
total cost per 1 MWh/year energy saved	€ 1.744,96
total cost per 1 kWh/year energy saved	€ 1,74
Cost to Government per 1 MWh/year energy saved	€ 436,24
Cost to Government per 1 kWh/year energy saved	€ 0,44
total cost per 1kt CO ₂ saved	€ 1.930.092,54
total cost per 1t CO ₂ saved	€ 1.930,09
total cost per kg CO ₂ saved	€ 1,93
Cost to Government per 1 kt CO ₂ saved	€ 1.840.679,69
Cost to Government per 1 t CO ₂ saved	€ 1.840,68
Cost to Government per kg CO ₂ avoided	€ 1,84
Cost of natural gas (annual average) in €/kWh (without taxes)	0,0342
total cost of energy saved by consumers (assuming nat. Gas and without taxes)	€ 73.883,54

averages

totals

5. Conclusions

The Provincial Call can be considered a successful incentive programme since it had several positive aspects and met important goals in terms of energy efficiency at the provincial level, such as:

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- Average Intervention cost less than € 3,000, increasing affordability for families
- Grant disbursed in same year as investment, rather than over a longer period
- Higher success rate of grant applications for autonomous boilers than centralized systems, linked to difficulties in coming to agreement in condominiums
- the Province of Modena, through this incentive scheme, promoted the innovative technology of condensing boilers at the local level.

Part III. Programme analysis

In order to compare the programmes analysed within Emilia Romagna with those in the other regional contexts, further calculations have been carried out.

The data from the 55% tax rebate measures applied to investments in solar thermal systems and heating systems (mostly energy-efficient condensing boilers) (data from 2011 only) were first compared with the data from the Provincial grants and then further compared with similar programmes in Saxony and Lower Silesia.

The results were as follows:

item	ER 55% heating (boilers etc) only 2011	ER 55% solar thermal only 2011	ER- PMO heating boilers	ER- PMO solar thermal
n° of approved applications	9.446	3428	1.388	319
share of beneficiaries	0,47%	0,17%	0,46%	0,11%
Total Energy saved (MWh/year)	73.711,18	17.400,86	2.160,34	1.839,66
CO ₂ not emitted into atmosphere (t/year)	15.700,48	3.706,38	512,00	436,00
Cost to Government per 1 MWh/year energy saved	€ 1.061,39	€ 804,40	€ 436,24	€ 284,19
Cost to Government per 1 t CO ₂ saved	€ 4.983,04	€ 3.776,54	€ 1.840,68	€ 1.199,13
total energy saved per beneficiary in MWh/year	7,80	5,08	1,56	5,77

averages

totals

Table 1 – Overview of the analysed funding programmes of Emilia-Romagna

Additionally, in order to objectively assess the regional programmes a weight-ranking score was adopted for each analysed incentive.

The assigned score for each main indicator was given a value ranging from 1 to 4 points: 1 corresponding to the best value, 4 to the worst. Weights (from 1 to 3) also have been assigned to the indicators deemed most relevant (1 for total values, 3 for average values, according to the project's aims).

This way the programme achieving the lowest overall score can be considered as the most effective one.

item	Weight	ER 55% heating (boilers etc) only 2011	POINTS TOTAL		ER 55% solar thermal only 2011	POINTS TOTAL		ER- PMO heating boilers	POINTS TOTAL		ER- PMO solar thermal	POINTS TOTAL	
n° of approved applications	1	9.446	1	1	3428	2	2	1.388	3	3	319	4	4
share of beneficiaries	1	0,47%	1	1	0,17%	3	3	0,46%	2	2	0,11%	4	4
Total Energy saved (MWh/year)	1	73.711,18	1	1	17.400,86	2	2	2.160,34	3	3	1.839,66	4	4
CO ₂ not emitted into atmosphere (t/year)	1	15.700,48	1	1	3.706,38	2	2	512,00	3	3	436,00	4	4
Cost to Government per 1 MWh/year energy saved	3	€ 1.061,39	4	12	€ 804,40	3	9	€ 436,24	2	6	€ 284,19	1	3
Cost to Government per 1 t CO ₂ saved	3	€ 4.983,04	4	12	€ 3.776,54	3	9	€ 1.840,68	2	6	€ 1.199,13	1	3
total energy saved per beneficiary in MWh/year	3	7,80	1	3	5,08	3	9	1,56	4	12	5,77	2,00	6
TOTAL				31			36			35			28

Table 2 – Assessment of the analysed funding programmes of Emilia-Romagna

Results of this comparison assessment are rather unexpected. Despite the low number of interventions implemented through the Provincial Call for solar thermal systems, it definitely represents the most cost and energy-effective incentive programme analysed at the regional level. For the same types of interventions using the 55% tax rebate scheme, although leading to almost identical energy saving values, results in costs for the Central Government that are three times higher than those for the incentive promoted at the local level, thus positioning the 55% tax rebate as the least cost-effective incentive scheme for solar thermal systems.

In contrast, for heating systems (energy-efficient boilers), the 55% tax rebate shows better results compared to the Provincial Call, especially in relation to the total energy saved through the implemented measures.

Part IV. General conclusions

By early May 2013, the directions of the energy policy of the new Italian Government were not yet clear (a Government was only formed at the end of April), so it will remain to be seen if there are any important changes introduced. The current incentives coincide with the priorities underlined in various strategy documents aimed at the national or regional/local level including:

- the National Energy Strategy of 2012
- the Regional Operational Energy Plan 2011-2013
- the Provincial Energy Programme Plan of Modena

Meetings with regional and provincial representatives will be held even after the GRACE project is completed in order to ensure that all relevant stakeholders are informed and can take the GRACE recommendations into account in their policies.

The analysed funding programmes within the EnercitEE project contributed to an energy saving of nearly 100 GWh per year for Emilia-Romagna and a CO₂ avoidance of around 20 kt per year.

Part V. Summary of findings

Though the number of measures undertaken within the framework of the 55% tax rebate incentive programme was quite extensive, so that a direct comparison with the grant schemes implemented by the Province of Modena becomes difficult (we have made a comparison for the interventions regarding solar thermal and energy-efficient boilers), some positive aspects of the provincial initiatives deserve to be pointed out:

- in terms of cost-benefit indicators, in one case they appear to be more cost effective and in the other to be comparable to results of the huge national 55% tax rebate programme.
- the cost to the public body supporting the energy efficiency/renewable measures was very limited, thus suggesting that, theoretically, any local authority could promote such an incentive in its territory.
- The generated impacts – in terms of energy, CO₂ emissions and cost savings - of such small initiatives are, however, not irrelevant. For example, the indicator expressing the *total energy saved per beneficiary through the incentive* in terms of solar thermal systems was higher (even if not substantially so) than that for the 55% tax rebate applied to solar thermal investments, for which far greater financial resources were made available. This result could therefore be considered as significant, and such a model could be promoted to stimulate other local authorities to follow the lead of Modena in this field.
- Despite the high costs, the 55% tax rebate incentive promoted by the Italian central Government has proved to be quite effective, especially in relation to specific typologies of intervention (i.e. heating systems) both in terms of overall number of interventions and in relation to energy efficiency impacts.

Part VI. Lessons learned

In comparison, the Saxony region has been among the leading regions in Germany in pursuing ambitious environmental policies to achieve its main goal of becoming a low carbon region.

While the incentive for heating boilers appears to be the most cost-effective, the amount of energy

saved through the Passive House schemes is impressive: it is interesting to see how a very limited number of interventions in Passive Houses (125 applications) generated a very large amount of energy savings.

The replacement of old and inefficient heating boilers has been encouraged and supported throughout the German region, while in Emilia-Romagna the incentive was limited to (some) provinces, thus allowing Saxony to achieve quite important energy savings (and CO₂ reductions) results in a shorter timeframe. It is important to remember that the Province of Modena incentives went into effect prior to the 55% incentive (which also covers boilers and solar thermal) in addition to other incentives. The 55% tax rebate was a very comprehensive programme covering different types of incentives—thus precluding much effort on the part of regional and local authorities.

Also thanks to the interregional comparison, an initial general recommendation to Public Authorities about incentives for energy efficiency could be to focus on systems that are widely diffused, for which the saving potential is high and which are targeted to a large share of the population (it is not a coincidence that in both of the analysed regions the most effective incentives concerned heating boilers and solar-thermal systems).

Part VII. Policy Recommendations

First of all, it is important to remember that the Province of Modena incentives were in effect in 2003-2005 prior to the introduction of the 55% incentive (which also covers boilers and solar thermal) in addition to other types of investments. The 55% tax rebate is a very comprehensive programme—thus, regional and local authorities would have seen less need to introduce similar measures aimed at citizens. However, this incentive will end shortly and there is this a great need to increase energy-efficiency in the Region's residential sector and within community services.

Recommendations concerning 55% tax rebate

- 1) clearer and more consistent parameters and conditions from year to year would have been helpful: changes in government policy each year created confusion/uncertainty in the market ;
- 2) online application form was easy to compile--except where the expected energy saving was requested. A table for estimated energy / CO₂ savings for X capacity boiler (or other intervention) in residence with Y m² floor area would be helpful within the application form, rather than requiring an applicant to search for this information.
- 3) companies engaging in interventions should be able to provide more support to citizens in understanding how much energy /CO₂ can be saved with their particular product under X conditions.

4) uncertainty about 55% tax rebate was the main reason for companies not to apply for: enterprises need to have fixed and sure rules to deal with in order to make significant investments.

Recommendations concerning Grants by the Province of Modena for high energy efficiency boilers and for solar thermal systems

- 1) The Region could encourage (while providing more resources) other Provinces or Municipalities to engage in similar initiatives by providing clear information on the functioning of the incentive and the effects on energy/CO₂ savings;
- 2) greater linkage to energy/climate objectives of the Region and create linkage to "white certificates" of the local gas companies.

In general terms:

- 1) Increased information for citizens and support from companies engaging in interventions is needed;
- 2) There is a need for more accessible/detailed energy data at the regional level in order to be able to monitor and evaluate the effects of EE interventions. The last Energy Balance of the Emilia-Romagna Region is from 2008!
- 3) More accessible energy data are required even at the provincial basis (at least for total gas consumption--ISTAT provides data on per capita gas and electricity consumption in provincial capitals) and updated at least up to 2011.
- 4) For the Province of Modena grants, it was quite easy to obtain final relevant indicators, but in general – throughout the region - there is a need for a change in the tracking procedures for the applications presented to Local Authorities relevant to energy-efficiency interventions in order to develop a standardised database, reflecting the parameters that are most useful in assessing the effectiveness of the measures. Essential parameters are:
 - specific technology or building process;
 - investment amount;
 - energy/environmental benefits (KWh or toe of energy saved and CO₂ avoided);
 - phase reached by the application in the construction or renovation implementation
 - effective dates.
- 5) There is furthermore a concern related to the energy-savings potential gained by tenants. While it may be the case that a building owner is not sufficiently interested in building refurbishment, a tenant may be very motivated to save on energy costs. This situation may affect not only a residential tenant of an apartment, but also the manager of a commercial business, especially if the refurbishment could result in a reduction of the tax²⁸

burden and lower energy expenditures. Therefore initiatives should be developed and promoted also by extending current measures to provide benefits to tenants.

- 6) Currently in Italy there are other incentives for building refurbishment which do not provide any encouragement or requirement for increased energy efficiency (i.e. 50% tax rebate on any kind of retrofitting intervention—regardless of whether the intervention improves energy performance of the building). These tend to have a negative effect because they do not reinforce the critical principle that only interventions aimed at achieving better energy performance deserve public support. Decision-makers should therefore attempt to modify/improve this dangerous (particularly from a cultural perspective) incentive.
- 7) Last, but not least, incentive schemes implemented with the involvement of key actors (target groups to whom the incentive is addressed, installers, banks, etc) proved to be more effective and therefore – when planning to launch a new incentive or adapting an existing one - a participatory process should be always undertaken.

Finally, GRACE was mainly focussed on incentives concerning the residential sector, but it would be highly instructive to study the energy-efficiency measure experiences of another target group--enterprises (i.e. in Emilia Romagna, only 6% of the 55% tax rebate applications were submitted by enterprises)—in order to better understand how public resources/incentives could be better allocated to favour a more complete and therefore more comprehensive effort aimed at making the region more energy efficient in all of its buildings, including commercial buildings used as offices.

With regard to businesses:

- 1) Bureaucracy is a major hurdle for businesses which wish to make energy efficiency investments: authorities should try to simplify (and make consistent) rules and permissions.
- 2) Businesses should be increasingly engaged in energy efficiency processes also through stricter legislation (i.e. Green Procurement rules they should comply with)
- 3) Improvement of training for professionals in the sector (installers and designers often tend not to promote innovation, preferring to use “safer” but old technologies)
- 4) Promotion of a better dialogue between businesses and banks in order to make energy efficiency projects more bankable and facilitate easier access to funds from SMEs.

Appendix: other existing programmes in Emilia Romagna

➤ Urban Premiums survey

Within the framework of the GRACE project a survey on a sample of regional municipalities was carried out. In particular, it aimed at analysing certain types of incentive measures. These measures seek to improve building energy performance beyond the minimum requirements foreseen by regional building regulations, as well as to promote other types of interventions linked to environmental sustainability (use of eco-friendly materials, rainwater recycling, green roofs, etc...). Such measures are currently being implemented by several environmentally conscious municipalities in the Emilia-Romagna Region.

The principle behind the incentives is to encourage the construction industry to derive benefits not from tax rebates or building permit fee reductions, but by easing the conditions regarding the permitted volume (size) of the buildings. This type of incentive, defined as a "volumetric" incentive, may also include other related measures, like gaining a higher priority in the granting of building permits, a reduction in the technical obligations required in the building permit, higher ranking within calls for tender, etc...).

Twenty municipalities were involved in the field study, but only seven participated in detailed interviews. The topics covered in the interviews were:

- Energy and environmental benefits;
- Innovative measures;
- Problems encountered by planners;
- Problems encountered by Municipal officers;
- Assessment of incentive effectiveness;
- Recommendations for the future.

Volumetric incentives in Emilia-Romagna could represent a learning case. The Emilia Romagna municipalities do not regularly collect relevant data or monitor the results of such initiatives/incentives. Thus significant improvements in understanding the impact of such practices could be achieved, including at the regional institutional level, by providing Local Authorities with access to easy to use tools for data collection and monitoring. The collection of reliable, consistent and comparable energy data is crucial to understanding the real impacts of the incentive systems implemented.

At present, the construction market is deeply affected by the financial and economic crisis, and the market itself has undergone a natural selection, rewarding only those new buildings constructed with high energy performance technologies and materials. The volumetric incentive is therefore not so effective for new construction. Thus, the conclusion of most interviewees was that the real benefits of the "volumetric" incentive are more evident in the existing building stock, requiring a more careful focus on the renovation market.

An additional element which may discourage building owners from applying for volumetric

incentives is that the timing for investment recovery of 10 – 15 years is considered too long to be worth it. Such long payback periods are generally only acceptable to banks or public bodies.

It is worth noting the innovative case of the Municipality of Rimini, where the bio-building regulation foresees three types of incentives:

- economic: mostly through the national tax credit or the reduction of up to 50% of the secondary⁵ urbanisation fees, proportional to the investment made;
- construction: recovery of useful surfaces (through extension of external walls, proportional to the refurbishment made) and an additional allowance for built volume;
- quality certification: sustainable building certification in order to provide a guarantee to the purchaser on the quality of the purchase.

Finally, it is recommended that municipalities should continue to encourage the implementation of “volumetric” incentive measures, because they deliver good results with respect to building renovation and raise the awareness of building owners, construction companies, planners, and citizens regarding building sustainability.

➤ White Certificates

The so-called “White Certificates” (*Titoli di Efficienza Energetica, TEE*) represent increases in energy efficiency that have to be achieved by final distributors of natural gas and electricity. The “white certificates” were introduced at the national level in order to promote interventions aimed at efficiency in final consumption of energy. The mechanism is based on the obligations of power and natural gas distributors to reach annual energy savings objectives set by the Ministerial Decree 20 July 2004 and Ministerial Decree 21 December 2007. Italy was the first country to use this mechanism. Each TEE emitted represents one tonne of oil equivalent (TOE) saved for each year of duration over the useful life of the intervention. The TEEs can also be commercially traded.

The energy savings objectives are expressed in terms of tonnes of oil equivalent (TOE)--each TEE certifies the implementation of savings of primary energy equivalent to one TOE, or approximately 5.3 MWh of electricity and circa 1,200 Nm³ of natural gas. Thus, any interventions by final consumers that save energy can earn rights to white certificates, which are issued by the Energy Markets Manager on the basis of communication from the AEEG certifying the savings implemented. The subjects authorised to request White Certificates are the distributors of electricity and gas with more than 50,000 final customers, subjects with energy managers under ex Law 10/91 (industrial consumers that consume more than 10,000 toe/year and service sector and public administrations registering more than 1,000 toe/year of consumption) and Energy Service Companies (ESCOs). There are three different methods to evaluate the savings

⁵ Secondary urbanisation fees are deemed to cover the investment costs in schools, sport facilities, parks,^{3.1}

implemented through energy efficiency interventions: 1) **standardised**; 2) **analytical**; and 3) *consumptive*.

The most recent report issued by the Agency for Electric Energy and Gas (AEEG) (25 October 2012), shows that in Emilia-Romagna some 940,065 TEE have been issued since the beginning of the national programme. More than half (491,339 TEE) involved substitution with compact fluorescent light bulbs (more than 5.7 million), while 191,083 TEE (3.3 million faucet spigots) were due to substitution of low-flow faucet spigots. While this mechanism is frequently cited as a successful practice, the cost of the initiative to the energy company and the beneficiaries (citizens, businesses, public or social structures) is not reported, nor is it clear how much energy is really being saved, since the TEE represent theoretical carbon and energy savings based on the upfront "intervention".

➤ Related incentive: ENEL reimbursement for energy-efficiency interventions white certificates (nationwide)

In 2012 the electricity company ENEL launched an incentive programme which would allow the power company to earn white certificates associated with the energy-efficiency investments made by end customers during a brief period from **25 September until 31 December 2012**. The white certificates associated with the initiative are recognised by the AEEG for the eligible subjects for a period that varies, depending on the specific intervention, from 5 to 8 years. The sectors that are eligible are indicated for each of the technical tables provided by AEEG, in particular:

- Domestic --individual family boilers, heat pumps, double glazing, insulation ;
- Residential --solar thermal collectors;
- Tertiary (only offices, retail, education, hospitals) for double glazing, insulation;
- Tertiary in general --*solar collectors*;
- Industrial -- *Inverters on motors*.

The beneficiaries of the initiative are private citizens, individual companies and associated professionals, commercial and retail firms, non-commercial entities, non-profit associations and condominiums that are fiscally resident in Italy according to the laws in effect. It is also possible for those with the right of residence or use of the property that is subject to the intervention (i.e. renters, others who have the right of use) to adhere to the initiative. However, the holder of the right must also be the signatory of the documentation provided.

Autonomous interventions that can benefit from ENEL's contributions are:

- Substitution of single glass * (*only substitution of existing*)
- Insulation of walls and roofs (*only substitution of existing*)
- Solar thermal Collectors (*substitution of existing and/or new installation*)
- Individual family boilers (*substitution of existing and/or new installation*)
- Heat pumps (*substitution of existing and/or new installation*)

- Inverter in pumping systems (*substitution of existing and/or new installation*)

* the incentive is foreseen for double glazing, but it is also possible to make a request referring to installation of windows comprising double glazing.

In order to benefit from the incentive, the date of completion must be prior to the deadline of the initiative and not more than 120 calendar days prior to the date of completion of the on line application on the Portal. For example, if the date of completion of the on line application on the dedicated internet site is 31 December 2012, the date for the completion of work has to be after 02 September 2012.

In order for a power distributor to submit a request to the AEEG for certification and emission of relevant white certificates, it is necessary to reach a minimum dimension that varies according to the method of evaluation utilised. For the interventions foreseen in this particular initiative, the required minimum for ENEL is equal to 20 toe, achievable by aggregating interventions realised by different subjects within the framework of the same initiative. The interventions covered by the ENEL initiative are analysed according to the **standardised method**, applying relevant technical tables provided by AEEG that allow a quantification of the savings obtained without necessity for accurate measurements, based on a series of variable parameters for each intervention.

Applicants were required to send their specific requests to Enel Distribuzione's dedicated Internet site, providing registry data and technical information related to the energy-efficiency intervention realised, as well as the documentation regarding the quantification of the primary energy savings. There was a time limit of 120 days from the date of the completion of the work on one (or more) of the interventions in order to participate. In order to participate, it is necessary to provide scanned copies of:

- The invoice for installation;
- The technical documentation related to each initiative;
- Copy of a valid identity card.

The value of the incentive (contribution) varies and depends on the location of the building that is subject to the intervention and some technical parameters. For each intervention there is a range (min-max) of the contribution per physical unit of reference –the total budget for the ENEL incentive is **€9 million**, allocated in the following manner:

- **Solar Collectors** [€31.12--€158.35 per m2 of surface area of collectors installed] (up to €3 million total)
- **Double glazing** [€2.43 -- €31.59 per m2 of glass substituted] (up to €2 million total)
- **Heat pumps** [€11.76 -- €212.98 for each residential unit in which the intervention is realised] (up to €1 million total)
- **Insulation of walls and roofs** [€0.36 -- €16.40 per each m2 of surface covered] (up to €1 million total)

- **High-efficiency Boiler (4 stelle)** [€ 9.68 - € 80.90 for each residential unit in which the intervention is realised] (up to €1 million total)
- **Inverter** [€ 17.02 - € 220.79 for each kW of installed electrical power (referring to the pumps)] (up to €1 million total)

The mechanism of the white certificates is **100% cumulative** with the provisions related to the 55% tax rebates foreseen by the budget laws of 2007, 2008, 2010, 2012. Those who have already received an incentive through the tax rebate related to the same intervention may adhere to the offer as long as the indications reflected in the rules are respected.

➤ Conto Termico

At the end of December 2012, the Italian Government introduced the Conto Termico, which provides €900 million for energy efficiency and renewable energy investments: €200 million for public sector buildings and €700 million for citizens and businesses which will generally cover 40% of investment costs and be disbursed over two years (five years for larger interventions). Officially launched in January 2013, it covers biomass heating systems, heat pumps, solar thermal and solar cooling interventions as well as small-scale energy requalification of public buildings. Some of the intervention targets are the same as those covered by the 55% tax rebate. The new measure is coherent with Italy's new National Energy Strategy (2012) and will contribute to 2020 Climate and Energy objectives. The availability of the incentive is limited by budget.

➤ "50 TOE" regional call

Launched in in early 2013, this regional call provides €6.6 million for energy efficiency/ renewables measures in 24 local authorities. These grants are aimed at mobilising €34 million worth of investment in the public sector, which has been severely affected in recent years by the so-called "Stability Covenant" and strict rules regarding further public debt.

The response to the call was very high: 128 project proposals were presented, showing deep interest of the region's Local Authorities in energy efficiency policies/actions. The grant measures apply to:

- High energy-efficiency CHP systems (overall power: 1.7 MWe and 1.4 MWt)
- PV systems (5 MWp)
- Renewal of the public lighting systems (10,500 lighting points)
- New high energy efficiency heating systems (1.5 MWt)
- Mini-hydro systems (500 kWe)
- Heat pumps (500 kWe)

The annual energy savings related to the measures to be implemented is estimated at 7000 TOE.

➤ Low interest rate loans for energy-efficiency projects (regional fund)

Funded through EU sources, this initiative will support the implementation of energy-efficiency measures and renewable energy systems by SMEs. Applications to the regional fund can be submitted as of March 2013 once resources are available. The fund was approved by the Emilia-Romagna Region and is based on an initial fund of €24 million to be managed by Unifidi-Fidindustria.

The fund is aimed at providing low-interest loans with a maximum duration of 4 years, with the amount ranging from €75,000 up to €300,000 per project. The regional fund is constituted 40% by public resources, while 60% will be covered by private bank resources. Loans are subject to the current TAEG rate of 3.25%. For more details, <http://www.fondoenergia.eu> (in Italian).

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