

SOLAR THERMAL IN ITALY

Italy is among the countries which have declared ambitious targets for the solar heating and cooling sector in its National Renewable Energy Action Plan. To achieve the main aims, administration has taken a first step through proper implementation the Law Number 28.

The law includes several important items with regard to the solar thermal sector:

- Article 8 simplifies the approval of solar thermal systems. It allows home owners who want to buy a solar thermal system to start with the installation after sending a simple “advance notification” to the municipality administration. This regulation applies to all collector fields that are integrated into the building with the same inclination or orientation as the roof or façade.
- Article 11 specifies new regulations for the national renewable obligation, which has so far stipulated that new or refurbished residential buildings are to include a renewable heating installation that meets at least 50 % of the hot water demand. New law 28 also shifts requirements from a “domestic hot water only approach” to one meeting the entire heating needs of a building: From 1 January 2012 onwards, new and refurbished buildings must cover both 50 % of their hot water demand as well as 20 % of their heating demand by renewable sources, presenting a new challenge to the solar thermal sector.
- Article 28 appears to be the most important one of all, as it provides the basis for a feed-in tariff incentive scheme for small renewable heating systems.
- Law 28 also stipulates a new requirement in order to receive the incentives: From 2013 solar collectors must be Solar Keymark certificated.

GOVERNMENT APPROVES NEW SUBSIDY SCHEME

The decree introducing the new incentive mechanism for renewable heating systems and energy-efficient measures in Italy was published in the Official Gazette at 2 January 2013. The decree introduces a subsidy scheme for renewable heating technologies pursuant to Article 28 of Legislative Decree 28/11, which requires the implementation of a feed-in tariff. Systems installed after 2 January 2013 are eligible for the incentive scheme.

The total budget is EUR 900 million, of which EUR 200 million should be spent on public applications and EUR 700 million on private constructions by companies and individuals. Among the technologies eligible for this new scheme are also solar heating and cooling systems for hot water or space heating. Other technologies include heat pumps or biomass boilers. In public buildings, the programme will also subsidise thermal insulation, condensing boilers or shading systems.

The new subsidy is officially named “Mechanism of Renewable Heating Systems and Energy Efficient Measures (small size)” but the sector players have named it “Conto Energia Termico”, which basically means “Feed-in Tariff”. Still, it is important to emphasise the fact that - at the moment - the subsidy scheme is not a real feed-in-tariff. During the one-year consultation process, the parties involved could not really agree on how to measure the solar yield. Instead, the now starting grant scheme will subsidise per square metre of collector area.

The particularity of the subsidy is its payment system, according to which subsidies are paid over two years for systems with a collector area below 50 m² and over five years for systems with a collector area above 50 m². Small hot water or space heating systems (below 50 m²) will receive 170 €/m²/year for 2 years. When combined with a solar cooling system, the square metre grant will be 255 €/m²/year for 2 years.

Larger systems above 50 m² will receive an annual 55 €/m² over 5 years. When combined with a solar cooling system, the area-specific amount will increase to an annual 83 €/m² over 5 years.

Plants above 1000 m² do not fall into the scope of this law. The buyer of the solar thermal system – private, commercial or public – submits the application to Management of Energy Services (GSE).

INCENTIVE LEVEL FOR DIFFERENT PLANT SIZES AND CATEGORIES.

	Incentive (€/m ² year) for plants with gross surface <50 m ²	Incentive (€/m ² year) for plants with gross surface >50 m ²
Conventional solar thermal	170	55
Solar cooling	255	83
Concentrating solar thermal	221	72
Concentrating solar cooling	306	100

Source:

<http://www.solar-district-heating.eu/it/NewsEventi/NewsArticoli/tabid/1014/ArticleId/270>

The annual cap is 700 M€ for private developers and 200 M€ for public authorities. Once this cap is reached, the competent Ministries should revise and possibly update the scheme. A revision of the grant scheme is planned after two years into the programme. During this transition period, the ministries and GSE will work together to draft new rules and implement a real feed-in tariff. The key issues here are to develop guidelines for heat metering and to incorporate them into the decree during revision.

The incentives apply only to existing buildings. Applying the “renewable obligation” to new buildings would make a solar heating system eligible for incentives only above the size necessary to meet the obligation. The grants are exclusively allocated to projects which do not have access to other state incentives. They can be combined with nothing else than guarantee funds, revolving funds or interest subsidies.

55 % TAX DEDUCTIONS UNTIL 30 JUNE 2013

According to the latest amendments to Italy's tax deduction policies "Decree on Growth", the 55 % tax deductions, originally to expire on 31 December 2012, will now stay unchanged until 30 June 2013. In the "Decree on Growth", the 55 % of the investment can be only be recovered within a 10-year period. Maximum deductible expenses are still at EUR 60,000.

It is interesting to note that although the government has not done enough to make the 55% tax deductions more effective, the results (see <http://www.solarthermalworld.org/content/italy-solar-energy-cheapest-energy-saving-measure-tax-deduction-scheme>) seem to suggest that important energy efficiency targets have indeed been achieved and that citizens, especially in northern Italy, have been successfully persuaded of the programme's usefulness and convenience.

EFFECT OF THE 55 % TAX DEDUCTIONS FROM 2010

According to a recent study published by ENEA, it is clear that mainly because of better supportive legislative framework, more conducive environment for solar thermal technology and share of families with tax payments higher, solar thermal customers, in Italy, especially, in northern Italy, who used the 55 % regulation, is quite high.

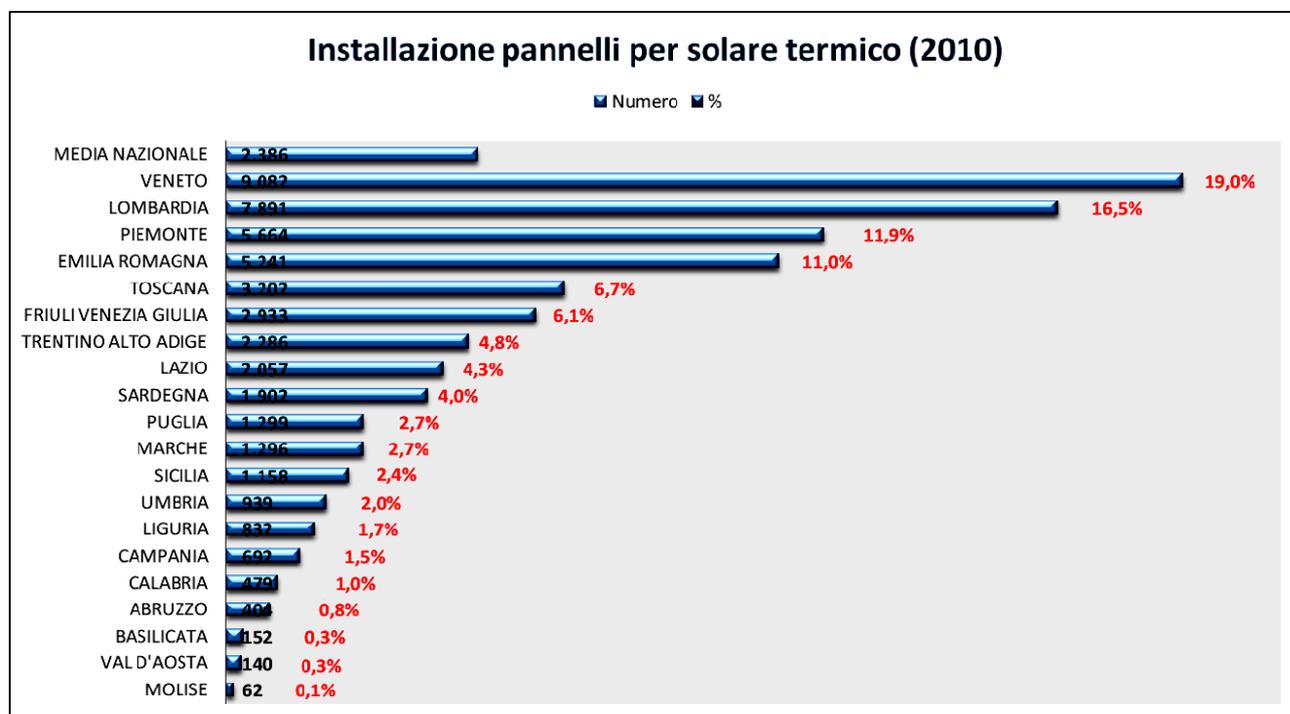
The following table summarises other interesting information from the most recent study called "55% tax deduction for the retrofitting of existing buildings" (55% tax deduction for energy retrofit of existing buildings). Here, it is worth to note that until June 2013, there will be two kinds of tax deductions in the private housing sector. The first is at 50% and relates to building renovations in general. The second, a 55% deduction, is for energy efficiency measures in existing buildings. It will be lowered to 50% next year.

Effect of the 55 % tax deduction on solar water heating systems

Year	Number of solar thermal applications	Energy savings (GWh/Year)	Total investment (EUR)	Deducted 55% (EUR)
2007	20,140	93	139 million	77 million
2008	37,100	288	258 million	142 million
2009	35,300	245	248 million	136 million
<u>2010</u>	<u>47,300</u>	<u>254</u>	<u>353 million</u>	<u>194 million</u>

Source: <http://efficienzaenergetica.acs.enea.it/opuscoli.htm>

According to these annual studies, the total investment in solar thermal systems under the tax deduction scheme more than tripled between 2007 and 2010, reaching EUR 194 million in 2010. Solar thermal made up 12% of all tax deduction applications. The most popular energy-saving measure was to replace a building's windows. Analysing the data published, it was observed that nearly 263,000 m² (54%) of collector area was installed under the tax deduction scheme, in 2010.



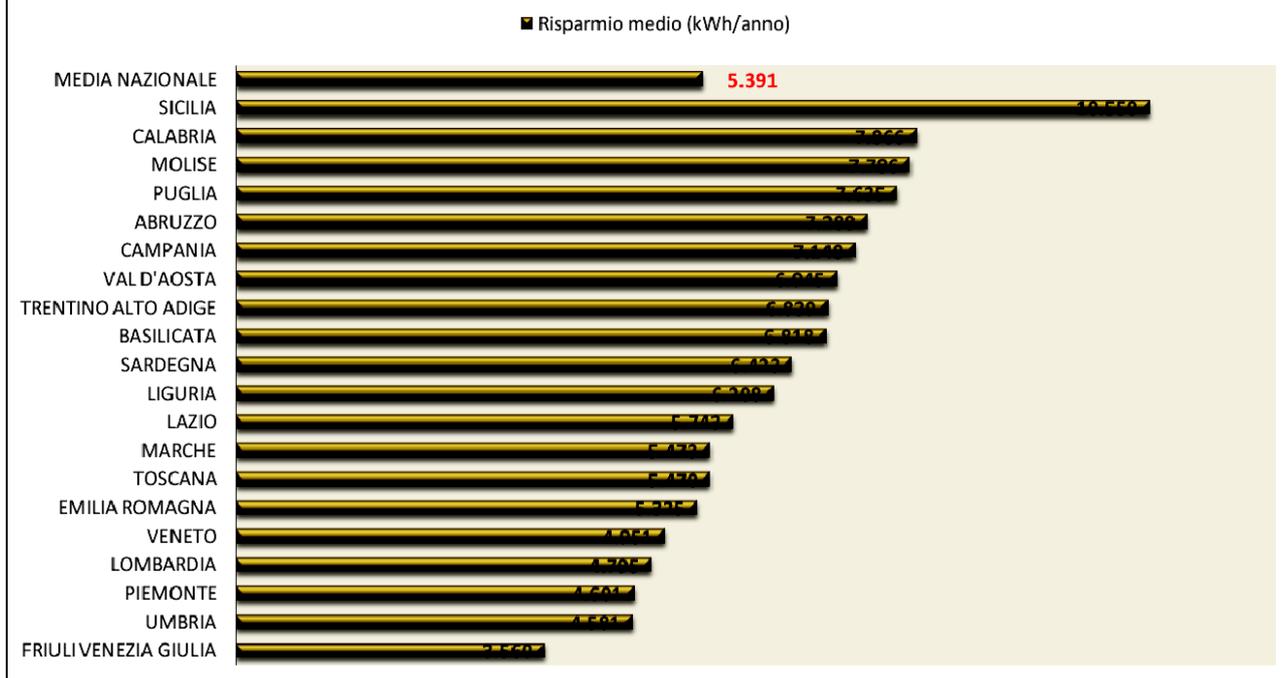
Source: <http://efficienzaenergetica.acs.enea.it/opuscoli.htm>

Both absolute numbers and the number of tax deduction grants per 1,000 inhabitants point to greater usage of the incentive in the north. The regions which had the highest absolute numbers also had the highest numbers for the different types of tax deduction requests, including solar thermal. But if the square meters per 1,000 inhabitants are taken into account, the three regions which have benefited the most from the mechanism were Friuli Venezia Giulia, Trentino-Alto Adige and Veneto: three northern regions, in which the culture of solar heating is more pronounced than in other areas of Italy.

Between 2007 and 2010, the number of applications increased by 135%. At first glance, it is an interesting increase, which, however, is not as strong as the overall growth of other energy-saving measures within the programme. Programme's beneficiaries have, in fact, mostly chosen simpler and less expensive measures over the last years. For example, replacing a building's windows grew to almost five times its original value between 2007 and 2010.

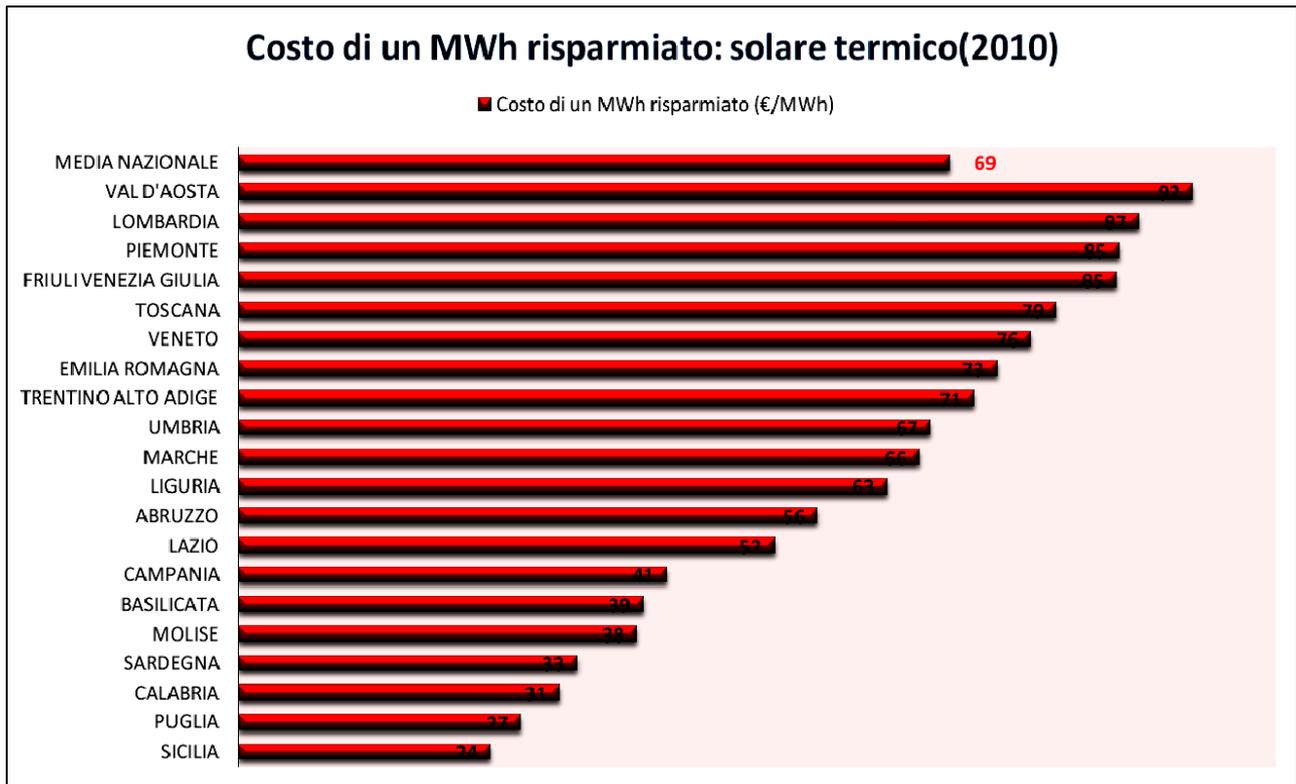
Average investment costs in 2010 were EUR 7,394, with savings of about 5 MWh/year. The authors calculated the average specific price of a solar thermal system with a flat plate collector to be 1,300 EUR/m² and a system with a vacuum tube collector was sold at 1,400 EUR/m², keeping in mind that flat plate collectors were the preferred technology in the market (76%).

Risparmio dichiarato per intervento: solare termico



Source: <http://efficienzaenergetica.acs.enea.it/opuscoli.htm>

The total investment in solar thermal systems under the tax deduction scheme more than tripled between 2007 and 2010, reaching EUR 194 million in 2010. As shown in the figure on the next page, *The average cost of saving 1 MWh by a solar water heater was at EUR 69 which was 2010 the best cost-benefit ratio in terms of fossil fuel savings.*



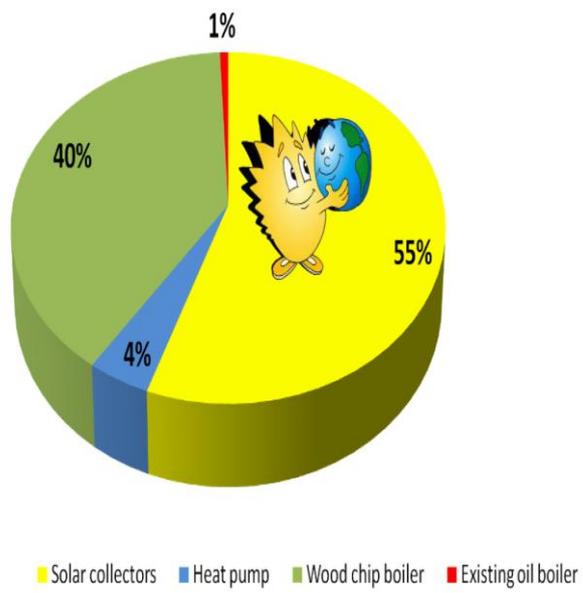
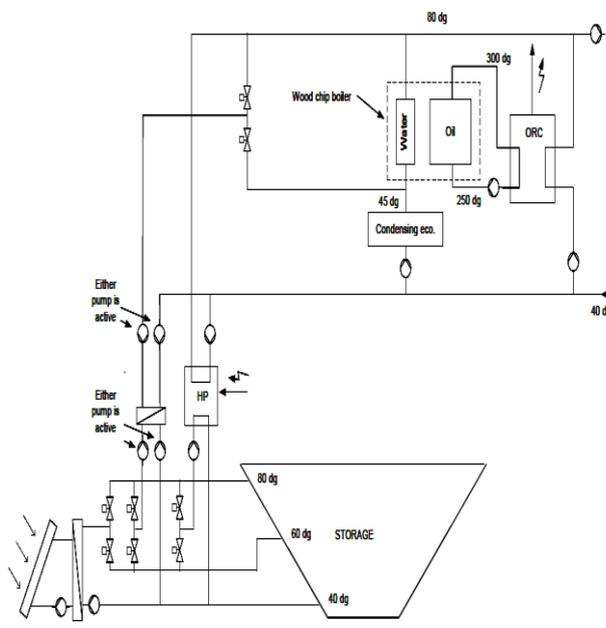
Source: <http://efficienzaenergetica.acs.enea.it/opuscoli.htm>

DISTRICT HEATING USING RENEWABLE ENERGY

District heating using renewable energy that so far was considered to be an "exotic" solution applied in few advanced system and potential of which was known to a small circle of professional, is now gaining great interest, in Italy. Moreover, the recently approved new incentive mechanism allowing solar space heating/ cooling, water heating and heat pumps, to participate in the program and thus making eligible the large solar thermal plants to receive an incentive of 55 €/m² per year, over a period of 5 years, certainly appears to be a good opportunity for solar district heating. Regarding the potential application to solar district heating, a calculation example will clarify the relevance: a 1000 m² solar plant, with a specific turn-key cost of 500 €/m², would receive, in a period of 5 years 275 000 €, which is more than 50% of the investment cost.

Also, it is worth to note that “Sunstore4” FP7 Project, is in line with the government efforts to achieve 100% renewable district heating. The overall objectives of the project are to demonstrate a “SUNSTORE 4” energy concept of a large scale innovative cost efficient, and technical reliable 100% renewable energy supply system for a (Marstal, DK) large scale (district) heating system with yearly heating production of 28,000 MWh - based on 55% solar energy and 45% biomass energy (willow wood chips from energy crops) including a CO₂ heat pump and electricity production from biomass energy through an Organic Rankine Cycle (ORC) unit.

The plant comprise: 15,000 m² solar system, CHP system with a low emission 4.0 MW wood chip thermal oil boiler and a 750 kWel ORC, 75,000 m³ pit heat storage, 1.5 MW (thermal) heat pump with CO₂ as refrigerant - supplementing the existing demonstration plant (SUNSTORE 2) including 18,300 m² solar thermal and 10,340 m³ pilot pit heat storage. In brief, it can be stated that 100% renewable DH is possible with not too high generation cost, using advanced generation plants and strong synergy between solar and other renewable.



Source: <http://www.sunstore.dk/SUNSTORE%20.html>

SOLAR THERMAL ACTIVITIES AT ENEA RESEARCH CENTRE TRISAIA (ITALY)

ENEA Research Centre Trisaia hosts a plant for the qualification of solar collectors and systems. The solar test laboratory is accredited to perform tests in compliance with the EU and International test regulations both for solar collector (EN 12975-2, and ISO 9806), and for solar systems generating sanitary hot water (EN 12976-2, and ISO 9459-2).

Specifically, research is centred on the following activities:

- Analysis and energy optimization of low and medium temperature solar systems;
- Development of thermo-fluid-dynamic and optical models for the energy analysis of solar collectors for medium temperature applications; technical and economic evaluation and optimization of solar-cooling plants components;
- Energetic characterization of CPCs for medium-temperature applications by using test facilities able to thermally analyze such components at an operating temperature of up to 300 °C.