

WP 4: THE REGIONAL STATE OF THE ART IN LAZIO REGION



WP leader: FUNDITEC

JULY 2013 3rd version

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Introduction

The present analysis focuses on how the Region of Lazio addresses the ongoing and emerging challenges related to the promotion of solar energy. Such challenges cannot be detached from those faced at national level and by Europe as a whole, namely: mitigate the dependency on imports, promote diversification, stabilize prices, meet the growing energy demand, address climate change threats, improve energy efficiency, establish easier and more transparent administrative procedures, facilitate markets integration and interconnection, etc.

Specific policy and legal tools, taken into consideration in the present paper, establish the framework through which the aforementioned challenges are addressed: i) at national level, the “National Energy Strategy” built on the EU Directive 2009/28/EC on the promotion of the use of energy from renewable sources; ii) at regional level, the 2009 Regional energy plan and related work plan which, among other issues, aims to increase the production of energy from renewable sources as a means for economic development and job creation.

Thanks to its good solar radiation and the incentives to the sector over the last six years, the Region of Lazio experienced a boom of solar energy, especially photovoltaic. Due to the uncertainty whether or not the financial support will continue in the future, such development is now slowing down, something that stabilizes the market. Having said this, no doubt that the production of energy from renewable sources remains a high strategic issue; as a matter of fact, during the elaboration of the present analysis, the Region of Lazio allocated 75 million of EURO to small and medium enterprises and local administrations for energy saving and production of energy from renewable sources.

1. A regional Solar Policies overview in Lazio (Italy): preliminary state of the art and needs identification for the SHAAMS POLICY ACCELERATOR

The “National Energy Strategy” – It is the result of an extensive process of public consultation, which was launched in mid-October 2012. After the approval of the Council of Ministers, the document was validated by all relevant institutions (Parliament, Energy Authority and Antitrust, Joint Conference, CNEL, the European Commission) and more than 100 trade associations, social partners and trade unions, environmental groups and consumer organizations, research bodies and think tanks. Were also received over 800 suggestions and contributions from individual citizens and businesses through the public consultation that took place on-line on the website of the Ministry of Economic Development. As a result of this process, many contributions have been included, among which i) greater explanation of the strategies of long-term (up to 2050), in line with the roadmap to decarbonize the EU, and the basic choices for R&D ii) quantification of the economic costs and benefits of the strategy for the system, in particular for the electricity iii) more precise description of the measures for the so-called grid parity renewable electricity (in particular the photovoltaic); iv) better definition of the instruments to accelerate improvements in energy efficiency (e.g. mandatory standards and certification); v) possible improvements in the governance of the sector. The realization of the proposed strategy will allow a gradual but significant alignment to the targets of Europe “20-20-20”. These include the reduction of greenhouse gas emissions by 21% compared to 2005 (EU target: 18%), 24% reduction in primary consumption than the performance inertial (EU target: 20%) and reached 19-20% of impact of renewable energy on the gross final consumption (European target: 17%). In particular, it is expected that renewables become the premier source in the electricity sector like the gas with an incidence of 35-38%.

- The “Fifth Energy Bill” – issued on 05.07.2012 and valid until 07.07.2013, the “Energy Bill”, whose implementation regulations have been produced, encourages the production of electricity from PV plants connected to the grid; the new phase introduces specific incentives for energy audits and energy certification.

All the incentives provided will be reviewed every six months from the date of entry into force of the bill. The “Fifth Energy Bill” foresees two tariffs

types: i) feed-in tariff applied to the energy fed into the grid; ii) premium tariff for the energy consumed on site and not fed into the grid. The incentives provided are intended to financially support the investment in PV systems (especially small-medium size), and are paid on the basis of different criteria such as the size of the plant and the type of facility (e.g. plants on buildings and other PV systems. The rate is recognized for a period of 20 years from the date of entry into operation.

- The "Thermal Account" - the publication of the Ministerial Decree 28.12.12 (the so-called "Thermal Account") gave effect to the legislative decree of March 2011 that encouraged small-scale interventions for increasing energy efficiency and the production of thermal energy from renewable sources. GSE is the entity responsible for implementation and management of this mechanism, including the provision of incentives to the beneficiaries. The interventions benefiting of the incentives refer to both the external efficiency of existing buildings (insulation of walls and roofs, replacement windows and install solar screens) and the replacement of existing systems for heating systems with higher efficiency (condensing boilers) and replacement or, in some cases, the new installation of power plants using renewable sources. The decree introduces specific incentives for energy audits and energy certification when combined to the interventions mentioned above. The incentive is established on the basis of the type of intervention as a function of the energy efficiency achievable with the improvement of the energy performance of the building and/or as the energy output from plants fueled by renewable sources. The incentive is a contribution to the costs incurred and will be paid annually for a variable duration (between 2 and 5 years) according the type of interventions. The incentive mechanism targets two types of entities: i) government; ii) individuals, condominiums and owners of business.
- The "Energy Regional Plan and Action Plan" – done in collaboration with ENEA, it does not dive into specific issue but contains a number of proposals to be evaluated, and shaped, in conjunction with all the interested parties. It constitutes a blueprint to formulate interventions aiming to achieve higher levels of energy efficiency, competitiveness, flexibility and security. An update of the Energy Regional Plan is being prepared so to integrate recent EU and national provisions on energy policy

- Specific Regional Regulations (e.g. energy certification): The Region of Lazio adopted a Regional Regulation (Nr. 125 on 23 March 2012) on for the accreditation of the persons authorized to issue certification of energy efficiency and “green” buildings.

1.2 Institutional organisation of the solar sector

Regione Lazio:

- Ministry of Environment, Land and Sea
- Ministry of Economic development
- Gestore dei Servizi Energetici (GSE S.p.A.)
- Regione Lazio – Energy Area
- Regione Lazio – Institutional and Territory Area
- Provinces (Frosinone, Latina, Rieti, Viterbo) – Department of Environment/Transports/Energy
- Municipality of Rome – Programme Department and Urban Implementation

1.3 The energy/solar strategy in Lazio

By means the Regional Law No. 14 (06.08.1999), the Region of Lazio performs the following tasks with respect to energy related issues:

1. Promote measures for: i) the reduction of energy consumption and improvement of energy rationalization and efficiency; ii) the development and use of renewable sources of energy their integration into productive and economic activities, and urban in areas; iii) the promotion of technologies related to the use or transformation of energy
2. Establish the criteria and the procedures for granting financial incentives;
3. Establish the procedures for the location of plants and networks for the production and distribution of energy;
4. Coordinate the applied research, develop demonstration projects and promote the replicability of plants and systems with high energy efficiency;
5. Update periodically the capacity of the energy technicians;
6. Provide resources for technical and economic feasibility studies related to the energy generation, use, efficiency and transformation and distribution
7. Assist local authorities in their informational activities for end users as well as in the organizations of trainings for public and private stakeholders concerning the

design, installation, operation and control of heating systems.

It is also reserved for the Region, those functions and administrative tasks which are neither reserved to the State nor to local authorities, including those relating to renewable energy, electricity, nuclear power, the oil and gas.

The "Regional Energy Plan" is the main energy/solar strategic tool, whose ultimate objective is to contribute to the reduction of CO² in line with the national and EU commitments. To pursue such objective by 2020, an Action Plan for Energy was drafted with respect to: i) energy saving targets; ii) CO² emissions reduction targets; iii) targets for the use of renewable resources; iv) a more efficient distribution system. The programme of measure of the Action Plan concerns seven fields: i) thermoelectric sector ii) renewable energy sources iii) efficient use of energy in the civil and industrial sector iv) sustainable transports v) the agricultural sector; vi) research and development vii) governance

1.4 Region of Lazio 2020 and the MED Solar Plan

The Region of Lazio is very interested in being involved.

1.5 Questionnaire Results

The number of the filled questionnaires received has been so low that the reliability and significance of the conclusions drawn cannot be representative of the public administration sector. Having said this, here below the summary of the answers:

- i) 50% of the recipients say that information on renewable energy is adequately conveyed
- ii) all are engaged in the development of actions for supporting and promoting sustainable energy among stakeholders though such actions are deemed largely improvable
- iii) all are linked to the national government when it comes to develop their sustainable energy strategy
- iv) there are incentives to PV and thermal systems
- v) full agreement that solar energy is likely to be the source of energy on which Italy will be focusing on in the next years
- vi) all agree that administrative bureaucracy and lack of funding are the main hurdles to promote solar energy

1.6 SWOT analysis and results

	HELPFUL (To achieving the objective)	HARMFUL (To achieving the objective)
INTERNAL ORIGIN	<ul style="list-style-type: none"> Regulatory tools on energy efficiency and use and transmission of energies from RES Current building regulations and territorial planning promote energy efficiency and RES development 	<ul style="list-style-type: none"> Lack of funds and technical staff with respect to the territory Great potential for wind energy Complex administrative procedures Weak communication of the comparative advantages of renewable energy with respect to fossil fuels
EXTERNAL ORIGIN	<ul style="list-style-type: none"> Potential creation of jobs 	<ul style="list-style-type: none"> General distrust towards PV as associated to high electricity bills

The Region of Lazio, which lies in central Italy, has a population of 5.5 million, a territory of 17.207,68 Km² and a good solar radiation (1671 Kwh/m²).

After the PV boom in 2007 triggered by financial incentives, the PV sector tends to stability but looking with uncertainty to the future, when the incentives to the solar sector will come to an end (in 2014), and a significant percentage of the existing solar plants will be out-of-warranty. Despite all, 5445 jobs are expected to be created in the PV sector in the region of Lazio by 2020. Having said this, there is still some extent of distrust to PV due to the fact that the generous incentives are paid by consumers through high electricity bills.

After years of low profile, the solar thermal is growing significantly in the region: 900.00 Euro have been allocated and approx. 1.600.000 m² of solar thermal are expected to be installed by 2020. The "Thermal Bill" which allows up to 55% tax exemption to the installation of systems with renewable source; moreover, in June 2013, the reform of the condominiums with important facilities for the installation of renewable energy systems and energy efficiency measures entered into force.

1.7 Global conclusions for the policy accelerator in Lazio region.

To understand the development of the solar energy sector in the Region of Lazio, it is a key to look at the national picture. With 549,871 solar plants and 17,444 MW installed capacity, Italy is the world's second largest market for PV behind Germany. Despite these figures, many stress the need of a robust national energy policy that may avoid the current "confusion" and "too much emotion" at the basis of the "schizophrenic" incentives system.

On the other hand, the solar sector in Region of Lazio cannot be detached by its overall regional energy policy whose cornerstones are i) the "Energy Regional Plan", which defines the strategic objectives ii) the "Action Plan for Energy", which puts forward how to achieve the objectives taking into account the latest technological advances iii) the M&E plan to assess progress and results.

Among others, it is worth stressing that the "Action Plan for Energy" proposes to:

- draft a new Law on the sustainable development of the energy sector, with particular reference to the production of electricity
- establish tools for public consultation
- optimize the work of distribution actors by the release of "Energy Efficiency Certificates"
- produce new guidelines for municipal building, with the introduction of rules and incentives for energy efficiency and the use of solar (thermal and PV) for new construction and renovations
- build synergies among universities/research centers to promote technological progress and effective transfer of results to the business sector
- promote the formation and development of ESCO (Energy Service Companies).

It is relevant to underline that: i) the photovoltaic power station built in Montalto di Castro (Viterbo) is the largest PV project in Italy (44,000 PV panels) and among the largest worldwide ii) the municipality of Broccostella (Frosinone) is the 43th municipality with the highest number of PV plants on roofs with 5,1 MW installed capacity; iii) the Municipality of Rome counts 5,416 PV plants for an installed capacity of 103 MW; iv) most municipalities in the region have introduced the obligation of PV in their Building Regulations before this became mandatory by the law (Dlgs 28/2011); v) as far as the thermal solar is concerned, the municipality of Rome counts 3.537 m² occupied by solar thermal plants and 1.485 m² in public buildings.

2. The SHAAMS ENTERPRISE RESEARCH ACCELERATOR in Lazio Region

2.1 The R&D for energy and the solar market in Lazio Region

- % of expenditure on R&D in relation to GDP
- % of employees in the sector with high education
- Number of patent applications
- Number of pilot projects with advanced technology
- % of cost reduction in PV electricity generation (€/kWh)
- % increase in PV module efficiency
- Number of years inverter lifetime
- Number of companies that have introduced technological, organizational or marketing/service innovations
- % people between 30-65 who would install a solar plan (PV, thermal or thermodynamic)

2.2 Economic, market and financial barriers and facilitators to the strategy implementation

In the Region of Lazio: there are 360 municipalities (over 95% of the total) with at least one plant from renewable sources, and 48 municipalities produce more energy from RES than required for the resident families. The stable growth of PV in the region is apparent as, at the end of 2012, there were 31,945 PV plants (1,136 MW installed capacity) distributed among the provinces as follows: Rome (18,149), Latina (4,267), Viterbo (4,207), Frosinone (3,723) and Rieti (1,599). On the other hand, the municipalities with the highest PV installed capacity are: Montalto di Castro (152 MW), Rome (124 MW), Latina (64 MW), Aprilia (47 MW) and Lanuvio (30 MW). As to solar thermal, where the census is more complex because the systems are not connected to the networks, data show a very widespread distribution: Rieti (3,650 m² installed), Rome (3,537.54 m²), Neptune (3,173.91 m²), Fonte Nuova (1,568.93 m²) and Ferentino (654.06 m²) (Data taken from Legambiente report "Renewable Municipalities 2013"). Against this picture, several barriers still exist at national level hindering the smooth development of the sector in all the regions; the removal of such barriers would definitely improve the performance of PV.

Here below the main barriers:

- although PV accounts for 5% (up to 10% during in peak hours) of the whole energy production, its diffusion rate is slow due to the high costs;
- widespread doubts on the capability of PV to secure supply under extreme conditions;
- compared to other countries (e.g. online registrations, less rigid and bureaucratic procedures, shorter time to obtain authorization for PV installation);
- the regulatory framework and the administrative procedures are complex and slow (the time to develop a PV related projects may arrive up to 82 weeks while bureaucracy procedures may absorb up to 69% of project costs);
- low investments in R&D and weak collaboration among the few small excellences centers, which in turn make very difficult to meet the needs of the industry in the short term.

Facilitators:

- Market mechanisms are expected to promote the decrease of the costs of Watts (at least for the residential segment) from the current 2.31 Euro to 1.30 Euro by 2020. Likewise, the cost of the panels (3 Kw) should decrease from the current 6.000 Euro to 4.500 Euro.
- greater cooperation among networks operators, and between them and PV producers is needed to overcome doubts about PV stable supply capacity as well as investments in infrastructure to improve the efficiency of the entire energy system
- create integrated and agile authorizations with clear guidelines and deadlines supported by mandatory technical standards and connection rules

2.3 Questionnaire Results

Research method

- Fieldwork conducted by the SHAAMS partner

- Personal contact by telephone to recruit to web, follow up by online interviews
- Online invitation (The template will be shared by “survey monkey” tool)

Results

The number of the filled questionnaires received has been so low that the reliability and significance of the conclusions drawn cannot be representative of the enterprises and R&D sector. Having said this, the answers received can be summarized as follows:

- i) knowledge of the national policy/legislation on solar energy, especially PV
- ii) legislation and lack of funding are the main hurdles to implement solar energy systems in their organizations
- iii) none use solar energy systems in its organizations
- iv) links with public/governmental bodies
- v) interest in attending trainings or activities aimed at transferring technology

2.4 SWOT Analysis

	HELPFUL (To achieving the objective)	HARMFUL (To achieving the objective)
INTERNAL ORIGIN	<ul style="list-style-type: none"> • Solid technical knowledge • Growing interest for the solar thermodynamic 	<ul style="list-style-type: none"> • Limited sharing of knowledge and communication of R&D results
EXTERNAL ORIGIN	<ul style="list-style-type: none"> • Examples of collaboration between R&D entities are in place • Organic Solar Pole 	<ul style="list-style-type: none"> • Insufficient, and uncertain, financial resources to support R&D

Overall, there is solid technical and technological knowledge of the PV and solar thermal, and growing interest for the solar thermodynamic following the results of the thermodynamic solar plant installed in Sicily in 2010 (ARCHIMEDE Project); the Region of Lazio showed interest in building a similar plant in the area of Civitavecchia. It is worth mentioning the existing Center for Hybrid and Organic Solar Energy (CHOSE) coordinated by the University of Roma Tor Vergata.

In Italy, the National Strategic Framework 2007-2013 included about \$ 10 billion

(mainly from EU budgets) for R&D; at the same time, there was an increase of 15% of private investments on R&D mainly due to fiscal incentives. The Region of Lazio allocated for innovation about 70 million Euro for the period 2007–2013, and RES are indicated as priorities themes (taken from “Programma strategico regionale per la ricerca, l’innovazione ed il trasferimento tecnologico per la IX legislatura periodo 2011-2013”).

2.5 Regional Conclusions

ENEA, the main public organization operating in the fields of energy, environment and new technologies, has located its main research complex in Casaccia, 28 Km from Rome. Over there, ENEA carries out R&D on PV, smart grid, eco-buildings design, concentrated solar thermal and energy storage. In the PV sector, ENEA develops materials, components and innovative technologies in traditional crystalline silicon areas and in the more advanced ones of multi-junction cells, third generation and nano materials. Collaborates with PV industries in order to implement research results in market applications and to optimize processes and equipment for device manufacture. Moreover, ENEA carries out activities on device test and characterization, monitoring of technology evolution, training, technical standards as well as on technologies for grid connection optimization.

As to the R&D in the region, it is important recalling the aforementioned “CHOSE” (Center for Hybrid and Organic Solar Energy) as a result of the collaboration between the Region of Lazio and the Department of Electronic Engineering of the University of Rome - Tor Vergata. CHOSE is a center of excellence for the research and industrialization of organic and hybrid organic-inorganic technology applied to PV cells. The use of organic solar cells is designed to improve energy efficiency, promote renewable sources, and make PV technology a widespread and affordable clean energy. The project forms part of the initiatives to achieve the objectives of the Kyoto Protocol of less greenhouse emissions through the use of renewable sources of energy (<http://www.chose.uniroma2.it/it/>)

It is worth mentioning here below some innovative applications of PV though they occur outside of the Region of Lazio. The most interesting applications are those effectively integrated in the territory such as innovative systems “agro-voltaic”: an important example is the plant of 410 kW built in the town of Isola Della Scala near Verona where the 1,424 panels that make up the system are suspended on a kiwi farm making possible for the farmers the use the land. Another example of

this kind is the plant in Monticelli, in the province of Piacenza, where the PV panels are suspended 4 meters above wheat fields occupying an area of 21 hectare with a power of 3.2 MW and an annual output of 4,865,500 Kwh able to meet 49% of the energy needs of the resident families.

3. The SHAAMS SOCIAL ACCELERATOR in Lazio

3.1 Public awareness on the solar sector in Lazio

As to on-going initiatives, two are particularly worth being mentioned:

SEIZE YOUR POWER:

(http://wwf.panda.org/about_our_earth/aboutcc/seize_your_power/);

whose objective is to ask financial institutions and governments to invest more financial resources on renewable energy. This initiative can raise the profile of what is going-on in the Mediterranean region on RES and, in turn, provide Med countries with best practices from all over the world to be adapted and replicated

EARTH HOUR (<http://www.earthhour.org/>), one the biggest environmental awareness campaign ever seen to mobilize people to take action against climate change.

3.2 Barriers and Facilitators for the social apprehension of solar sector solutions

Lack of clear information is the main hurdle. The way to raise the awareness of civil society on the advantages of solar energy and promote its effective participation is through communication campaigns that use no technical jargon and target the general public; at the same time it is needed to strengthen the technical, political, legislative capacity of those organizations already engaged in the sector. The establishment of consumer or citizens' movements may help them gain further leverage. It will be up to the public authorities to set up mechanisms where participation effectively takes place so that citizen may exert real influence on the decision-making processes on energy.

3.3 Questionnaire Results

The number of the filled questionnaires received has been so low that the reliability and significance of the conclusions drawn cannot be representative of the civil society sector. Having said this, the answers can be summarized as follows:

- i) knowledge of basic information such the national production of renewable energy and the amount of solar energy within the renewable energy produced
- ii) expectation that, in twenty year time, at least 75% of the energy production would come from renewable energy sources
- iii) lack of political will is deemed the main barrier to further develop renewable energy solutions
- iv) interest in participating in public hearings and roundtables and/or in campaigns and education activities on energy

3.4 SWOT Analysis

	HELPFUL (To achieving the objective)	HARMFUL (To achieving the objective)
INTERNAL ORIGIN	<ul style="list-style-type: none"> Widespread awareness of the need to shift to RES NGOs/associations with good level of knowledge of the solar sector 	<ul style="list-style-type: none"> Lack of incisive policies and low national and foreign investments Complex, and changing, solar sector regulatory frameworks and financing tools
EXTERNAL ORIGIN	<ul style="list-style-type: none"> Growing attention of media on RES, especially solar, advantages and opportunities 	<ul style="list-style-type: none"> Low pressure of civil society to promote RES

Several actions are taken to foster public participation on solar energy related issues, such as the regional conference on energy or the establishment of RES desks in the five provinces of the region.

3.5 Regional conclusions

Since data limited to the Region of Lazio have not been found, it is relevant to mention the results of the 2012 report "The Italians and the solar energy" prepared by IPR Marketing. The report shows an increase of 26% in popularity of the solar energy with respect to the previous 2 years; those having a positive

opinion on solar energy are the 92% though only the 44% is quite knowledgeable of what solar energy is about. Reading the data, it turns out that only 17% of Italians know that a solar panel lasts between 20-30 years, while 70% believes that all solar panels are the same. In a nutshell, the survey shows that most people are aware of solar energy potential but still lack of specific information to make them able to actively participate, or advocate for, a new energy development pattern.

4. SHAAMS common indicators for the sectors analysis.

Indicator	Category		Exists by end of 2011	Exists by end of 2012	Exists by end of 2013	Exists by end of 2014	Exists by end of the project	Notes
Region of reference: Lazio								
1 - N° of solar systems in the region	Solar thermal power							
	Solar thermal application in hot water, space heating, drying, solar cooling							
	Solar PV systems							
	Installed power per capita							
2 -Total investments in solar energy in your region	Grant schemes to support private investments							
	No of solar systems in public buildings							
	Money invested on raising awareness (training, communication)							
	Which technology does the state support?							
3 – Total solar energy production in your region	Total energy generated from the solar energy							