



## European Territorial Cooperation and local benefits, increasing energy efficiency in the Mediterranean agro-food sector

Javier Gómez Prieto\*

Project Evaluation Officer

Interreg MED Programme, Joint Secretariat, Marseilles, France

Javier.gomez@ec.europa.eu<sup>1</sup>

Maria Stella Scarpinella

Urban Planner and Territorial Development Specialist

Sapienza University

DOI: 10.1481/icasVII.2016.e26

### Abstract

The agro-food sector is characterized for demanding a significant amount of energy in its industrial processes. According to the Joint Research Centre of the European Commission, the amount of energy necessary to cultivate, process, pack and bring the food to European citizens' tables accounts for 26 % of the EU's final energy consumption in the same year (Monforti-Ferrario et al 2015). In the Mediterranean area, the agro-food sector is highly represented by Small and Medium Enterprises (SMEs) which demand innovation and practical solutions to greening the supply chains. In contrast, SMEs are often reluctant to change production behaviours due to limited financing alternatives, lack of information on the most fitting technologies or gaps in knowing benefits without affecting the quality of the final products.

Aiming at assisting agro-food SMEs of the Mediterranean area, the project Sinergia<sup>2</sup> has contributed to identify innovative processes, address energy efficiency patterns in the productive chains and guarantee a wide replication of the technological solutions for energy saving and CO<sub>2</sub> reduction. Sinergia pools the experience of 10 Mediterranean partners who jointly developed an Energy Self-Assessment Tool (ESAT) to help SMEs to better know their own energy consumption features and to identify energy saving potentials. The project is financed in the framework of the EU Cohesion Policy through its European Territorial Cooperation (ETC) objective. The aim of this paper is to analyse the effects and contributions of ETC to the increase of energy efficiency levels in agro-food sector. The paper analyses Key Performance Indicators (KPI) of reference and highlights how ETC exercises can address data availability challenges.

Keywords: Energy efficiency, Agro-food sector, SMEs, Mediterranean

---

<sup>1</sup> The scientific output expressed does not imply a policy position of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of this publication.

<sup>2</sup> The project website is: <http://www.sinergia-med.eu/>

## 1. Introduction

Over the recent years, market trends and environmental pressures make clear that an essential requisite for future growth and competitiveness of the European agro-food industry are not only the investments in the global network of commodities and distribution channels but also to extend the paradigm of sustainability in the food processing from the big corporations to the SMEs. This aspect is particularly important if we observe it from the energy side. Although agro-food industry is considered as a low-energy intensity sector, some steps in the value chain are characterised by consuming high levels of energy to transform, process, cook, warm, dry, cool and store the final food products.

In the Mediterranean region, agro-food industry is one of the largest and more productive sector, mostly composed by small and medium enterprises with limited resources and unqualified personnel for addressing greening practices in the supply chain innovation. Furthermore, SMEs typically consider additional investments not as a way to improve their energy efficiency but as a loss or major change in their product market characteristics and quality already assimilated by target consumers.

The purpose of Sinergia is to help the Mediterranean agro-food industry to spark green energy practices. One of the most innovative aspects of the project is the proactive method offered to the agro-food SMEs to make them feel closer to the knowledge poles in the field of energy and to stimulate investments to improve the environmental footprint of food processing. Sinergia tackles the energy challenges by designing friendly instruments to increase the SMEs' awareness and introduce innovation in the energy efficiency processes. These instruments are designed to cover monitoring and selection of the most fitting technologies to the energy managers' across the whole investment life cycle.

This paper focuses on Sinergia project as an example of European Territorial Cooperation where several partners of different Mediterranean countries have addressed a common challenge by giving a unified response through collective action. To this respect, the added value of ETC is of significant importance for the agro-food sector as it allows sharing knowledge, good practices and motivating exchanges between experts and entrepreneurs of several Mediterranean countries.

## **2. European Territorial Cooperation, joining efforts to support the Mediterranean agro-food sector.**

In the European Union, the Cohesion Policy finances initiatives to reduce disparities among member states and regions who evidence different growth progression as a result of heterogeneous market dynamics and trends. European Territorial Cooperation is part of the EU Cohesion Policy and promotes collaborative actions in response to common challenges. In the Mediterranean area, ETC addresses some of the common challenges normally by following a three-phase approach consisting of: (1) diagnosis and strategies to be addressed commonly by partners of different territories, (2) testing activities and demonstrative actions to validate future and higher interventions and (3) transferability and capitalization actions based on the amplification of previous test and results towards concrete policy changes (Gómez and Stephanedes, 2015).

Results of European Territorial Cooperation are not normally seen as infrastructure-oriented achievements. Instead, ETC contributes to the delivery of reports and analysis based on state of the art, legislation tendencies and changes, roadmaps, guidance materials for several public targets, communication and awareness raising campaigns, establishment of local working groups, international conferences, events to facilitate exchanges between public and private sector, political Memorandums of Understanding and provision of evidence for improving local, regional and national policies (Gomez Prieto, 2015).

Concerning the agro-food sector in the Mediterranean area, over the period 2007-2013 the European Territorial Cooperation instrument contributed to the support of several stakeholders through different initiatives in areas such as innovation and transnational collaborative platforms (Agro-environmed, 2013), promotion of sustainable diets and agriculture traditions (Fooding, 2011), simplification of technical and administrative procedures and operation for Horticultural Perishable Products (E.H.P.P.C, 2011), exchange for technology transfer in the agro-biotechnologies (Agrobiotech exchange, 2005) and energy efficiency advice to SMEs (Sinergia, 2015)

According to the nature of ETC, achieved results should be considered as interface of new interventions in same or similar thematic and targeted territories. Although project outputs are of varied nature they could be used individually or collectively to define starting points, references or baselines of future projects and initiatives. This approach is part of the so-called capitalisation strategies promoted at programme and project level.

## **3. The Sinergia project, increasing energy performance by transfer innovation.**

Sinergia is an ETC project implemented by the transnational programme Interreg MED. The project is coordinated by the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) and engages the participation of eight partners representing research centres, federations, clusters and agencies of Spain, Italy, France, Greece, Slovenia, Croatia and Turkey committed to the development of agro-food sector in the Mediterranean area.

The main mission of Sinergia is to promote the technology transfer to the SMEs of the agro-food industry in order to (1) identify innovative processes and address energy efficiency patterns in the productive chain (2) guarantee a wide replication of the technological solutions for energy saving and CO<sub>2</sub> reduction undertaken by the different agro-food divisions and productive clusters in the

involved MED regions and (3) strengthen the competitiveness of the agro-food industry in the Euro-Mediterranean and global markets.

To achieve the objective, the project developed 50 pilot cases addressing concrete technological options to boost better energy performances in SMEs, with high potential of replication to strengthen competitiveness and sustainable resource management of agro-food industry in the Mediterranean area. The following case addresses for instance energy efficiency practices in a winery of Greece.

### Case study on Energy efficiency practices in a Greek winery

Company description and products. Brintzikis is a Greek winery and produces 500 tons of wine annually wine from locally grown grape varieties. It is the first winery in Greece with zero carbon footprint, thanks to its two ground source heat pumps systems coupled to photovoltaic panels. Production process includes grape collection from the vine trees, transport to the winery, production of must, cold static decantation, separation, alcoholic fermentation, aging, storing and bottling.

Energy use. Heating needs are limited to 5 days in winter in order to maintain wine storing temperature at 12 °C. Cooling is needed during the wine production season in September for treatment of must after pressing and removal of grape solids, static decantation and alcoholic fermentation of the must. Additional cooling is needed in order to maintain the wine aging as well as a storing room temperature at 18 °C during from May to October. Electricity is also needed for lighting, driving motors at the pressing system and filtering units, as well as for pumps and fans.

Renewable Energy technology installed. Heat, cool and chill are provided by a pair of ground source heat pumps (57 kWth heating and 53 kWc cooling each). One of them provides base load and the second provides peak load. At times when both heating and cooling are needed in the plant, one GSHP provides heating and the other cooling, operating in maximum efficiency due to the favourable temperature prevailing at the bore hole heat exchangers (BHE). The GSHP units are connected to a ground heat exchanger which delivers 16 °C water to the GSHPs in heating mode during winter and 20 °C water in cooling mode during summer.

Electricity is provided by photovoltaic panels placed at the roof, which sell all generated electricity to the grid at a guaranteed feed-in tariff according to national regulations. The PV panels generate 150 MWh of electricity annually exceeding plant needs of 100 MWhe.

Annual energy savings. Useful energy delivered by the GSHPs is estimated at 152 MWhe for cooling plus 17 MWth for heating. The corresponding electricity consumption is estimated at 32 MWhe, resulting in energy savings of 137 MWh annually. In addition, the PVs provide another 150 MWhe of renewable energy every year. It must be noted that correction of the power factor does not result in energy savings, but only in cost savings.

These pilots demonstrated in one hand the variety of industrial processes and energy consumption patterns in the Mediterranean agro-food sector. Even if we talk about similar food items, feta cheese production in Greece entails a particular process that cannot be compared to the elaboration of Mozzarella in Italy or Banon in France. On the other hand, small and medium entrepreneurs are normally more sensible towards the preservation of traditional industrial processes rather than modernising the practices by introducing energy efficiency measures that could bring both economic and environmental benefits.

Sinergia project also implemented a set of tools to promote technology transfer in agro-food industries of the Mediterranean. Concretely, an energy efficiency simulator, a food energy tech database, help desks and an energy self-assessment tool were designed to stimulate energy efficiency practices in SMEs and demonstrate that final products can be elaborated with the same quality and less energy consumption. In this paper, analysis is concentrated in the Energy Self-Assessment Tool<sup>3</sup>.

#### 4. The Energy Self-Assessment Tool and key performance indicators

The Energy Self-Assessment Tool (ESAT) was designed to stimulate energy efficiency patterns in the productive chain of SMEs' industrial processes. The tool is based on an free-accessible software<sup>4</sup> which was developed to process a set of information about SMEs' energy cost/consumption and production data. Users can enter data about energy performance associated to food production into a software that provides a diagnosis regarding the energy efficiency of the site by comparison with appropriate benchmarks. ESAT allows to evaluate higher margins of energy performance improvements and supports enterprises in their choices.

As for the functioning, ESAT was designed to work on two operative levels: the first one is a preliminary check-up consisting on a simple and quick process to calculate SME performance indicators and compare them with reference values for the same sector. Here, the tool requests for basic information in order to deliver indicators related to working hours per day, energy bill and averages. In the second level, a comprehensive energy check-up, based also on preliminary information, allows the system to properly identify when and where the higher energy consumptions occur along production process. This second level assists SMEs to identify specific energy consumption by analysing all energy vectors consumed and energy techs installed.

The Energy Self-Assessment tool not only allowed to determine quantitative values of energy consumption in targeted SMEs of Mediterranean agro-food sector. The obtained results were also visible through the increase of awareness about SMEs energy consumption not only by entrepreneurs but also by policy makers and other relevant stakeholders. Comparison on SMEs energy performance, energy consumptions assessment for each segment of the production chain and simulation of major energy efficiency scenarios were also part of the associated results.

The key performance indicators addressed by Sinergia were linked to the needs and demands of the agro-food industry as one of the largest and most important manufacturing sector in the Mediterranean area. Although mostly composed by SMEs with limited resources and qualified personnel for investing in research and innovation, the Mediterranean agro-food sector counts on great innovation potentialities leading to improve energy efficiency levels of industrial processes.

After diagnosis analysis and surveys addressed to representatives of SMEs, these KPI were jointly defined by project partners as a way to identify common solutions. Concretely, the defined KPI were: energy consumption per square meter, energy cost per square meter, energy consumption per volume produced and energy cost per volume produced.

---

<sup>3</sup> Details of these tools are available at: <http://www.sinergia-med.eu/index.php/my-energy-efficiency-simulator>

<sup>4</sup> Managed by the Italian National Agency for new technologies, energy and sustainable economic development ENEA. Available at : [www.esat.casaccia.enea.it](http://www.esat.casaccia.enea.it)

## 5. Discussion and key messages to stakeholders and policy makers

In previous sessions, it was demonstrated how European Territorial Cooperation contributed to improve energy efficiency levels in the Mediterranean agro-food sector. Sinergia project in particular addressed key interventions towards the support of SMEs in order to modify energy consumption practices. However, some observations and results obtained through project operation are valid for policy dimension at local, regional and national level. The following messages are addressed to policy makers and stakeholders committed to the improvement of the Mediterranean agro-food sector:

Moving companies towards sound energy efficiency diagnosis. Making the agro-food companies, in particular the SMEs, aware about their potential energy efficiency upgrade is definitely the first step to achieve reasonable energy efficiency levels. Assisting SMEs to run an initial self-diagnosis of their energy consumption patterns is the way to convince them to investigate market alternatives as well as to identify suitable low carbon technologies fitting with specific industrial processes. Decision support systems such as ESAT represent a concrete support to any SMEs as it offers a set of energy performance reference values for the selected agro-food divisions and technologies, helps enterprises to pre-evaluate the potential benefits, maps out the innovation hubs and the available local RES and E-services. Tools like ESAT encourage the agro-food companies to wisely approach their own energy performance problems and deal with the EU directive on energy efficiency which promotes the energy diagnosis in the EU SMEs.

Improving the industrial associations' innovative services for the greening of the supply chain. Most of the agro-food companies are not fully aware of the transformation of the EU market towards the single market for green products. In the meantime, large agro-food corporations have started requiring green standards to their supply chain, selecting mainly sub-providers able to meet clear environmental criteria. In this perspective, the green innovation challenges not only the enterprise at individual level but the whole agro-food local productive system (clusters of companies located in the same territorial background). The agro-food associations should be widely supported in order to enhance the efforts to provide their members with a vision over the future market trends and new services, with the goal of promoting the large scale introduction of eco-innovation model analysis in the agro-food sector and stimulating targeted investments.

Assisting agro-food companies to get oriented across the numerous sources of information. The access to good quality and scientific-based innovative ideas to improve the environmental performances of the agro-food industry is one of the main challenges to stimulate the green innovation of this sector. However, the enterprises, especially small and medium sized ones, must be supported in order to fully exploit the advantages offered by heterogeneous, numerous and complex information sources. SMEs often do not have a sufficient capacity to understand what technology options could better fit with their own production patterns and to calculate the cost/benefits of the investment in the full life cycle. Key elements to meet new SMEs' requests of information are the various tools available online to enable two-way information flows, starting from the simplest to the more evolved, that attract the companies making it possible to obtain useful information about the opportunity of new energy technologies. Therefore, the use of organized and structured tools allows SMEs to achieve an high level of innovation, but this process should be guided by technology intermediates and skilled specialists to better fulfil the companies' expectations.

Introducing innovation within the traditional food processing systems. Food and Drink sector shows relative slowness to pursue innovation, including the integration of new clean technologies into the

industrial processes. Among the main challenges for stimulating innovation in agro-food, the following ones are the more recurrent: risks of investment towards innovation, failure rate of innovation projects (technical management, business support) during the process, legal and administrative barriers, insufficient protection of confidential information/knowledge related to the food processing, inflexible legislative framework for research and innovation and bureaucratic system of public funding schemes. Furthermore, SMEs typically see financing possibilities as a way to improve their traditional longstanding manufacturing processes rather than introducing innovative elements in the production chains.

Smart specialisation as a driver of innovation and interregional cooperation. Agro-food is one of the main economic pillar in the Mediterranean area and it is recognized as priority of smart specialisation in most of the concerned Regions. The introduction of eco-innovation model analysis in the agro-food sector, both to reduce the environmental stress factors in the value chain and to support the competitiveness of the agro-food SMEs requires synergies between regional strategies. To this regard, the European Commission has recently<sup>5</sup> launched a Smart Specialisation Thematic Platform on Agro-food. The platform promotes innovation-driven investments and cooperation around new agro-food growth opportunities.

Training and skills are fundamental! On one hand, the specialization of the educational systems, from the technical colleges to the universities, to meet the demand of new green skills and green jobs shall be pursued by encouraging new forms of public and private collaboration on the labour market. On the other, the enrichment of the vocational training with topics for the development of skills on eco-innovation, the innovation management and the sustainability issues are necessary to assure a correct implementation of priorities. Initiatives among agro-food federations, high education, R&D and specialized market/skills organizations should be promoted to increase the professional capacities in energy diagnosis and green energy projects in agro-food enterprises.

Creating alliances and inter-disciplinary networks. Agro-food sector in the Mediterranean area needs reorientation towards eco-innovation driven businesses in order to face the world-wide competition and effectively contribute to reach international post-Kyoto goals. Opening up to strategic intervention from technical, political and financial perspective strongly depends on the participation in European and international networks, economic forums, technology platforms and project partnerships. New and traditional cooperation on technology tendencies and novelties as well as in low environmental footprint patterns shall be conveyed within specific agro-food supply chains and be implemented by enterprises. National and European Agro-food cluster's vision in favour of sustainability has to be deeply promoted also across the small and medium agro-food stakeholders. In this perspective, the mechanisms for bottom-up participation and transnational think-tank in profiling the "vision to sustainability and competitiveness" should be enhanced.

Transposing new energy and clean technologies to the market. Developing close-to-market research projects focused on energy efficiency, renewables and clean technologies is necessary as a supplementary way of transposing research into market by introducing new high-tech applications for the agro-food enterprises. The elaboration of new projects under targeted financing programmes should be inspired by the advances and results derived from EU Technology Platforms. Concept and approach should be characterized by innovation (research-driven innovation and innovation in business models, design, branding and services that add value for users especially for SMEs) and engagement of all actors (R&D performers, final beneficiaries, intermediates) in the innovation

---

<sup>5</sup> Official launching of the Agro-food platform took place on 1st June 2016, Brussels as a joint initiative between DGs Agricultural and Rural Development, Regional and Urban Policy, Research and Innovation and Joint Research Centre.

cycle. A special attention should be devoted to the implementation of demonstrative pilots, being the key-factor to accelerate the propagation of successful case studies to the market.

## 6. Conclusions

European Territorial Cooperation has contributed to greening the Mediterranean agro-food sector through several initiatives. Sinergia project in particular has demonstrated that although the variety of industrial processes, techniques and traditions, Mediterranean stakeholders and policy makers might converge on joint action to provide collective answer to the energy efficiency challenge of related industries. Additionally, the public-domain character of achieved results and outputs, allow to prepare, design and implement further related interventions by integrating what has been already analysed, elaborated and concluded.

Decreasing energy consumption is one of the main options to make agro-food companies green and competitive. Reliable, scientific-based and independent tools of public use like ESAT might motivate the interest of agro-food SMEs to get a first screen of the possible company-based energy efficiency interventions. This tool, along with other Sinergia outputs, allowed to clarify SMEs' concerns related to: What are the best available technologies in the fields of energy efficiency for specific agro-food SMEs in specific food processing area? Are there any other example, best practices or successful case studies to get inspiration in the Mediterranean Region? Is my personal energy consultant aware about the newest applications?

Many of the problems faced by the EU agro-food sector cut across the territories of the MED areas characterized by similar climates and geo-morphologies for the land use in agriculture as well as socio-economic conditions and effective solutions. require an integrated approach and cooperation between the various authorities and stakeholders involved in order to ensure a cohesive and sustainable development of the sector. The know-how of Mediterranean SMEs is usually based on a specific and traditional products. Small entrepreneurs typically consider potential investments to improve their energy efficiency as a loss in the low price approach or as a major change in their product market characteristics already assimilated by consumers. Therefore, more focused intervention to assist Mediterranean SMEs on greening their daily processes is necessary.

## REFERENCES

Agrobiotech exchange Project (2005), Virtual Exchange for Technology Transfer in the Agrobiotechnologies and Agro-food Sectors. European Territorial Cooperation Programme Interreg MED.

Agroenvironmed Project (2013), Leaders of eco-innovation. European Territorial Cooperation Programme Interreg MED.

EHPPC Project (2011), Enhancing Horticultural Perishable Products Circulation among the Mediterranean territories. European Territorial Cooperation Programme ENPI CBC MED.

Fooding Project (2011), Enhancement and innovation of typical food. European Territorial Cooperation Programme ENPI CBC MED.



Gomez Prieto J (2015) European Territorial Cooperation programmes and evaluation processes. Lessons learnt and definition of a cross-programme evaluation framework in the Mediterranean. *European Structural and Investment Funds Journal*, 3:2, pp. 56-68.

Gómez Prieto J, Stephanedes Y, (2015) Effects of European Transnational Cooperation on the promotion of Renewable Energy and Energy Efficiency in IPA countries: the experience of the MED programme, *Proceedings 8th International Scientific Conference on Energy and Climate Change*, 7-9 October 2015, ISBN: 978-618-82339-2-8 (pp. 281-293)

Monforti-Ferrario et al, (2015) Energy use in the EU food sector: State of play and opportunities for improvement. Joint Research Centre Policy Report.

Sinergia Project (2015), Agro-food industry goes green. European Territorial Cooperation Programme Interreg MED.