Global Energy Management System Implementation: Case Study

Italy

City of Sovizzo

Sovizzo Municipality improves Energy Performance by 34.8% due to the implementation of EnMS in the 4 years of activities!

—City of Sovizzo

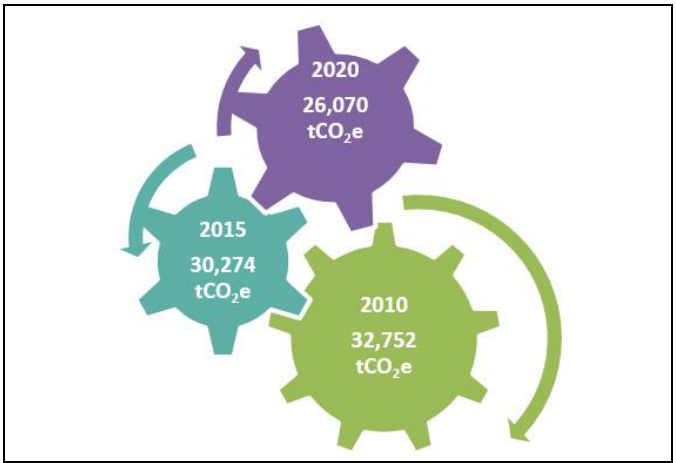
Business Case for Energy Management

Sovizzo is a small Italian town with a population over 7,500 located in the conurbation area of Vicenza City in Veneto Region, and it covers an area of 15.6 km^2 at 44m above sea level. The energy policy development work began with the signing of the Aalborg Charter (2005) and the European Covenant of Mayors initiative (2010). In 2013 the Municipality joined the EU funded project Conurbant focused on the development and implementation of SEAPs (Sustainable Energy Action Plans) in the Covenant of Mayors framework. The project supported more than 40 municipalities in 10 EU Countries to develop, implement and monitoring SEAPs in conurbation areas around capital cities creating synergies of development between small and large municipalities. Sovizzo City Council approved its SEAP at the end of 2013 and at the beginning of 2014 the Local Autority (LA) top management (City Council) decide to establish and implement an EnMS according with ISO 50001 in order to "institutionalize" its SEAP targets getting the ISO 50001 certification. In March 2014 the LA, following the commitments made with the SEAP, relaunched its activities for energy sustainability by certifying its Energy Management System. Sovizzo has been the first Municipality in the Veneto Region and the fourth Local Authority at national level to achieve this ambitious goal. The LA according with its SEAP targets established a set of initiative (in public and private sectors) to reduce CO_2 emission related to energy uses by 20.2% from 2010 levels by the end of 2020. Through innovative project and EnMS implementation and a strong commitment of the political and technical staff, the LA surpassed the target in 2016 in public sector (-27.4% tCO_2e).

Case Study Snapshot	
Tertiary	Local Government
Product/Service	Public Authority
Location	Sovizzo, Italy
Energy Management System	ISO 50001
Energy Performance Improvement Period	4 years
Energy Performance Improvement (%) over improvement period	34.8%
Total energy cost savings over improvement period (4 years)	96,251 $USD
Cost to implement EnMS	42,258 $USD
Payback period on EnMS implementation (years)	3.7
Total Energy Savings over improvement period	2,844 GJ
Total CO_2-e emission reduction over improvement period	146.5 Metric tons

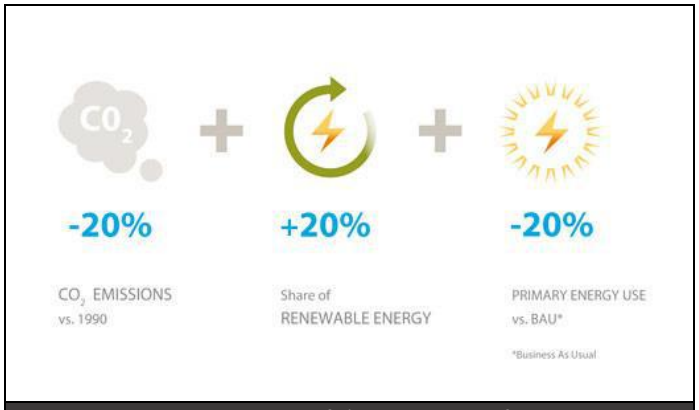
On July 2014, a new Energy Efficiency Law was approved in Italy transposing the EU Directive 27/2014: the Legislative Decree n. 102/2014. The law establishes a framework of measures for the promotion and improvement of energy efficiency that contributes to national energy saving targets. However the Law does not includes the Local Governments in the energy efficiency targets so in Italy there is no specific national regulatory framework on energy efficiency. The ISO 50001 certification and the Covenant of Mayors initiative are both voluntary schemes for the Local Governments who want to improve energy efficiency performance and reduce the environmental impact arising from energy consumption.

Going beyond national targets and regulatory framework, the Municipality signed the Covenant of Mayors and voluntarily implemented its SEAP+EnMS committing to reduce GHG emission in the whole territory of the city by 20.2% until 2020 (-6,682 tCO_2e by 2020) compared with 2010 through combined actions in private and public sectors.



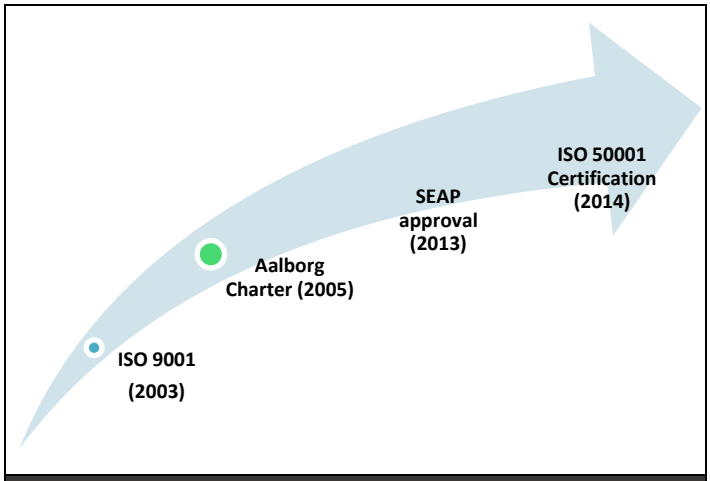
—Figure 1 tCO_2 reduction target of Sovizzo through SEAP+EnMS measures implementation

The commitment signed by LA of Sovizzo is aimed to support European policies for the fight against climate change and focused on achieving the EU targets for 2020, that is:



—Figure 2 20-20-20 target of the Covenant of Mayors initiative

The EnMS implementation has been driven by the interest to use public resources more efficiently in order to reduce the impact of energy costs on the Municipal budget and to be able to improve the quality of public service to the citizens. Moreover, EnMS allowed improving the image of the Municipality.



—Figure 3 Sovizzo energy sustainability path to ISO 50001

"The integration between the two instruments SEAP+EnMS has allowed the Municipality and the territory to achieve important results in reducing energy costs and environmental impacts"

—Figure 4 Marilisa Munari, Mayor of the Sovizzo Municipality

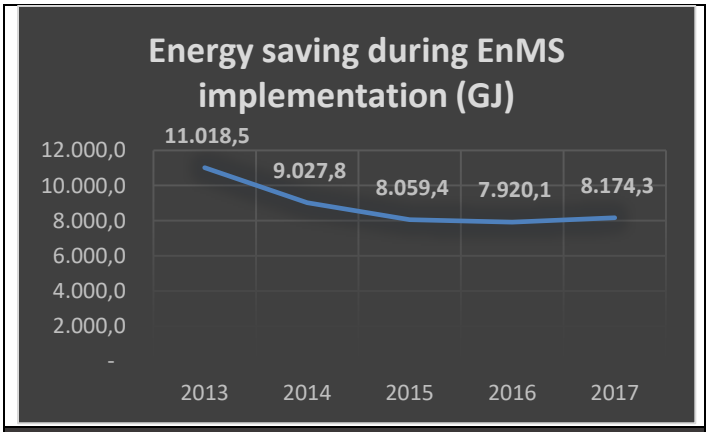
Business Benefits Achieved

Attention to the environment and to energy sustainability are one of the priorities of the Sovizzo municipal administration, together with the protection of the territory and the landscape, as central elements with a view to sustainable development. The concrete action towards the implementation of policies aimed at the energy and environmental sustainability of the Local Authority and the territory has been realized through the development, implementation and continuous monitoring of the SEAP and of its Energy Management System.

The ISO 50001 certificate proves the implementation of the Energy Management System in three main public sectors (boundaries of the system):

- Public buildings (includes 8 buildings including Schools, facilities and cultural buildings for associations with a total surface of 8,968 m^2)
- Public street lighting (includes 1,525 luminaires);
- LG vehicle fleet (includes 8 vehicles);
- PV plants installed on Public Buildings (2 PV plants for a total of 23 kW installed).

EnMS implementation provide a total energy saving about 2,844 GJ in 2017 compared with 2013 (EnMS baseline). Energy saving measures are annually planned, implemented, monitored and reviewed through appropriate Energy Performance Indicators.
Annual total consumption of electricity, natural gas and fuels of the sectors mentioned is about 8,174 GJ in 2017.

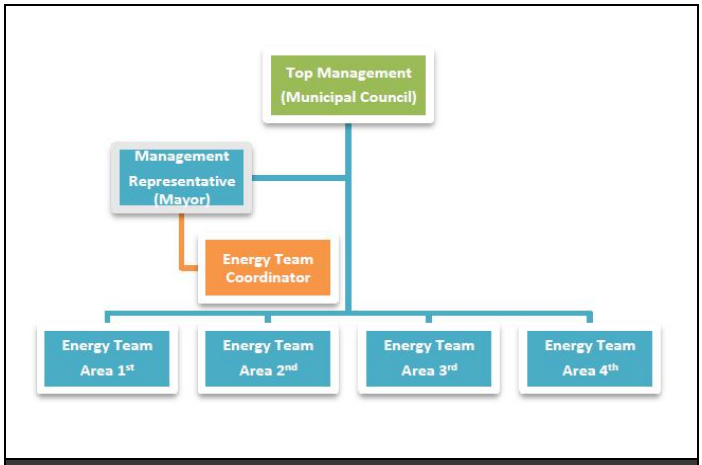


—Figure 5 Energy saving achievements

EnMS Development and Implementation

Organizational

The LA Administration has defined internal rules and responsibilities in order to develop and implement ISO 50001 integrating its energy policy in the activities of the Municipality. Continual energy improvement and CO_2e reduction has become a fundamental criterion reflecting the energy policy of the Municipality. Internal and external responsibilities and communication were established. The Energy Management structure coordinated by the certified internal auditor consists of the energy team whose members include:



—Figure 6 Energy Management System internal organization in Sovizzo Municipality

Area	Services
Area 1st General Secretariat and Staff Services Sector	Administrative and Quality Management, internal organization and Contracts
Area 2nd – Finance and Taxes Sector	Public Procurement
	Public tenders
	Accountancy
Area 3rd – Public Works and Urban Planning Sector	Technical office
	Design
	Public Works
	Public Building maintenance
	Public Lighting maintenance
	Data analysis
Area 4th – Urban Planning and Environment	Urban Planning
	Environmental management
	Waste-Water management
	Unique Desk for Productive Activities

Table 1 Energy team members per Area

Energy review and planning

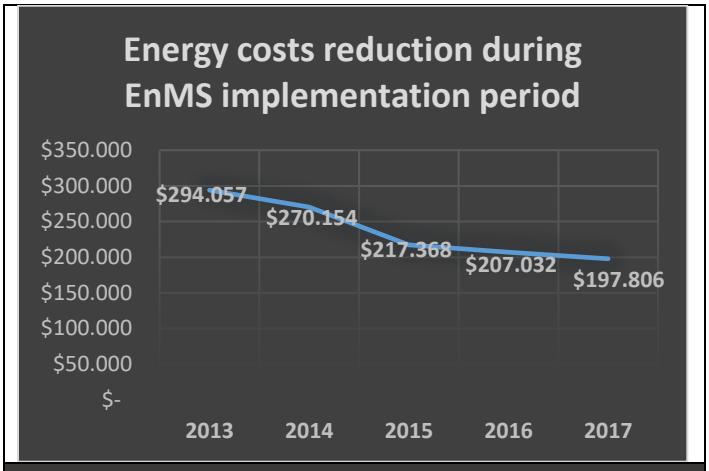
An annual initial Energy Review based on real energy consumption identify:

- Past and present energy uses;
- Significant and non-significant energy uses according with a specific and formal significance index (defined in the Management Review);
- Appropriate opportunities for improvement in the future (defined according to the Energy Review and resource availability coming from the LA economic budget);
- Additional opportunities of improvement deriving from the optimization of the operational control;
- Persons whose work for or on its behalf the LA related to significant energy uses (including buildings and facilities users and suppliers of energy goods and services)

Sovizzo Municipality defined specific energy baseline for single energy use according with formal criteria defined in the Energy Review which are annually reviewed in the Management Review. All energy uses in terms of energy consumed/produced (electricity and gas in buildings, facilities and infrastructures; electricity in public lighting; fuels in vehicle fleet and PV plants power production) are registered monthly. These registrations are compared with significance index in order to generate a sites load breakdown and identify significant energy uses. The monthly monitoring of the energy performance of each site under the LA control provides a continual operational control and represents a fundamental element of the continuous energy performance improvement. Monthly review of the EnPIs evaluated through factors used to normalize data are carried out by the Energy Team members under the internal certified auditor control and coordination. The EnPIs inform the energy key performance indicator which is reported monthly to the Management Representative and to the Top Management. Energy Management Action Plan is prepared and reviewed yearly. The Action Plan is populated with projects from energy saving opportunities and operational control improvement.

Cost-benefit analysis

Since achieving ISO 50001 the LA has achieved $93,451 savings from investments of $1,232,378 (investments in energy efficiency measures planned and implemented 2014-2017) over 4 years reducing its energy consumption over 2,800 GJ.



—Figure 7 Annual energy costs reduction

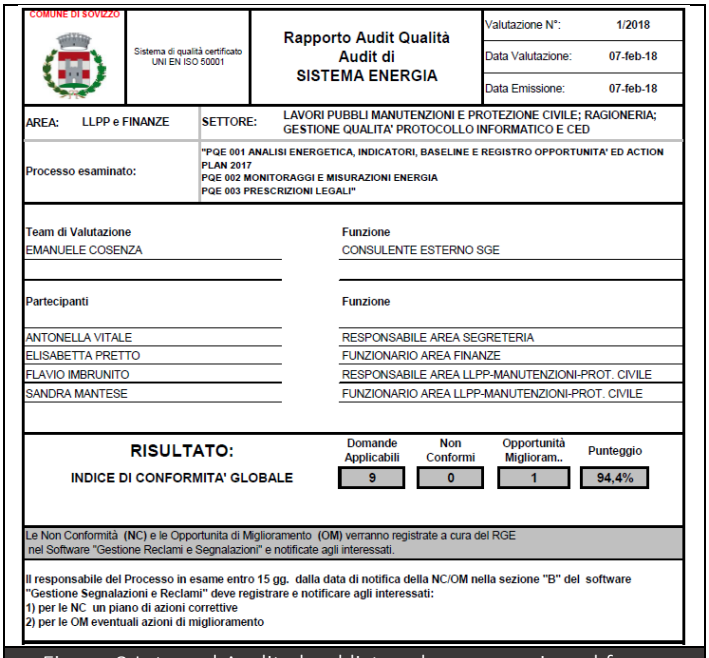
Approach used to determine whether energy performance improved

The continuous monitoring of the energy performance of the LA's assets is the key characteristic of the Sovizzo EnMS achievements. Monthly data collection, registration, analysis and evaluation according specific EnPIs provides a clear vision about the significant impacts on energy uses in the organization. An adequate definition of the EnPIs constitute a fundamental element of the EnMS quality. Annual review of the EnPIs is carried out by the Energy Team and is subject to Management Review evaluation. In case of deviations which exceed a certain threshold with respect to the reference consumption these are immediately analyzed by the Energy Team member who have in charge the data analysis process. Deviations are immediately and formally communicated to the Coordinator and to the maintenance staff in order to act and report the corrective action effectiveness. The overall performance of the organization is annually reviewed as part of the Management Review. The EnPIs inform the energy performance reached to the top management according with the Energy Action Plan measures annually planned and officially approved.

Approach used to validate results

The compliance with EnMS requirements (including Legal requirements) and internal procedures is daily monitored by the internal Quality Management department. The Quality Management has in charge the evaluation of the administrative services provided in accordance with the organization's quality and energy policy. The two Management System in place in Sovizzo Municipality (ISO 9001 and ISO 50001) are integrated.

Internal audits led by certified internal and external auditors provide for the assessment of technical and system aspects of the EnMS. Energy Team Coordinator (expert internal auditor) ensures that internal auditors are trained and certified as junior/expert auditor. For external auditor the level required is certified expert auditor. An Energy Audit Schedule is developed annually taking into consideration the status of current EnMS implementation level and the previous audits results. Audit results are recorded in the Energy Audit checklist which provide a score on requirements/conformities. The score assigned by the audit contributes to decreeing the EnMS improvement status achieved.



COMUNE DI SOVIZZO

Sistema di qualità certificato UNI EN ISO 50001

Rapporto Audit Qualità Audit di SISTEMA ENERGIA

Valutazione N°:	1/2018
Data Valutazione:	07-feb-18
Data Emissione:	07-feb-18

AREA: LLPP e FINANZE	SETTORE: LAVORI PUBBLI MANUTENZIONI E PROTEZIONE CIVILE; RAGIONERIA; GESTIONE QUALITA' PROTOCOLLO INFORMATICO E CED
Processo esaminato:	"PQE 001 ANALISI ENERGETICA, INDICATORI, BASELINE E REGISTRO OPPORTUNITA' ED ACTION PLAN 2017 PQE 002 MONITORAGGI E MISURAZIONI ENERGIA PQE 003 PRESCRIZIONI LEGALI"

Team di Valutazione	Funzione
EMANUELE COSENZA	CONSULENTE ESTERNO SGE

Partecipanti	Funzione
ANTONELLA VITALE	RESPONSABILE AREA SEGRETERIA
ELISABETTA PRETTO	FUNZIONARIO AREA FINANZE
FLAVIO IMBRUNITO	RESPONSABILE AREA LLPP-MANUTENZIONI-PROT. CIVILE
SANDRA MANTESE	FUNZIONARIO AREA LLPP-MANUTENZIONI-PROT. CIVILE

RISULTATO:	Domande Applicabili	Non Conformi	Opportunità Miglioram..	Punteggio
INDICE DI CONFORMITA' GLOBALE	9	0	1	94,4%

Le Non Conformità (NC) e le Opportunita di Miglioramento (OM) verranno registrate a cura del RGE nel Software "Gestione Reclami e Segnalazioni" e notificate agli interessati.

Il responsabile del Processo in esame entro 15 gg. dalla data di notifica della NC/OM nella sezione "B" del software "Gestione Segnalazioni e Reclami" deve registrare e notificare agli interessati:
1) per le NC un piano di azioni correttive
2) per le OM eventuali azioni di miglioramento

—Figure 8 Internal Audit checklist and scores assigned for EnMS requirements/procedures/performances under evaluation

—Figure 9 Energy and Quality Management System in place in Sovizzo Municipality

Steps taken to maintain operational control and sustain energy performance improvement

Sovizzo Municipality established formal procedures, modules and criterion to identify significant energy uses. Procedures and modules to control these uses are in existence and annually reviewed during the Management Review. Quality and Energy Management System procedures (ISO 9001 and ISO 50001) are integrated. Design, Legal requirements and Procurement procedures are used to monitor the LA's purchase of services and products which could have a direct impact to energy consumption. The procedures use is currently part of the daily life of the Administration in order to comply with the Energy Policy targets and deliver sustainable and efficient services to the population. Non-conformities and potential non-conformities are identified and adequately corrected through corrective and preventive actions. The monthly monitoring of the energy performance together with a direct relationship between the maintenance staff and the energy and services suppliers ensure that non-conformities are managed in line with Energy Management System targets and Policy.

Development and use of professional expertise, training, and communications

Since 2008 the LA is member of the Italian "Quality Management Association of LAs" certified by DASA Rägister. The Association provides specific training to Sovizzo administrative employees on Quality and Energy Management. Furthermore external EnMS certified professional experts from SOGESCA provide technical support to the LA in the EnMS activities. The organization energy performance is communicated internally and externally. Internally the performance is communicated to employees and to other personnel working for or on behalf the organization through monthly emails. Externally is communicated to the personnel working/operating in Public Buildings and Facilities (including Schools, Sport facilities, Culture Associations etc) and to the population in according with the SEAP requirements though the LA's website, road signs on the entry vectors in the Town and local press articles. Furthermore the Energy Performance as benchmark of excellence is communicated at European level through the Covenant of Mayor platform in the session dedicated to the LA.

—Figure 10 Sovizzo Road Sign "Town Certified Quality and Energy"

Tools & resources

Procedures, modules and energy performance are managed through the internal software for Quality management.

Lessons learned

- Investment to improve the energy performance guarantees a very short payback time;
- Savings guaranteed by efficient energy management decrease environmental impact and generate additional resources for citizens;
- EnMS are perfectly adaptable also in LAs with important results on costs and energy saving;
- When hardware improvements are implemented, operational control could makes the difference in energy performance achievements

Keys to Success

- Top Management commitment
- Trained Energy Team
- Employee engagement and motivation
- Availability of technical skills and resources

—Figure 11 EnMS Recertification in Sovizzo with IMQ Certification Body and the National Accreditation Body (ACCREDIA) as observer

"Energy performance improvement achieved has been an example for citizens. LA has a fundamental role in spreading a culture of environment protection."

—Mrs Antonella Vitale, Energy Team Coordinator

Through the Energy Management Working Group (EMWG), government officials worldwide share best practices and leverage their collective knowledge and experience to create high-impact national programs that accelerate the use of energy management systems in industry and commercial buildings. The EMWG was launched in 2010 by the Clean Energy Ministerial (CEM) and International Partnership for Energy Efficiency Cooperation (IPEEC).

For more information, please visit *www.cleanenergyministerial.org/energymanagement*.

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