

# Monitoring and evaluation of Sustainable Energy Action Plan: Practice and perspective



Ilaria Delponte<sup>a</sup>, Ilaria Pittaluga<sup>b</sup>, Corrado Schenone<sup>b,\*</sup>

<sup>a</sup> DICCA – Department of Civil, Chemical and Environmental Engineering, University of Genova, Genova, Italy

<sup>b</sup> DIME – Department of Mechanical Engineering, University of Genova, Genova, Italy

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## ABSTRACT

The Sustainable Energy Action Plan (SEAP), promoted by the Covenant of Mayors, is a key tool for policies aimed at reducing fossil fuel consumption and GHG emissions, in accordance with the Kyoto protocol and its updates. To achieve an actual implementation of the SEAP and to obtain its expected targets, monitoring is a crucial component. SEAP monitoring has to look at both the progress of each single action and its global environmental effect, which requires more than one level of development. In the present paper, an integrated strategy for surveying, controlling and managing the SEAP through a “Monitoring and Evaluation” (M & E) process is introduced. The implementation in the city of Genova, Italy, was used to test the efficacy of this approach and to assess its strengths and weaknesses. In particular, cost benefit analysis, bankability, peer review and participatory level were identified as key elements for obtaining an operative SEAP monitoring and for then fostering an effective environmental energy policy. Some recommendations were proposed to better outline the “Monitoring and Evaluation” methodology and to help other cities to define a strategy for SEAP monitoring and fulfilment.

## 1. Introduction

In consequence of the adoption of the Renewable Energy and Climate Change Package in 2008, the European Commission launched the Covenant of Mayors (CoM) initiative at the local government scale. This initiative had the aim of sparking and supporting the efforts of municipal administrations, a basic unit of the public administration, in the process of actualizing energy and climate change policies (Derissen et al., 2011). The CoM initiative, launched on 29th January 2008, and the planning tool it promotes, the Sustainable Energy Action Plan (SEAP), are located within this framework and foster the implementation of EU commitments for the Kyoto Protocol with unilateral and voluntary participation of European cities (Alberti and Marzluff, 2004).

During the last several years, the SEAP has become a key tool for developing municipal energy policies, and more than 6989 cities (October 2016) inside and outside EU have joined this initiative (Covenant map). CoM has therefore been assuming an increasing role in achieving the targets of the Kyoto Protocol and, now, of the Paris Agreement. In addition, CoM has been recently heralded by Canete (COP21: EU institutions strengthen alliance with cities through New

Covenant of Mayors for Climate and Energy) as “the world's biggest urban climate and energy initiative”. The success of this initiative and its ongoing evolution called Sustainable Energy and Climate Action Plan (SECAP) (Q & As for cities) do not remove the complexity and problems of the SEAP implementation.

The SEAP operates as a dynamic tool to be upgraded and optimized based on the obtained results of compliance with EU objectives concerning GHG reduction. From the methodological point of view, the SEAP is based on the results of the “Baseline Emission Inventory” (BEI), which quantifies the energy consumption and CO<sub>2</sub> emissions of an urban territory for the adopted reference year and identifies several short-term (ST) and long-term (LT) actions in different priority areas to be developed in order to obtain the expected GHG reduction. Planning, implementation and monitoring are the three integrated phases by which SEAP goals can be achieved through a coordinated initiative at the municipal level involving public institutions, private stakeholders and citizens.

Monitoring is a key component of the cyclical process of continuous improvement and refinement characterizing the SEAPs, conceived of as dynamic and evolving tools. In fact, during its implementation, the

Abbreviations: BEI, Baseline Emission Inventory; CEA, Cost Efficacy Analysis; CBA, Cost Benefit Analysis; CoM, Covenant of Mayors; CoMO, Covenant of Mayors Office; DBs, Data Bases; JRC, Joint Research Centre; MCDA, Multi Criteria Decision Aid; M & E, Monitoring and Evaluation; MEI, Monitoring Emission Inventory; SEAP, Sustainable Energy Action Plan

\* Correspondence to: DIME, University of Genova, Via all'Opera Pia 15A, 16145 Genova, Italy.  
E-mail address: [corrado.schenone@unige.it](mailto:corrado.schenone@unige.it) (I. Delponte).

Sustainable Energy Action Plan has to address changing needs and face evolving scenarios. Technological innovation, public policies, economic situation and regulatory framework continuously change, thus demanding a corresponding evolution throughout the whole progress of the SEAP (Schenone et al., 2015). In this sense, the monitoring activities are a crucial opportunity not only to assess the level of implementation but also to evaluate the planning process and to tune the provided measures, according to changes and events.

Following the CoM vision, during the SEAP implementation, the local territory tends to increase its environmental quality through a process of continuous improvement and the relative assessment in subsequent steps. This perspective is well described by the term “monitoring and evaluation” (M&E) that, as clearly evidenced by Annecke (Annecke, 2008), properly represents this dual but integrated process. A successful implementation of the SEAP and, more generally, of an effective urban policy for real GHG emissions reduction, strongly depends on this iterative process of continuous checking and refinement. This result cannot be achieved through only monitoring activities tracking the SEAP actions progress, such as those stated in the CoM monitoring guidelines (Covenant of Mayors Office (CoMO) “Reporting Guidelines on Sustainable Energy Action Plan and monitoring”). Conversely, it requires a thorough integration of survey, control and planning. The word “evaluation” in this context means the assessment of the efficacy of each single action, the ranking of the options to maximize their impact and the decision concerning further steps to be promoted to strengthen the sustainable energy planning. This process is not simple, and diverse experiences (Kona et al., 2015) have shown that SEAP M & E deserves close attention because of the key issues that often hinder an effective implementation of this practice.

In this respect, starting from ideas proposed by the CoM about monitoring, the literature survey and a case study experience (Municipality of Genoa, Italy), the authors address a few main questions. Selected actions are supposed to be able to produce expected GHG reduction, but the track of their implementation and the updates showed that this is not sufficient. Then, after establishing the plan, is there another type of “step” that can be taken to periodically test whether the actions are still efficient or not, considering the current scenario? Monitoring is a tool that has to be considered within the framework of energy planning itself: but how it can become an efficient tool to contribute to the concrete realization of the measures?

After a literature review, this paper illustrates the strategy for SEAP monitoring and deploys the case of the Genoa SEAP for reflections based on field experience. Then, a discussion around the above mentioned main questions is provided, together with a set of recommendations that aim to improve the “evaluation side” of the monitoring process implemented so far.

## 2. Background and state-of-the-art

It is a shared idea that only through accurate monitoring activities and tracking progress can real SEAP implementation can be achieved. In 2014, the Covenant of Mayors Office (CoMO), in collaboration with the Joint Research Centre (JRC) of the European Commission, released the “Reporting Guidelines on Sustainable Energy Action Plan and Monitoring” document (Covenant of Mayors Office (CoMO) “Reporting Guidelines on Sustainable Energy Action Plan and monitoring”), a tool aimed to control and check the progress of SEAPs. For the implementation of a Sustainable Energy Action Plan in fact, after planning, has to take into account the changing and updating needs, the knowledge scenario and the related administration initiatives; simultaneously, the territory feedback and the economic and regulatory framework also need to be considered. In this sense, monitoring activities are supposed to be the way to control processes and to recalibrate objectives and instruments of implemented measures. The assessment phase deriving from the monitoring should be able to refine the approach in light of the needs and difficulties. Thus, through a multi-stage strategy, we are

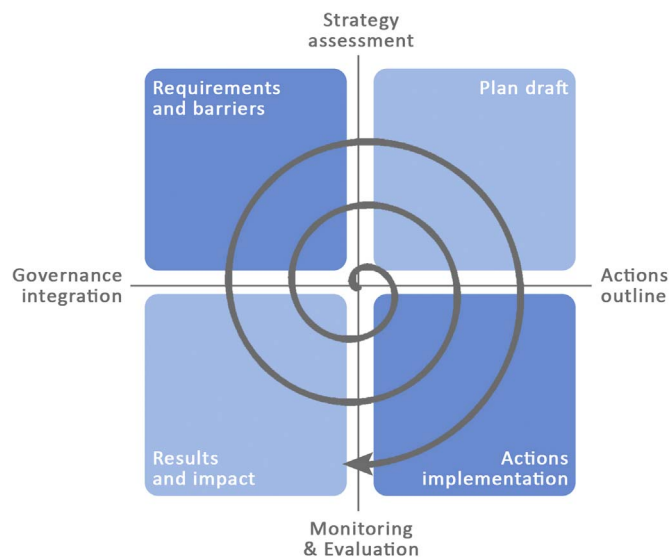


Fig. 1. Cyclical monitoring process of SEAPs.

able to develop virtuous tools for the implementation of actions, according to the cyclic process depicted in Fig. 1.

From the operative standpoint, as stated in SEAP Guidelines (How to develop a Sustainable Energy Action Plan (SEAP) – Guidebook Part II \_ Baseline Emission Inventory), CoM signatories are committed to producing two documents after the SEAP submission. The first one, to be submitted every two years, is an implementation report containing qualitative and quantitative information on interventions to evaluate, monitor and verify the status of the Action Plan (SEAP Implementation Status) and its effect; the second one is an update of the CO<sub>2</sub> emission inventory, named the Monitoring Emission Inventory (MEI), to be compared with the Baseline Emission Inventory (BEI) for monitoring the progress in terms of emission reductions every four years. CoM provides a monitoring template for the SEAP Implementation Status, in which every measure presents new fields to be filled in such as staff capacity allocation, overall budget spent so far and, where possible, main barriers encountered during SEAP implementation.

Therefore, according to CoM, the term “monitoring” is a process in which emission assessment and status of the administrative machine are tested. This can be sufficient for providing information about the adopted plan after a set of years; however, this would be not effective enough for a well-designed environmental plan. The word “monitoring” in the energy field quite often refers to the post-completion test of the different action implementations for waste recovery, plant efficiency, consumption reduction etc., becoming a synonym of energy “balance” compared with a reference year. Many methods were applied: Boonekamp (Boonekamp, 2004) added that the analysis of the trends is typically followed by influencing and explanatory factors, which are given as endogen or hexogen factors of misalignment.

Multi-criteria methodologies were also adopted, but, in this case, only for the SEAP planning phase and not for the monitoring phase (Dall’O’ et al., 2013); scenario simulation, modelling tools and decision methods applied in the plan’s preparation phase were not considered (Mirakyan and De Guio, 2013). Multi-criteria decision aids (MCDAs) are useful in determining the right mix of energy systems and technologies for optimizing investments within certain boundaries and constraints. However, they have mainly been applied for evaluating the efficiency of a single energy plant or technological solution and not of an entire strategy, taking into account a set of criteria to be contemporarily respected (Lehtilä and Pirilä, 1996; Løken, 2007; Pohekar and Ramachandran, 2004; Tsoutsos et al., 2009).

The purpose here is to introduce an M & E practice into the SEAP process to control and foster the sustainable energy plan through a dynamic mechanism. A survey on what “monitoring” and “evaluation”

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