Municipal Energy Planning and Monitoring Approaches and Tools

A comparative analysis

Version 2.0 for comments

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This summary brief has been prepared for the **Swiss State Secretariat for Economic Affairs** (SECO). SECO has implemented projects in Rumania and in the Ukraine with the European Energy Award (eea) label. It has chosen this approach because currently, more than 700 municipalities in Switzerland covering about 4.5 Mio inhabitants are using it successfully with 385 being certified. Therefore, the present comparative analysis puts a particular focus on the European Energy Award and how it compares to similar approaches used in international contexts, with the goal to find ways to cooperate and leverage important synergies.

This analysis provides a brief overview and **comparative analysis of Municipal Energy Planning and Monitoring Approaches and Tools**. The first section (*Section I*) presents an overview of six (6) of the most commonly referenced international approaches and tools for energy and climate management. *Section II* identifies some of the distinctive characteristics of the approaches, summarised in table 1.0. *Section III* proposes a discussion of the potential value added of the European Energy Award when adopted by a country and local authorities, highlighting comparative strengths as well as some of the main challenges related to the unique approach of the eea. The brief concludes with (*Section IV*) a discussion on how the eea combines with other approaches and tools analysed in this paper, showing how countries can effectively engage in more than one approach at a time.

Disclaimer: The information and data used in this paper have been collected based on desk review; no interviews were conducted so far to get more specific and empirical information. The analysis should therefore be considered as a work-in-progress.

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I. Overview of approaches and tools

This section provides a brief summary of the approaches and tools assessed in this paper. The list is not exhaustive but represents a selection of the most widely used approaches internationally, including in developing and emerging economies.

European Energy Award

Creation	The European Energy Award (eea) was established in 2003, based on the Swiss "*Energiestadt/Cité de l'énergie*" Label (1990). The founding countries are Switzerland, Austria and Nordrhein-Westfalen (Germany).
Management	At the international level, the eea is managed by the International Office (IO), based in Zurich (Switzerland) of the Forum European Energy Award, an Association (e.V.) registered in Germany. At national levels, designated National Authorities are charged with managing the national eea processes and certification.
Currently involved	1346 municipalities, 40 million inhabitants, 8 countries (+3 pilot countries)

The European Energy Award (eea®) is a quality management and certification system for municipalities and regions. It supports local authorities in establishing interdisciplinary planning approaches and implementing effective energy and climate policy measures. The national/ regional eea organisation refers the municipality to an accredited eea advisor, who provides technical and organisational support to the municipality throughout the entire eea process. **The eea is based on a process of continuous improvement, ensuring that committed municipalities continually increase their energy efficiency, the use of renewable energies and sustainable mobility approaches.** The process includes the following steps:

1- **High-level commitment**: Municipalities take a top-level decision to enter the eea process. They designate staff for this purpose and register with the national/regional eea organisation before they continue with the process.

2- **Energy Team**: The municipality sets up a working group charged with implementing the eea process. The team is composed of municipal key persons, which may include other local public agencies and civil society/ private sector representatives.

3- **Initial energy review:** Based on the eea-Management-Tool (EMT), the Energy Team and eea advisor review the municipality's current energy and climate policy, achievements, impacts and areas that provide potential for improvement. From this initial energy review a report sets out the municipality's individual profile of strengths and weaknesses. The eea tools take into account a municipality's full scope of action regarding energy and climate protection policy based on six (6) areas: urban and spatial planning; municipal buildings and infrastructure; supply and disposal; mobility; internal organization; cooperation and communication.

4- **Energy policy program:** Based on the results of the initial energy review, the Energy Team prepares an energy policy program, with a binding set of activities for subsequent years and sets out responsibilities and deadlines.

5- **Project implementation**: Policymakers, public administration and private stakeholders implement the municipal activities program. Guidance for decision-making and implementation may be delivered through the national eea organisation, depending on the country.

6- **Monitoring and internal auditing**: The Energy Team and the eea advisor conduct an annual, internal audit in order to review the status of implementation of activities and check for the achievement of locally set targets.

7- **External audit (every four years):** If the internal audit shows that a municipality has reached at least 50% of the 79 measures proposed, it is referred to an external audit, which must be completed and renewed every four years.

8- **Certification and award**: Once both the eea auditor and the national eea committee have confirmed a municipality's outstanding energy and climate performance, based on the results of the external audit, the municipality is awarded the European Energy Award® or the European Energy Award® Gold label (if it has reached more than 75% of total measures).

Covenant of Mayors

Creation	The Covenant of Mayors (CoM) was launched by the European Commission in 2008, after the adoption of the European Union Climate and Energy Package the same year.
Management	At the international level, the Covenant of Mayors Office (CoMO), located in Brussels, Belgium, is responsible for the coordination and operational management of the initiative. The CoM Joint Research Centre (JRC), based in Italy, is the scientific and technical arm of the European Commission. It works in close co-operation with the CoMO to provide signatories with clear technical guidelines and templates in order to assist delivery of their Covenant of Mayors commitments as well as to monitor implementation and results. At national levels, Covenant Coordinators provide strategic guidance, financial and technical support to signatory cities; and Covenant Supporters (e.g. networks of local authorities) are charged with promotional activities and facilitating the sharing of experience.
Currently involved	6030 signatories, 212 Million inhabitants, 57 countries

After the adoption in 2008 of the EU Climate and Energy Package, the European Commission launched the Covenant of Mayors (CoM) to endorse and support the efforts deployed by local authorities in the implementation of sustainable energy policies. As the only movement of its kind mobilising local and regional actors around the fulfilment of EU objectives – the Covenant of Mayors is often considered an exceptional model of multi-level governance by European institutions.

The Covenant of Mayors is a **step-by-step initiative aimed to facilitate the development of local Sustainable Energy Action Plans (SEAPs) for cities to reduce emissions by 20% until 2020, based on a GHG emissions inventory referring to a baseline year and compared to a "business as usual" curve.** Specifically, signatories of the CoM agree to:

- Prepare a Baseline Emission Inventory within the year following adhesion;
- Submit a SEAP (approved by the municipal council) within the year following adhesion (a lengthy and detailed guidelines document for SEAP preparation is available);
- Publish periodically (every 2 years after submission of their SEAP) *Implementation Reports* stating the degree of implementation of the action plan and the interim results;
- Promote their activities and involve local citizens/stakeholders, including the organisation of *Local Energy Days*; and

- Spread the message of the CoM, encouraging other local authorities to join and by contributing to events and thematic workshops.

Tool for Rapid Assessment of City Energy[1]

Creation	The Tool for Rapid Assessment of City Energy (TRACE) was developed by the Energy Sector Management Assistance Program (ESMAP), a global technical assistance programme administered by the World Bank in 2010.
Management	The tool can be downloaded from the ESMAP website. In a partnership with ESMAP, the World Bank Institute provides a TRACE e-learning course for the use of TRACE by city governments and their partners.
Currently involved	27 cities, 45 million inhabitants, 17 countries.

The Tool for Rapid Assessment of City Energy (TRACE) was developed in 2010 by the World Bank and is a **decision-support tool designed to help cities quickly identify under-performing sectors, evaluate improvement and cost-saving potential, and prioritize sectors and actions for energy efficiency (EE) intervention**. It covers six (6) municipal sectors: passenger transport, municipal buildings, water and wastewater, public lighting, solid waste, and power and heat.

TRACE consists of three modules to be undertaken over a 3-month period: an **energy benchmarking** module which compares 28 key performance indicators (KPIs) among peer cities, a **sector prioritization** module which identifies sectors that offer the greatest potential with respect to energy-cost savings (e.g. urban transport, buildings, water and wastewater management, public lighting and municipal waste), and an **intervention selection** module which functions like a "playbook" of 60 tried-and-tested energy efficiency measures from over 190 case studies and helps select locally appropriate energy efficiency interventions.

TRACE is designed with the intention to involve city decision makers in the deployment process. It starts with benchmark data collection, goes through an on-location assessment involving experts and decision makers, and ends with a final report to city authorities with recommendations of EE interventions tailored to the city's individual context.

Compact of Mayors

Creation	The Compact of Mayors was launched at the 2014 United Nations Climate Summit by UN Secretary-General Ban Ki-moon and his Special Envoy for Cities and Climate Change, Michael R. Bloomberg.
Management	On an international level, the reporting platforms (carbon*n*® Climate Registry) and the CDP (formerly Carbon Disclosure Project) are respectively managed by the Bonn Centre for Local Climate Action and Reporting (carbon*n*® Centre), hosted by the Local Governments for Sustainability (ICLEI) World Secretariat in Germany, and by the CDP headquartered in London, United Kingdom. There are no management structures at national levels. The Compact of Mayors is a public reporting space for cities to report independently on their climate data, via the Web.

[1] TRACE will be included in the comparative table as part of the World Bank's SUEEP Approach.

Currently involved	392 cities, 362 Million inhabitants, 78 countries.

The Compact of Mayors was launched by UN Secretary-General Ban Ki-moon and his Special Envoy for Cities and Climate Change, Michael R. Bloomberg, under the leadership of the world's global city networks – C40 Cities Climate Leadership Group (C40), ICLEI – Local Governments for Sustainability (ICLEI) and the United Cities and Local Governments (UCLG) –with support from UN-Habitat, the UN's lead agency on urban issues[2]. The Compact of Mayors is a global coalition of mayors and city officials committing to **reduce local greenhouse gas emissions, enhance resilience to climate change and track their progress publicly**. It is an agreement by city networks – and by their members – to fight climate change in a consistent and complimentary manner to national efforts.[3]

The Compact (i) collects climate data that cities are already reporting in a transparent manner and makes it available on a single platform; (ii) builds on existing cooperative efforts, partnering with other initiatives to better measure and communicate the impact of city action; and (iii) brings attention to, and quantifies, city action and its impact.

Cities engaged with the Compact commit to the following mitigation and adaptation measures:

a. *Mitigation:* reduce GHG emissions, measure community emissions, set data-based targets for the future, develop climate action plans

b. *Adaptation:* address the impacts of climate change, identify climate hazards, assess vulnerabilities, develop climate adaptation plans

Cities are expected to register and report data through the carbon*n* Climate Registry or CDP platform (formerly the "Carbon Disclosure Project"). Based on a GHG inventory and identification of climate hazards, the city will set its own measurable targets, based on which it will establish action plans to (a) reduce GHG emissions and (b) adjust to actual and expected climate change impacts. The establishment of the action plan is based on the CURB tool (see below) simulating expected climate impacts of planned actions. **Once the action plans are established, the city has met all of the Compact of Mayors requirements. It will be expected to report its progress on mitigation and adaptation annually**.

Climate Action for Urban Sustainability (CURB)[4]*: Energy and Climate Impact Modelling Tool*

Creation	The Climate Action for Urban Sustainability (CURB) Tool was pre-launched by the World Bank in a partnership with AECOM during the COP20 in Lima, Peru, and officially launched in 2015 in a partnership with C40.
Management	World Bank (TBC)
Currently involved	No data found

CURB is a dynamic modeling and simulation tool that helps municipal governments and local climate planners **understand the energy and emission implications of specific climate interventions**. In addition to a benchmarking system that allows cities to see how their carbon and energy performance

[2] http://www.compactofmayors.org/history/.

[3] http://www.compactofmayors.org/content/uploads/sites/14/2015/07/Compact-of-Mayors-Full-Guide_July2015.pdf.

[4] CURB will be included in the comparative table as part of the Compact of Mayors approach.

compares to other cities, CURB is aimed to help local climate planners **assess which strategies make the most sense from a cost and performance perspective**.

The CURB Tool helps cities simulate the projected impacts of municipal policies or technology intervention on energy demand, energy spending, and GHG emissions (it might further include air quality impacts, currently under discussion). The impacts are put in the perspective of a city's overall energy profile (based on the city's data on current performance, e.g. a GHG emissions inventory). The simulation helps cities (a) understand the *projected emissions/ energy demand trajectory* in a business-as-usual scenario, (b) set local *emissions/ energy targets* and (c) *prioritize interventions* based on expected cost savings, emission abatement and complexity/cost of implementation. Financial implications include lifetime implementation costs and annual savings. Impact modeling draws upon a set of data provided by the city on current energy performance, and a considerable amount of global data.

ISO 50001 - Energy management systems – Requirements with guidance for use

Creation	The ISO 50001 was developed in 2011 as a voluntary International Standard by the International Organisation for Standardisation (ISO)
Management	ISO certification is delivered by accredited certification bodies (ISO does not directly deliver certifications)
Currently involved	Currently used by private enterprises (1115 in Germany; 15 in Japan); and to a smaller extent in public institutions (35 in France; 120 in Spain; 85 in Denmark)

ISO 50001 (established in 2011) is a voluntary International Standard developed by ISO (International Organization for Standardization) developed for organizations to establish the systems and processes necessary to improve energy performance, including energy efficiency, use, and consumption. Implementation of this standard is intended to lead to reductions in GHG emissions, energy cost, and other related environmental impacts, through systematic management of energy.

More precisely, ISO 50001 establishes a framework for industrial plants; commercial, institutional, and governmental facilities; and entire organizations to manage energy. Targeting broad applicability across national economic sectors, it is estimated that the standard could influence up to 60 % of the world's energy use[5]. ISO 50001 is aimed to provide organizations, such as municipalities, with a **recognized framework for integrating energy performance into their management practices, increase energy efficiency and reduce costs**.

The standard **specifies requirements of an energy management system (EnMS)** for an organization (e.g. municipality) to develop and implement an energy policy, establish objectives, targets, and action plans, which take into account legal requirements and information related to significant energy use. ISO 50001 follows the **Plan-Do-Check-Act process for *continual* improvement of an organization (e.g. city)'s internal energy management system**. It provides a framework of requirements enabling organizations to (1) develop a policy for more efficient use of energy, (2) fix targets and objectives to meet the policy, (3) use data to better understand and make decisions concerning energy use and consumption, (4) measure the results, (5) review the effectiveness of the policy, and (6) continually improve energy management.

[5] http://www.iso.org/iso/iso_50001_energy.pdf.

II. Overview of distinctive characteristics

The following section provides an overview of distinctive characteristics associated with the approaches and tools listed above. The overview (to be further refined in following versions of this analysis) assesses a number of indicators to point out some of the main differences and complementary characteristics of each approach/ tool, with a particular focus on the eea and its distinctive characteristics compared to other tools.

The following indicators have been assessed in a comparative table (Table 1.0):

1- ***Climate change mitigation versus adaptation-oriented measures****:* The eea is the only tool of those assessed that includes, to a very minor extent though, adaptation measures.

2- ***Main target user****:* City-governments in most cases, with the exception of ISO 50'001 targeting organisations more generally, including but not limited to municipal administration.

3- ***Process Governance***: With the exception of the Covenant of Mayors in developing country contexts, the eea is the only approach proposing (and recommending) a very active engagement of the National Government (e.g. National designated eea authority).

4- ***Project Planning Cycle Phases covered***: Most approaches cover the three initial stages of the Planning Process (commitment, diagnostic and planning). The eea, through its national offices, is the only one to deliver tools for project implementation. Based on an annual monitoring process, the eea and ISO 50'001 are the only approaches proposing certification schemes.

5- ***Duration of the full cycle****:* The establishment of an action plans lasts between two months (eea) and 3 years (Compact of Mayors)[6], depending on the city-size and the level of details to be included in the plan. Certification must be renewed every 4 years for the eea, and every 3 years for ISO 50'001.

6- ***Cost of Implementation/ Business Model***: The cost of engaging with a particular approach or tools is assessed from both a municipal and a national perspective, indicating additional/ external financing sources. The eea is the only approach to be expected to "stand alone," with no or very little subsidies for initial reviews, planning and monitoring. This means that municipal and national governments are expected to pay (annual member and licence) fees. With the exception of ISO, where organisations pay a lump sum of EUR 100 to use the norm, the use of all other tools is "free of charge" for municipal and national governments, thanks to subsidies provided by international organisations (e.g. EU, World Bank, international donors, etc.). Fees for pilot and developing countries have been substantially reduced (e.g. Morocco) or removed for countries (e.g. Chile) using an "eea-inspired version." For cities seeking certification, an additional audit fee will be charged (eea, ISO 50 001).

7- ***Local Investment in Human Resources***: Most approaches depend on international support and the financing of advisors. In Europe, eea advisors, trainers and auditors are contracted by municipal governments and remunerated on a mission-base.

[6] Information found on the Web, to be verified.

8- ***Advisory services provided to local governments***: With the exception of ISO 50'001, all approaches are based on external assistance to local governments, acting as facilitators. A key difference of eea is the accreditation of advisors and auditors (by the National Designated Authority) for cities to choose from a list of qualified experts. In all cases, investments by local authorities is relatively high; a strong local commitment is required for any approach or tool to be effective and eventually, owned by local actors. Some eea-countries like Luxembourg deploy a number of "free advisory days" (e.g. 30/ year) to city governments engaged in the process. In Switzerland, eea-municipalities can apply for project implementation support, to mention a few examples.

9- ***Sectors covered*:** Another key difference identified is the coverage of sectors. The most emissions-intensive sectors managed by the city are included in all approaches and tools, although the Covenant of Mayors considers that not all of them are compulsory. The eea pledges for a more holistic approach, including additional sectors like urban planning, internal organisation/ finance, and communication/ awareness. The ISO 50'001 coverage needs to be specified by the municipality undergoing certification: it may or may not include areas that are not under the direct control of municipal administration.

10- ***User profile:*** The Covenant of Mayors, which is actively promoted by the EU, has the highest number of signatory cities, followed by the eea. All approaches and tools apply to all sizes of cities. However, most cities engaged with the eea are small or medium-sized; the Covenant of Mayors and TRACE apply to all sizes of cities with TRACE and CURB being more adapted to larger city contexts.

The following colour code has been used to indicate:

Unique characteristics of the *eea®*

Applies fully; key component/ strength

Applies partially

Does not apply/ not available

Table 1.0 Distinctive characteristics	**European Energy Award (eea)**	**Covenant of Mayors/ SEAP**	**Sustainable Urban Energy and Emissions Planning (SUEEP) - TRACE**	**Compact of Mayors - CURB**	**ISO 50001**
1- Focus on climate change					
Mitigation					
Adaptation/ Resilience	Only marginal focus: 2/ 79 measures refer to adaptation/ resilience.				
2- Designed for					
Municipal Governments					
All kind of organizations					
3- Governance of the process					
National Commitment required	National designated eea authority	National focal point			
Local coordination unit required	Municipal Energy Team	CoM Local Coordinator	Municipal "Leadership"	Mayor	(Top) Managers
4- Providing guidance on the following planning/ management steps					
Commitment					
Diagnostic					
Planning					
Implementation	Country-specific toolboxes				
Monitoring/ Reporting	Annual reporting	Monitoring (every 2 years)		Annual reporting	
Certification					
5- Duration of the planning-management cycle					
Establishment of action plan	2 months	4-6 months	Not specified	Up to 3 years	Not specified
Evaluation/ reporting	Yearly	Every 2 years		Annually	Not specified
Validity of certification	4 years				3 years
6- Cost of implementation (fees, contracting)/ Business Model					
For cities (or their partners)	Annual licence fee: EUR 500 – 2'000/ city, depending on nb. of inhabitants; EUR 1'000 for pilot cities participating *without* a national authority Auditors fee (approx. EUR 3000/ city every 4 years)	Free of charge	Free of charge	Free of charge	EUR 100 (Certification Standard Download) Auditors fee

Table 1.0 Distinctive characteristics	**European Energy Award (eea)**	**Covenant of Mayors/ SEAP**	**Sustainable Urban Energy and Emissions Planning (SUEEP) - TRACE**	**Compact of Mayors - CURB**	**ISO 50001**
For national governments	Annual licence fee in pilot and developing countries (**near Europe**): EUR 5'000/year Membership fee[7] (EUR 2'000/y.)				
Subsidies/ donors	**In Europe**: national authorities in charge of energy/ environment/ municipalities **In extra-European contexts**: international donors/ national governments	**EU Institutions:** European Commission, Committee of the Regions, European Parliament, European Investment Bank	**World Bank/ ESMAP**	**Compact of Mayors:** Bloomberg Philanthropies **CURB:** World Bank C40 Cities AECOM	N/A
Business Model	Nationally self-sustained (stand-alone) process based on cities' financial contribution Financing of the Forum eea based on national contributions	Fully subsidized by the EU	Fully subsidized by the WB	Fully subsidized by: - C40 - ICLEI - UCLG UN-Habitat	Self-sustained by the city
7- Local investment in Human Resources required					
Investment in HR (country)	National office (part-time staff) Eea Trainers (mission-based) EEA Advisors (mission-based) EEA Auditors (mission-based)	Coordination Office Supporting Organizations			
Investment in HR (city)	Decision-makers Energy Team Technical (project) teams	Decision-makers 1 CoM coordinator/ city	Decision-makers Technical agents in charge of energy/ environment	Decision-makers Technical agents in charge of energy/ environment	Decision-makers Technical agents in charge of energy/ environment
8- Advisory services provided to local governments:					
For the diagnostic	Nationally accredited eea advisors *In Europe: paid by cities*	EU sponsored consultants	WB sponsored consultants	Independent consultants*	
For planning	Nationally accredited eea advisors *In Europe: paid by cities*	EU sponsored consultants	WB sponsored consultants	Independent consultants*	
For project design and Implementation	In some countries: e.g. 30 days/ year/ city in LUX (paid by nat. government)				
Monitoring	Nationally accredited eea advisors				
Audit	Nationally accredited eea auditors *In Europe: paid by cities*				Independent auditors

[7] Participation at the Forum eea (Annual meetings)

Table 1.0 Distinctive characteristics	**European Energy Award (eea)**	**Covenant of Mayors/ SEAP**	**Sustainable Urban Energy and Emissions Planning (SUEEP) - TRACE**	**Compact of Mayors - CURB**	**ISO 50001**
9- Sectors covered					
Urban Planning		If opportunities identified			Sectors/ the scope of coverage need to be specified by the municipality/ organisation undergoing certification
Municipal Buildings		Compulsory			
Private/ residential buildings	Estimates of coverage				
Industry	Estimates of coverage				
Public Lighting		Compulsory			
Electricity Production		If opportunities identified			
Heat Production		If opportunities identified			
Solid Waste Management		If opportunities identified			
Water/ Waste Water		If opportunities identified			
Transport/ Mobility		Compulsory			
Internal organization					
Communication, awareness					
10- User profile					
Number of municipalities	1'346 user cities	5896 signatories 16 countries (Europe) 9 countries (South Mediterranean Region)	27 cities 17 countries	200 signatories	Not specified
Number of inhabitants	40 Million	Not specified	45 Million inhabitants	270 Million	Not specified
Average size of user city	Small (less than 500'000 inhabitants) Exception: France (with several large cities participating)	Small, medium and large	Small, medium and large	Large	Not specified

III. The comparative added value of the eea®: strengths, challenges and opportunities

The eea, like all other instruments and approaches, aims to provide guidance and support for sustainable energy planning and management at the municipal level. Similar to the other approaches included in the analysis, it focuses on climate change *mitigation*, rather than adaptation and resilience.

Special characteristics and unique strengths

Its unique strengths can be summarised as follows: the eea is (a) a *process*-based quality-management system providing guidance for city governments to engage in a *holistic* long-term approach to sustainable energy management, including both *qualitative* and quantitative indicators; it (b) proposes a catalogue of 79 concrete measures, based on international best-practice, for city governments to choose from and prioritise; it (c) provides a framework for annual monitoring and comparison with peer cities, based on a common, standardised and nationally adapted grading tool; and (d) it allows cities to eventually get certified for outstanding energy policy and performance.

The eea® special characteristics are presented below:

1- **Strengthen** *local governance* **to provide a solid basis for effective planning, implementation and monitoring at city-levels**

The eea methodological framework structure and contents reflect the need for a holistic local approach that engages city governments, council members and other local stakeholders in a long-term process of sustainable energy management. Like other approaches, the eea supports interventions in the generally recommended technical areas that a city can *directly control* (e.g. buildings, public lighting, and transport, electricity/ heat/ cold production, disposal/ waste and waste water management). In addition to these areas and unlike other approaches, **it encourages the city to consider additional aspects related to internal governance and organization (e.g. establishment of municipal Energy Teams; allocation of local resources and budgeting; municipal training programs, etc.); urban and spatial planning and cooperation/ communication (with other administrative levels, other cities, regions; public, civil and private sector stakeholders), referring to the city government as a *facilitator, co-investor and regulator*.**

2- **Provide** *guidance on specific action***, based on international best practice but** *adapted locally*

Many approaches and tools help cities identify priority sectors, based on initial assessments (e.g. energy consumption, costs and GHG emissions). Based on theses baseline assessments, tools like TRACE or CURB evaluate the reduction potentials and projected cost-savings, thus allow for city governments to set targets based on their own data and the use of complementary international databases. Most of the approaches leave it open to the cities and their advisors, however, to *define the specific actions* to be taken. **The eea is one of the few frameworks[8] to provide further guidance towards implementation, by proposing a catalogue of standardized measures (*eea® Catalogue of 79 measures*) to be taken by committed cities, based on international best practice, with regular inputs from member cities (i.e. *Annual Calibration Meeting*) and adjusted to the specific national constraints and opportunities (regulatory framework and policies). Each country defines the specific steps to be undertaken by city governments to reach a 100% on each measure. The adjustment of the eea® methodological framework of measures and indicators to the specific national context is therefore a *prerequisite* for new countries and cities to engage in the eea® process.**

[8] Similarly to the « playbook » of 60 energy efficiency measures proposed by TRACE

3- Providing a standardized framework of indicators for *continuous monitoring*

Most approaches considered for city-based energy management provide instruments for baseline assessments, target-setting and planning (energy balance, GHG inventories, simulations based on benchmark data, scenario modelling, etc.). Implementation and monitoring is generally left up to the city government. **The eea specifically calls for cities to continuously monitor progress and to compare with each other, based on a common national framework of measures and indicators, providing the basis for annual monitoring (and eventually, certification** – *see below*). **Nationally accredited eea® advisors (local experts from public or private sectors) facilitate the planning and monitoring. Even small steps towards the achievement of a 100% on each measure can be recognised and rewarded**, based on the eea monitoring system.

4- Measuring performance taking into account *process-based, intermediate results* **as well as impacts**

The indicators usually provided for initial assessments and reporting (e.g. Covenant and Compact of Mayors) are mainly quantitative, allowing cities to estimate/ measure cost-savings or GHG reductions (projected or) achieved over time. The focus lies on *measuring impact rather than results/ achievements*. However, it often takes a considerable amount of time (2-5 years in average, according to the nature and complexity of projects) for cities to implement actions that yield measurable, quantifiable impacts. **The eea catalogue of measures includes both *quantitative and qualitative/ process-based measures* and indicators. It encourages cities to engage in a *step-by-step process*, starting with preparatory activities (such as data collection, political decisions etc.) to take action and eventually measure the outputs and impact achieved. The eea-monitoring framework recognizes *intermediary* results achieved by the city – on an annual basis and based on a nationally standardized monitoring framework.**

5- Providing a *label to certify* **(and publicly reward/ recognise) municipal "energy management and performance"**

Most approaches provide the basis for (participatory) city planning; few of them offer a framework for monitoring. And with the exception of ISO 50001, **the eea is the only approach to provide a *certification system* based on accredited auditors and linked with a national support structure (i.e. Designated National eea Authority, eea National Office and Label Commission). Based on the monitoring process mentioned above, cities can reach between 0-100% on each of the 79 measures. Once they reach a certain level of achievements/ impacts (e.g. 30%, 50%, 75% depending on a country's certification system), cities can be audited, certified and rewarded (e.g. Label Energiestadt in Switzerland, Cit'ergie in France, Pacte Climat in Luxembourg, Jiha Tinou in Morocco).** It is up to the countries to eventually link certification with a rewarding system. In Luxemburg for instance, cities with a higher level of certification get more days of technical assistance for free (offered by the national designated eea authority). Certification can also be linked with access to concessional loans, subsidies or other benefits (e.g. study tours, etc.).

6- *Minimal barriers of entry* **for the city**

Compared with other approaches and tools, the efforts associated with *preliminary data collection* for a city to engage in energy planning are relatively modest in the eea process. Most approaches urge the city to conduct a GHG emissions inventory and/ or to establish an energy balance/ audit, as part of the initial review process. Data collection, however, is time-consuming, given that data is often unavailable, inaccessible, unreliable or out-dated. **The eea does *not require data collection prior to the establishment of an activities program*. The eea initial energy review, conducted at the beginning of the eea process, can be understood as a "photography/ snap shot" of the current local**

energy policy situation, a review of what the city has already achieved, is currently doing and planning to do, compared with best national and international practice (e.g. 79 measures). The eea framework thus recognizes data collection as *an action in itself and as a first step* to take informed action: e.g. if the city wants to establish a Municipal Energy Accounting System (i.e. measure n° 2.1.3 of the eea Catalogue of Measures), it will be required to make an inventory of municipal buildings, counters, energy bills, etc. as a first step to progressively reach a 100% on that specific measure. Such inventories, however, are not a *pre*requisite to *enter* the eea planning process.

Challenges and opportunities related with the eea approach and process

Two major challenges are associated with the eea approach and process: (a) the establishment of a solid, competent and legitimate *national framework* with the ability to sustainably manage the eea national process and certification system (including quality control and continuous adjustment of instruments); and (b) the development of a *business-model* to ensure the viability and sustainability of the national structure and process, based on cities' financial contribution and incentivising mechanisms.

1- A national support structure expected to be *"stand-alone"*

Unlike other approaches (e.g. Covenant and Compact of Mayors) that are highly subsidized (by the European Union, the World Bank or other international donors), allowing city governments to directly engage with supra-national bodies, the eea process is a *nationally anchored process*, implying the establishment of a national framework and support structure for sustainable energy management at the city level. This structure is based on (a) a designated National eea Authority; (b) a National eea Office/ Bureau; (c) a pool of accredited eea advisors and auditors and (d) in some countries, a national label commission, all of which however need to be funded. In Europe, the business model is based on cities' yearly contributions (EUR 500,00 – 2000,00/ city) and public subsidies (e.g. from the Ministry of Energy). In developing country contexts, cities are less willing/ able to contribute financially, thus, alternative/ complementary funding sources/ incentivizing mechanisms need to be found.

Thus, while the entry barrier for cities to engage with the eea process is relatively low, **the establishment of an eea (based/ inspired) *national* process requires an in-depth understanding of national institutions, their respective missions and relations. A designated national eea authority needs to have the ability, legitimacy and willingness to manage the eea process and label system, and to *provide adequate support* to city governments**. Ideally, the process is tested through a pilot cycle (2-3 years), to be further developed and adjusted based on an initial evaluation.

2- A *nationally adapted methodological framework* **of measures and indicators**

Similarly to the eea (based/ inspired) national process and support structure, the methodological *framework and tools* – in order to serve as a nationally recognized and standardized monitoring tool for municipal energy management – need to be adapted during an initial pilot cycle, with the active participation of experts and city representatives. The eea catalogue and grading tool should indeed reflect what is *globally desirable and nationally feasible* (in each of the 6 areas), given the specific regulatory framework and the opportunities and constraints for city-governments to participate in national policies. **The efforts required for the establishment of a nationally standardised, broadly recognized and accepted national framework of measures and indicators are relatively important, at the beginning and over time: once the initial framework has been established, regular updates are needed to reflect regulatory reforms, the introduction of new national policies and changes in the institutional landscape.**

IV. Opportunities for other tools/ approaches to be used in combination with eea

Providing guidance for sustainable energy planning and an adaptable framework for energy policy/ performance monitoring, the eea is indeed compatible and complementary with other approaches and tools:

a. By signing the ***Covenant of Mayors*** city mayors commit to reduce GHG emissions by 20% until 2020. Based on this commitment, cities establish a GHG inventory and a Sustainable Energy Action Plan (SEAP) focusing on four compulsory areas (Municipal Buildings, Public Lighting, Urban Mobility and Communication) and, depending on opportunities, additional areas such as Electricity/Heat Production, Solid Waste and Waste Water. **The eea catalogue – covering all of the CoM areas with an additional focus on "Internal Organisation" – can be used to facilitate the establishment of SEAPs:** based on its catalogue of 79 measures proposed for all relevant areas (simultaneously considered by the Covenant of Mayors), cities can choose those measures that are most relevant for them, set their own targets and establish an activities programme that is compatible with both the CoM Methodology and templates; and with the eea.

   By doing so, **a CoM signatory city can simultaneously comply with the requirements of both approaches and engage in two complementary and mutually supportive monitoring processes**: the eea monitoring process rewarding intermediary results and achievements in all six areas of the eea framework; and the CoM bi-annual reporting of performance indicators directly associated with the SEAP priority actions.

b. The ***World Bank's TRACE*** tool can be used as a complement to the eea, in order to help city governments prioritize sectors and actions for energy efficiency (EE) intervention, based on a quick assessment of under-performing sectors, improvement and cost-saving potentials. A city – already engaged or willing to engage – in the eea can use TRACE to identify priority action, based on a 3-month process of *energy benchmarking, sector prioritization* and *intervention selection* drawing from the ESMAP "playbook" of 60 tried-and-tested energy efficiency measures, and the eea® Catalogue of 79 measures reflecting best practice in Europe. **Based on the three-months TRACE Assessment, the city will be able to make an informed selection of measures (e.g. from the eea Catalogue) to achieve the largest possible impact at the lowest cost. The eea framework will further help the city identify additional and complementary areas of intervention (related with urban planning, local governance and cooperation/ communication), engage in a more holistic approach to sustainable energy management, and make sure that high-impact projects build on a solid ground.**

c. The ***Compact of Mayors*** can be signed by any eea-committed/ certified city, provided that the city government is able and willing to collect the climate data required for international reporting on the CoM international climate registry platform. Several measures of the eea Catalogue of measures call for the city to collect energy and climate data, e.g. to establish a city-based Energy/ Climate Accounting and Monitoring System; to prepare for well-targeted retrofitting and energy-efficiency intervention in municipal buildings, urban transport or waste management. **Such data – collected during the eea Activities Programme implementation phase - can directly be used for international climate reporting, via the Compact of Mayors reporting platform/ registry.** By signing the Compact of Mayors, an eea certified city can gain international exposure; its success stories will be disseminated among other signatories, thus facilitate the sharing of knowledge.

d. Similarly to TRACE, the ***CURB*** tool – recently adopted by the Compact of Mayors – can be used as a complement to the eea® during the planning process: In addition to *energy benchmarking* and *sector-prioritization* (as offered by TRACE, see above), CURB allows the city to *simulate* the

projected energy and emissions of specific climate interventions, set sector-specific local targets based on the modelling of "business as usual" scenarios, and prioritise interventions based on expected cost savings, emission abatement and the complexity/cost of implementation. **Once local targets are set, priority measures can be *selected from* the 79 measures of the eea Catalogue and *prioritized* based on CURB simulations. The city can further decide to pursue the eea "track" to (a) develop of a more holistic energy-climate approach, to (c) engage in regulator monitoring of intermediary results, achievements and impacts, and eventually (c) to get certified.**

e. ***ISO 50001*** Certification follows the same principles of the eea certification process (plan-do-check-act cycle), yet with a focus on city-*internal* energy management only, *unless* the city explicitly decides to include areas that are not under its direct control (e.g. urban planning). Thus, the scope of areas to be considered for the ISO certification is to be determined by the city itself. The ISO 50001 certification refers to all kind of organizations, *among which* municipal administrations; thus, many of the areas considered need to be specified and adjusted to the specific requirements of *municipal* administrations. **In Switzerland for instance, eea Gold certified municipalities will be encouraged and supported to achieve ISO 50001 certification as a special label for Energy Management Excellence[9].**

V. Conclusion

It can be concluded that

1- Most of the tools and approaches assessed are complementary or overlapping. In none of the cases they are contradictory.

2- All approaches pursue the same general objective: support local governments in sustainable energy and climate mitigation planning.

3- Most of the approaches are compatible; all of them are complementary to the eea: a city can therefore engage with other approaches (CoM, CURB, TRACE) and still be considered for the eea. Schematically, it can be stated that the different approaches emphasise *different stages* of the planning cycle (*see* also Annex A):
   - Covenant of Mayors and Compact of Mayors stress more than others the importance of an **initial, political commitment**;
   - Covenant of Mayors, TRACE and CURB emphasise the need for **quantitative initial diagnostics** (assessment of the municipal energy and carbon profile as a compulsory *pre-requisite* of sector prioritisation (TRACE, CURB) and the establishment of local energy and climate objectives); the eea proposes an initial energy review based on qualitative indicators;
   - TRACE and eea propose a **menu of measures and actions** to allow local governments to plan based on international best-practice (as a source of inspiration);
   - The eea is the only one offering (country-specific) tools for **implementation support**;
   - The eea and the Covenant of Mayors propose a framework for annual **monitoring**, beyond planning; the Compact of Mayors allow cities to report impacts on an international climate data platform;
   - Only two approaches (ISO 50'001/eea) propose a **certification** scheme.

The choice of the most appropriate tool remains to the city and its partners. It depends on the type and degree (short-, medium-, long-term) of commitment of a city; of the presence/ absence of committed national authorities willing to support local energy development; and on the city-size: the establishment of a climate detailed carbon assessment as a preliminary requisite of planning, for instance, seems to be more relevant in larger cities (with larger projects) than in small cities, where planning priorities may be more easily set.

[9] Announcement made by the Association "Cité de l'Energie" at the EEA Forum's General Assembly, 2 November 2015.

ANNEX A: A Comparative Analysis of Municipal Energy Planning and Monitoring Approaches *(and related tools)*

	European Energy Award	Covenant of Mayors/ SEAP	Sustainable Urban Energy and Emissions Planning (SUEEP)[10] - **TRACE**	Compact of Mayors **CURB**	**ISO 50'001**
Governance structure	**National process** based on the following bodies: **Designated national authority required** (Public entity, cities' association, private) **EEA Label Commission** **EEA National Advisors** **EEA Auditors**	**Covenant of Mayors Office** **Joint Research Centre**, Brussels **City-based approach** in Europe In Non-European countries: **CoM Supporters** **CoM Coordinators**	**City-based approach** **Partnership with national authorities** on behalf of the World Bank	**Purely city-based system**, no implication of national authorities needed	**International Standard** **Organisation** provides standards (to be purchased) **City (organization) -based** approach Accredits **independent auditors** for certification.
Process	**The eea® is structured around the (Commit)-Plan-Do-Check-Act cycle (5 steps):**	**The CoM process is divided in 4 phases and 11 steps:**	**The SUEEP process is divided into 6 stages and 17 steps:**	**To comply with the Compact of Mayors, a city has to go through a 4-step process:**	**ISO 50001 follows the Plan-Do-Check-Act cycle based on 4 steps:**
Commitment	**1. Voluntary Commitment** - National commitment - Local commitment - Set up a Municipal Energy Team (covering all 6 thematic areas, mix of council members and professional staff)	**1. Initiation and Political Commitment** - Political binding commitment and signing of the Covenant[11] - Adapt city administrative structures (designated team, CoM coordinator) - Build stakeholder support	**1. Commitment** - Create a Vision Statement - Establish Leadership and Organization - Identify Stakeholders and Links	**1. Commitment** A mayor may register via the standard reporting platforms or email for his/her submission to be proceeded.	**1- PLAN** - **Commitment** of municipal decision makers - Designation of an energy team/ reference person
Diagnostic	**2. Initial Energy Review** - Review of the Municipal energy policy, achievements, on-going and planned initiatives, available data *(snapshot of existing structures, processes, projects and data)*	**2. Planning** *Baseline Review* - Assessment of the current framework: GHG Inventory	2. **Urban Energy and Emissions Diagnostics** - Energy and Emissions Inventory - Existing Projects and Initiatives Catalogue - Potential energy and emissions projects assessment	**3. Inventory** - GHG emissions inventory - Identification of climate hazards - Report on both via CDP/ carbon*n* reporting platforms	- Conduct an **Energy Review** - Establish a baseline, energy performance indicators (EnPIs)

[10] http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/09/19/000442464_20130919113535/Rendered/PDF/811110PUB0Gree0Box0379830B00PUBLIC0.pdf
[11] Commitment to reduce GHG emissions by 20% by 2020 (based on a year of reference, and compared to a business as usual scenario)

Target setting	**3. Activities program** - Set targets (short, medium, long term) - Establish an activities program - Identify funding sources	*Goal setting and planning* - Establish a vision - Elaborate a Sustainable Energy Action Plan (SEAP) - Plan for approval and submission - Identify financial resources	**2. Goal Setting** - Make the Case for Sustainable Urban Energy and Emissions Planning - Establish Goals - Prioritize and Select Projects	**3. Target-setting** - Update the GHG inventory to include the water sector - Set targets to reduce GHG emissions - Conduct a climate change vulnerability assessment, and report	- **Set objectives, target** taking into consideration national regulation - Declaration of purpose and general aim of the city's energy policy - Internal communication on the energy policy - **Establish action plans** necessary to deliver results in accordance with opportunities to improve energy performance and the organization's energy policy
Planning			4. **Planning:** Energy and Emissions Plan - Draft the Plan - Finalize and distribute the plan	**4. Plan** Establish an action plan that shows how to deliver on the city's commitment to reduce GHG emissions and adapt to climate change. → The establishment of the action plan is based on the **CURB tool** simulating expected climate impacts of planned actions (see below).	
Implementation	**4. Implementation and Monitoring** Guidance depends on specific countries *(e.g. eea advisors in Luxembourg provide 30 days of assistance for implementation)* Most countries provide a toolkit and case studies for each technical area/ measure	**3. Implementation** *No specific guidance*	**4. Implementation** - Develop Content for High-Priority Projects - Improve Policy Environment - Identify Financing Mechanisms - Roll out Projects	n/a	**2- Do** Implement the energy management action plans. *No further guidance provided.*
Monitoring		**4. Monitoring and Reporting** • Monitoring • Reporting and submission of the implementation report[12] • In Europe: Monitoring Emissions Inventory (MEI) every fourth year	**5. Monitoring and Reporting** - Collect Information on Projects - Publish Status Report	**5. Annual reporting** In order to comply with the Compact, annual data reporting is required.	**3- Check** *(internal audits)* - Monitor and measure processes and key characteristics of operations that determine energy performance against the energy policy and objectives - Report the results

[12] Implementation Report' to be submitted every second year following the submission of the SEAP

Certification	**5. Audit and certification** (every 4 years) - Audit by eea auditor - EEA Silver (50%) and Gold (75%) certification	n/a	n/a	- A "**Committed" badge**: upon registering - A "**Compliant" badge**: after establishing an action plan (renewable each year)	**4- Act** *(adjust & improve)* Take actions to continually improve energy performance and the EnMS. **Certification** through accredited auditors (optional, unless imposed by national regulation)
Tools	**EEA Toolkit:**	**CoM Toolkit:**	**SUEEP Toolkit:**	**Compact of Mayors Toolkit:**	**ISO 50001 Norm:**
Commitment		**Covenant Official Text** Official Text outlining the CoM commitments to be approved by the municipal council **Covenant Adhesion Form** Form to be signed by the Mayor **SEAP Guidebook (Europe)** Guiding signatories throughout the SEAP development process **SEAP Guidelines for South Mediterranean countries** (CES-MED)		**Letter of Commitment** **Guide to compliance** **Compliance Requirements** *(→ cCR Offline Reporting Sheet)*	**4.1 General requirements** **4.2 Management Responsibility** - Definition of energy policy - Mainstream energy considerations in planning - Establishment of energy referent - Provide adequate resources - Define internal processes - Internal communication

Diagnostic	**EEA Assessment and Monitoring Tools** The eea initial energy review is based on the eea ***Catalogue of 79 measures***, reflecting best international practice regarding municipal energy policy, management and performance, and according to a framework of indicators and values (e.g. Monitoring-Grading Tool). User countries adapt the eea ***Monitoring-Grading Tool*** to their specific country contexts. The choice of indicators and the weighting of required steps to reach a 100% on each of the 79 measures are based on countries' specific regulations, national targets and policies, institutions and role of local authorities.	**CoM Baseline Emission Inventory**[13] The Baseline Emission Inventory (BEI) quantifies the amount of CO2 emitted due to energy consumption on the municipal territory (Covenant Signatory) in a baseline year. *(→ Conversion factor and IPCC emission factor tables; SEAT Template; Baseline Determination Guide*[14]*)* **Quick Reference Guide – Grouped SEAP analysis** for Covenant Territorial Coordinators	**Tool for Rapid Assessment of City Energy (TRACE)** **1- Data collection** *GHG emissions inventory* (→ GHG Inventory Spread Sheet[15]) *Energy Balance Study:* Mapping of primary and secondary energy supply and use (→ Energy Balance Spread Sheet). **2- Energy Benchmarking** (→ database of 28 Key Performance Indicators collected from 64 cities) The data are entered into the tool using a web-like interface and analyzed in order to benchmark a city's energy use against peer cities selected based on city population, climate, and human development index.	**Global Protocol for Community-Scale Greenhouse Gas Inventories** (Summary, Full document, Video) *(→ cCR Offline Reporting Sheet; CDP Cities Questionnaire Guidance ; C40 Hazard Taxonomy)* **Climate Action for Urban Sustainability (CURB)** Based on a GHG emissions inventory (e.g. Compact of Mayors Procedure) and the collection of complementary/ extra data, the ***CURB Tool allows the city to simulate emission/ energy demand trajectories over time***/ up to a certain time horizon (e.g. 2020, 2030, 2040).	**4.3 Energy policy**, *including:* - Assessment of overall energy performance - Adequate targets - Obligations to respect energy performance norms (e.g., building standards) - Access to relevant information - Respects national regulation - General framework for action - Rules for public procurement - Reporting and communication - Regular monitoring and updates

[13] Covenant of Mayors (2010) "How to Develop a Sustainable Energy Action Plan (SEAP)—Guidebook" (http://www.eumayors.eu/IMG/pdf/seap_guidelines_en.pdf).

[14] http://www.energymodel.eu/IMG/pdf/IL_4_-_Baseline.pdf, part II.

[15] Based on the Local Governments for Sustainability's (ICLEI) "International Local Government Greenhouse Gas Emissions Analysis Protocol" (2009), which follows principles of the Intergovernmental Panel on Climate Change's (IPCC) "2006 Guidelines for Greenhouse Gas Inventories" (2006).

Planning	**EEA catalogue of 79 measures** The eea catalogue is a standardized list of measures and indicators; the 79 measures reflect best International/ European practice in each of the 6 areas considered. Cities are expected to ***use the 79 measures as a source of inspiration, and as a basis for target setting*** and planning, based on the specific opportunities and constraints identified during the initial energy review. *(→ Activities Program Template)*	**Baseline Definition Guide** **Guidebook "How to develop a Sustainable Action Plan"** Step-by-step recommendations for the entire process of elaborating SEAP and local strategy. Divided in 3 parts: (1) description of the overall SEAP process; (2) guidance on how to elaborate the BEI; (3) description of technical measures for implementation **SEAP Template** Supporting template to establish a SEAP **Quick Reference Guide – Joint Sustainable Energy Action Plan** for collective action plans of several cities. **Report on existing methodologies and tools** (mentioning EEA, among others) **SEAP Submission & Verification Processes** Describing SEAP Submission & Assessment Process **Guidelines for Covenant Supporters** Overview of key roles and activities to be undertaken by networks of local and regional authorities – as supporters **Guidelines for Covenant Coordinators**	**3- The Sector Prioritization** Module using "***relative energy intensity,*** **"** ***"sector energy spending,"*** and "***city authority control***" to prioritize sectors with the most significant energy efficiency potential*. *The "sector spending function" allows the user to enter the total amount of money that the city spends in the sector, and the "city authority control" function allows the user to indicate the amount of control that the city authority has in the sector. The "relative intensity function' shows the potential energy efficiency improvement the city may realize if it were to match the average of better-performing cities. Based on these functions, TRACE provides a ***prioritized list of sectors that the city can engage in order to realize potential energy savings***. **4- Intervention Selection** TRACE contains a set of 59 energy efficiency interventions combining high-level strategic level programs and specific activities that a city can pursue. Recommendations are supported by a database of 191 case studies. *Each recommendation is "rated" on 3 attributes: (a) energy savings potential (b) first cost (c) speed of implementation.* **Additional tools:** - Project Assessment - Prioritization Toolkit	**Climate Action for Urban Sustainability (CURB)** Based on the projected GHG emissions/ energy demand trajectories, the CURB Tool allows the city to ***establish its own emissions/ energy demand targets*** (e.g. target emissions trajectory curve). The city can ***compare the performance of specific sectors with those of other cities*** (i.e. Key Performance Indicator of Public Lighting) (with a similar Human Development Index) → out of the C40 network. The CURB Tool then helps the city ***prioritize action areas, based on the responses of other cities*** on the cost-efficiency/ saving potential and difficulty of implementation. The potential impacts (on emissions and electricity use) can be simulated based on specific (technology) solutions (e.g. generalized use of LED). Once the city has selected all of its actions, CURB *compares the cumulative impacts of that scenario with the city's reduction targets.*	**4.4 Energy Planning** ***Energy Performance Review*** - Energy sources and use - Energy use of buildings, equipment, processes, administration, etc. - Identify measures for improvement - Continuous/ regular monitoring - Establish an energy use baseline - Define Energy Performance Indicators (EnPI) ***Target setting and planning*** - In harmony with energy policy - Energy targets - Action plans - Monitoring of activities - Continuous process of improvement

Implementation	**Country-specific toolboxes, e.g.** www.citédelenergie.ch www.citergie.ademe.fr www.pacteclimat.lu	**Guidebook, part III: Technical measures for energy efficiency and renewable energy** Overview of measures to be taken in key sectors: building, lighting, heating/cooling, industry, electricity production, district heating/ cooling, office appliances, biogas, demand side management, energy audits **Quick Reference Guide – Financing Opportunities** for Local Sustainable Energy 2014-2020	n/a	n/a	**4.5 Implementation & Operation** - Capacity-building - Internal communication - Participatory improvement processes - External communication - Documentation
Monitoring	**EEA Assessment and Monitoring-Grading Tool** (= tool used for the initial energy review)	**Reporting Guidelines on SEAP and Monitoring** for signatories **Monitoring Template** Template to support reporting of SEAP progress[16] **Quick Reference Guide –** Monitoring SEAP implementation	n/a	**cCR Offline Reporting Sheet**	**4.6 Checking** - Monitoring of results, reporting - Impact assessments - Respect of national regulation - Internal auditing of EnMS - Tracking of activities **4.7 Management Review**
Certification	**EEA Assessment and Monitoring-Grading Tool** (= tool used for the initial energy review)	n/a	n/a	n/a	**Norm ISO 50001** Accredited auditor/ Internal audit

[16] http://www.eumayors.eu/IMG/pdf/New_Monitoring_Template.pdf.