

Energy Efficiency in the Baltic Sea Region

Policy Review

Background Paper II



This background paper is an outcome of the project EFFECT – Dialogue Platform on Energy and Resource Efficiency in the Baltic Sea Region. EFFECT is a Thematic Partnership (TP) funded by Swedish Institute and led by the Council of the Baltic Sea States (CBSS) with its Unit Baltic 21. This paper has been written by Stefanie Lange Scherbenske and Liisa Perjo at Nordregio (Nordic Centre for Spatial Development) as partner in the project.

The paper is part of the collection and mapping of good practices, indicators and success factors on energy efficiency. This background paper shall support EFFECT partners in the pursuit of a common understanding of key terms such as energy efficiency and create a basis for further discussions in the project.

More information on EFFECT: <http://www.cbss.org/EFFECT>

Stockholm, September 2013

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1 Introduction

The aim of this background paper is to provide an overview of policies concerning energy efficiency, with a special focus on energy efficiency in buildings. The paper provides an overview of existing policy approaches at four levels: the EU level, the Baltic Sea Region level, the national level and the local level.

At EU level, the paper reviews the key energy efficiency policy documents and directives. At the Baltic Sea Region level, the report looks into the EU Baltic Sea Region Strategy as well as other relevant pan-Baltic policy documents.

The European Commission has obliged all Member States to draft National Energy Efficiency Action Plans. Plans from the Baltic Sea Region states are studied in this paper. When the national level policies are reviewed, the paper also looks shortly into the Norwegian and Russian energy efficiency policies where information in English has been available.

The study on local level approaches to energy efficiency has been conducted with the EU Covenant of Mayors initiative as the point of departure. To illustrate how local level authorities in the different BSR states can engage in increasing energy efficiency, selected Sustainable Energy Action Plans drafted within the Covenant of Mayors framework are studied.

In this paper, energy efficiency issues are discussed on general level but sector-specific attention is paid to the building sector based on the discussion on the interest and needs of the EFFECT partners.

2 Energy efficiency - definition

Energy efficiency is a concept that for several years has been of increasing importance in policies towards improved sustainability and greening the economy. It is often discussed in connection to increased use of renewable energy sources and it is also integrated in current key policy concepts such as low carbon economy and green growth. Investing in energy efficiency is of crucial importance for meeting future energy demands and mitigating climate change globally. Energy efficiency both reduces greenhouse gas emissions and increases productivity (Sustainable Energy for All 2013).

Energy efficiency aims at reduced energy consumption and production and thus decreased costs and emissions. Energy efficiency is generally understood as using less energy for the same energy service or generating more energy service for the same amount of energy.

Measures and activities related to energy efficiency usually address supplying energy or consuming energy. To increase

“Energy efficiency is simply the process of doing more with less. The goal is to accomplish the same tasks and functions as before while using less energy.”
(Centre for Sustainable Energy 2013)

energy efficiency, it is important to address both the supply of energy and energy consumption (OECD & IEA 2012).

Energy efficiency measures can address the technical efficiency of energy services or include non-technical factors such as behaviour. According to the *OECD* and the *International Energy Agency* (IEA), individual behaviour is an aspect of energy efficiency. Therefore it is essential to improve both the technical energy delivery performance and energy management (including awareness) (OECD & IEA 2012).

Energy efficiency has an essential role for the implementation of broad policies and concepts such as sustainable energy policy, low carbon economy and green growth. In addition to contributing to increased environmental sustainability, energy efficiency measures contribute to economic growth and social development. Energy efficiency can be seen as “means to pursue a range of practical improvements for various levels of society” (OECD & IEA 2012).

Increasing energy efficiency is a task spanning over a variety of sectors (e.g. building, manufacturing industry and transport). Increasing energy efficiency requires involvement of and measures taken by different kinds of actors (e.g. policy- and decision-makers, entrepreneurs, civil society). Among others, the *European Union* (EU) and the *United Nations Environment Programme* (UNEP) stress in particular the potential for energy efficiency within the building sector. The building sector is globally one of the largest contributors to GHG emissions and responsible for one third of global resource consumption (UNEP 2011).

UNEP has studied the benefits of improving the energy efficiency of buildings in a global perspective, but energy efficiency in buildings is also a key issue at the European level. After the energy sector itself, the building sector has the second biggest potential in terms of increasing energy efficiency and decreasing GHG emission in Europe.

As of now, buildings stand for almost 40% of final energy consumption in Europe. In addition to being a goal in itself, improving the energy efficiency in buildings also brings other benefits for the EU by creating jobs, improving health as well as improving energy security and the competitiveness of the region (EC 2013a).

3 Energy efficiency in EU policies

In the following section, the main EU policies related to energy efficiency as policy goals are reviewed. Special attention is paid to measures and initiatives related to buildings as well as to the role of the building sector in increasing energy efficiency. Therefore detailed descriptions of measures related to other sectors that are relevant to energy efficiency such as the transport sector are excluded from this review.

Transition towards a low carbon economy and green growth are central targets of the **Europe’s growth strategy: Europe 2020**. The Europe 2020 Strategy presents targets for increasing the share of renewable energy in the final energy consumption to 20% and moving towards increasing energy

efficiency by 20% (EC 2012c). As an initiative under the Europe 2020 strategy, the **Strategy for competitive, sustainable and secure energy - Energy 2020** was elaborated in 2010. It prioritises an energy efficient Europe and presents energy efficiency as the “most cost effective way to reduce emissions, improve energy security and competitiveness, make energy consumption more affordable for consumers as well as create employment”. Improving energy efficiency in the building and transport sectors is the first action within the priority area of energy efficiency in the strategy (EC 2010c).

In the framework of the Europe 2020 strategy, the EU has also prepared three roadmaps that are particularly relevant for the issue of energy efficiency: Roadmap for moving to a competitive low carbon economy 2050, Roadmap to a Resource Efficient Europe and Energy Roadmap 2050. Short descriptions of the roadmaps, in terms of energy efficiency, are presented in following chapter.

The **Roadmap for moving to a competitive low carbon economy 2050** sets up targets for climate efforts and emphasises the need for innovation and green growth in transition towards low carbon economy. It states that energy efficiency will be a key driver in the transition process. The EU could be using approximately 30% less energy in 2050 than in 2005. According to the roadmap, emissions from houses and office buildings can be cut by around 90% by 2050. Passive house technology and retrofitting old buildings will improve the energy performance. The investments made can be recovered over time through reduced energy bills (EC 2011b).

The **Roadmap to a Resource Efficient Europe** analyses the key resources from a life cycle and value chain perspective. It outlines how to “transform Europe’s economy into a sustainable one by 2050” and identifies key challenges and opportunities related to the task. Its three action lines include transforming the economy, addressing natural capital and tackling key sectors. It identifies nutrition, mobility and housing as responsible for 70-80% of all environmental impacts in industrialised countries and therefore proposes measures related to those areas.

The roadmap also states that the *European Commission* should put forward a “communication on sustainable buildings” by 2013 (EC 2011c). The communication has not yet been published (in May 2013), but an impact assessment roadmap published in late 2012 states that existing policy initiatives on environmental performance of buildings have mainly been targeting energy efficiency. The upcoming initiatives will take a more holistic approach by addressing resource use and environmental impacts all along the life-cycle of buildings: from the extraction of building materials to the demolition and recycling of materials. The upcoming roadmap on sustainable buildings is expected to set out concrete actions to improve the resource efficiency of the sector (EC 2012d).

In December 2011, the *European Commission* adopted an **Energy Roadmap 2050**. It stresses the need for investment incentives to increase the rate of energy efficient renovations together with energy labelling of buildings in a long-term perspective by 2050. The roadmap emphasises that public authorities need to “lead by example” and use energy criteria in all public procurement. Programmes and technical assistance facilities should be provided to build up capacities among all energy service market participants. Further, EU financial programmes will make energy efficiency a strong condition for financial support (EC 2011a).

The Energy Roadmap 2050 also looks at implications that the EU goal of cutting Greenhouse Gas emissions by 85-95% can have on the energy system. It states that energy efficiency should remain

the prime focus in transforming the energy system and should be included as a key priority in all decarbonisation scenarios (EC 2011a).

The roadmap further prioritises improved energy efficiency in both old and new buildings as key actions towards improving the overall energy efficiency of the economy as a whole. Nearly zero-energy buildings should become the norm. Buildings and homes could produce more energy than they use and tools such as smart meters shall provide consumers with improved possibilities to influence their own energy consumption patterns. Both, households and companies should make investments and access to capital should be improved. Further it is considered essential to include incentives to change behaviour (e.g. taxes, on-site advice by experts or monetary incentives) (EC 2011a).

In March 2013, the *European Commission* published a **Green paper on a 2030 framework for climate and energy policies**. The green paper asks for comments from the Member States and stakeholders and discusses issues related to how the climate and energy targets for 2030 should be set and what sort of instruments should be used. In relation to energy efficiency, the Green paper discusses whether it would be beneficial to set targets for Member States or sector-specific. It states that the current approach to energy efficiency is a combination of aspirational targets and binding measures. It discusses the potentials and challenges related to setting legally binding targets for the Member States (EC 2013a).

3.1 EU Directives on Energy Efficiency

As described in the previous chapter, the European Union has produced several directives, road maps, policies and initiatives related to energy efficiency in its role as a key driver in the transition towards a low carbon economy. In this chapter, the main EU directives targeting energy efficiency are presented in chronological order. For further reading on the low carbon economy please see the Internal Working Paper I.

The **Directive on Energy End-Use Efficiency and Energy Services (ESD)** (2006/32/EC) from 2006 established indicative targets and incentives as well as the financial and legal framework for the efficient end use of energy. The ESD set out that all Member States must adopt and achieve an energy savings target of 9% by 2016. All Member States were obliged to outline activities to be implemented in order to reach the target in the National Energy Efficiency Action Plans (NEEAPs). The ESD also obliged the Member States to appoint one or more independent public sector authorities or agencies to monitor the process towards reaching the energy efficiency targets (EC 2006).

In 2010, the EU established a directive on energy performance of buildings: the **Energy Performance of Buildings Directive (EPBD)** (2010/31/EU). The directive focuses on energy efficiency in buildings and declares that each Member State is to establish and apply minimum energy performance requirements for new and existing buildings. All Member States shall also introduce certification of energy performance of buildings and require regular inspection of e.g. boilers and air conditioning systems.

According to the directive, the Member States shall ensure that by 2021, all new buildings are “nearly zero-energy buildings” (EC 2010a). In 2012, the directive was supplemented by the EU Delegated Regulation (No 244/2012) on

“Nearly zero-energy building’ means a building that has a very high energy performance [...]. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby.” (EC 2010a)

establishing a comparative methodology framework for calculating cost-optimal levels of minimum energy performance requirements for buildings and building elements (EC 2012a).

In 2012, the energy efficiency and energy services directive of 2006 was replaced by a new **Energy Efficiency Directive (EED)** (2012/27/EU). It sets a framework of common measures to ensure the achievement of the 20% target for increased energy efficiency according to the Europe 2020 Strategy. The EED lays down a series of rules, including those for removing barriers in the energy market and sets out legally binding measures to increase the Member States’ efforts for more efficient energy use at all stages of the energy chain. All Member States are obliged to establish energy efficiency obligation schemes or policy measures that aim at increased energy efficiency in households, industries and transport. Further measures concerning the exemplary role of the public sector and the consumers’ right to receive information concerning their energy consumption are included in the directive.

According to the directive, all Member States shall submit revised National Energy Efficiency Action Plans to the European Commission every third year, the next one being due in April 2014. The NEEAPs cover significant energy efficiency improvement measures as well as expected and achieved energy savings in supply, transmission, distribution and the end-use of energy. The European Commission assesses the NEEAPs and the progress made by each Member State. Attached to the NEEAPs, the Member States now also have to prepare new long-term strategies for mobilising investments in the renovation of the national stock of both private and public residential and commercial buildings. The first strategies are due in 2014 (EC 2012b).

3.2 Energy Efficiency Plan 2011

Based on initial analysis of the second National Energy Efficiency Action Plans submitted by the Member States (see chapter 4), the Commission identified that the EU is not on track to reach its energy efficiency targets. Following that, a specific new plan for increasing energy efficiency was drafted. The **Energy Efficiency Plan 2011 (EEP)** describes concrete measures that are to be taken to increase energy efficiency and facilitate the transition towards a low carbon economy. The energy efficiency measures will be implemented as part of the wider resource efficiency goal of the EU and the plan will be pursued consistently with the Resource Efficient Europe initiative and the roadmaps drafted within its framework (EC 2011d) (see chapter 2.1).

In line with other EU communications, the EEP emphasises that buildings have the greatest energy savings potential. It introduces instruments to trigger renovation processes in public and private housing as well as to improve energy efficiency of the building sector. It also presents instruments related to industry and transport as well as to improve the energy performance of devices used by consumers (EC 2011d).

As a concrete way towards a more energy efficient Europe, the plan stresses that the public sector needs to “lead by example” and engage in steering public spending towards energy efficient products, buildings and services. The EEP also encourages public bodies to at least double the current renovation rate of buildings. From 2019 onwards, public bodies that are subject to the EU Public Procurement Directive will have to take into account energy efficiency criteria for buildings (nearly zero-energy performance level). According to the EEP, the EU will present a legal instrument that obliges public authorities to refurbish at least 3% of their building (by floor area) each year (EC 2011d).

The EEP states that energy performance contracting is an important tool in the refurbishment of buildings. Energy performance contracting means energy performance-based purchasing which results in lower utility bills and lower maintenance brought about by the increased energy efficiency. Energy performance contracting has been proved cost-effective in several Member States. It has also been found to be relevant for triggering renovation in public buildings as well as upgrading the energy efficiency in public infrastructure. However there are ambiguities in the legal framework and lack of reliable energy consumption data in many of the Member States that hinders the use of energy performance contracting. The Energy Efficiency Plan 2011 states that the Commission will bring forward legislative proposals to overcome those problems (EC 2011d).

The EEP has stressed that public bodies can engage in implementing energy efficiency “on the ground” by getting involved in the *Covenant of Mayors*. The Covenant of Mayors is a formal commitment to reduce the signatories’ CO₂ emissions by more than 20% by 2020. The local authorities involved describe concrete goals in their Sustainable Energy Action Plans (SEAPs) that they develop in line with the *Covenant of Mayors* methodology and that are formally agreed to by each city (EC 2011d).

Low-energy buildings are prioritized in the EEP and the Member States are invited to establish promotion systems for private sector building. Addressing heat consumption in buildings is an important issue to address in the coming years. The EEP states that the Commission will introduce legislative propositions that require Member States to introduce measures to address the problems that arise in situations where both owners and tenants are reluctant to pay for improving energy performance of a rented property (EC 2011d).

Since energy efficient building solutions are often technically demanding, the EEP stresses that the transition towards energy efficient technologies requires new skills, environmentally-conscious vocational education and training in construction as well as other sectors. The EEP supports the Member States in assessing the need for training in the construction sector¹ (EC 2011d).

The role of *Energy Service Companies* (ESCOs) as catalysts for renovation is defined in the EEP. The ESCOs deliver energy efficiency improvements and can help public authorities to upgrade buildings by grouping them into scalable projects under energy performance contracts. However, both private and public sectors usually lack information on those services. The *European Commission* provides Member States with market information, lists of accredited energy service providers as well as model contracts. Access to financial resources for energy service companies through innovative financing is discussed in the EEP as well (EC 2011d).

¹ More information available on <http://www.buildupskills.eu>.

Improving the energy performance of buildings is one of the most tangible ways in which energy efficiency can benefit household budgets. Member States are obliged to provide at least 80% of their final consumers with smart electricity meters by 2020 to ensure consumers an opportunity to follow their own energy consumption (EC 2011d).

3.3 European Union Strategy for the Baltic Sea Region

The Baltic Sea Region (BSR) is the first macro-region of the EU and includes eight countries (Sweden, Denmark, Estonia, Finland, Germany, Latvia, Lithuania and Poland). In this chapter, approaches on energy efficiency at the Baltic Sea Region level by various organisations are reviewed.

In 2009, the EU published the **European Union Strategy for the Baltic Sea Region (EUSBSR)**. In 2013, the EUSBSR and its Action Plan were revised. The main focus is now on the following three objectives: “Save the Sea”, “Connect the Region” and “Increase Prosperity”. Energy efficiency is addressed under the Priority Area: “Energy – Improving the access to, and the efficiency and security of the energy markets as means to secure energy supply, reduce energy demand and to attain climate, energy and economic targets”. The Action Plan states that “there is an urgent need to end the energy isolation of some Member States in the region, to foster market integration, and to support energy efficiency and sustainable energy sources throughout the macro-region” (EC 2013b).

Energy efficiency is integrated into a number of flagship projects to be implemented within the framework of the Action Plan. Among others, “Promoting energy efficiency measures” is one of the flagship projects; it aims to ensure the efficient and successful implementation of the Energy Efficiency Directive by exchanging best practices and experience between Member States (EC 2013b).

Energy efficiency has also been an important issue in a number of transnational projects² (see boxes below) that have received EU funding from the Baltic Sea Region Programme 2007-2013. The projects have dealt with themes such as renewable energy, sustainable technologies and energy efficiency in urban contexts as well as resource savings in buildings.

The pan-Baltic organisation *Union of the Baltic Cities* (UBC) has published a Sustainability Action Programme 2010-2015 identifying inefficient energy consumption and high energy dependency as central challenges in the Baltic Sea Region. The programme states that the current state of material and energy intensity is unsustainable and needs to be addressed at the local level, by cities in the Baltic Sea Region. The important role of the local level and municipalities in increasing energy efficiency is emphasised. One of the goals of the programme is that all UBC cities support energy savings and energy efficiency, but no detailed measures related to energy efficiency are introduced (UBC Commission on Environment 2010).

² Projects involved: Longlife (Standards for sustainable, energy-efficient residential buildings; see Project example I), SPIN (Eco-innovative technologies for SMEs), REMOWE (Waste-to-Energy), Co2ol Bricks (Climate protection and cultural heritage), Urb.Energy (Energy efficient urban development for building stocks; see Project example II), PEA (Public sustainable energy production), Bionenergy Promotion (Biomass-to-Energy) and BalticBiogasBus (Biogas in public transport system).

Energy efficiency and energy savings are also prioritised by the *Baltic Sea Energy Cooperation* (BASREC) that works under the umbrella of the Council of the Baltic Sea States (CBSS). BASREC supports “the development of competitive, efficient and well-functioning energy markets to promote sustainable growth, security and prosperity in the region”. The BASREC activities consist of ministerial meetings, meetings of its group of senior officials and executive committee, as well as a project support facility with a budget framework of 1 million euros for the period 2009-2011 (CBSS 2013; BASREC 2013).

The following boxes present two projects financed under the *Baltic Sea Region Programme 2007-2013* that deal with energy efficiency:

Project example I: Longlife project

The Longlife project (2008-2012) focused on developing practices, innovative technologies, unified procedures and guidelines for sustainable and energy and resource efficient residential building in the Baltic Sea Region. As the extension stage of the Longlife project, the Longlife Invest initiative was undertaken. In January 2013, Longlife Invest started the development of a student apartment building as a Longlife Pilot Building in Klaipeda, Lithuania. In addition, the Longlife Institute e.V. was initiated in connection with the project in September 2011. Longlife Institute is an association for sustainable, energy efficient and resource saving buildings with respect to certification and life cycle analysis. The Institute seeks to continue the international cooperation and harmonisation of building standards in the Baltic Sea Region. It is also possible to apply for a membership in the Longlife Institute. For more information on the project, see <http://www.longlife-world.eu/>. For more information on the Longlife Institute, see <http://www.longlife-institute.org/>.

Project example II: Urb.Energy

The Urb.Energy project (2008-2012) addressed the fact that European housing stock is a major contributor to energy waste and CO2 emissions while the refurbishment rate in the new Member States remains low and sustainable urban development concepts are rarely addressed. The aim of the project was to elaborate and partly implement transferable integrated concepts and strategies for the sustainable and holistic rehabilitation of residential areas in the BSR. The project built upon the results of the BSR Interreg III B project BEEN that focused on strategies to promote the energy efficient refurbishment of the prefabricated housing stock. The Urb.Energy project combined the approach of the BEEN project with an approach for integrated urban development. The project resulted in a number of outcomes, including analyses of potential and constraints in residential quarters in the BSR, manuals and policy recommendation for energy efficient urban areas. For more information on the project, please see <http://www.urbenergy.eu/>

4 National Energy Efficiency Action Plans in Baltic Sea Region countries

This chapter provides a review of the National Energy Efficiency Action Plans (NEEAPs) of all Baltic Sea Region EU Member States and the Energy Strategy of Russia. The main overall goals and targets for the period up to 2030 concerning energy efficiency are summarised. Measures particularly related to the role of the public sector in increasing energy efficiency as well as measures related to the building sector are presented.

According to the Energy End-Use Efficiency and Energy Services Directive (2006) and later the Energy Efficiency Directive (2012), all Member States are supposed to submit National Energy Efficiency Action Plans to the European Commission. The first NEEAP was to be submitted by June 2007, the deadline for the second plan was June 2011. The current deadline for the third revision is in 2014. In the NEEAPs, the Member States describe their energy efficiency measures to be taken as well as their progress towards the energy efficiency goals, for example, concerning the shared energy savings target of 9% by 2016 according to the EU Directive from 2006. The NEEAPs also include information concerning the role of the public sector and provide information to energy consumers.

Even though the EU sets the general guidelines on what the NEEAPs shall include, in practice, the characteristics of the NEEAPs vary between Member States. In general, the NEEAPs have different functions in different Member States across the EU. Most of the Member States do not use the NEEAP as an actual policy tool, but instead as an inventory of measures to report the main successes of national energy efficiency policy (Thenius 2012).

When looking exclusively into the NEEAPs of the Baltic Sea Region Member States, it can be noted that scope and character differ. While some of the NEEAPs focus mainly on already implemented measures, others also include extensive descriptions of future activities and clearly defined quantitative targets covering different aspects of energy efficiency.

It should be noted that the Second National Energy Efficiency Action Plans were drafted in 2010-2011, following the former Energy End-Use Efficiency and Energy Services Directive and therefore do not follow the new requirements established in the current Energy Efficiency Directive adopted in 2012. The third NEEAPs to be submitted in 2014 will be drafted within the framework of the current directive.

4.1 Denmark

The overall objective of the Danish NEEAP is to make Denmark independent of fossil fuels by 2050. Gross energy consumption shall decrease by 4% between 2011 and 2020 compared to 2006. For the period 2008-2016, Denmark sets 9% as target for energy saving. Denmark further aims to become one of the most energy efficient countries in the world by 2020.

Energy efficiency in the public sector

According to the Danish NEEAP, activities related to energy efficiency in the public sector are incorporated into several policy programmes. A particular "forerunner" role is given to the public administration. Energy consumption in public buildings is to be reduced by 10%. Energy efficient behaviour will be displayed through the procurement of energy efficient products, amongst other measures. State-owned or -rented buildings are supposed to be energy labelled as well as constructed and operated as efficiently as possible.

At the local level, energy efficient behaviour and procurement is promoted and a special focus will lie on the energy efficiency of buildings. All local and regional government buildings must be operated and maintained in an energy efficient manner. At the regional level, special attention is paid to energy efficiency in connection to large investments that will have to be made in the future in new hospitals and extensions of existing hospital buildings.

Energy efficiency in buildings

Tightening up building regulations in 2010 is one of the key measures in the NEEAP. The new regulations reduce the limits for the amount of energy that a new building can use by 25% from the 2006 level. The regulations also include a voluntary framework for cutting the energy consumption of new buildings by 50%. This will be made mandatory by 2015.

The NEEAP also stresses the major potential for energy savings in existing buildings. It proposes requirements for a range of efforts, including an energy framework for new buildings, stricter energy requirements for building envelopes and windows in new buildings, component requirements for minor renovations as well as stricter component requirements for installations and building envelopes in existing buildings. The activities are further supported by information campaigns targeting the building industry and private households. According to the NEEAP, all future buildings will be "positive energy" buildings (i.e. producing more energy than they consume), but no clear schedule for reaching the target is given (Danish Energy Agency 2010).

4.2 Estonia

In Estonia, the aim is to keep the final energy consumption at the level of 2010 in 2020. By 2016, the aim is to achieve 9.9 PJ (petajoules) which responds to 9% energy savings (in compliance with the EED).

Energy efficiency in the public sector

According to the NEEAP, the public sector in Estonia shall set an example and take on cost-effective energy conservation and efficiency measures. The public sector should also inform the public, produce guidelines and create opportunities for exchange information.

Energy efficiency in buildings

The NEEAP stresses the importance of energy conservation in buildings but also underlines the high economic costs related to the modernisation of buildings to achieve modern energy conservation standards. Measures such as regulations on energy performance of buildings, the modernisation of buildings, tax policy measures, improvements in the skills of construction specialists and applied R&D to ensure analysis of the state of repairs have been implemented to increase the energy performance of buildings. The role of energy performance regulations is well-emphasised and it is stated that Estonia still has a lot to do to ensure high-quality implementation of the regulation.

Estonia has drawn up initial proposals for minimum energy efficiency requirements for nearly zero-energy buildings but when the action plan was published in 2011, there was no decision made regarding the schedule for reinforcing the minimum requirements. The plan further notes that the reconstruction of existing buildings requires large investments and stresses that reconstructions can be made in situations where state and/or public authorities have adequate budgetary resources (Estonian Ministry of Economic Affairs and Communications 2011).

4.3 Finland

The Finnish NEEAP presents on-going and completed activities to reach the energy saving target of 9% by 2016.

Energy efficiency in the public sector

All state organisations in Finland have to prepare energy efficiency plans and set comprehensive targets for energy savings. Related to the energy efficiency of buildings, the central government aims to make its premises approximately 20-25% more efficient.

Measures are also set related to the renovation of state property and improving energy efficiency in new construction. Providing information for users plays a significant role in reducing energy consumption of the property stock and maintaining energy efficiency. Energy savings are estimated to increase to 11% by 2016 and nearly 16% by 2020.

Also Senate Properties (government-owned property asset manager), which manages the majority of the state-owned building stock has signed up to the energy efficiency agreement. The agreement includes a mandatory energy savings target of 6% for 2011-2016 for the properties and an obligation to prepare an energy efficiency plan. Further, all public buildings of more than 1 000 m² must have energy certificates on display.

Finland has introduced an energy efficiency agreement scheme for local governments and supports energy audits for local government service buildings. Large- and medium-sized local governments can enter an agreement with the Ministry of Employment and the Economy. By 2011, 101 local governments had joined the agreement. There is also an energy audit measure that among other things, provides subsidies for energy audits of local government service buildings. It is expected that these measures together will increase energy efficiency by 5% by 2016.

Energy efficiency in buildings

According to the NEEAP, the most significant energy saving measures are:

- More stringent energy efficiency regulations for the construction of new buildings,
- Use of renewable energy sources,
- Advisory services,
- Energy subsidies for residential buildings and
- Energy efficiency agreement work related to oil-heated single-family dwellings.

New energy efficiency regulations for buildings entered into force in 2012. The regulations aim to increase the energy efficiency of new buildings by 20%. Limits for a building's total energy consumption have been set depending on the type of building. In addition to the NEEAP, the Ministry of Environment published a roadmap for improving the energy efficiency of new buildings; which aims to have nearly zero-energy construction by 2020. Also, a national plan for nearly zero energy building was drafted in 2011. The regulation and plans mainly address the energy performance of new buildings, but the Ministry of Environment is also in the process of drafting energy efficiency requirements for the renovation of existing buildings (Ministry of Employment and the Economy 2011).

4.4 Germany

The German NEEAP includes an analysis of existing measures, energy consumption and savings in different sectors. 9% by 2016 is the energy savings target. The NEEAP stresses that it is central to “wherever possible use market-based elements to increase energy efficiency and to realise energy savings among consumers”. Economic incentives and improved information and advice shall help enable both consumers and companies to increase energy efficiency independently.

Energy efficiency in the public sector

At the state level, initiatives such as procurement guidelines, state economic programmes and programmes for lending to municipalities have been used. In Germany, the public sector in 13 000 municipalities makes up approximately two thirds of public sector energy consumption. At the local level, energy efficiency measures include a range of investment measures including those for property redevelopment, expansion of local heating networks, replacement of street lights and the leasing of urban roof areas for the expansion of photovoltaic installations.

The planned future measures for the public sector include anchoring energy efficiency criteria legally in the process for awarding public sector contracts. The federal government will continuously engage in developing and promoting the market for energy services as well as support industry. Also, other financial incentives in terms of taxes and funding possibilities are outlined. The analysis done in the NEEAP shows that the public sector in Germany is already fulfilling its exemplary role in a variety of ways.

Energy efficiency in buildings

The main objective here is to reduce heating requirements of the building stock in the long-term. The aim is to achieve an almost climate-neutral building stock by 2050. The required energy would be coming from renewable sources. The mid- and long-term targets for the building sector are to double the energy modernisation rate from 1% to 2%, to reduce heating requirements by 20% by 2020, exclusively build new buildings that are climate-neutral and to reduce the primary energy requirement in the building sector by 80% by 2050.

To reach the targets, appropriate and reliable legal framework, time and considerable investments are required. Further a new strategic approach is needed. It is considered important in the NEEAP to define the redevelopment requirements with a long-term perspective so that they can be taken into account in investment plans. However, it is stressed that redevelopment should in no cases be compulsory (Federal Ministry of Economics and Technology 2011).

4.5 Latvia

The Latvian NEEAP targets energy savings in both end-use sectors and primary energy savings of 3 484 GWh by 2016. As the residential and transport sectors are the largest energy end-use consumers in Latvia (35,5% and 28,2% respectively), those sectors have been prioritised in the work towards increased energy efficiency.

Energy efficiency in the public sector

The public sector focuses on improving the energy efficiency of buildings. Energy efficiency of buildings accommodating higher education institutions and local authorities will be improved by preparing energy audit reports, technical inspection reports and calculating the energy efficiency of buildings. These activities will be combined with reconstruction work and improved heating supply. In addition, the Latvian NEEAP sets out measures to promote the role of the public sector as an example, leading the development towards increased energy efficiency in terms of the procurement of energy efficient equipment and the use of energy audits and the implementation of the resulting cost-effective recommendations.

Energy efficiency in buildings

The NEEAP presents measures to improve the thermal stability of apartment blocks and social housing. The NEEAP states that Latvia has no experience in the construction of nearly zero-energy buildings. When the NEEAP was published, research was still being carried out to lay down specific objectives concerning nearly zero-energy buildings (Ministry of Economics of the Republic of Latvia 2011).

4.6 Lithuania

The Lithuanian NEEAP also aims at 9% energy savings based on the average final energy consumption during 2001-2005. The Lithuanian NEEAP introduces specific measures related to households, services, the industrial sector, the energy sector as well as transport sector together with horizontal measures.

Energy efficiency in the public sector

In the Lithuanian NEEAP, the role of the public sector is mainly included in the obligatory chapter on the exemplary role of the public sector. It is stated that energy efficiency improvements in public buildings are being implemented in various programmes intended for 2003-2020. It is also stated that exchanges of experience in the area of energy efficiency will be promoted. However, actual activities are not clearly outlined. Furthermore, the role of green public procurement is discussed.

Energy efficiency in buildings

The NEEAP focuses on measures related to housing but does not set targets for energy consumption in new buildings or the share of nearly zero-energy buildings. Lithuania is implementing a multi-apartment building renovation/upgrading programme (2005-2020), where energy efficiency measures such as heating unit renovation, repair and sealing of windows and doors are carried out. The NEEAP also includes new and planned measures and programmes such as the town of Visagina's multi-apartment building renovation programme and a special programme for climate change and renewable energy (Ministry of Economy of the Republic of Lithuania 2011).

4.7 Norway

As a non-EU Member State, Norway does not have a National Energy Efficiency Action Plan in place. As an EEA member, Norway has however adapted other energy related directives and, for example, drafted a National Renewable Energy Action Plan applying the EU framework. Norway has also adopted the Energy Performance of Buildings Directive.

The key themes in Norwegian energy policy are improved energy efficiency, flexibility in energy supply and decreased dependency on direct electricity for heating as well as an increased share of renewable energy (other than hydropower) in the energy mix.

Energy efficiency in the public sector

The government-owned enterprise Enova SF manages the transition towards more sustainable energy production and consumption in Norway. All municipalities are obliged to draft climate and energy plans.

Energy efficiency in buildings

Energy efficiency for buildings and the residential sector is supported by financial and legislative measures in Norway. For example, Norway has grant programmes for energy savings in built environment, energy saving loans and information campaigns on the issue. Private and public building owners can apply for grants covering the additional costs of planning and constructing more energy efficient buildings. Enova SF provides free energy saving advice, amongst other things. In 2010, Norway started implementing a new standard for passive and low energy houses, including definitions concerning elements such as heat loss, heating demand and requirements for building components (IET 2012).

4.8 Poland

The Polish NEEAP states that during the last 20 years, Poland has made significant progress towards energy efficiency. Polish energy efficiency policy includes goals to maintain zero-energy economic growth and to consistently lower the energy consumption of the Polish economy to reach the level of EU-15.

Energy efficiency in the public sector

Poland has implemented several measures related to energy efficiency in the public sector, among others, producing an open register of persons authorised to prepare energy performance certificates for buildings. The NEEAP further includes measures to decrease energy consumption in public utility facilities and states that the public sector will play an exemplary role in implementing and promoting nearly zero-energy buildings for public utility facilities. Construction of facilities should be awarded primarily (and after 2015 exclusively) to buildings with increased energy efficiency.

Thermo-modernisation is a central theme that includes specific activities such as the insulation of buildings, exchange of windows and doors as well as use of energy management system in buildings. Energy efficiency and environmental protection in public procurement are also discussed.

Energy efficiency in buildings

In promoting the energy efficiency of buildings, the NEEAP focuses mainly on repair investments and thermo-modernisation including lower energy demand for heating. Investors can receive a thermo-modernisation bonus for reaching the requirements set in the Polish legislation (Ministry of Economy 2012).

4.9 Russia

The objective of Russian energy policy is “to maximize the effective use of natural energy resources and the potential of the energy sector to sustain economic growth, improve the quality of life of the population and promote the strengthening of foreign economic positions of the country”. The main focus is on a transition to the path of innovative and energy efficient development, change in the structure and scale of energy production, development of competitive market environment and integration into the world energy system.

Energy efficiency

In terms of energy efficiency, the aim is to maximise the rational use of energy resources by ensuring that saving energy and using the potentials of organisational and technological energy saving are in the energy consumers’ interests. The Russian energy strategy provides a list of planned measures for achieving energy efficiency of the economy, but does not set out a detailed description of their implementation or responsible authorities. The measures include:

- Elaborating comprehensive federal and regional legislation concerning energy saving,
- Promoting entrepreneurial energy savings activities,
- Increasing responsibility and penalties for violation of energy savings standards,
- Developing energy savings programs at all administrative levels and
- Developing international cooperation.

Furthermore, Russia has published a programme called “Energy Saving and Energy Efficiency Improvements until 2020” which aims at reducing the energy intensity of GDP by 40% by 2020 compared to 2007, with 26.5% of reductions coming from structural changes in the economy and 13.5% from new efficiency measures or new construction standards that were approved in 2011 (ABB 2012).

Energy efficiency in buildings

Russia aims to implement measures to improve energy efficiency in housing and communal complexes including a method of return on investments, new mandatory construction norms and regulations for effective use of energy for housing properties, public, commercial and industrial buildings, amongst others (Ministry of Energy of the Russian Federation 2010).

4.10 Sweden

The Swedish NEEAP states that the effective utilisation of resources, including energy, is the foundation for economic growth and sustainable development. The objective is to achieve economic growth without increasing energy consumption. In line with the Energy Efficiency Directive, Sweden aims at 9% energy savings by 2016.

Energy efficiency in the public sector

The public sector engages in measures and programmes with both tangible (such as new procurement rules) and intangible objectives (such as increased cooperation). The NEEAP includes six actions that respond to the Energy Services Directive and each of the 180 state agencies have to implement at least two of those.

Swedish municipalities and county councils can receive state aid for strategic work on improving energy efficiency. The Swedish Energy Agency and the county administrative boards support and provide information to municipalities. The Energy Agency also runs the Sustainable Municipalities Programme that supports energy efficiency in municipalities and supports possibilities for citizens, households and local business communities to get involved in local energy efficiency work. The municipalities are asked to provide a sound political basis and produce energy and climate strategies.

Energy efficiency in buildings

Swedish building regulations include requirements on energy management as well as upper limits for energy use in new buildings. Further, all buildings that are sold, rented, built or occupied by public authorities must have an energy certificate. In 2011, the general guidance on the alteration of buildings was revised and it became a binding administrative provision. Similar functional requirements are to be applied for both new buildings and renovation. It is the responsibility of the municipalities to ensure that the regulations concerning buildings are followed.

The Swedish NEEAP includes building-related measures on windows, biofuels and conversion to renewable energy, as well as technology procurement as a method of commencing a shift in the market towards efficient technology. The Swedish Low-Energy Buildings Programme coordinated by the Swedish Construction Federation aims at stimulating the energy efficiency of new buildings. Low-energy buildings are promoted in a five year programme, where developments with buildings with energy consumption at least 50% below the requirements can receive funding (Ministry of Enterprise, Energy and Communications 2011).

4.11 Summary

In compliance with the Energy Efficiency Directive, all EU Member States in the Baltic Sea Region have prepared a National Energy Efficiency Action Plan (NEEAP). In their NEEAPs the countries outline how they are going to reach the energy saving target of 9% by 2016. Depending on circumstances in the countries, Member States prioritise and describe measures differently in their NEEAPs.

In all NEEAPs in the Baltic Sea Region, the role of the public sector as setting an example is discussed. The public sector will reduce its own energy consumption but also engage in providing information for energy consumers. In many cases, clear targets are not provided, but for example, the Danish NEEAP states that energy consumption shall be reduced by 10% per each ministerial area.

As another example, the Swedish and Finnish NEEAPs favour agreements between local actors and the state to facilitate the work towards increased energy efficiency in municipalities. Swedish municipalities can apply for state aid for strategic work on improving energy efficiency in their own activities. Finnish municipalities can enter agreements with the ministry responsible for energy efficiency. The German NEEAP includes lending programmes to municipalities.

All of the NEEAPs studied emphasise the need for increased energy efficiency in the building sector in both new and existing public and residential buildings. Further, the NEEAPs set targets on the share of nearly-zero energy buildings. The Danish NEEAP also mentions positive energy buildings that produce more energy than they consume. However, specific targets concerning the share of nearly-zero energy buildings are not specified in the Estonian, Latvian and Lithuanian NEEAPs and the Russia strategy. A lack of knowledge and experience in constructing nearly zero-energy buildings is mentioned for example in the Latvian NEEAP. The NEEAPs also have a strong focus on heating provision as more efficient heating is an important contributor to the overall energy efficiency of buildings.

The availability of financial investments and funding is essential for increasing the energy efficiency of the building sector. The fact that the reconstruction of existing buildings requires extensive investment, and can only be implemented when adequate budgetary resources are available, is underlined in the Estonian NEEAP. In connection to the redevelopment of private buildings, the German NEEAP highlights that it is essential to have a strategic long-term approach to the building redevelopment requirements so that the owners are encouraged and able to take them into consideration in their investment plans.

The table below provides a list of examples of measures concerning energy efficiency in buildings and shall provide an overview of the variety of different measures taken in the NEEAPs. The list is not exhaustive. Many of the measures are implemented in more than one country but mentioned only once to avoid too much repetition.

Table 1: Main responsible authorities for NEEAPs and examples of measures concerning energy efficiency in buildings (non-exhaustive)

Country	Responsible authority	Examples of measures
DK	Danish Energy Agency	<ul style="list-style-type: none"> • Tightening up building regulations for e.g. building envelopes and components • Energy efficiency labels for state-owned buildings
EE	Ministry of Economic Affairs and Communications	<ul style="list-style-type: none"> • Energy conservation in apartment blocks • Programme for renovation loans • Support scheme for reconstruction of apartment buildings especially for insulation and utility systems
FI	Ministry of Employment and the Economy & Ministry of Environment	<ul style="list-style-type: none"> • Energy efficiency regulations for new buildings • Energy subsidies for residential buildings • Mandatory water meters for homes
DE	Federal Ministry of Economics and Technology	<ul style="list-style-type: none"> • Investment subsidies and long-term low-interest loans for e.g. energy efficient redevelopment and housing modernisation • Subsidies for low-energy buildings within eco allowances • Funding for on-site consultation by accredited energy advisors (thermal insulation, heat generation and distribution)
LV	Ministry of Economics and Latvian Investment and Development Agency	<ul style="list-style-type: none"> • Support for low-energy buildings (e.g. energy audits, preparation and approval of design in accordance with efficiency requirements, reconstruction work, replacement of heating supply systems, inspecting building envelopes) • Complex solution to reduce GHG emissions for housing and public buildings
LT	Ministry of Energy	<ul style="list-style-type: none"> • Energy consumption audits for buildings and certification of specialists performing the audits • Programme for upgrading (e.g. replacement of windows and doors, renovation of heating units, installation of ventilation systems)
NO	Ministry of Petroleum and Energy	<ul style="list-style-type: none"> • Grants for energy savings in the built environment • Free energy saving advice • Energy guidance label "Enova recommends" to promote the best products in terms of energy (e.g. windows and insulation)
PL	Ministry of Economy	<ul style="list-style-type: none"> • Support system for thermo-modernisation and repair investments
RU	Ministry of Energy	<ul style="list-style-type: none"> • Mandatory construction norms and regulations for effective use of energy for housing properties and public, commercial and industrial buildings
SE	Swedish Energy Agency	<ul style="list-style-type: none"> • Low-energy buildings programme (at least 50% below the requirements) • Support (state aid) for municipalities and county councils to improve energy efficiency

5 Sustainable Energy Action Plans in selected Baltic Sea Region cities

The Sustainable Energy Action Plans (SEAPs) are an important tool for promoting sustainable energy policy at the local level. In SEAPs, European cities outline actions to reduce CO₂ emissions by at least 20% by the year 2020. Participation is voluntary. As of today, 4375 European cities have elaborated a SEAP. The *Covenant of Mayors* monitors the implementation of the SEAPs and facilitates the exchange of experiences between participating cities. Every two years (after the submission of the SEAP), the signatories are expected to submit an implementation report outlining the interim results of the implementation of the SEAP.

Generally, the SEAPs are relatively similar in their structure and content, following the guidelines provided by the *Covenant of Mayors*. Cities can also adapt their SEAPs to their individual needs and contexts however. All signatories have to make a baseline emission inventory, quantifying the amount of CO₂ emissions due to energy consumption in their territories to identify the main sources of emissions as well as to investigate the reduction potentials related to them. In table 2, the main quantitative targets related to CO₂ emissions are presented. The baseline years vary, while the recommendation of the *Covenant of Mayors* for a baseline year is 1990.

In the following section, we present how energy efficiency has been addressed in SEAPs developed by six cities located in the Baltic Sea Region. We tried to cover cities participating or represented in the EFFECT Thematic Partnership project. However, only Kaunas (LT) and Malmö (SE) have currently prepared a SEAP within the Covenant of Mayors framework. Other EFFECT project partners may have individual local and regional strategies and plans on energy issues, but in this overview, the plans were chosen based on whether they have been submitted to the Covenant of Mayors and are available to download on the Covenant website, preferably in English.

Further, SEAPs have been selected for the review according to reduction targets (to gain a variety of different targets), status (preferably accepted) and language (preferably available in English language). In addition to the SEAPs of Malmö and Kaunas, the plans from Frederikshavn (DK), Tampere (FI), Jelgava (LV) and Warsaw (PL) have been reviewed.

Table 2: Cities and their reduction targets

City	Targets
Frederikshavn SEAP adopted in 2012	<ul style="list-style-type: none"> • Overall CO2 emission reduction target: 53% (compared to 2007) • Reduction of CO2 emission for electricity & heat production, transport: 53% • Increase of renewable energy production to 70% • 100% independent of fossil fuels by 2030
Malmö SEAP adopted in 2009	<ul style="list-style-type: none"> • Overall CO2 emission reduction target: 40% (compared to 1990) • Share of renewable energy at least 50% by 2020 and energy exclusively from renewable sources by 2030 • Decrease in energy use by 20% • Decrease in energy use in the municipality's own operation and companies by 30% • Increase of the share of renewable energy to 100%
Tampere SEAP adopted in 2009 (updated in 2012)	<ul style="list-style-type: none"> • Overall CO2 emission reduction target: 30% (compared to 2005)
Jelgava SEAP adopted in 2010	<ul style="list-style-type: none"> • Overall CO2 emission reduction target: 20% (compared to 2005) • Energy efficiency increase target: 20% • 20% of the total consumed energy from renewable sources
Kaunas SEAP adopted in 2010	<ul style="list-style-type: none"> • Overall CO2 emission reduction target: 30% (compared to 1990) • At least 50% of multi-storey dwellings planned to be renovated by 2010
Warsaw SEAP adopted in 2011	<ul style="list-style-type: none"> • Overall CO2 emission reduction target: 20% (compared to 2007) • Reduction in use of energy: 20%

5.1 Energy efficiency in buildings

In line with the EU policies and the National Energy Efficiency Action Plans, the SEAPs emphasise the need for increasing the energy efficiency of buildings mainly by renovating both public buildings and residential buildings. The SEAPs generally seem to have less of a focus on new zero energy buildings or the share of new buildings being zero energy buildings even though they are in most cases discussed in the NEEAPs.

As buildings have the greatest potential for increasing energy efficiency, and are also the focus area of this paper, examples of measures related to energy efficiency and buildings are presented in Table 3.

Table 3: Examples of measures concerning energy efficiency in buildings

City	Measures
Frederikshavn SEAP adopted in 2012	<ul style="list-style-type: none"> • Consultancy regarding heating and electricity in the private housing sector • Systematic Energy Management in municipal buildings • Energy renovation of existing municipal buildings • Effective insulation of buildings and replacement of building components with the parts that insulates better and/or consume less energy • Recovery of heat by effective ventilation systems • Information and motivation of employees, establishing of cooperation groups on energy savings
Malmö SEAP adopted in 2009	<ul style="list-style-type: none"> • New buildings on municipal land must follow the energy demands in the Environmental Building Programme SYD or aim at A-level efficiency • Information about energy efficiency of buildings provided in connection to e.g. planning permission application processes • Establish dialogue with bigger private real estate owners concerning energy efficiency measures • Use energy mapping as the basis for establishing e.g. efficiency programmes for buildings and structures
Tampere SEAP adopted in 2009 (updated in 2012)	<ul style="list-style-type: none"> • Efficient use of space in public buildings • Maintenance and renovation and fundamental improvement of public buildings to increase energy efficiency in existing buildings • Construction of new energy efficient buildings (close to the best energy certificate level) • Efficient use of space, e.g. decreasing the inside temperature by one degree • Maintenance and renovation (e.g. LED lightning, installation of water saving appliances) • Fundamental improvement of housing (e.g. more efficient heating, installing more energy efficient domestic appliances, installation of water striders in apartments)
Jelgava SEAP adopted in 2010	<ul style="list-style-type: none"> • Technical status inspection and energy audit report of multi-residential buildings • Elaboration of concept for energy efficiency improvements of multi-residential buildings • Renovation and energy efficiency improvement of multi-residential buildings • Increasing energy efficiency and renovation of schools (e.g. heat insulation, renovation of water supply and sewage systems)
Kaunas SEAP adopted in 2010	<ul style="list-style-type: none"> • Renovation of public buildings (kindergartens, schools, hospitals etc.) to reduce thermal energy consumption (e.g. renovation of heating units and roof insulation) • High-efficiency thermal power plant construction in Kaunas Median University Hospital • Implementation of residential home renovation programme

	<p>covering more than 50% of Kaunas city housing (e.g. wall insulation, window replacement, installation of individual thermal sensors)</p> <ul style="list-style-type: none"> • Support for citizen participation in the renovation of apartment houses
<p>Warsaw SEAP adopted in 2011</p>	<ul style="list-style-type: none"> • Comprehensive thermal retrofitting of all residential buildings with standards close to the Thermal Retrofit Act • Modernisation of indoor lighting, replacement of electronic equipment and household appliances etc. • Same measures that are used to increase efficiency in the housing sector are also implemented in public sector buildings • All advances in technology should be used to enrich construction sector, among others passive houses, low-energy houses and energy-efficient houses

5.2 Summary

The signatories (cities) can choose their focus areas independently, but in principle the *Covenant of Mayors* expects the SEAPs to cover themes such as buildings, industries, transport, local small-scale electricity production and local district heating, as well as combined heat and power production (CHP). The SEAP Guidebook³ published by the *Covenant of Mayors* provides extensive information and guidance on how to draft a SEAP. It presents among other things the preferable SEAP structure and lists the main points to keep in mind when drafting a SEAP.

Being a local level policy document, a SEAP is supposed to have a specific focus on issues where local authorities have a particularly central role to play. These issues can include land use planning, public procurement (including energy efficiency requirements), working with citizens and other stakeholders as well as waste and water management (Covenant of Mayors 2013).

All of the studied SEAPs stress the importance of increased use and production of renewable energy in their territories. For example the City of Kaunas plans to build a new power plant for incineration of municipal waste (City of Kaunas 2010). In Jelgava a biofuel CHP plant is planned (City of Jelgava 2010). Several other SEAPs that were studied include plans concerning increased production of renewable energy. Different renewable sources are to be used in energy and electricity production as well as in the provision of heat and hot water. The SEAPs include commitments from local actors to start using energy from renewable sources.

When it comes to the use and production of renewable energy, the differences in the energy systems and the current state of play in terms of sustainable energy between the countries are visible in the SEAPs. Energy production in Poland is still largely based on the use of traditional energy sources but the SEAP of the City of Warsaw notes increasing awareness of environmental damages caused by

³ In order to get acquainted with the guidebook, please download it at the Covenant of Mayors website: <http://www.eumayors.eu>.

conventional energy production. However, the listed measures for 2010-2020 still do not include measures concerning renewable energy (City of Warsaw 2011).

Heat production and the development of combined heat and power production are important priorities in several of the plans. In particular, measures are taken to decrease heating losses and thereby increase efficiency. The City of Jelgava wants to reduce heat losses in the district heating system and the City of Kaunas is going to reconstruct and develop its district-heating network. In the City of Frederikshavn, it is estimated that renovation of the district-heating grid can result in one percentage point reduction in heat loss (City of Frederikshavn 2012; City of Kaunas 2010; City of Jelgava 2010).

The SEAPs of Malmö and Frederikshavn emphasise the need for linking the energy strategies with municipal physical or land-use planning both in cities and rural areas. The City of Tampere stresses the importance of densifying the settlement structure to enable an increase in energy efficiency (City of Frederikshavn 2012; City of Malmö 2011; City of Tampere 2012).

Land-use and urban planning are also important focus areas in other SEAPs where the notable need to develop the public transport systems, foot and cycle paths as well as increasing the amount of green areas are included. In terms of land-use and planning, transport issues are crucial for energy efficiency and include investigating opportunities for using green buses in public transportation in Tampere, purchasing of low-polluting means of transportation in Kaunas and targeting at 10% of the fuel used being biofuel by municipal public transportation in Jelgava (City of Jelgava 2010; City of Kaunas 2010; City of Tampere 2012).

At the local level, public procurement is used to promote sustainable energy consumption. All of the studied SEAPs include measures concerning sustainable energy use in public procurement in terms such as public transportation, public and residential buildings and more efficient outdoor lightning. The City of Tampere stresses the key role of public procurement in energy efficiency. Public procurement measures range from increasing energy efficiency of lightning to favouring vegetarian seasonally produced food. For example, the City of Malmö aims to only purchase electricity, gas and district heating produced from renewable energy sources (City of Malmö 2011; City of Tampere 2012).

The guidelines from the *Covenant of Mayors* concerning SEAPs underline the importance of citizen involvement and information and the studied SEAPs do include related activities. However, in most cases the practical role of involvement for energy efficiency or the actual information activities are not outlined in detail.

Due to the fact that awareness concerning energy related issues has been low – and the share of conventional energy sources high in Poland - the City of Warsaw considers information and education, as well as raising awareness for the existence of the SEAP, as a key activity. The plan also introduces a few actions such as an annual “picnic with climate” event. The SEAP of Malmö can be considered as having a pedagogic approach seemingly aiming at explaining technical issues in a way that can be understandable for the general public. It also provides a glossary of the concepts used as well as clarifications on measurements which make it easier to understand the targets and their scale even for readers without wide knowledge of the energy sector (City of Malmö 2011; City of Warsaw 2011).

Outlining the responsibilities of different actors concerning the implementation of the plans is also an essential part of the SEAPs. The funding of measures is often outlined in the SEAPs or, at the very least, opportunities are listed initially. For example, the City of Jelgava extensively presents the ways in which different funding sources can contribute to reaching its goals (EU Structural and Cohesion Funds as well as green investment schemes). The role of credits granted by commercial banks is identified as a major instrument for financing energy efficiency measures for the renovation of buildings in the city (City of Jelgava 2010).

Furthermore, indicators to monitor the implementation of the plans are presented in some of the SEAPs. The City of Tampere identifies four different types of indicators in its SEAP that can be used to follow up different types of measures. For example, concrete, measurable energy conservation or efficiency measures require different kinds of indicators than more qualitative and non-measurable measures (City of Tampere 2012).

6 Summary

Energy efficiency, and energy efficiency in the building sector in particular, has become one of the most central focus areas in EU policy. Nearly 40% of final energy consumption and 36% of GHG emissions comes from houses, offices, shops and other buildings. Buildings have the second largest potential after the energy sector for energy savings. According to the Energy Strategy 2020, energy efficiency is “the most cost efficient way to reduce emissions, improve energy security and competitiveness”. The co-benefits of improving energy efficiency in buildings include job creation, fuel poverty alleviation, health improvements, better energy security and improved industrial competitiveness (EC 2010b; EC 2013a).

Improving the energy efficiency of both new and existing buildings plays a key role in increasing the overall energy efficiency of the economy. Energy efficiency of the building sector is discussed in EU policy documents concerning sustainable energy and is also discussed as an essential part of the more general overall transition towards low-carbon resource efficient economy. Related to the key issue of energy efficiency and buildings, the European Commission is going to publish a roadmap on sustainable buildings in 2013 in which the issues of energy efficiency are of key importance. It will also include a shift towards a more holistic approach, taking into consideration not only energy efficiency as such but also addressing resource use and environmental impacts during the entire life cycle of buildings (EC 2012d).

The Energy Efficiency Directive (EED) and the Energy Performance of Buildings Directive (EPBD) are currently the most central directives concerning energy efficiency and buildings. Among other things, the EPBD states that all EU Member States shall establish and apply minimum energy performance requirements for buildings by introducing certifications and regular inspections. It also obliges Member States to ensure that by 2021 all new buildings are nearly zero-energy buildings (EC 2010a).

The Energy Efficiency Directive sets out legally binding measures to increase Member States' efforts for increased energy efficiency in all sectors. It obliges all EU Member States to draft National Energy

Efficiency Action Plans where they describe their implemented and planned energy efficiency activities (EC 2012b). All EU Member States in the Baltic Sea Region have prepared a NEEAP according to the Directive even though they are drafted and used differently as policy tools (Thenius 2012).

All of the NEEAPs stress the role of the public sector setting an example on energy efficiency and many countries also provide national level support in programmes for local and regional level authorities to facilitate the local work towards increased efficiency. All of the national plans identify the building sector as having a large potential in increasing energy efficiency in their countries. Many states have made or plan to make their building regulations stricter in terms of energy efficiency and also aim to increase the share of nearly zero-energy buildings as well as to renovate existing public and residential buildings to increase their energy efficiency. However, there are notable differences between the countries. Particularly relevant in the context of this report, the Baltic States note that they may lack the needed know-how in constructing low-energy buildings. There, the thermo-modernisation of the existing building stock can be considered a more pressing issue in terms of energy efficiency in buildings.

Crucial to increasing the energy efficiency of the building stock is the availability of investment incentives and funding. The challenge related to a lack of financing is underlined among others in the Estonian NEEAP. A report on financial support for energy efficiency in buildings published by the European Commission looks at the effectiveness of EU funding and other public funding forms, as well as coordination between national and EU funding. The analysis of 25 financial support schemes shows that the most successful support programmes are based on preferential loans often supplemented with grant and/or technical assistance packages. However, success also depends on other factors such as administrative procedures and information to citizens (EC 2013a).

According to the report on financial support for energy efficiency in buildings, it is essential to improve the financial support for energy efficiency in buildings by ensuring that the regulatory framework of the EU is properly followed by the Member States. This would increase the amount of financing available and address the key technical, financial, informational and behavioural barriers. Close cooperation between public authorities, finance providers and the building sector is needed. It is also important to convince building owners of the benefits of improving the energy efficiency of their buildings. According to the Energy Efficiency Directive, in 2014 all Member States will for the first time be obliged to submit long-term strategies for mobilising investments in the renovation of the national stock of both private and public residential and commercial buildings (EC 2012b; EC 2013a).

To facilitate work towards increased energy efficiency at local level, the EU initiative the *Covenant of Mayors*, encourages local governments to draft and submit local sustainable energy action plans (SEAP). The covenant supports the signatories and also provides guidelines and assistance for drafting the action plans.

For this internal working paper, six SEAPs from around the Baltic Sea Region were studied to get an overview of what kind of issues are typically discussed and prioritised. Renewable energy was identified as an important factor for increased sustainability in energy production even though the current situation between regions and states differ. The SEAPs also extensively cover issues related to energy efficiency and link the sustainable use of energy to different sectors and activities. In some

of the plans, it is seen as especially important to take energy issues into consideration in other policies and link land use planning and energy.

Both NEEAPs and SEAPs provide a variety of measures that can be studied as inspiration for increasing energy efficiency but that can also be further developed. Many of the NEAPs and SEAPs successfully analyse the challenges and potentials of their territories in terms of energy efficiency and sustainable energy in general and link the background analysis to the planned measures. However in many cases, both NEEAPs and SEAPs would benefit from improved follow up and clearer targets that would facilitate a better overview of the progress concerning energy efficiency in the entire economy. Especially in the SEAPs, it is essential to increasingly aim at a pedagogic approach that makes the content accessible for different kinds of stakeholders, which would facilitate engagement among different groups towards common objectives.

Energy efficiency is a priority in energy policy in BSR countries and cities and has also been addressed by various transnational projects in the BSR. NEEAPs and SEAPs, together with other initiatives, are important in setting targets and working towards increasing energy efficiency in all sectors. Addressing energy efficiency in the EU Baltic Sea Region Strategy will help to keep the issue on the agenda, which in return supports and motivates public authorities at different levels to address energy efficiency issues.

To increase the overall energy efficiency of the Baltic Sea Region, it would be beneficial to include more BSR cities in the *Covenant of Mayors* s. Having more BSR cities adopt a SEAP would facilitate and increase the exchange of experiences and good practices in the region. For the energy efficiency and competitiveness of the Baltic Sea Region, it would be beneficial to also encourage cities from Russia and Belarus to work with energy efficiency at the local level.

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