Finland's national plan to increase the number of nearly zero-energy buildings

24.10.2012

Report to the European Commission pursuant to Article 9 of Directive 2010/31/EU on the energy performance of buildings

CONTENTS

1. INTRODUCTION

Under the Energy Performance of Buildings Directive (2010/31/EU) which entered into force in July 2010, one of the obligations of Member States is to draw up a national plan to increase the number of nearly zero-energy buildings. The Commission shall by 31 December 2012 and every three years thereafter publish a report on the progress of Member States in increasing the number of nearly zero-energy buildings. On the basis of that report the Commission shall develop an action plan and, if necessary, propose measures to increase the number of those buildings and encourage best practices as regards the cost-effective transformation of existing buildings into nearly zero-energy buildings.

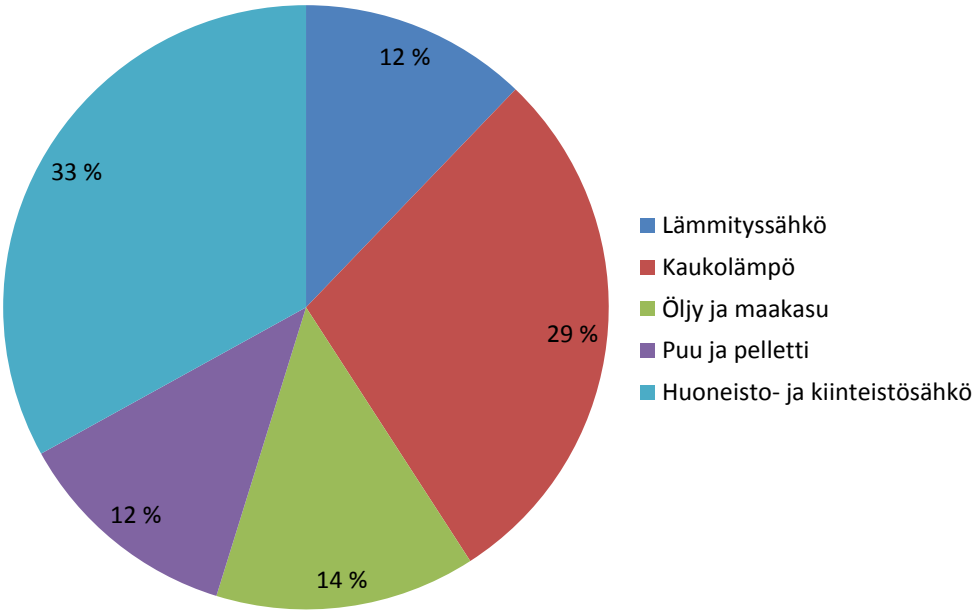
This report sets out Finland's national plan for increasing the number of nearly zero-energy buildings in accordance with the requirements laid down in the Energy Performance of Buildings Directive.

2. POINTS OF DEPARTURE

2.1 Energy use of buildings

The built environment has a central role in the use of energy and the generation of greenhouse emissions. The energy used in heating buildings and the apartment and property electricity used in buildings (in total, around 120 TWh) account for about 38 % of the end-use of energy in Finland, while the manufacture of building materials and construction account for 4 %.[1]

The end-use of electricity by buildings can be broken down into heating electricity (12 %), district heat (29 %), oil and natural gas (14 %), wood and briquettes (12 %) and apartment and property electricity (about 33 %).



[1] ERA17 – For an Energy-Smart Built Environment 2017. Ministry of the Environment, Sitra and Tekes, 2010, http://era17.fi/

Figure 1. Breakdown of end-use of energy by buildings*

Key to Figure 1

Lämmityssähkö	*Heating electricity*
Kaukolämpö	*District heat*
Öljy ja maakasu	*Oil and natural gas*
Puu ja pelletti	*Wood and briquettes*
Huoneistö- ja kiinteistösähkö	*Apartment and property electricity*

In Finland there are 1.4 million buildings, of which 85 % are residential buildings. The total number of dwelling units is just under three million. The total volume of the building stock is 1 800 million m^3, while the total floor area is 429 million m^2. The share of the volume and floor area of the building stock that is represented by residential and service buildings is about 60 %.

The quantity of one year's production of new buildings represents just over one per cent of the total building stock, while the wastage is (depending on the type of building) 0.3–2 %. It is estimated that about 75 % of the current building stock will still be present in 2050.

It is estimated that repair and renovation work will continue to increase in the 2010s and 2020s, in particular due to the need for repairs to façades and piping. In residential building, the economic inputs into repair and renovation work and into new building are almost equal.

3. TRANSFORMATION OF BUILDINGS THAT ARE REFURBISHED INTO NEARLY ZERO-ENERGY BUILDINGS

Obligations under Article 9.2 of the Directive

Under Article 9.2, Member States shall, following the leading example of the public sector, develop policies and take measures such as the setting up of targets in order to stimulate the transformation of buildings that are refurbished into nearly zero-energy buildings.

In accordance with the decision in principle[2] regarding energy efficiency action reached by the Council of State on 4 February 2010, the public sector acts as a powerful example in the promotion of energy efficiency. According to the decision in principle, the Council of State requires that the government target of renovations to existing buildings in 2010 is at least energy efficiency class C. This corresponds to the prescribed level for new building at the date of issue of the decision in principle. In addition, under the decision in principle the government target in buildings constructed, repaired and leased after 2015 is the "passive house".

On 3 May 2012 the Council of State made a decision in principle for a housing policy action plan for the period 2012 – 2015[3]. Under this action programme, the energy efficiency of Finland's stock of dwelling units is to be improved so as to be more cost-effective via renovations that are carried out. According to the action plan, in loans granted by ARA (the Housing Finance and Development

[2] http://www.valtioneuvosto.fi/toiminta/periaatepaatokset/periaatepaatos/fi.jsp?oid=287171

[3] http://valtioneuvosto.fi/toiminta/periaatepaatokset/periaatepaatos/fi.jsp?oid=356822

Centre of Finland), a body which falls within the administrative sector of the Ministry of the Environment, it is required that the target level for a renovated dwelling unit shall be level C.

The most significant example-setter in the promotion of energy efficiency is Senate Properties[4]. Senate Properties is a state enterprise which owns almost 12 000 buildings. Under the decision in principle[5] made by the Council of State on 21 December 2010 regarding the state property strategy, the concentration of the state's property assets to expert organisations, which are set up for that purpose or which already exist, will be continued; at the moment, these organisations comprise Senate Properties and Metsähallitus ("Forest Administration"), which operate as state-owned companies. Under the decision in principle, also, state property asset ownership and owner-possession arrangements must always take into account the realisation of the wider interests of the state. "The wider interests of the state" means not only financial impact but also social and environmental factors and factors relating to the protection of the natural heritage, plus other social viewpoints such as the regeneration of urban structures, the life cycle philosophy, sustainable development, the promotion of energy efficiency and a well-functioning property market.

4. DEFINITION OF A NEARLY ZERO-ENERGY BUILDING

Obligations under Article 9.3 a) of the Directive

Under Article 9.3 a) of the Directive, the national plan shall include an account of the Member State's application in practice of the definition of nearly zero-energy buildings, reflecting their national, regional or local conditions, and including a numerical indicator of primary energy use expressed in kWh/m^2 per year. Primary energy factors used for the determination of the primary energy use may be based on national or regional yearly average values and may take into account relevant European standards.

It is intended that the detailed specification at the national level of the definition of nearly zero-energy construction only be made at a later stage, in order that the energy performance level that is to be imposed can be set at no less than a cost-optimal level, taking into account the energy technology development of construction products, the development of energy systems and markets, and the general economic trend. In many national research programmes, research, development and innovation projects relating to nearly zero-energy construction are currently underway. Important data on the performance of various solutions will be obtained from the projects which are to monitor implemented Pilot subjects.

The Ministry of the Environment is bringing together various parties in the construction sector to participate in the specification of nearly zero-energy buildings. The aim is to compile the most comprehensive data possible on the results of the various research projects for the specification of nearly zero-energy buildings. In the implementation of nearly zero-energy construction, the entire construction sector must be able to participate in and to adopt the objective. To this end, in spring 2012 the Ministry of the Environment organised an experts' think-tank to prepare a roadmap for energy-efficient construction. Over 300 experts took part in this think-tank. The aim in this project was to enlist the experts in the sector to produce ideas for the drafting of new rules and regulations to improve energy efficiency and to prepare the timetable for starting nearly zero-energy building.

[4] http://www.senaatti.fi/

[5] http://www.vm.fi/vm/fi/04_julkaisut_ja_asiakirjat/03_muut_asiakirjat/20101221Valtio32051/name.jsp

In addition, Motiva organised a workshop on nearly zero-energy construction, aimed in particular at the manufacturers of one-family houses, as part of the ”Energiatehokas koti” (”Energy-efficient home”) project[6], the aim of which is to produce information promoting nearly zero-energy construction.

For the evaluation of rules regarding nearly zero-energy buildings, use will be made of the Commission Delegated Regulation (EU) No. 244/2012 on calculating cost-optimal levels. At the moment, the calculation of the cost-optimal level for the new energy rules for buildings (2012) is still underway. The result of this calculation will also provide initial estimates of the cost impact of the nearly zero-energy objective.

As an initial result in the preparation of a roadmap for energy-efficient construction statutes, it has been decided that the Ministry of the Environment will issue the technical descriptions regarding nearly zero-energy construction as recommendations in 2015. At present there are insufficient experiences, technical know-how and estimates of economic impact for stipulation of a more detailed approach and (for example) of requirement levels. Taking into account information obtained from development measures and background studies and technical and economic developments, the aim would be to issue building regulations regarding nearly zero-energy construction after the next parliamentary elections, during 2017. In accordance with the Energy Performance of Buildings Directive, the requirements of the building regulations would enter into force for buildings used by authorities from the start of 2019, and for all buildings from the start of 2021.

New regulations regarding new construction

In March 2011 the Ministry of the Environment issued new building regulations to improve energy performance, which entered into force on 1 July 2012. Part D3 of the National Building Code of Finland, ”Energy Management in Buildings” (2/11)[7] was issued as a Decree of the Ministry of the Environment in accordance with section 13 of the Land Use and Building Act (132/1999).

The regulations apply to new construction, and the main change that they introduce is a shift to a total energy consumption assessment. The total energy consumption assessment covers all energy consumption which takes place within the building. The regulations set an upper limit for a building’s total energy consumption, based on the type of building, which is expressed as an E-rating. A building’s total energy consumption, i.e. the E-rating (kWh/m2), means the building’s computational annual consumption of delivered energy (weighted by a form-of-energy coefficient) calculated by rules given in the regulations (”standard use”) per heated net area. The building’s consumption of delivered energy is energy which is obtained for the building e.g. from the electric power network, the district heating network, the district cooling network and as energy contained in renewable or fossil fuels. Delivered energy consists of the energy consumption of heating, ventilation and refrigeration systems plus consumer appliances and lighting, broken down by form of energy, with account being taken of the impact of renewable energy produced on-site in reducing delivered energy (figure 2). Renewable energy produced on-site is renewable energy produced from local renewable energy sources by equipment belonging to the property, with the exception of renewable fuels. Renewable energy produced on-site is, for example, energy produced in solar

[6] http://www.energiatehokaskoti.fi

[7] http://www.finlex.fi/fi/viranomaiset/normi/700001/37188

panels and solar collectors, local wind energy and energy taken from a heat source by a heat pump. Renewable fuels on the other hand are treated as a component of renewable delivered energy.

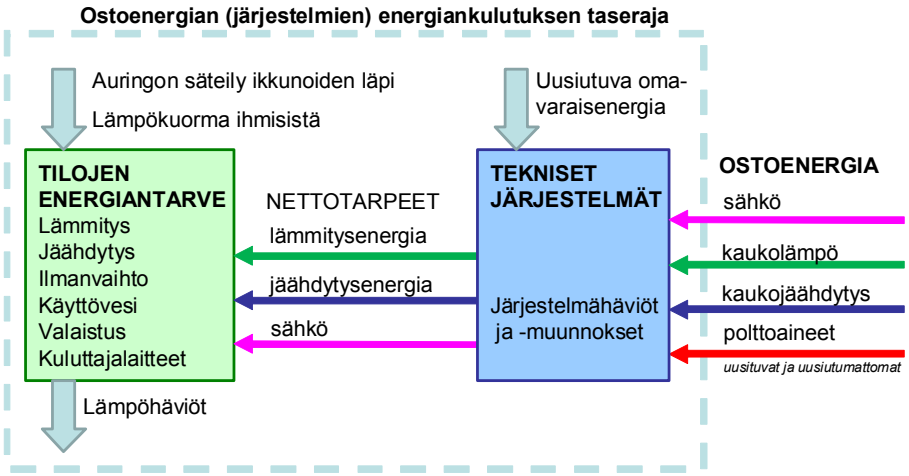


Figure 2. This figure shows the system boundary of net delivered energy in accordance with the Finnish Building Regulations.**

Key to Figure 2

Ostoenergian (järjestelmien) energiankulutuksen taseraja	*System boundary of delivered energy*
Auringon säiteily ikkunoiden läpi *Lämpökuorma ihmisistä*	*Solar heat gains / loads* *Internal heat gains / loads*
TILOJEN ENERGIANTARVE	*ENERGY NEED*
Lämmitys *Jäähdytys* *Ilmanvaihto* *Käyttövesi* *Valaistus* *Kuluttajalaitteet*	*Heating* *Cooling* *Ventilation* *DHW* *Lighting* *Appliances*
Lämpöhäviöt	*Heat exchange*
NETTOTARPEET	*NET ENERGY NEED*
lämmitysenergia *jäähdytysenergia* *sähkö*	*heating energy* *cooling energy* *electricity*
Uusiutuva omavaraisenergia	*On site renewable energy w/o fuels*
TEKNISET JÄRJESTELMÄT	*BUILDING TECHNICAL SYSTEMS*
Järjestelmähäviöt ja –muunnokset	*System losses and conversions*
OSTOENERGIA	*DELIVERED ENERGY*
sähkö *kaukolämpö* *kaukojäähdytys* *polttoaineet*	*electricity* *district heat* *district cooling* *fuels*
uusiutuvat ja uusiutumattomat	*(renewable and non-renewable)*

In the calculation of the E-rating, account is taken of the various forms of energy used by the building. In order to calculate this figure, coefficients for the various forms of energy are stipulated, which enable the different forms of energy to be added up. The coefficients stipulated for the forms

of energy encourage the use of renewable energy sources such as geothermal heat, solar collectors and solar panels, and also renewable fuels such as briquettes.

Table 1. Form-of-energy coefficients (National Building Code of Finland, D3/2012)

	Form-of-energy coefficients 2012
Fossil fuels	1.0
Electricity	1.7
District heat	0.7
District cooling	0.4
Renewable fuels	0.5

When calculating the E-rating, renewable energy produced on-site is not delivered energy, and it has no coefficient; rather, heat obtained from solar collectors (for example) reduces the consumption of delivered energy. Form-of-energy coefficients are only used for delivered energy.

The aim of the structure of the new building regulations was that they make it possible to set a minimum level for renewable energy and to gradually shift towards nearly zero-energy construction.

5. INTERMEDIATE TARGETS

Obligations under Article 9.3 b) of the Directive

Under Article 9.3 b) of the Directive, the national plan shall include intermediate targets for improving the energy performance of new buildings by 2015, with a view to preparing for the implementation of the target of nearly zero-energy.

In accordance with the Council of State's decision in principle issued on the promotion of sustainable choices in public procurements,[8] the intermediate target with a view to preparing for the implementation of the target of nearly zero-energy is that in new buildings in public administration to be built after 2015 the objective is the "passive house".

On 3 May 2012 the Council of State made a decision in principle for a housing policy action plan for the period 2012 – 2015.[9] According to the action plan, in loans granted by ARA (the Housing Finance and Development Centre of Finland) it is required that a new dwelling unit shall be level A.

In 2015, it is the intention of the Ministry of the Environment to issue the technical descriptions regarding nearly zero-energy construction as recommendations. In the period up to 2015, a number of experimental projects in nearly zero-energy construction based on different technical solutions will be launched by the Ministry of the Environment and the parties funding the research; also,

[8] http://www.valtioneuvosto.fi/toiminta/periaatepaatokset/periaatepaatos/fi.jsp?oid=258914

[9] http://valtioneuvosto.fi/toiminta/periaatepaatokset/periaatepaatos/fi.jsp?oid=356822

monitoring of the performance of these projects will be arranged. The aim of this trial construction is to set an example and also to test the performance of these experimental solutions in practice.

By mandate of the Ministry of the Environment and the Ministry of Employment and the Economy, Motiva Oy is running the "Energiatehokas koti" ("Energy-efficient house") campaign, which brings together the various sectors involved in energy-efficient construction. The campaign's main channel of communication is the website www.energiatehokaskoti.fi. The campaign was launched as early as 2005, originally in order to promote low-energy construction. The campaign turned out to be highly successful. The new target of promoting nearly zero-energy construction was set by the Ministry of the Environment in 2012. The work of the project is aimed at achieving a share of about 15 % for nearly zero-energy one-family houses by 2015.

6. DETAILS OF APPROVED MODES OF ACTION

Obligations under Article 9.3 c) of the Directive

Under Article 9.3 c) of the Directive, the national plan shall include information on the approved policies and financial or other measures adopted to promote nearly zero-energy buildings, including details of national requirements and measures concerning the use of energy from renewable sources in new buildings and existing buildings undergoing major renovation.

6.1 National strategies and programmes

Prime Minister Jyrki Katainen's government programme (2011)

The government programme is a plan of action approved by the parties participating in government, in which the most important task areas for the government are agreed. Prime Minister Jyrki Katainen's government programme[10] contains several entries to improve the energy performance of buildings:

- Draw up a roadmap for statutory provisions regarding the energy performance of buildings, with the target of nearly zero-energy construction by 2020. Utilise this roadmap to bring the regulations into force as a broader package.
- Improve the energy performance of construction by statutory provisions and other guidance, and by creating incentives.
- Enact energy efficiency requirements for repair and renovation work, whose implementation is economically cost-effective.
- Increase the exploitation of renewable energy in the building stock.
- Specify real emission reduction opportunities in the building stock, particularly in public buildings and in the stock of dwelling units; also specify to which timetable, financing and tendering models and with which technical solutions these will be attainable.

Long-term climate and energy strategy (2008)

[10] http://valtioneuvosto.fi/hallitus/hallitusohjelma/fi.jsp

In 2008, a new long-term climate and energy strategy for Finland was drawn up[11]. The strategy was prepared under the guidance of the government's climate and energy policy ministerial working group, while a climate and energy policy contact network made up of the representatives of various Ministries acted as its drafting body. On 6 November 2008 the Council of State presented the strategy to the Finnish Parliament in the form of a report, and Parliament issued its opinion on this in June 2009.

The long-term climate and energy strategy sets out the measures required by the policies approved by the European Council in spring 2007 and presented by the Commission as a climate and energy package based on the said policies in January 2008. The measures concerned target, for example, reductions in greenhouse gas emissions, energy procurement, renewable energy and energy efficiency in Finland. The main emphasis of the strategy is on the policies up to 2020 and the measures required by these. In addition to this, visions right up to 2050 are set out.

The updating work on the 2008 strategy has been commenced within the energy and climate policy ministerial working group. The aim of this updating is to ensure that Finland reaches the energy and climate policy objectives set for it for 2020, and to prepare a pathway towards the EU's long-term energy and climate objectives. In accordance with the government programme, the new strategy is being linked up with a programme to reduce oil dependency. It is intended to complete the work of updating the strategy by the end of 2012. The strategy work will be continued during 2013 in accordance with the government programme, and energy and climate roadmaps will be drafted right up to 2050. The drafting of the roadmap will also be combined with extensive consultation of interest groups and citizens.

The Council of State's future report on climate and energy policy: towards a low-emission Finland

In accordance with the government programme of the previous government, as well as the long-term climate strategy a climate and energy policy future report was also drawn up.[12] This report, which was completed in 2009, examined in particular climate and energy policy extending over the strategy's time horizon, up to the middle of the century and (where necessary) even further as well as reviewing global trends and preparing for the impact of climate change. As well as energy production, the report discusses energy use, transport, forests and other areas that are important from the aspect of climate protection. Four different model scenarios were drawn up for the report, describing possible paths towards a low-emission Finland. In the report, the Council of State outlines objectives and measures which signpost the road towards a prosperous and low-emission Finland.

One of the conclusions for Finland proposed in the report is that a material improvement in energy efficiency in all sectors is justified, irrespective of what energy sources are used to satisfy the energy need. This will require inter alia a tightening of standards for new building towards a zero-energy level, and the setting of obligations also for repair and renovation work. Due to the slowness of the rate of replacement of the building stock, even in the 2010s houses will need to be built with a view to the objectives for 2050.

Energy efficiency committee

[11] http://www.tem.fi/index.phtml?s=2658

[12] http://vnk.fi/julkaisut/listaus/julkaisu/fi.jsp?oid=273273

On 22 April 2008 the Ministry of Employment and the Economy set up a broad-based energy efficiency committee to prepare new energy-saving and energy efficiency measures. The basis of design for the work of the committee was an energy saving of 37 TWh in accordance with the long-term climate and energy strategy, with electricity accounting for a saving of 5 TWh. The report[13] submitted to the Ministry of Employment and the Economy by the committee on 9 June 2009 describes 125 new or enhanced energy-saving and energy efficiency measures. As part of the committee's work, an impact assessment was also made on the measures set out. One hundred and thirty experts from 40 organisations took part in the work of the committee. In total, it is estimated that 10 000 working hours were used in this work over the period of a year. On the basis of the energy efficiency committee's report, on 4 February 2010 the Council of State issued its decision in principle on the energy efficiency measures.

Council of State's decision in principle for a housing policy action plan for the period 2012-2015

On 3 May 2012 the Council of State made a decision in principle for a housing policy action plan for the period 2012 – 2015.[14] Under this action plan, the energy performance of the stock of dwelling units will be improved in a cost-effective way in connection with renovation work. In accordance with the action plan, loans granted by ARA (the Housing Finance and Development Centre of Finland), which falls within the administrative sector of the Ministry of the Environment, must require the energy class of a new dwelling to be level A, and that of a repaired dwelling (as a target) level C. When granting loans, account will also be taken of the size of the carbon footprint and the life cycle costs, in order to ensure that the total impact is properly taken into consideration. Under the action plan, the Ministry of the Environment will clarify and simplify the repair grant system. The action plan will emphasise genuine competition between alternative forms of heating, and attention will be given to the provision of unbiased advisory services.

Council of State's decision in principle on the promotion of sustainable choices in public procurements (8.4.2009)

In the decision in principle[15] which it approved on 8 April 2009, the Council of State required that Finland's civil service take environmental aspects into account in at least 70 % of its own procurements in 2010, and in all of its procurements in 2015. The central government offices have committed to the targets of this decision in principle. For state-owned enterprises and for municipalities, these targets are recommendations. Obligations relating to energy efficiency apply to the procurement of public transport services, cars and energy-using appliances, energy surveys of buildings, and also new building and properties for leasing.

Council of State's decision in principle on energy efficiency action (4.2.2010)

The Council of State's decision in principle of 4 February 2010 on energy efficiency action[16] was drafted in autumn 2009 at the Ministry of Employment and the Economy as an action plan for the implementation of the energy saving and energy efficiency measures set out in the Energy

[13] http://www.tem.fi/index.phtml?s=2403

[14] http://valtioneuvosto.fi/toiminta/periaatepaatokset/periaatepaatos/fi.jsp?oid=356822

[15] http://www.valtioneuvosto.fi/toiminta/periaatepaatokset/periaatepaatos/fi.jsp?oid=258914

[16] http://www.valtioneuvosto.fi/toiminta/periaatepaatokset/periaatepaatos/fi.jsp?oid=287171

Efficiency Committee's report, for the period 2010–2020. The aim was to launch most of the measures by the end of 2011.

The decision in principle sets out a total of 19 measures for four cross-cutting action areas (1. Basis for action, 2. Developing research and innovations, 3. Communication, advice and training and 4. Public sector) and a total of 28 measures for five sector-specific action areas (1. Urban structure, 2. Buildings, 3. Transport, 4. Households and farming and 5. Industry and the service sector). The Ministry of Employment and the Economy carries out regular coordination and monitoring of the implementation of the measures set out in the decision in principle.

Council of State's decision in principle on repair work (18.9.2008)

On 18 September 2008 the Council of State made a decision in principle on repair and renovation work.[17] This also emphasises measures to improve the energy performance of the building stock, to reduce the energy consumption and emissions of the building stock, and to regenerate communities by supplementary building; plus the boosting of information and know-how relating to repair work. The decision in principle is based on the Repair and Renovation Work Strategy for 2007–2017[18] drawn up in collaboration by the Ministry of the Environment and the property and construction sector; a plan of implementation has been prepared on the basis of this.

Council of State's decision in principle for a housing policy action plan for 2012-2015

The ERA 17 action plan

In 2010 a working party consisting of influential players from the worlds of business, research and public administration drew up the ERA17 action plan[19] ("For an Energy-Smart Built Environment 2017") under the leadership of Minister of Housing Jan Vapaavuori. The action plan consists of over 30 action recommendations, which focus on land use, dispersed energy production, the steering of construction, the use and ownership of properties, and the development of know-how.

The Cleantech strategic programme

In accordance with an entry in Prime Minister Jyrki Katainen's government programme, "cleantech" business activity is one of the priorities of Finland's business policy. On 1 February 2012 the Ministry of Employment and the Economy launched the Cleantech strategic programme[20], which is being steered by the Cabinet Committee on Economic Policy and which is the responsibility of Minister of Economic Affairs Jyrki Häkämies.

The programme expedites the move of Finnish enterprises towards sustainable growth and renewal via cleantech. Its target is to generate 40 000 new clean technology posts for Finland by 2020 and to double the total turnover of cleantech enterprises from ca. EUR 20 billion to EUR 40 billion by 2018.

[17] http://valtioneuvosto.fi/toiminta/periaatepaatokset/periaatepaatos/fi.jsp?oid=239007

[18] http://www.ymparisto.fi/default.asp?contentid=260735&lan=fi

[19] http://era17.fi/

[20] https://www.tem.fi/?105608_m=107833&s=4834

Examples of the strengths of Finland's cleantech are clean energy production, the energy performance of industry and buildings, resource-efficient industrial processes, water treatment and waste management and recycling.

During the first two years of the programme (2012-2013), the special focus will be on promoting, as pilot sectors, clean energy, energy efficiency (utilising ICT) and an environmentally-friendly mining industry, in addition to the general development of a business environment that supports the growth of cleantech business.

Energy Efficiency Agreements 2008-2016

The aim of the Energy Efficiency Agreements is to contribute towards Finland's international commitments in the work to combat climate change, in accordance with the national climate and energy strategy. The Energy Efficiency Agreements are voluntary agreements between the Finnish State and various sectors to improve energy efficiency. The first Energy Efficiency Agreements were signed in 2007. Subsequently, the EEAs have formed an extensive system of voluntary agreements covering over half of Finland's entire end use of energy as at the start of 2011. The EEAs cover business (industry, the energy sector, services), the property sector, the municipal sector, the oil sector, freight and public transport, and agriculture.

On 10 December 2009 the Rental Property Associations' Action Plan, with the Ministry of the Environment as the responsible Ministry and RAKLI ry as the trade association, was linked up to the Property and Building Sector EEA.

In autumn 2010 the Commercial Property Associations' Action Plan was drawn up as a joint effort of the Ministry of Employment and the Economy, RAKLI ry, the main sectoral players, and Motiva Oy. This plan is aimed at RAKLI's member enterprises which are engaged in the ownership, operation and delegated management of commercial properties. The Commercial Property Associations' Action Plan was linked to the Property and Building Sector EEA on 2 February 2011. The action plan aims at a 6 % energy saving via new energy saving measures implemented during the period 2011-2016.

More detailed information on the EEA system and on the EEAs which were concluded at the end of 2007 is collated on the web service maintained by Motiva Oy.[21]

[21] http://www.energiatehokkuussopimukset.fi/fi/

Figure 3. EEAs over the period 2008 - 2016.***

******Key to Figure 3***

Business Energy Efficiency Agreement	*Municipal sector Energy Efficiency Agreement and energy programme*	*Transport Energy Efficiency Agreements*
Industry *Energy sector* *Services*	*Cities* *Municipalities* *Joint Municipal Boards*	*Freight transport and logistics* *Public transport*
Responsible Ministry: TEM	*Responsible Ministry: TEM*	*Responsible Ministry: LVM*
Höylä III Energy Efficiency Agreement	*Property sector Energy Efficiency Agreement 2010-2016*	*Energy Programme for Farms 2010-2016*
Distribution of heating and transport fuels *Oil-fired heating properties*	*Residential properties** *Commercial properties***	*Farms*
Responsible Ministry: TEM	**Responsible Ministry: YM* ***Responsible Ministry: TEM*	*Responsible Ministry: MMM*

TEM = Ministry of Employment and the Economy
YM = Ministry of the Environment
LVM = Ministry of Transport and Communications
MMM = Ministry of Agriculture and Forestry

6.2 Financing of research, development and innovation

At present a number of national research programmes to promote the energy performance of buildings are underway, which include some component areas for the promotion of nearly zero-energy construction. In Finland there are three main public funders of research, development and innovation work, i.e. Tekes, the Academy of Finland (Suomen Akatemia) and Sitra.

Tekes[22]

Tekes is the principal public financer of applied research and product development in Finland. Each year about EUR 600 million is used for this financing, and its target groups are both enterprises and public research organisations. Tekes operates subject to the Ministry of Employment and the Economy, and obtains the funding for its activity from the State Budget. Tekes has specified energy and raw materials efficiency and intelligent energy systems as specific areas of emphasis in its strategy.

Financing has increased considerably in recent years, since energy efficiency is seen as being a main competitive factor in the future. About half of the financing has been directed to the industrial use of energy. Other important sectors are the energy performance of buildings and transport. Part of Tekes's financing is channelled via programmes constructed in subject areas which are important for business and society.

The Sustainable Community programme (2007-2012) creates new and renewable business activity in the planning, construction, maintenance and repair of energy-efficient areas and buildings.

The Built Environment Programme (2009-2014) is based on the needs of users and the demands which they impose on the performance and quality of the built environment. The programme engages players who are prepared to renew the sector's modes of procedure and processes. The particular emphasis of this programme is on repair work, infrastructure and construction for well-being.

The Strategic Centres for Science, Technology and Innovation (SHOK) are cooperation platforms for enterprises and research organisations. The work of the Strategic Centres is based on the research strategies specified by their owners, which are implemented by research programmes and business group projects.

Tekes engages in dialogue with the Strategic Centres on the orientation of activities, but does not take part in the decision-making. Tekes directs its own programme activity so that this does not involve overlaps with the programmes of the Strategic Centres.

The research programmes of the Strategic Centres consist of the joint research, development and innovation projects of research organisations and enterprises. The programmes create common core expertise, common technology and service platforms and common research environments and tools. The public financers decide, on the basis of the funding applications which they receive, on what part of the research programmes they will potentially finance.

Tekes finances research programmes and joint projects of the Strategic Centres on condition that these meet the financing criteria and are successful in the competition for funding. The participating enterprises finance an average of 40 per cent of the research carried out by the Strategic Centres.

[22] http://www.tekes.fi/fi/community/Etusivu/307/Etusivu/381

CLEEN Oy (SHOK)[23]
The clustering of energy and environment sector players enables the building of a joint research infrastructure and increases the possibilities of creating globally significant energy and environment innovations. The strategic theme areas selected are carbon-neutral energy production, dispersed energy systems, sustainable fuels, energy markets and intelligent electricity networks, efficient use of energy, resource-efficient production technologies and services, recycling of materials and waste management, plus measurement, monitoring and the appraisal of environmental efficiency.

RYM Oy (SHOK)[24]
The property and construction sector cluster RYM Oy aims at world-class know-how over the entire life cycle of the built environment. The selected themes of its research strategy are the development of modes of procedure and business models which are customer-led and take into account the entire lifecycle, utilising inter alia information modelling. Other targets of development include indoor environments which promote health and improve productivity, and urban planning and construction which is sustainable and utilises digital technology.

Finnish Innovation Fund Sitra[25]

The Finnish Innovation Fund Sitra was set up in 1967 (the 50th anniversary of Finland's independence). Sitra is a fund reporting to the Finnish Parliament, with the task of promoting Finland's stable and balanced development, economic growth, and Finland's international competitiveness and cooperation. Sitra acts both as an investor and as a coordinator of fixed-term programmes. Each year it funds projects related to the programmes to the tune of about EUR 50 million. The main programme relating to energy efficiency is Sitra's Energy Programme (2008–2012), which aims at a downward trend in energy consumption and emissions. Sustainable energy solutions are required in new building and in repair and renovation work and also in town and regional planning, as well as production and distribution. By increasing energy efficiency, it will be possible to reduce emissions and at the same time to improve competitiveness and to create new business activity.

Academy of Finland[26]

The Academy of Finland, which falls within the administrative sphere of the Ministry of Education and Culture, is an important financer of scientific research. The Academy funds e.g. research projects, research programmes, centres of excellence for research, research posts, researcher training and international cooperation. The majority of the Academy's funding derived from the State Budget is channelled towards university research. In 2012 the Academy is funding research to

[23] http://www.cleen.fi/fi/

[24] http://www.rym.fi/

[25] http://www.sitra.fi/energia

[26] http://www.aka.fi

the tune of EUR 327 million. The main Academy programmes relating to energy efficiency are the Sustainable Energy programme (2008–2012), the Climate Change (impact and control) programme (2011–2014) and the Future of Living and Housing programme (2011-2015).

6.3 Energy grants for residential buildings

Funds from the administrative sector of the Ministry of the Environment are granted for residential buildings in the form of energy grants. These are dealt with in the Act (1184/2005) and Decree (128/2006) on grants for repairing dwellings or improving their energy economy and health standard. The 2012 State Budget allocated an appropriation of EUR 10 million of the grants for repair and renovation work to the introduction of modes of heating which utilise renewable energy in residential buildings. EUR 8.8 million has been reserved for other energy grants for residential buildings; of this, EUR 2 million is targeted on means-tested energy grants for one-family houses. In particular, energy grants are awarded for residential building energy surveys, outer shell repairs and energy performance improvement, ventilation heat recovery construction and the connection of residential buildings to district heating. The improvement of energy performance is also given significant weight when considering the award of repair and renovation grants for residential buildings.

6.4 Communication and advice

The main provider of energy efficiency communication and advice is Motiva, which was originally set up by the Ministry of Trade and Industry (now the Ministry of Employment and the Economy) in 1993 as a three-year Energy Information Centre project. Nowadays Motiva is a State-owned limited-liability company which also promotes the sustainable use of renewable energy and materials. Motiva supports the government in the implementation of the national climate and energy strategy and of EU Directives such as the Energy Performance of Buildings Directive. Communication and advice work is one of Motiva's areas of special emphasis. In December 2010 the Ministry of Employment and the Economy appointed Motiva as the consumer energy advice coordination centre for the whole of Finland.

Communication and advice work in relation to energy efficiency is carried out in Finland by many consumer and civic organisations, unions and associations, and by regional and local "energy agencies". There are ten energy agencies, which were launched with the assistance of EU co-funding, and many of these work actively in their own geographical areas. The energy agencies are networked under the leadership of Motiva. The Association of Finnish Local and Regional Authorities activates municipalities, e.g. as part of the Cities for Climate Protection campaign. Local government officials are also offered information and training in municipal Energy Efficiency Agreement work. Advice is also on offer to enterprises involved in this work. In addition, for decades now many energy companies have been distributing information to their customers regarding appropriate energy use.

The need of consumers for energy advice has been recognised in national strategies and programmes. During the period 2010–2011 an exceptionally large-scale project for advice to consumers was implemented in Finland; of its total financing, which amounted to almost EUR 4 million, half was provided by the implementers of advice projects, EUR 1.4 million by the Ministry of Employment and the Economy, and EUR 0.5 million by Sitra.

The aim of repair and renovation advice is to offer commercially independent, impartial and timely advice, which if necessary can also be given on-site. Energy efficiency and regular maintenance of

properties are important component areas for communication concerning renovation building. The advice network in Finland includes about 40 bodies (public corporations, municipalities, regional museums, renovation building centres, and players in the property and construction sector) and about 500 individuals, 300 of whom give advice on municipal energy grants.

Almost 300 leaflets are available via Motiva's internet shopping basket service. Examples of important online services include www.motiva.fi;[27] www.topten-suomi.fi,[28] a service funded by the Ministry of Employment and the Economy and the EU, which gives advice on the best energy-efficient appliances; www.motiva.fi/energiatodistus ,[29] which is a buildings energy performance certification service developed by mandate of the Ministry of the Environment; and www.energiatehokaskoti.fi,[30] which is produced in collaboration with various sectoral players and promotes nearly zero-energy construction.

In 2011 the service www.korjaustieto.fi[31] was introduced; this is produced by the Ministry of the Environment, and focuses on renovation building. The internet service acts as an instrument of advice for the maintenance and repair of one-family houses and housing cooperatives. The content, which is compiled by specialist experts, is intended for customers, owners and housing cooperatives, and also for property management professionals.

6.5 Building regulations

New construction

In March 2011 the Ministry of the Environment issued new building regulations to improve energy performance; these entered into force on 1 July 2012.

The intention is to impose a renewable energy minimum requirement for new construction from 2015 onwards.

Major repairs

On 6 September 2012 the Council of State issued a Bill to Finland's Parliament for amendment of the Land Use and Building Act. The Act will enable the issue of a Decree regarding energy performance regulations for renovation building following its entry into force.

This Decree will impose minimum requirements for the energy performance of a building in the following situations: repairs that require a permit, change of intended use, or the repair of technical systems. Examples of such repairs include extensive major repairs, repairs to the outer shell of the building and the replacement of technical systems. Energy performance improvement measures will

[27] http://www.motiva.fi

[28] http://www.topten-suomi.fi

[29] http://www.energiatodistus.motiva.fi

[30] http://www.energiatehokaskoti.fi

[31] http://www.korjaustieto.fi

not need to be implemented if these are not technically, operationally or economically feasible. It is also important that actions to improve energy performance are taken with due consideration of the special features and intended use of the building.

The intention is to issue minimum requirements in terms of renewable energy in connection with extensive major repair work from 2015 onwards.

6.6 Energy performance certificate

An energy certification scheme as per the Energy Performance of Buildings Directive has been in use in Finland since 2008. The energy performance certificate system has contributed significantly towards the construction of buildings which are superior to the prescribed standard. According to centralised monitoring of energy performance certificates, 29 % of one-family houses completed in 2009 were in energy class A; in 2011, the proportion was already about 50 %. Other new residential buildings are not quite as energy-efficient as one-family houses, but their energy performance too has clearly improved. For example, the proportion of energy class A in multi-storey blocks and terraced housing was only 5 % in 2009, but by 2011 it was already 37 %. The Ministry of the Environment collects energy performance certificate data from the municipal building supervisory authorities.

The work on reform of the energy performance certificate legislation is currently underway. The aim is to take promotion of nearly zero-energy construction into account in the updated energy classification.