

# ERA 17



## For an energy-smart built environment 2017

**SITRA**

ERA17 – Finnish action plan  
2010-2017

28.10.2010 Jarek Kurnitski

*Suomen itsenäisyyden juhlarahasto Sitra*

# ERA 17 Finnish action plan 2010–2017

- Initiative to tackle 2020/2030/2050 targets
- Goal: to achieve 2020 targets in 2017
- Includes all major sectors and issues of built environment accounting for about 60% of total final energy use and CO<sub>2</sub> (centralized energy production and electric cars not included)
- Ended up with concrete policy measures for immediate implementation
- 31 proposals for 5 key areas prepared:
  - Roadmap for building regulation
  - Integrated land use planning
  - On site RES
  - Existing building stock package
  - R&D package

# ERA17 Preparation of ERA17 action plan

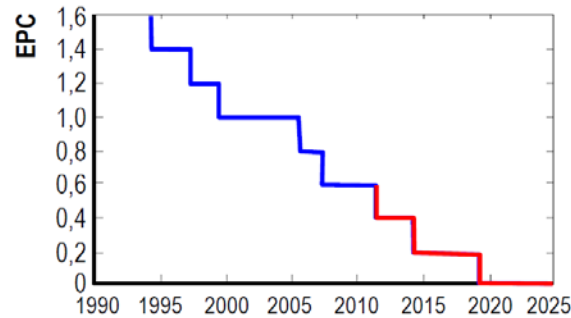
Background studies for the action plan:

- Final energy use and consequent emissions caused by built environment
- REHVA study on Benchmarking Regulations and Incentives on Energy Performance of Buildings in selected European countries (available in English)
- National energy scenario analyses until 2050
- Impact assessment for proposed measures
  
- ERA17 is a joint force of Ministry of the Environment, Sitra and Tekes, prepared by expert group of 40 persons led by Minister of the Housing, Jan Vapaavuori
- ERA17 includes follow up of implementation for 2 years

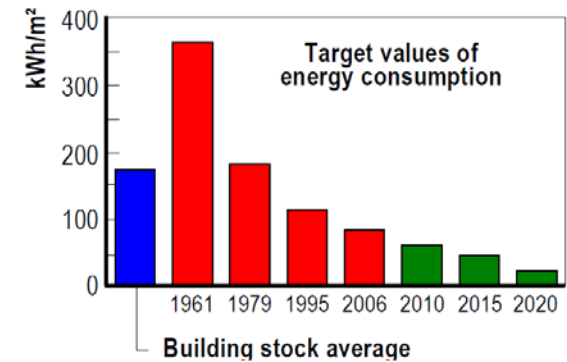
## REHVA benchmarking:

- Roadmap of some countries towards nearly zero energy buildings to improve energy performance of new buildings
- Many countries have prepared long term roadmaps with detailed targets
- Helps industry to prepare/commit to the targets

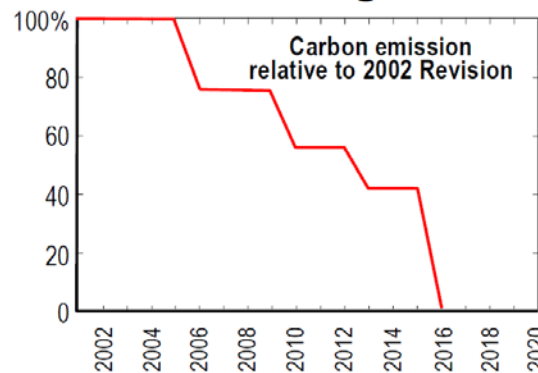
### The Netherlands



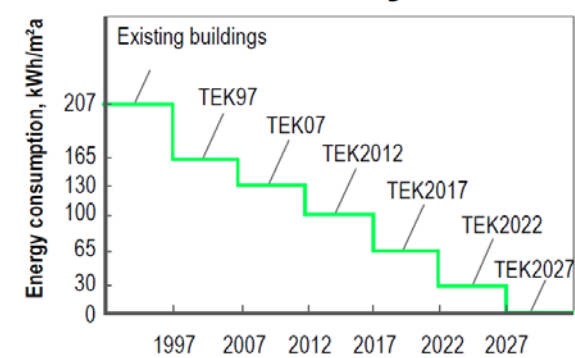
### Denmark



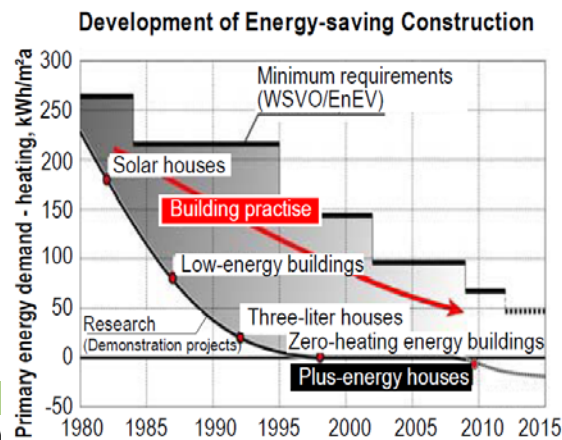
### United Kingdom



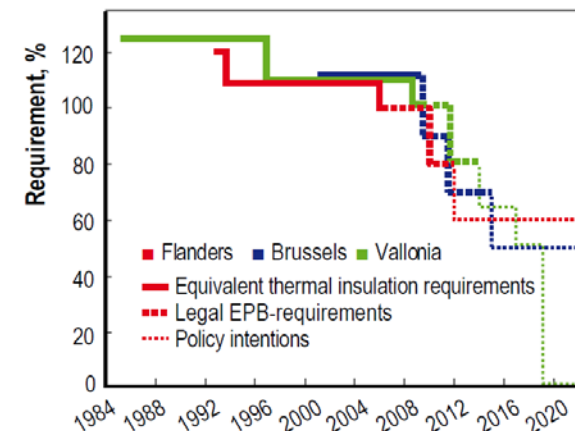
### Norway









### Germany



### Belgium



# REHVA benchmarking study: incentives

Summary Table of Incentives		DE	IT	FR	Hu	BE	SE	
								
		YEAR	2009	2009	2009	2009	2009	
FINANCIAL	Direct Funding of Energy Repairs		Yes	Yes	Yes	Yes	Yes	Stopped
	Financial Help for Low-Income Households		Yes	Yes	Yes	No	Yes	No
	Green Loans / Soft Loans		Yes	Yes	Yes	Yes	Yes	No
	Third Party Financing		Yes	Yes	Yes	Yes	Yes	No
TAXES	Tax Deduction		Stopped (2009)	Yes	Yes	No	Yes	Yes
	Lower VAT on Labour and Materials		Stopping	Materials	Labour & Material	No	Labour	n.a.
TECHNOLOGY SPECIFIC	Subsidies on Sustainable Energy Devices		Yes	Yes	Yes	Yes	Yes	Yes
	Feed-in Tariffs	per kWh (€/kWh)	Yes	Yes	Yes	Yes	No	n.a.
		Green Certificates	No	Yes	Yes	Yes	Yes	n.a.
OTHERS	Rent Indexation (Owner-Renter Balance) <sup>1</sup>		n.a.	n.a.	n.a.	No	n.a.	No

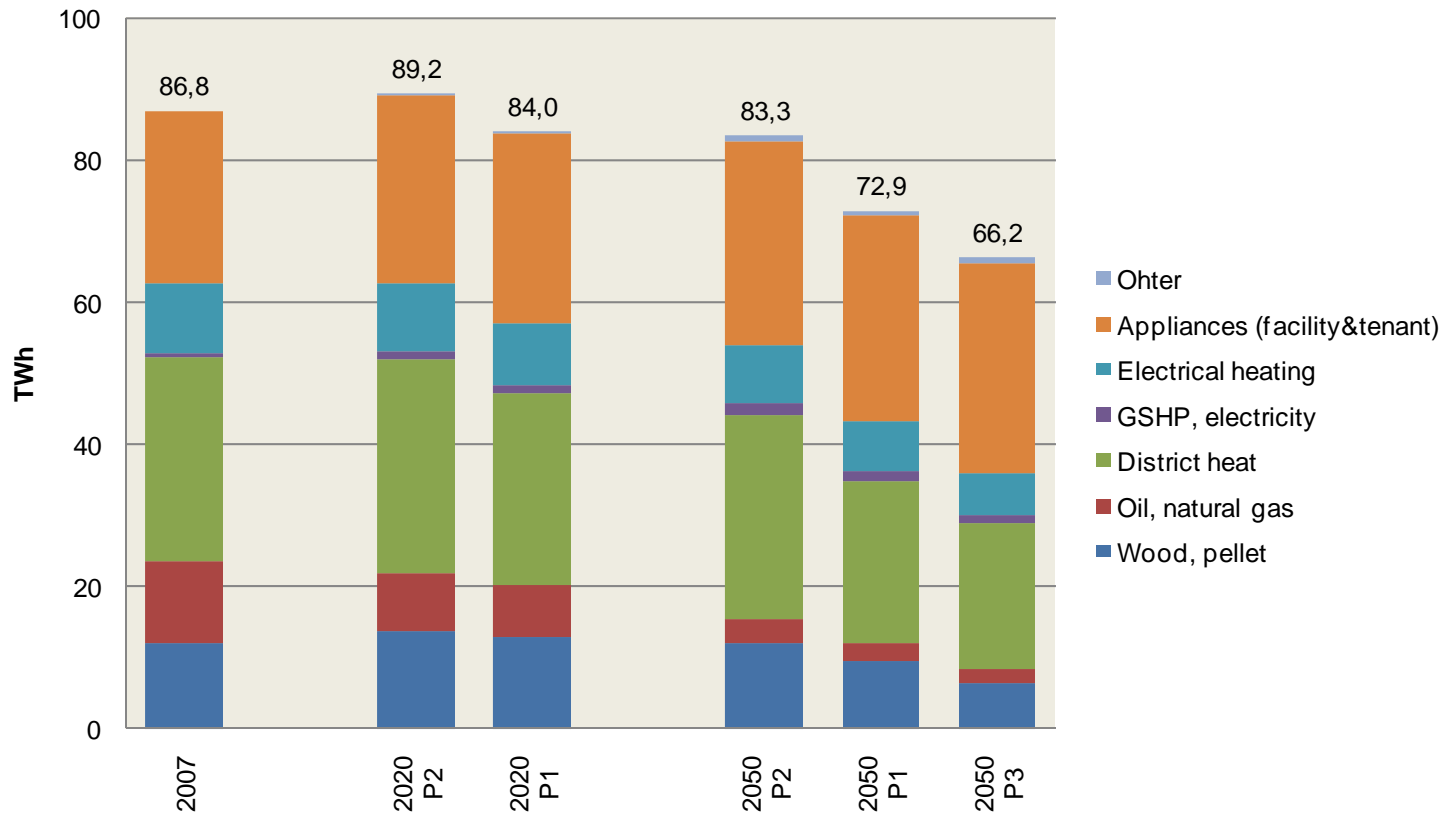
# REHVA benchmarking study

**Reported national practices and trends, some findings:**

- **the new building regulation applied on renovations in most of countries, but in different ways, in some countries almost all requirements apply for major renovations**
- **innovative systems (such as demand controlled systems or ground loop systems etc.) difficult to handle/ not yet included in “official” calculation process**
- **calculation procedures based mainly on national methods, dynamic calculation accepted in some countries**
- **most of the countries use primary energy in definition of energy performance in [kWh/m<sup>2</sup>,a] – EPBD has established a common methodology**
- **still many differences in energy calculation frame details, inc. boundaries, reference building approaches, calculation rules...**

# Finland: Decoupling for all energy used in the building stock soon possible

Delivered energy use in residential and commercial building stock



P1: 50% heating energy reduction in all major renovation

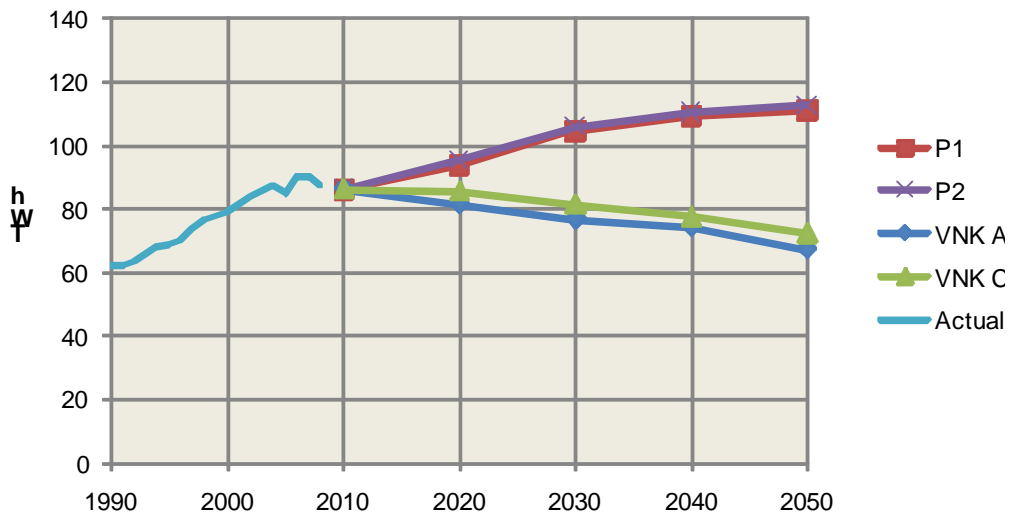
P2: no reduction at all in major renovations (compensated by quality improvements)

P3: theoretical, all building stock renovated to meet 2010 targets in 2050

Despite of reduced total energy use in 2020, electricity use will most probably continue to increase

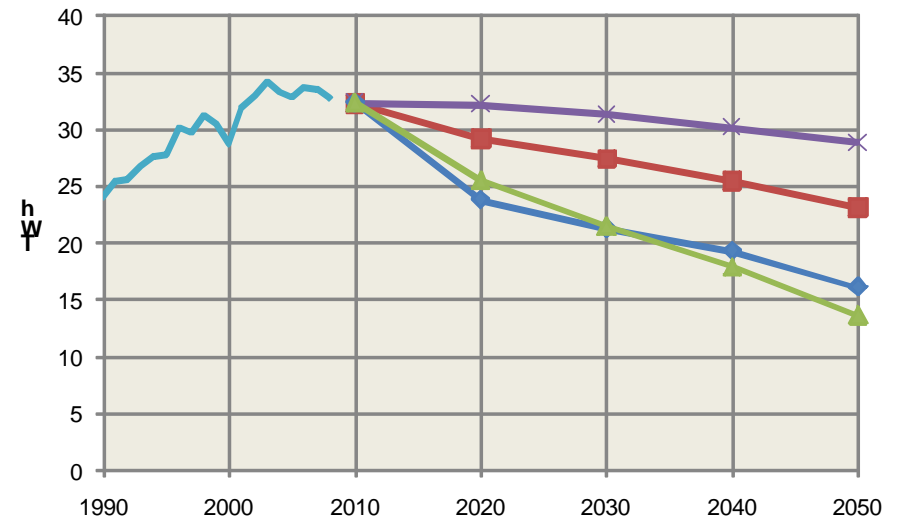
## Electricity

Total electrical energy use in Finland



## District heat

Total district heat energy use in Finland

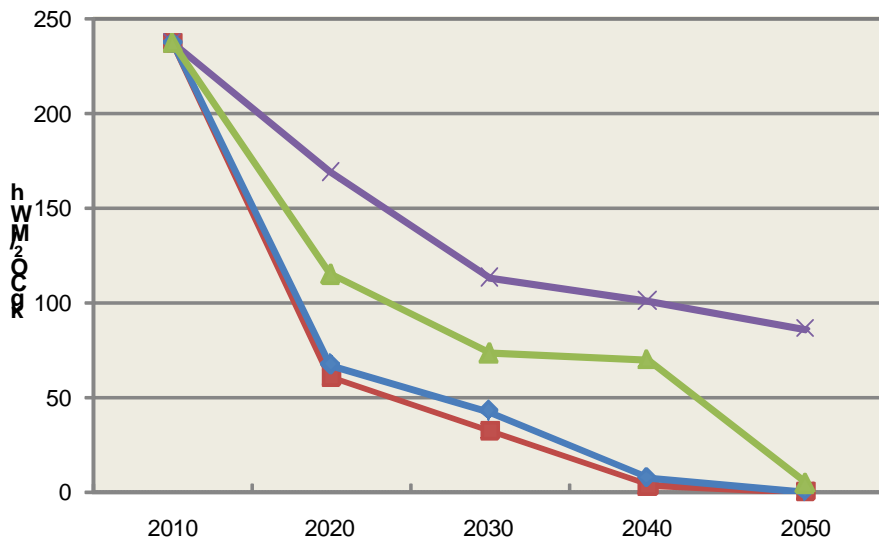




Specific emissions estimated to be roughly the same in the long term for the electricity and district heat

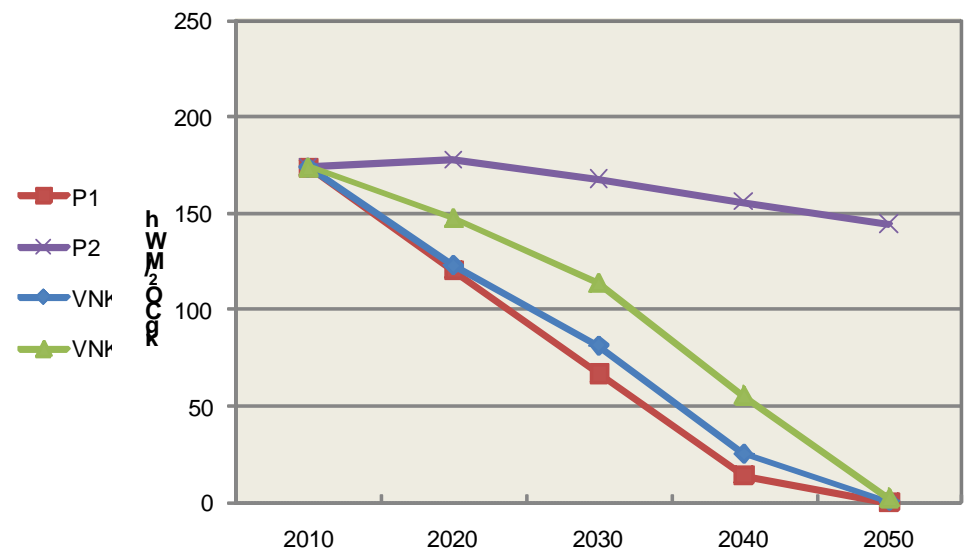
## Electricity

Average specific emissions of electricity production



## District heat

Average specific emissions of district heat production

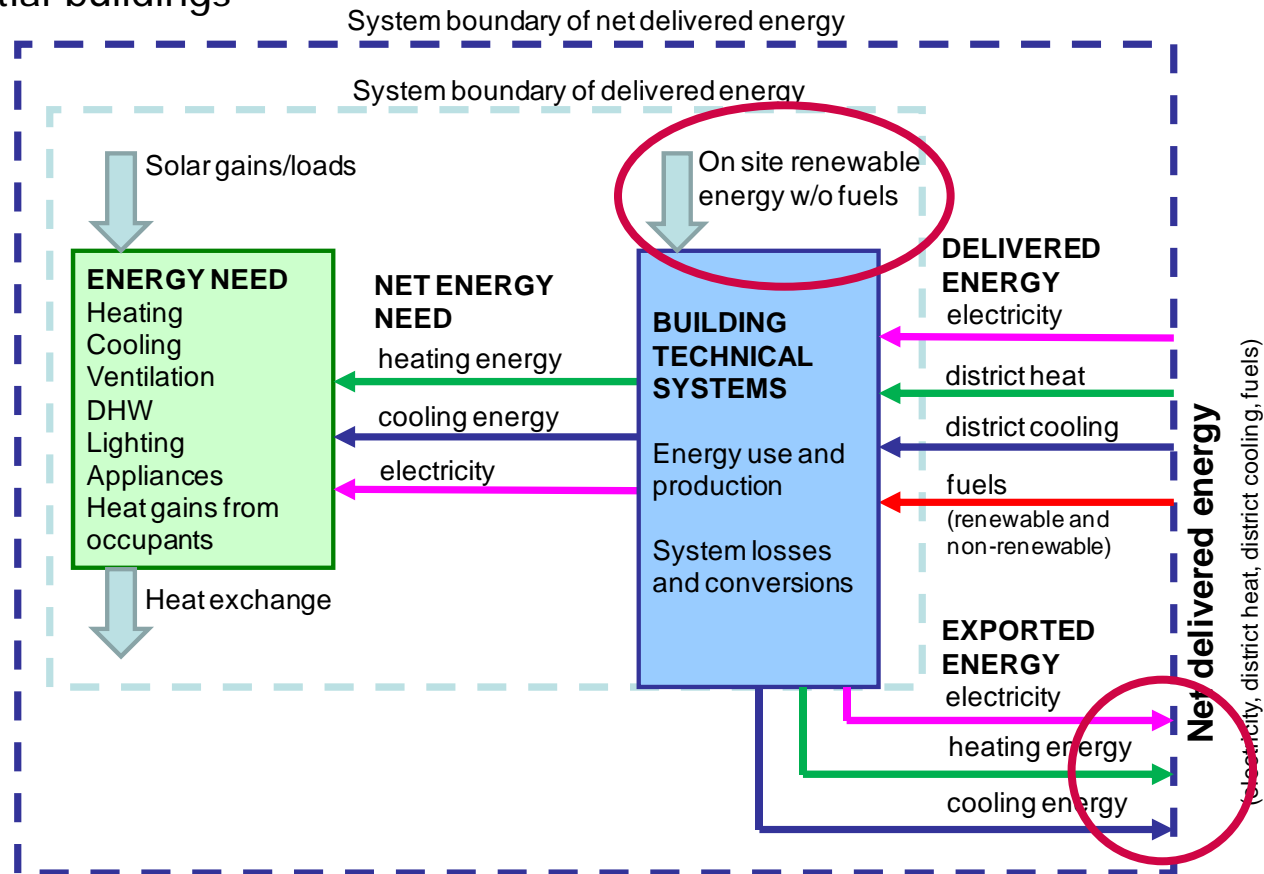


# ERA 17 ERA17 measures with the highest impact

- Net zero energy building regulation for new buildings
  - roadmap of code requirements for next 10 years
  - will mostly meet “cost optimal” criterion, except PV needing feed-in tariff
  - reasonable cost, and savings even higher compared to existing building stock
- Improvement of existing building stock
  - incentives needed, not cost efficient in buildings with district heating
  - cost efficient in electrically heated houses, still incentives needed to activate
- Integrated land use planning with increased density (UGB etc.)
  - almost no cost at all, savings through cheaper infrastructure
  - better utilization of local energy supply solutions
  - less vehicle km per person – significant reduction in fossil fuels
- Built environment can use 20-35% less energy in 2050 relative to 2010
- Most of investments cost effective, improving living and working quality

## Next step: 2012 building code

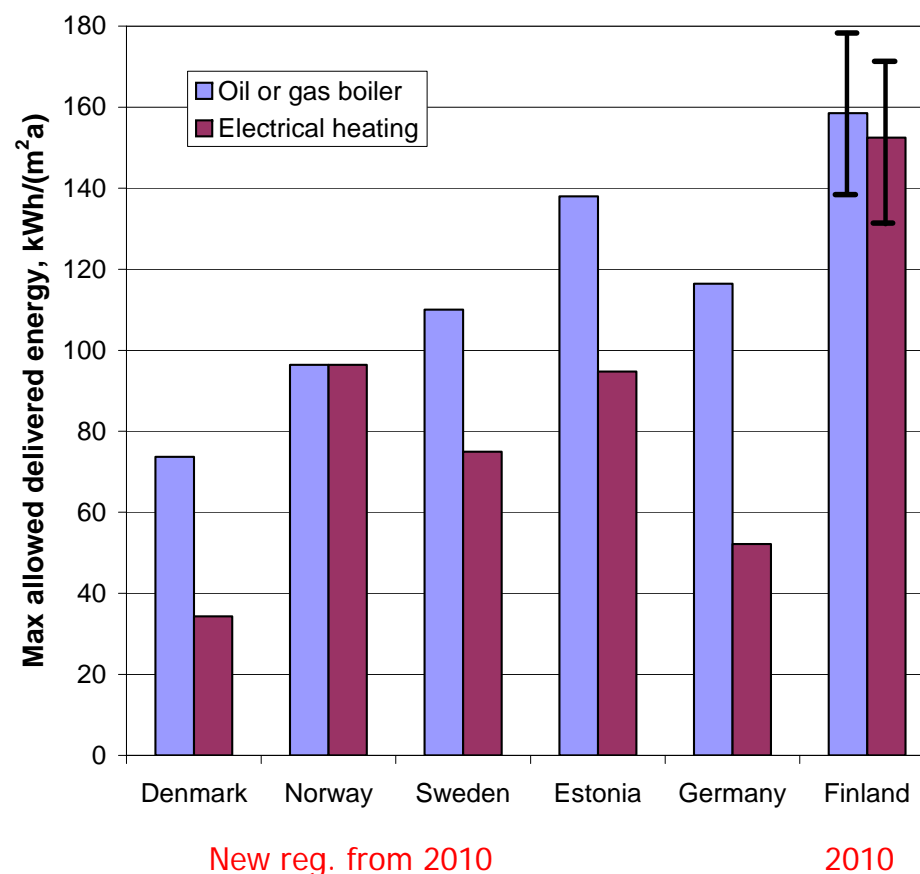
- Zero energy building compliant energy frame and calculation methodology
- Requirements tightened already 2008 and 2010, from 2012 based on **primary energy**
- 2012 performance level roughly equal to primary energy requirement of passive houses in residential buildings



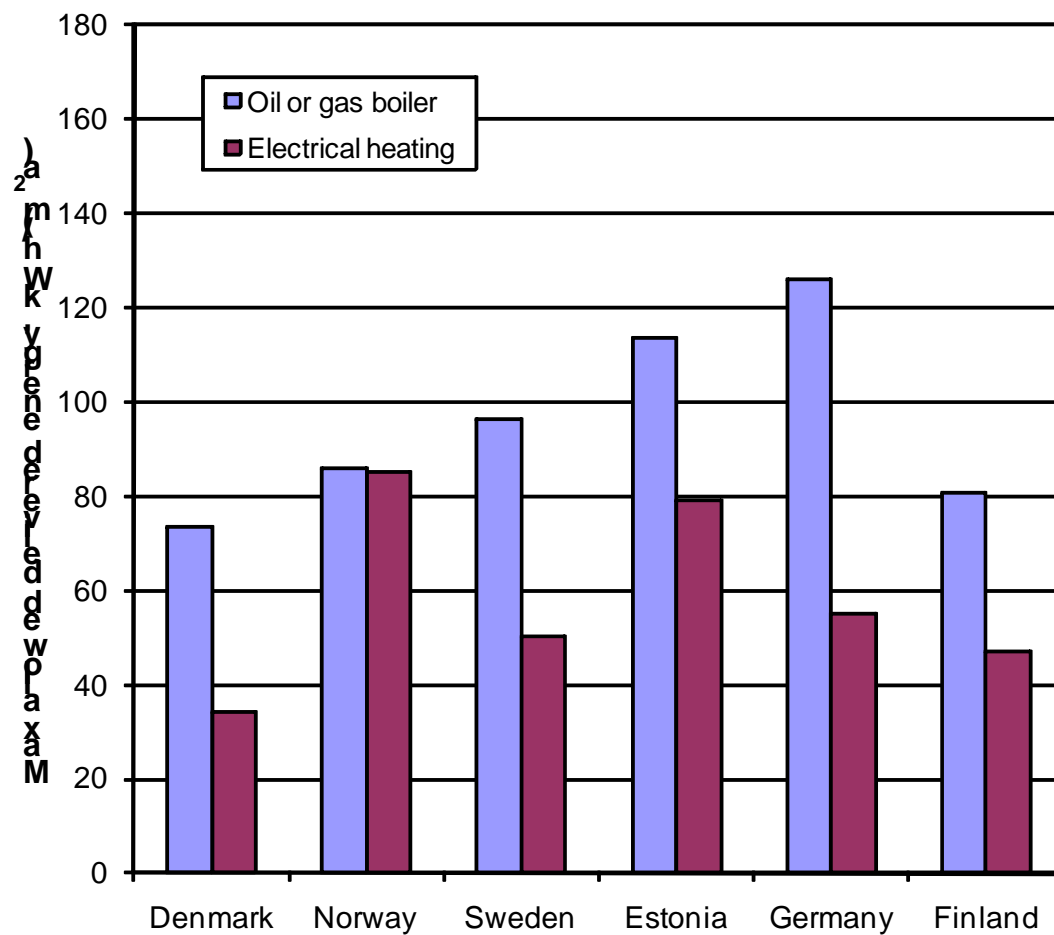
# EP-value comparison, 2008 data

Source: Kurnitski J. Contrasting the principles of EP requirements and calculation methods in EU member states. *REHVA journal*, December 2008, 22–28.

- The figure shows maximum allowed **delivered energy without household electricity** (i.e. delivered energy to heating, hot water and ventilation systems) in each country for fossil fuel or electrical heating
- In the comparison, the degree-day corrected data is used, all values are corrected with 17°C degree-days to Copenhagen
- Component-based regulations causes significant penalties for Finland
- The data represents the situation in 2008, and is not up to date, due to regulation changes at least in Sweden and Finland



# 2008 data, but Sweden 2010 and Finland 2012



# ERA 17 2012 energy calculation methods

- Advanced buildings/**innovative systems** need advanced calculation methods – no alternatives to dynamic simulation tools
- Energy simulation/commercial simulation tools will become major calculation method in Finland 2012:
  - dynamic simulation required in buildings with cooling system (both for mechanical and free cooling) due to heat transfer dynamic phenomenon
  - summer overheating/room temperatures to be simulated in all buildings in typical rooms – leads to some (free?) cooling in apartment buildings
  - exception for single family houses, there simulation is not needed if some simple rules (solar protection, window size and openings) are met
- Requirement of the validated simulation software in the code, all relevant European and other validation standards accepted
- Initiative for tools testing/comparison planned (voluntary R&D activity)
- Whole approach – nationwide experiment never done before