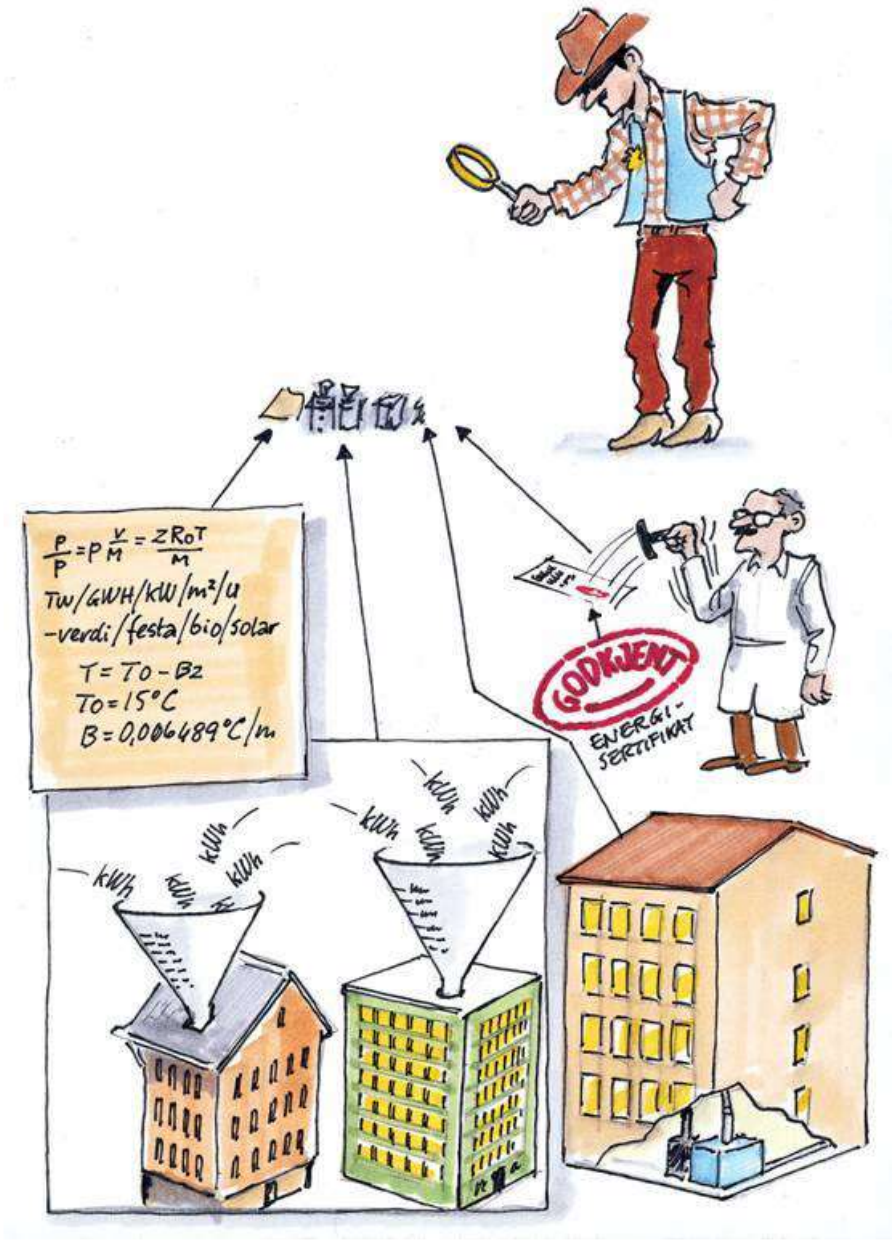

Policy Framework - Energy Efficiency in Buildings in Norway

Sergei Faschevsky

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European policy framework on energy efficiency in buildings

- Energy Efficiency directive (2012/27/EU) does not manage to reach 20% reduction of energy performance by 2020 (9% by 2016).
- Apprx. 40 % of all energy use is in buildings EU and Norway and it still grows
- Significant potential for profitable energy savings, both in new and old buildings
- EU-directive (2002/91/EF) on Energy Performance in Buildings is the main legislative act for energy performance in buildings
  - Minimum requirements to buildings and building code
  - Common calculation method
  - Certification of buildings
  - Inspection of boilers and air conditioners
  - Independence of experts

Norwegian Background

- "Green" electricity covers 80 % of energy use in residential and non residential buildings in Norway
- High energy use at winter time because of space heating
- Low energy use at summer time – mainly electricity specific and water heating
- Norway, long before it was finally decided in Norway to adopt the directive, worked on a series of measures at the same time:
  - the revision of the building codes and the energy requirements
  - the requirements of certifications and technical inspections
- New EPB directive (2010/31EU) has not yet implemented in Norway

Energy Authorities

- Ministry of Petroleum and Energy (OED) is the main contact point on energy matters
- Building codes – Norwegian Building Authority under the Ministry of Local Government and Regional Development (KRD)
- Support schemes - State company Enova
- Municipal Energy Planning - The Norwegian Water Resources and Energy Directorate (NVE)
- EPBD-inspections of technical installation (air-conditioning and boiler & heating systems) - NVE
- EPBD energy-certification - NVE
- The municipalities are responsible, in theory, to ensure inspections, and they have drawings of most buildings and other relevant information important to issue an energy certificate
- In practice, the municipalities have limited resources for inspections

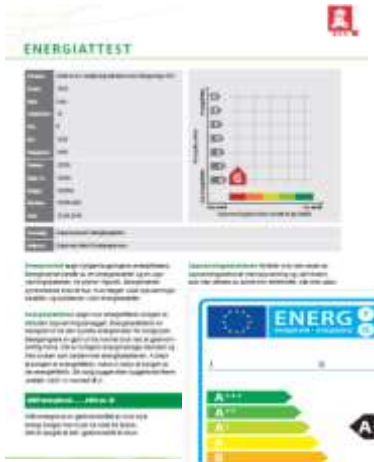
Main policy measures for energy efficiency in buildings in Norway

- Building codes

- Voluntary Arrangements and support mechanisms

enova

- Local initiatives



- Energy Performance in Buildings Directives (2002/91/EF)

- Eco-design (2009/125/EF)/ Eco-labelling ((2010/30/EU)

Building regulations

- Building regulations: 1967, 1987, 1997, 2007, 2010, 2015 (just arrived)
- Regulations gives framework for energy consumption
- How much energy the building is “allowed” to consume
- Regulations mainly affect new buildings

Energy Regulations 2010 (TEK10)

- Building code in English
  http://byggeregler.dibk.no/cms/content/uploads/Regulations-on-technical-requirements-for-building-works.pdf
- Mandatory minimum technical requirements for new buildings and large rehabilitations. Also minimum requirements to energy performance of main components (windows, walls, etc.)
- For buildings above 500 m2 -> Minimum 60 % of energy from other sources than direct electricity or fossil fuels
- Below 500 m2 - > Minimum 40 %
- Fossil fuels is not allowed to cover base load
- U-values

DIREKTORATET FOR BYGGKVALITET

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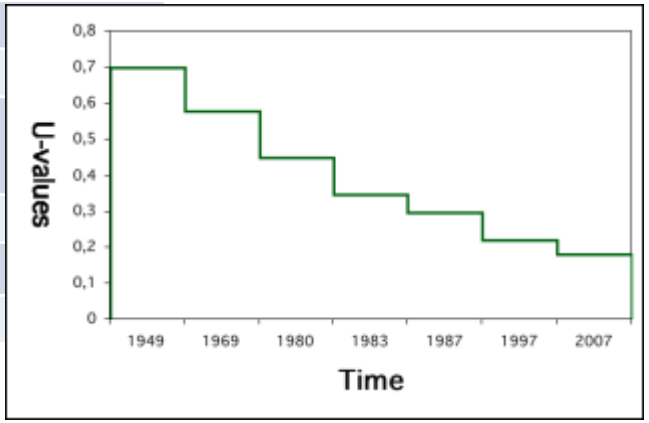
Building Codes: Net Energy Demand

Buildings category	Building Code TEK 1997	Building Code TEK 2007	Building Code TEK 2010
	(kWh/m2)		
Small buildings	173	125 + 1 600 /м2 floor area	120 + 1 600 /м2 floor area
Block of flats	149	120	115
Kindergarten	216	150	140
Office	202	165	150
School	188	135	120
Hospital	391	325	300 (335)
Nursing home	317	235	215 (250)
Hotell	276	240	240
Sports building	256	185	185
Commercial building	345	235	235
University	-	180	180
Cultural	231	180	180
Workshop	220	185	170



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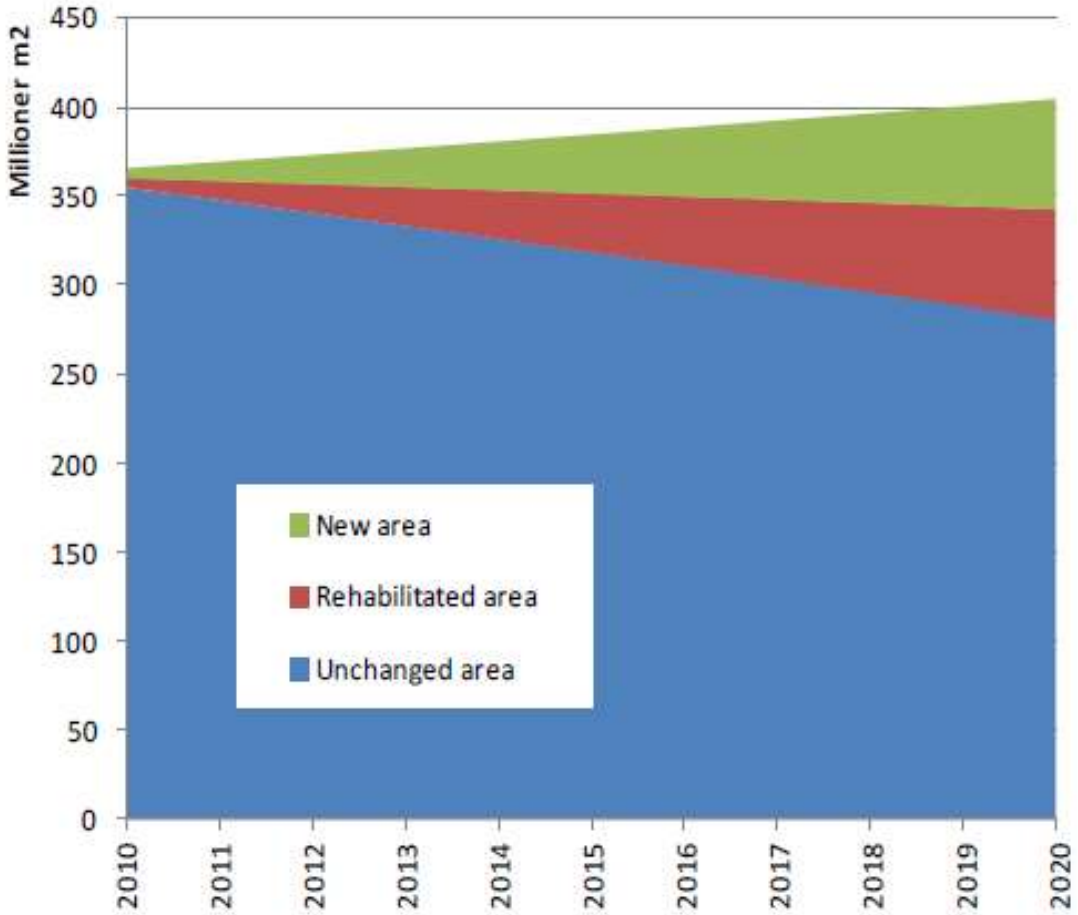
Impact of Building regulations



- But, it takes long time to change the area in buildings
- Building codes important for new buildings, as buildings exist for a long time

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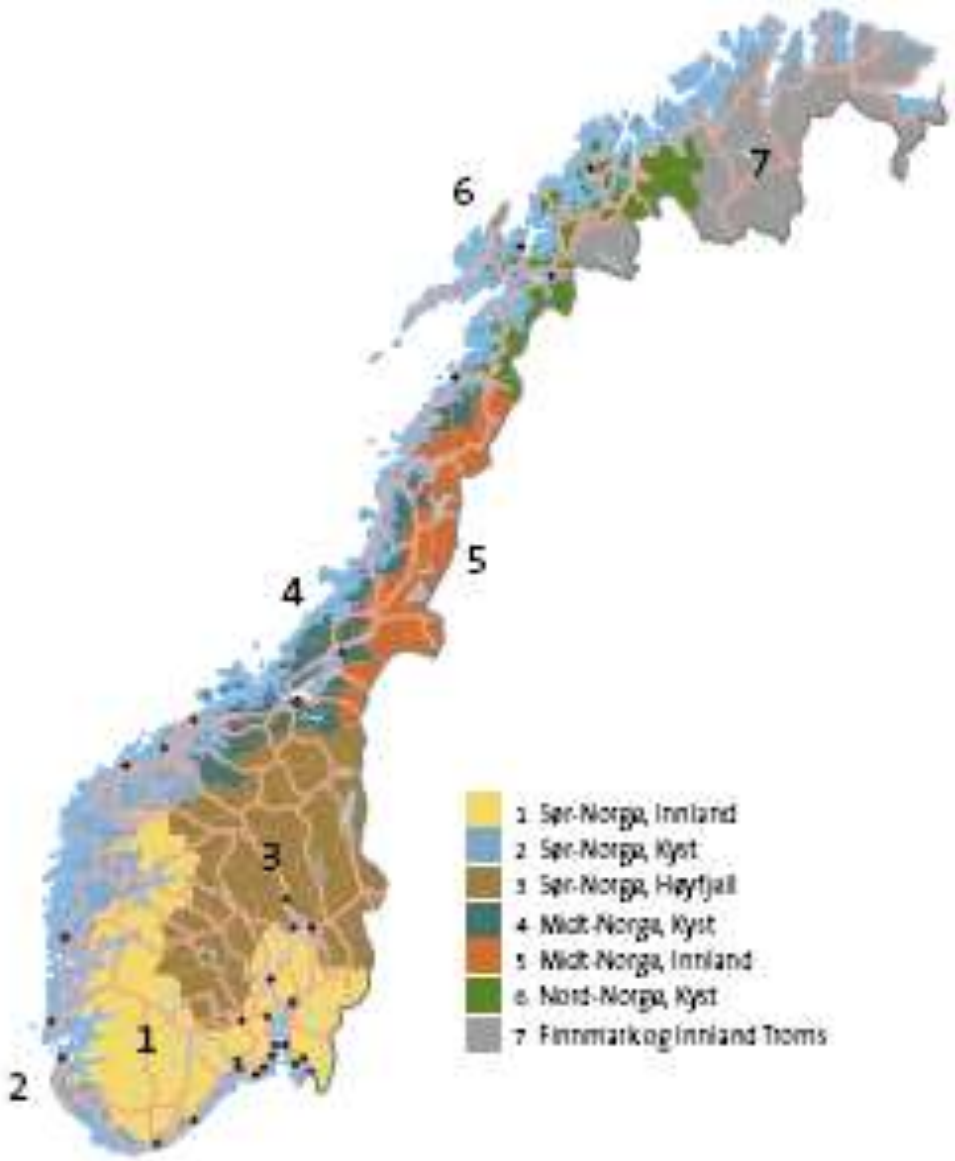
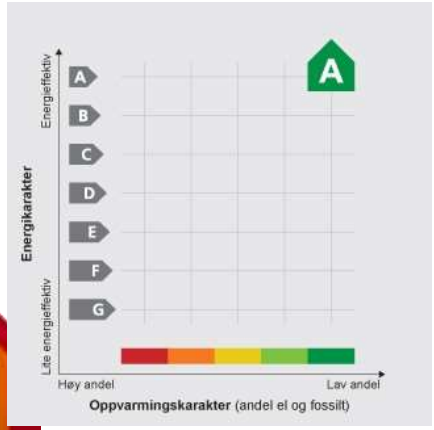
7 climatic zones
Norway
–
all scores are ba
on normalize
climate



De sju klimasonene i Norge

Energy efficiency labeling of buildings

- EU directive: Energy Performance of Buildings
- All buildings must be evaluated in terms of energy use for best usage and comparison between non-residential buildings
- Based on theoretical calculations
- Given a grade/label, Scale A to F (A is best) according to performance
- A is often “passive buildings”; C is when following TEK 10; E – G – most of the existing buildings
- List of improvements shall give owners indication on where to improve energy performance



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Status as of 2014 (Source: NVE)

Boliger

Energikarakter	Oppvarmingskarakter					Sum
A	1	48	238	204	39	530
B	742	1233	1205	2130	105	5415
C	6166	7133	2054	6453	185	21991
D	24295	25301	4669	8160	684	63109
E	17081	26370	3445	2948	416	50260
F	23248	35275	3007	4485	346	66361
G	15111	19746	1472	3721	303	40353
Sum	86644	115106	16090	28101	2078	248019

- Residential Buildings

Yrkesbygg

Energikarakter	Oppvarmingskarakter					Sum
A	3		25	54	15	97
B	290	98	214	384	17	1003
C	1831	220	258	779	18	3106
D	2698	187	160	919	40	4004
E	1766	105	102	535	34	2542
F	1910	98	81	387	31	2507
G	547	60	16	73	11	707
Sum	9045	768	856	3131	166	13966

- Public and commercial buildings

(colors correspond to heating systems – till which extent it is free from using electricity, oil, natural gas)

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Heating supply arrangements

- District heating connection obligation
- Oil boilers are not allowed for meeting the baseload (60-90%) heating load. Not allowed in Oslo after 2020
- New buildings with > 1000 м2 of floor area shall cover no more than 50 % heat load from electric power
- New buildings can not utilize fossil fuel for heating
- Waterborne heating systems shall be equipped with automatic regulation of water temperature
- New small houses shall be equipped with secondary piping system

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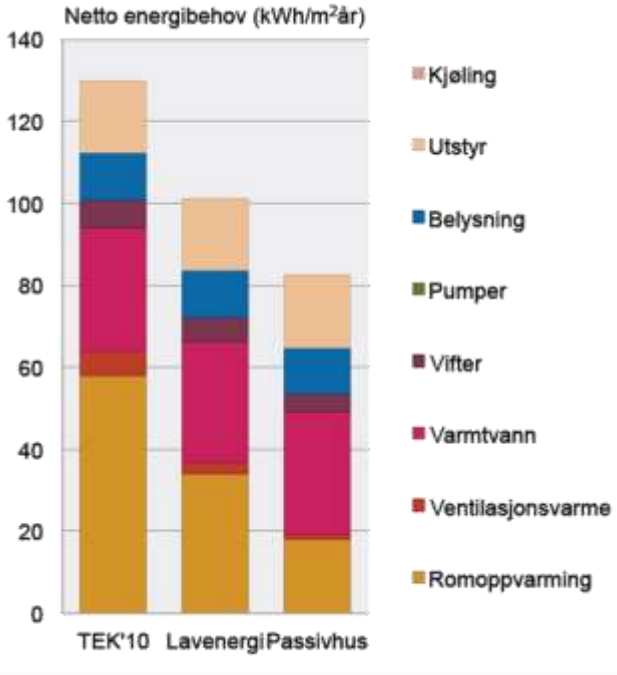
Voluntary arrangements and support mechanisms

- Norwegian standards for low energy and passive house buildings
- Enova – Financial support to projects who are innovative or have ambitious energy efficiency goals
- Several other systems and initiatives regarding energy in buildings



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Example of support mechanisms

Enova – national support scheme

- Support to projects identification in the existing buildings
- Support to projects implementation in the existing buildings
- Programme for heating sub-centrals
- Support for energy efficient new buildings

enova

Vi gir støtte til energi- og klimatiltak

Local support schemes

- Oslo – largest scheme

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Local support schemes

Municipality	Region	Supported activities
Oslo	Oslo	Energy scanning, insulation, improved efficiency of heating sources, control systems, ventilations
Aurskog-Høland	Akershus	Heat pumps, insulation, automation, bioboiler, etc.
Sørum	Akershus	Heat pumps, insulation, automation, bioboiler, etc.
Vågå	Oppland	Insulation, bioboiler, firewood ovens
Løten	Hedmark	Firewood ovens
Hol, Gol, Ål, Hemsedal	Buskerud	Solar heating, firewood ovens, heat pumps, windows, insulation, firewood/chips/pellets
Sirdal	Vest-Agder	Softloans for energy efficiency measures
Surdal	Rogaland	Bioboiler, solar heating, rehabilitation of buildings, heat pumps
Leifjord	Nordland	Firewood

Source: Enova

Support to Energy Studies

Enova

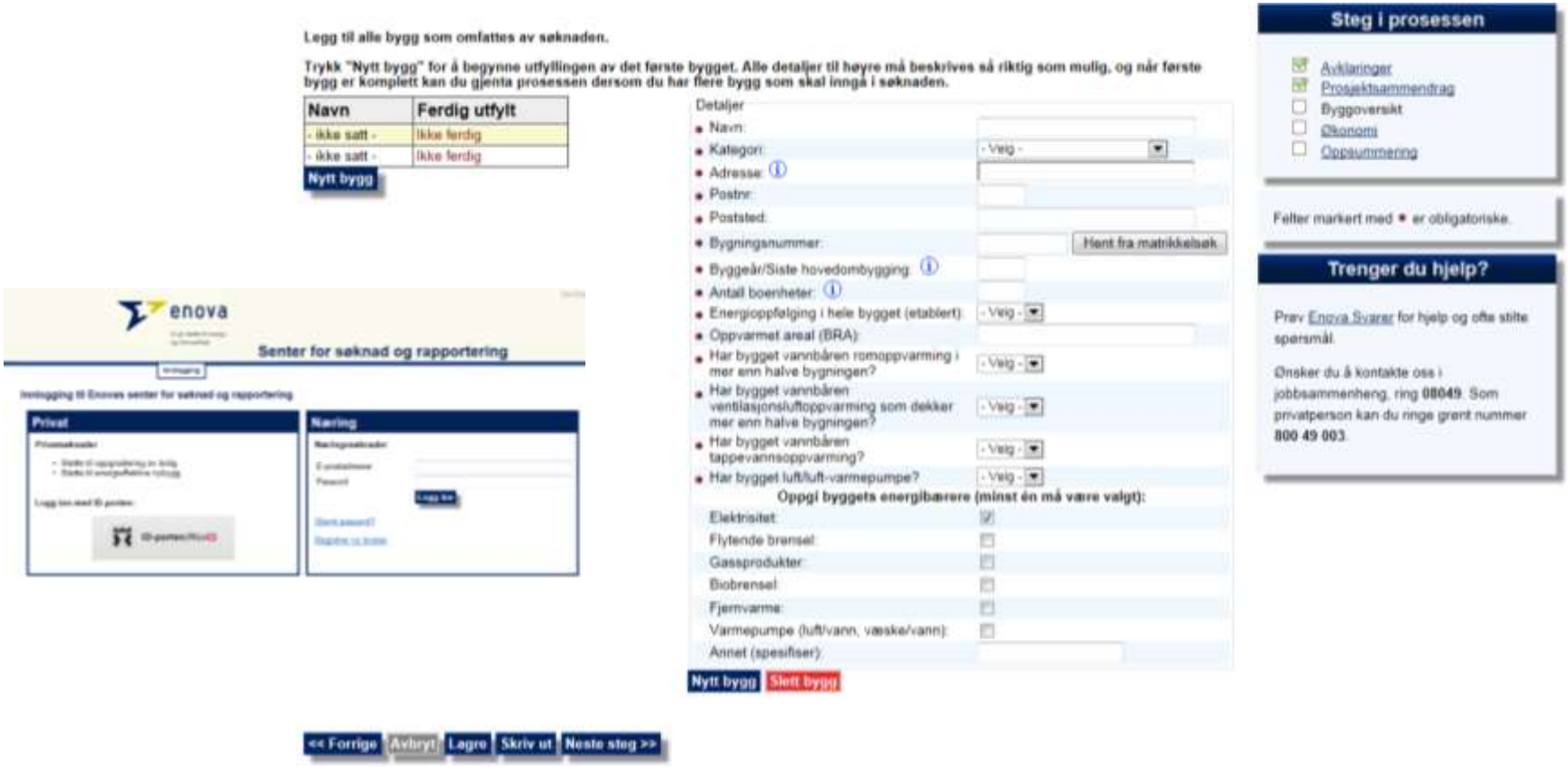
- Commercial buildings: support up to 500 000 kr (1 kr/ m^2)
- Buildings: support up to 250 000 kr (min. 10 apartments)
- Method for estimating equity contribution

Oslo Municipality Climate and Energy Fund

- Commercial and residential buildings: support up to 35 000 kr

Support up to 50% of costs for the study
Resulting in application for implementation support

Enovas on-line application portal



http://www.enova.no/finansiering/naring/naringsbygg/kartleggingsstotte-til-eksisterende-bygg/988/0/

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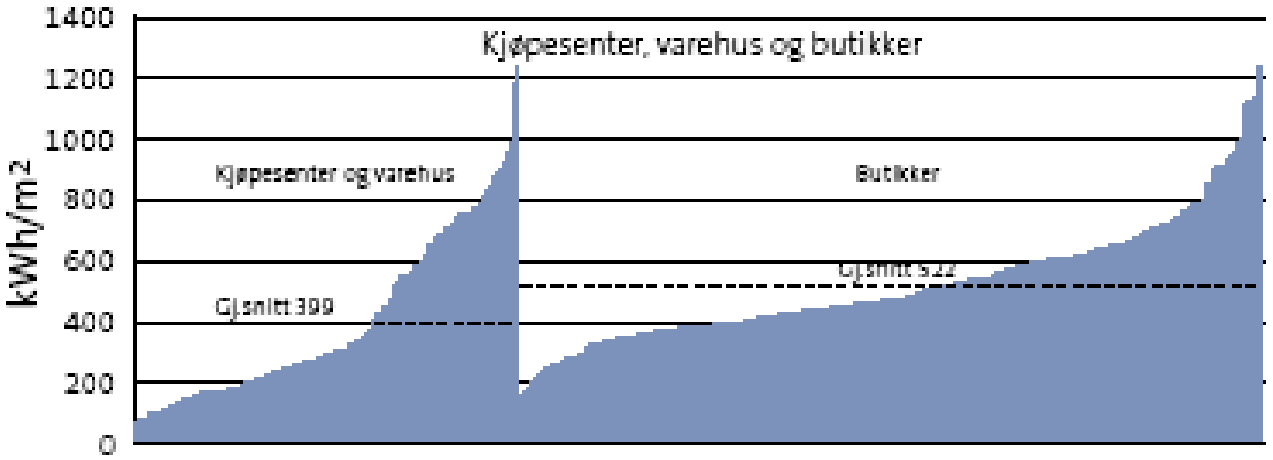
Enova Buildings Benchmark network

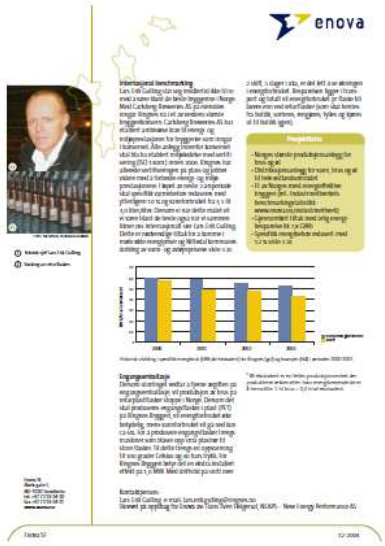


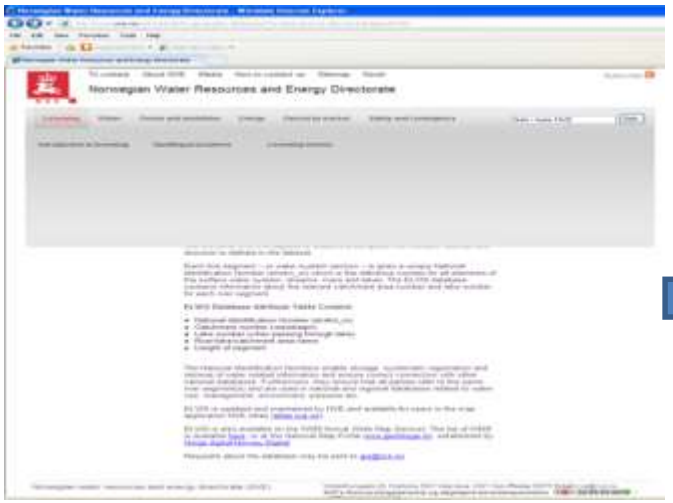
Figur 3.5: Temperaturkorrigert spesifikk tilført energibruk for kjøpesentre/varehus (kode 321/329) og butikkbygninger (kode 322) i 2005, i alt 502 stk. Det gjøres oppmerksom på at skillet mellom kjøpesenter, varehus og butikk kan være vurdert forskjellig. De 62 kjøpesentrene/varehusene med høyest forbruk er alle butikker som matvarehus som kan være del av større kjøpesenter eller på grunn av størrelse og vareutvalg blitt vurdert som selvstendig kjøpesenter. De 13 med lavest energibruk er møbelhus innen samme kjede. Også for butikker er det matvarehus som har høyest energibruk

Capacity building

Mapping Studies for
Energy Savings Potential

Best practice
cases





NVE offers
helpdesk

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Takk for meg