

Does building labeling lead to zero energy buildings

Designer's prespective

Teet Tark

Hevac Ltd, Estonia



Towards net zero energy buildings and building labelling

10.30 – 12.00

15.30 – 17.15

De
build

13.30 – 15.30

- Er
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Technical plenary session 7:
Does building labelling lead
to zero energy buildings?

Chair: Maija Virta, FINVAC, Finland

-
- ❑ There is some confusion in regards to terms and they would need to be sorted out and coordinated, both on the level of EU as well as the member states.
 - ❑ If the terms and concepts are not determined then there can be misunderstandings between the Client and designer – the customer is asking for one thing, but the designer understands something entirely different.

Scale of energy certificate

ENERGIAMÄRGIS		
Hoone kategooria: ELAMUD		Ehitusaasta:
Hoone kasutamise otstarve: [I] ([III])		[VII]
Seojusvarustus: [III]		Ehitisregistri kood:
Energiatüüp: [IV]		[VIII]
Tallaja: [V]		Kõrgetav pind, m ² :
Aadress: [VI]		[IX]
Energiamärk on koostatud: [X]		
Kahtunud energia- ahtasutus (KEK)	Vähe kütutav	Klass
	A	
	B	
	C	
	D	
	E	
	F	
	G	
	Palju kütutav	
Kahtunud energiaahtasutus *, kWh/(a.m ²):		[XIII]
Märgise väljastamise kuupäev: [XIV]	Märgise kohtumise kuupäev: [XV]	
Märgise väljastaja		
Ettevõtte või FIE: [XVI]	Reg nr: [XVII]	
Vastutav spetsialist: [XVIII]	Aidatav: [XIX]	

* arvutatud energiamuundamisefektidesse sisse arvestada energiatüüp ja kaalimisteguri järgi

Scale of energy labels

Energy performance value, kWh/(m²·a)

A+++ A+ A B C D E F G

The position on the scale for a :

- low energy building
- passive house
- nearly (net) zero energy building
- (net) zero energy building
- BREEAM
- LEED etc???

ENERGIAMÄRGIS		
Hoone kategooria: ELAMUD		Ehitusaasta:
Hoone kasutamise eelarve: [I] (III)		[VII]
Seojuurvarustus: [III]		Ehitusregistri lood:
Energialbust: [IV]		[VIII]
Tallaja: [V]		Kõrval pind, m ² :
Aadress: [VI]		[IX]
Energiamärgis on loodatud: [X]		
Kaalitud energiasõltuvus (KEEK)	Vähe lubatud	Klass
	A	
	B	
	C	
	D	
	E	
	F	
	G	
Palju lubatud		
Kaalitud energiasõltuvus *, kWh/(m ² ·a)	[XII]	
Märgise väljastamise kumpi arv: [XIV]	Märgise loomise kum: [XV]	
Märgise väljastaja		
Ettevõtte või FIE: [XVI]	Reg nr: [XVII]	
Vastutav spetsialist: [XVIII]	Allkiri: [XIX]	

* arvutatud energiamuundamisefektiivsusele alusel arvestades energiamuundamise järelevalveteguri järele

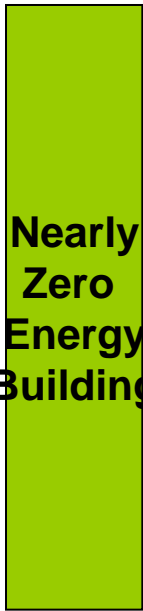


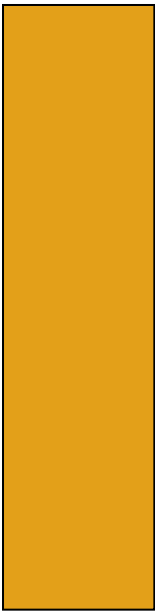
Type of building	Energy performance value, kWh/(m ² ·a)						
	A	B	C	D	E	F	G
Detached house							
Apartment building							
Office building							
Hotel, canteen, supermarket etc							
Entertainment buildings							
School							
Hospital							
Swimming pool							



Minimum requirements of EPV for new buildings



Minimum requirements of EPV for reconstruction buildings

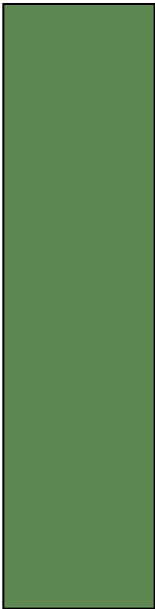
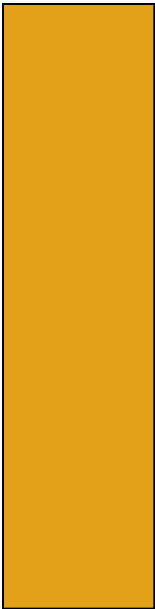
Type of building	Energy performance value, kWh/(m ² ·a)						
	A	B	C	D	E	F	G
Detached house	 Nearly Zero Energy Building	 Low Energy Building					
Apartment building							
Office building							
Hotel, canteen, supermarket etc							
Entertainment buildings							
School							
Hospital							
Swimming pool							



Minimum requirements of EPV for new buildings



Minimum requirements of EPV for reconstruction buildings

Type of building		Energy performance value, kWh/(m ² ·a)						
		A	B	C	D	E	F	G
Detached house	Nearly Zero Energy Building		Low Energy Building					
Apartment building								
Office building								
Hotel, canteen, supermarket etc								
Entertainment buildings								
School								
Hospital								
Swimming pool								



Minimum requirements of EPV for new buildings



Minimum requirements of EPV for reconstruction buildings

The scale of energy labels should be brought up to date, it should also accommodate :

- net nearly zero energy building
- net zero energy building ???
- net plus energy ???

We need the uniform scale of energy certificate

How adequate is the label?



LEED® (Leadership in Energy and Environmental Design) Green Building Rating System™ on tunnustatud hindamissüsteem, mis propageerib jätkusuutliku ruumide ehituse kriteeriumide täitmist läbi õhult akrediteerivatele kriteeriumidele.

LEED tunnustab kogu olemasoleva keskkonnalist võimevõimust.

Jätkusuutlik arendamine ja ohutus
Vee säästmine
Elektriline energiasääst
Materjalide valik
Hoonde sisetunnetus
Kvaliteet ja innovatsioon
Disain

Rauas & Pless Arhitektuuribüroo on saanud SILVER LEED-sertifikaadi number 200 ting on esimene LEED-sertifikaat saaja Eestis.

The LEED® (Leadership in Energy and Environmental Design) Green Building Rating System™ is a feature-oriented rating system that awards buildings points for satisfying specified green building criteria.

The six major environmental categories of review include:

Sustainable Sites
Water Efficiency
Energy and Atmosphere
Materials and Resources
Indoor Environmental
Quality and Innovation
Design

In January 2010, Rauas & Pless shopping centre received SILVER LEED-certification, making it the first LEED-certified property in the Baltic countries.

LEED silver

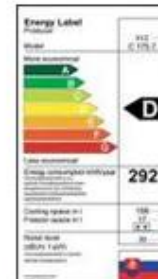
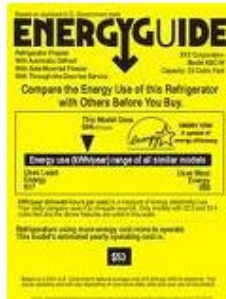
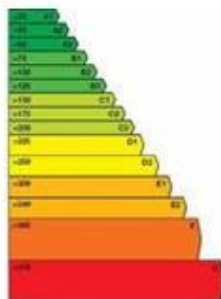
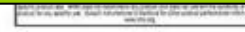
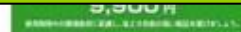
Kaalutud energia-erikasutus (KEK)	Vähe kulutav	Klass:
KEK≤150	A	
151≤KEK≤170	B	
171≤KEK≤200	C	
201≤KEK≤250	D	
251≤KEK≤310	E	
311≤KEK≤390	F	
391≤KEK≤480	G	G
KEK≥481	H	
	Palju kulutav	

LEED Silver

Leadership in Energy & Environmental Design



Acquiring the largest number of labels should not be the aim, as in the more labels the better a building it is



Example: Existing building

ENERGIAMÄRGIS		
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Hoone kasutamise otstarve: [I] ([III])		[VII]
Soojusvarustus: [III]		Ehitisregistri kood:
Energiaallikas: [IV]		[VIII]
Tehaja: [V]		Kõetav pind, m ² :
Aadress: [VI]		[IX]
Building 1		
Energiamärgis on koostatud: [X]		
Kahtunud energia- enikasutus (KEK)	Vähe kuluav	Klass
	A	
	B	
	C	
185	D	D
	E	
	F	
	G	
	Palju kuluav	
Kahtunud energiaenikasutus *, kWh/(a·m ²):		[XIII]
Märgise väljastamise kuupäev: [XIV]	Märgis kehtib kuni: [XV]	
Märgise väljastaja		
Ettevõtte või FIE: [XVI]	Reg nr: [XVII]	
Vastutav spetsialist: [XVIII]	Allkiri: [XIX]	

* arvutatud energiamuundamisestadesse sisse antava energiakoguse ja kaalumisteguri järgi

ENERGIAMÄRGIS		
Hoone kategooria: ELAMUD		Ehitusaasta:
Hoone kasutamise otstarve: [I] ([III])		[VII]
Soojusvarustus: [III]		Ehitisregistri kood:
Energiaallikas: [IV]		[VIII]
Tehaja: [V]		Kõetav pind, m ² :
Aadress: [VI]		[IX]
Building 2		
Energiamärgis on koostatud: [X]		
Kahtunud energia- enikasutus (KEK)	Vähe kuluav	Klass
	A	
	B	
	C	
220	D	
	E	E
	F	
	G	
	Palju kuluav	
Kahtunud energiaenikasutus *, kWh/(a·m ²):		[XIII]
Märgise väljastamise kuupäev: [XIV]	Märgis kehtib kuni: [XV]	
Märgise väljastaja		
Ettevõtte või FIE: [XVI]	Reg nr: [XVII]	
Vastutav spetsialist: [XVIII]	Allkiri: [XIX]	

* arvutatud energiamuundamisestadesse sisse antava energiakoguse ja kaalumisteguri järgi

Building 1

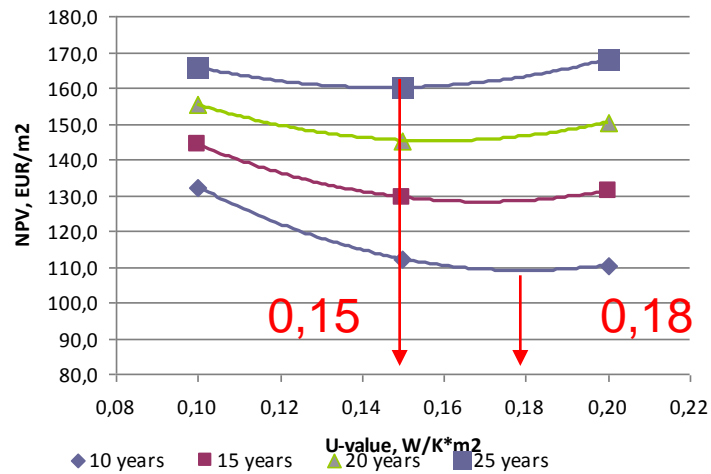




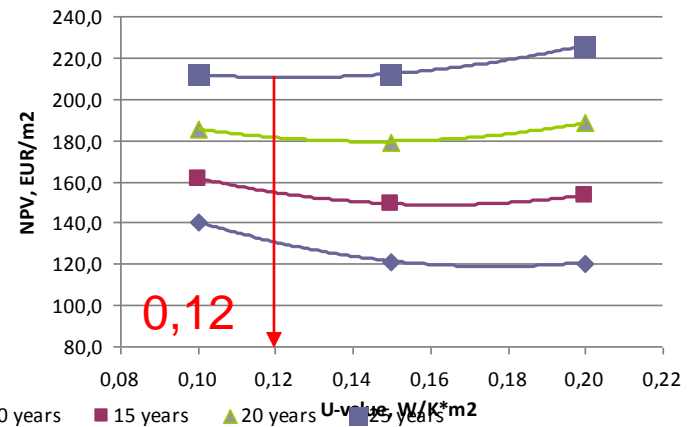
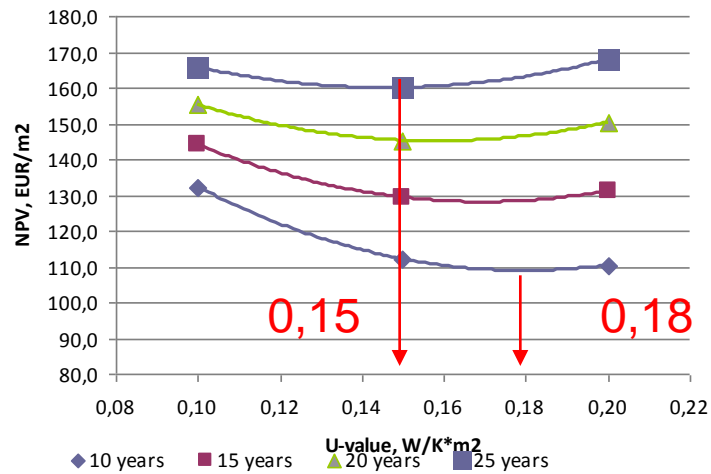




Cost optimal solution



annual increase in energy prices: 3 %
 interest rate: 5%



annual increase in energy prices: 3 %
interest rate: 5%

annual increase in energy prices: 6 %
interest rate: 5%

The calculations for cost optimal solution substantially depend on any given prerequisite data:

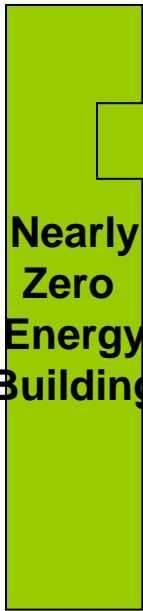

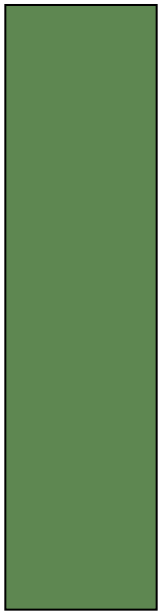
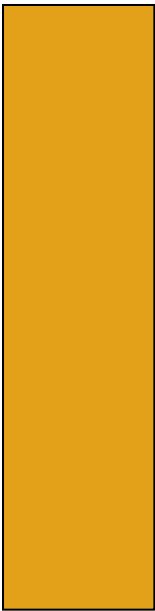
- the length of the period
- the percentage of the interest

It is also often different for public and private sector

- inflation

It is very difficult to forecast the changes in the prices of energy in a longer perspective

The EU Commission have promised to work out an appropriate methodology by this summer. Hopefully it brings clarity into the methods for calculations and homogenizes the approach

Type of building	Energy performance value, kWh/(m ² ·a)						
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Detached house	 Nearly Zero Energy Building	 Low Energy Building					
Apartment building							
Office building							
Hotel, canteen, supermarket etc							
Entertainment buildings							
School							
Hospital							
Swimming pool							



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Minimum requirements of EPV for reconstruction buildings

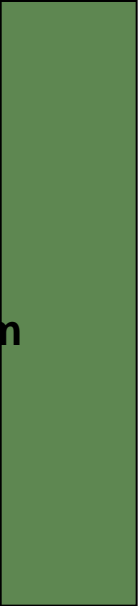
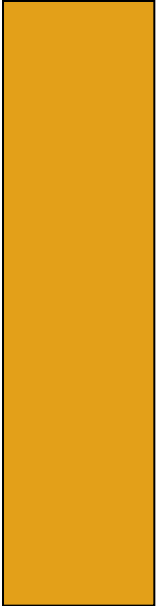
Type of building	Energy performance value, kWh/(m ² ·a)						
	A	B	C	D	E	F	G
Detached house		<div>Low Energy Building</div>	<div>Nearly Zero Energy Building</div>	<div></div>	<div></div>		
Apartment building							
Office building							
Hotel, canteen, supermarket etc							
Entertainment buildings							
School							
Hospital							
Swimming pool							



Minimum requirements of EPV for new buildings



Minimum requirements of EPV for reconstruction buildings

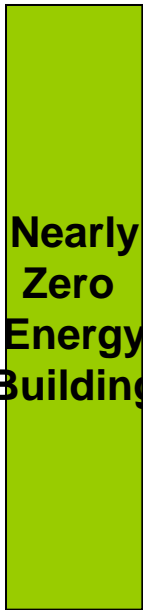



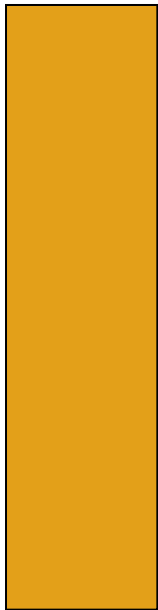
Type of building		Energy performance value, kWh/(m ² ·a)						
		A	B	C	D	E	F	G
Detached house	Nearly Zero Energy Building		Low Energy Building	Cost optimum				
Apartment building								
Office building								
Hotel, canteen, supermarket etc								
Entertainment buildings								
School								
Hospital								
Swimming pool								



Minimum requirements of EPV for new buildings



Minimum requirements of EPV for reconstruction buildings

Type of building	Energy performance value, kWh/(m ² ·a)						
	A	B	C	D	E	F	G
Detached house	 Nearly Zero Energy Building	 Low Energy Building	 Cost optimum				
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Office building							
Hotel, canteen, supermarket etc							
Entertainment buildings							
School							
Hospital							
Swimming pool							



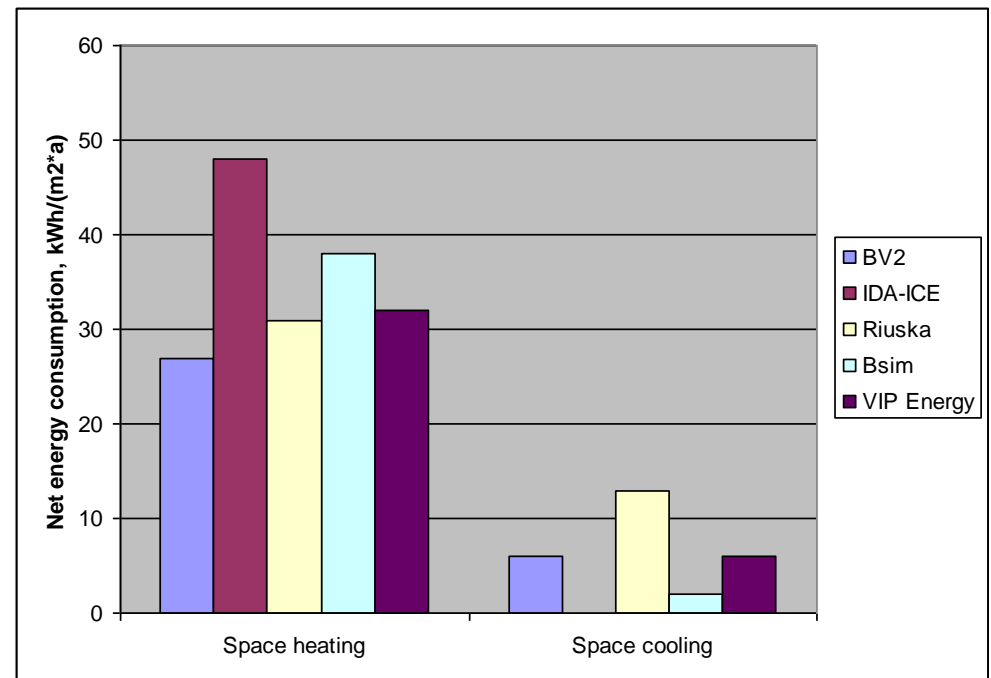
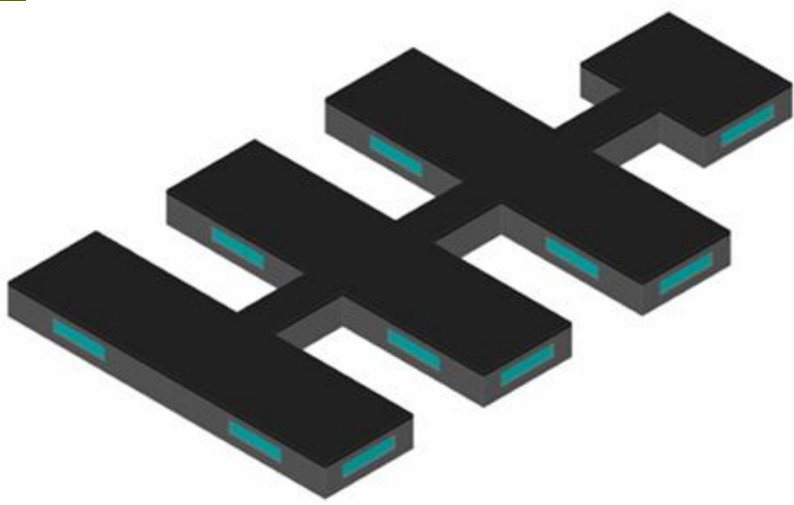
Minimum requirements of EPV for new buildings



Minimum requirements of EPV for reconstruction buildings

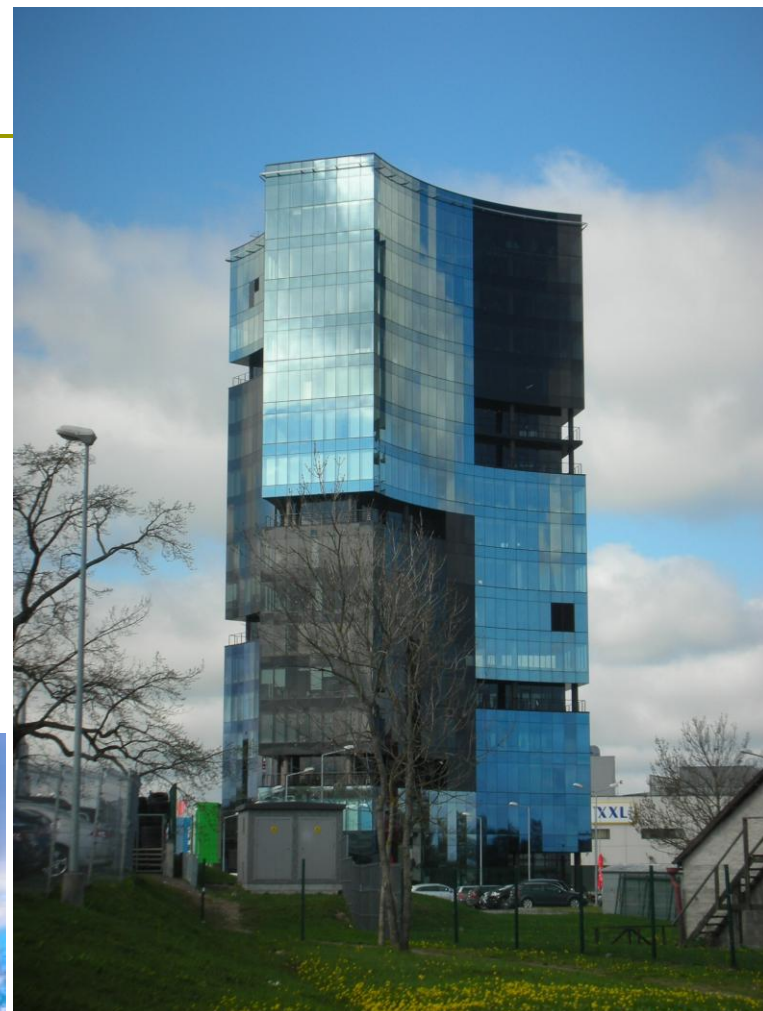
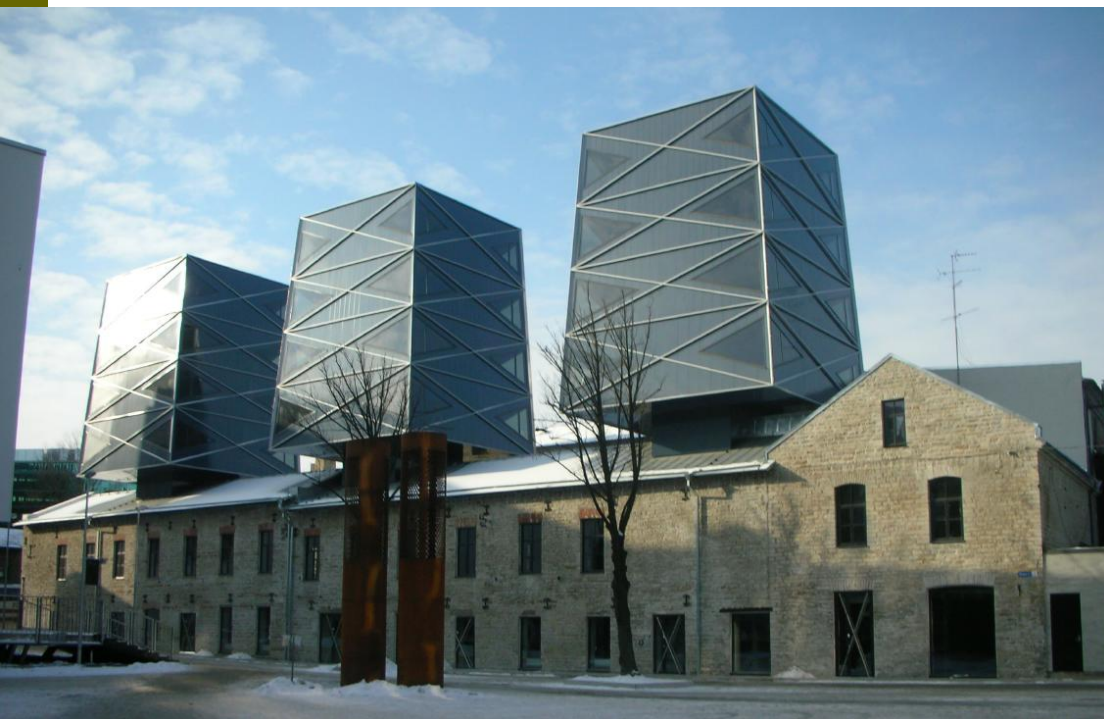
Energy label of new buildings

The results of the calculations for the building being designed depend on the software being used



Source: H. Voll, T. Tark 2010. *Energiatõhususe miinimumnõuete tõendamise ja selle kontrolli võimekuse tõstmine*

-
- ❑ The adequacy of the energy label for the buildings being designed depends in a large part on
 - -the software being used
 - -the professional skills of the persons conducting the calculations
 - ❑ The designers (including the architects) have to possess substantially more know-how about energy efficiency than they do today
 - ❑ Energy efficiency must be thought of and taken into consideration during the initial stages of design



Summary

- ❑ There is some confusion in regards to the use of terms
- ❑ There are too many different labeling systems
 - they are confusing
 - oftentimes they are not comparable
 - they express different values and goals
- ❑ The usual energy label should also give information about nnZEB, the scale of the label should be brought up to date
- ❑ Achieving nnZEB and nZEB is a great challenge for the designers and requires for them, including the architects, to have the appropriate know-how. Energy efficiency should be taken into consideration in the initial stages of designing the building.
- ❑ Quality of
 - construction works
 - supervision
 - testing and adjustments
 - commissioning
 - operation