

KLIIIMA-  
NEUTRAALNE  
AASTAKS  
2035



TAL  
TECH

# RENOVEERIMISE MAHUD JA MÕJUD

RENOVEERIMISLAINEGA KODUD KORDA JA MAJANDUS KÄIMA!

JAREK KURNITSKI

27.11.2024



ENERGIATÕHUSUSE  
TIPPKESKUS  
[www.ener.ee](http://www.ener.ee)



# KUIDAS HINNATA MÕISTLIKKU RENOVEERIMISE MAHTU?

- Vajaduspõhisus – suured küttearved ja kehvad elutingimused
- EED riiklik energiasäästukohustus lõpptarbimisele – sektorite ülene, aga eeldatavasti jagatakse ära
- Hoonete pikaajaline rekonstrueerimise strateegia – 2050 aastaks kõikide hoonete tervikrenoveerimine C klassi tasemele – optimistlik
- EPBD 2024 pakub mõningaid leevendusi:
  - Tagasihoidlikumad eesmärgid mitteiluhoonetele
  - Strateegia asemele tegevusi ja rahastust sisaldav renoveerimiskava
- Renoveerimiskava peab olema “jalad maas” siduvate kohustustega dokument ja selle tegemine on pikk protsess:
  - esimene kavand komisjonile 31.12.2025
  - hindamine, tagaside, täiendamine
  - esimene riiklik renoveerimiskava 31.12.2026 (uuendatakse iga 5 a tagant)
- EED rakendamiseks tehtud RENOWAVE projekt pakub sisendit:
  - <https://energiatalgud.ee/node/8919>

# RENOWAVE: RIIKLIKU ENERGIA-SÄÄSTUKOHUSTUSE TEEKAARDID



Support to the renovation wave - energy efficiency pathways and energy saving obligation in Estonia

REFORM/SC2022/067

International Webinar  
21 February 2024

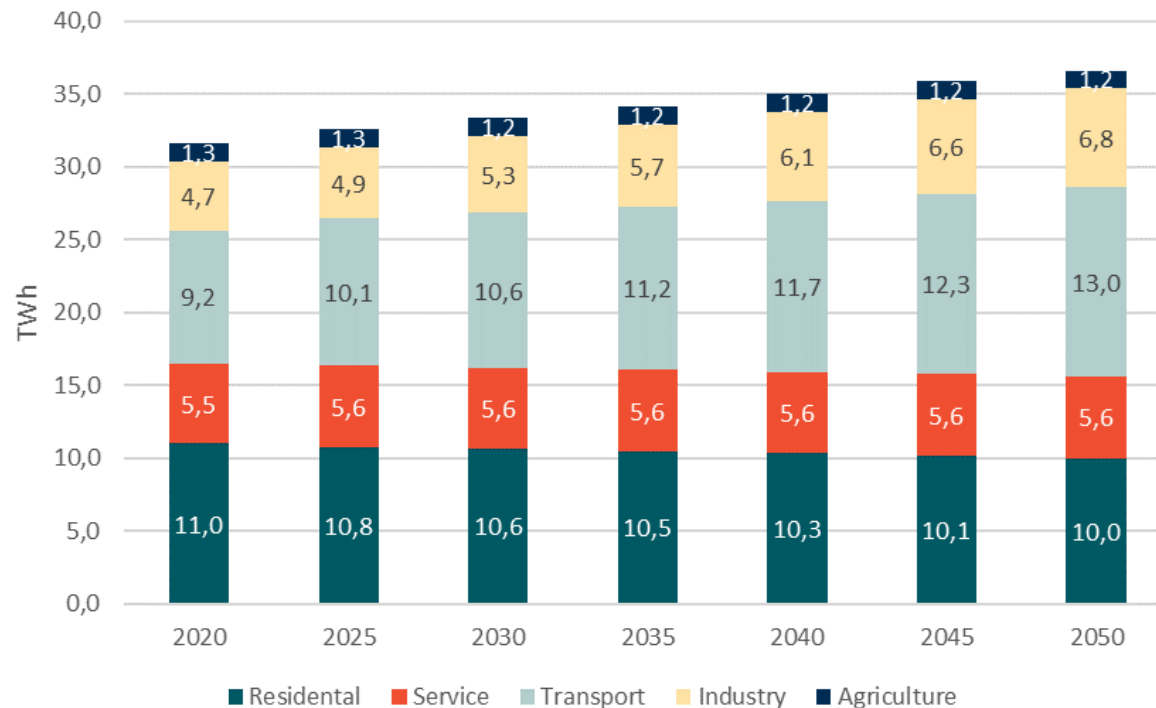
This project is carried out with funding by the European Union via the Technical Support Instrument and in cooperation with the Directorate General for Structural Reform Support of the European Commission

[www.trinomics.eu](http://www.trinomics.eu)

[Energiatalgud.ee](http://Energiatalgud.ee) → uuringud →  
**energiatõhususe uuringud**  
<https://energiatalgud.ee/node/8919>  
Aruanded, baasjoon, meetmete kataloog ...

# FOOKUS ENERGIA LÕPPTARBIMISEL (EED)

- 2024-2030 EED eesmärk 1,5%/a lõpptarbimise sääst (0,8 %/a varem)
- Praeguste meetmetega 0,14%/a
- EED 2030 lõpptarbimise eesmärk 30 TWh (praegu 32-33 TWh)

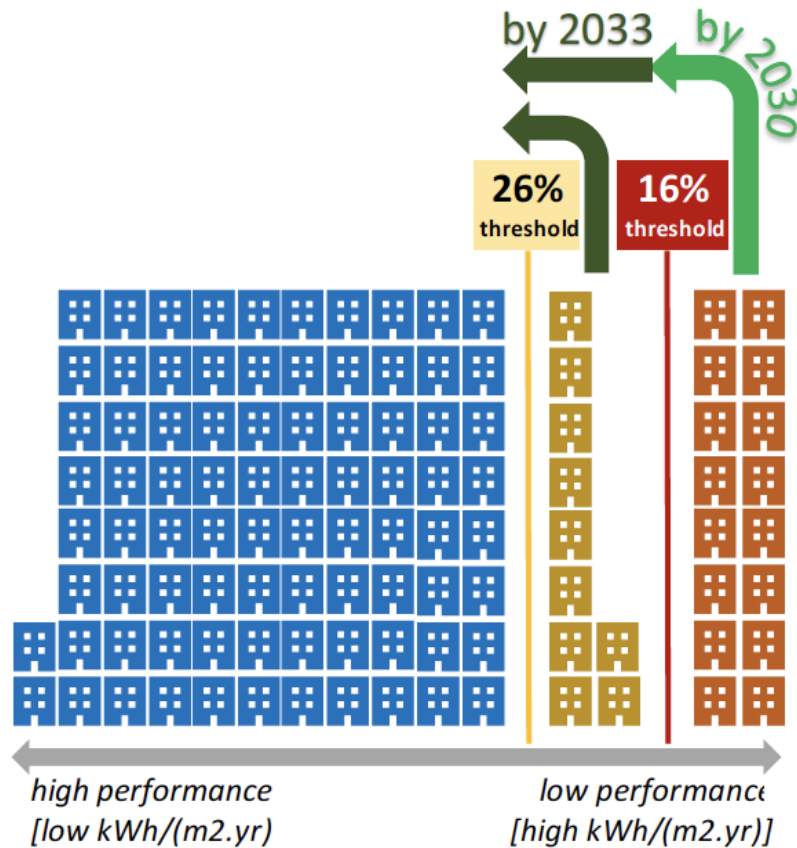


- Ilma meetmeteta (BAU, joonisel) lõpptarbimine kasvutrendis
- Hooned → fond kasvab, aga tõhusus paraneb (residential + service)
- Tööstus → 1,5% kasv aastas
- Transport → tõusva ajaloolise trendiga
- Kõikides sektorites elektrifitseerimine

# HOONETE ENERGIATÕHUSUSE TÕÖRIISTAD (EPBD)

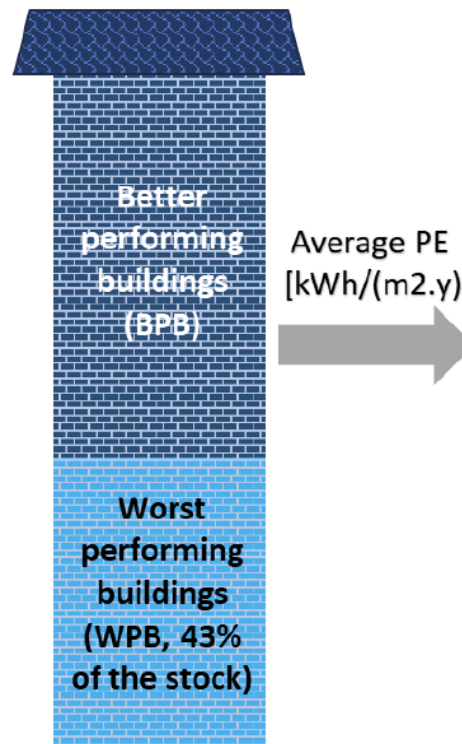
**Mitteeluhooned:** tõsta halvima tõhususega hooned F ja G klassist välja rakendades energiatõhususe miinimumstandardeid (MEPS)

Non-residential building stock 2020

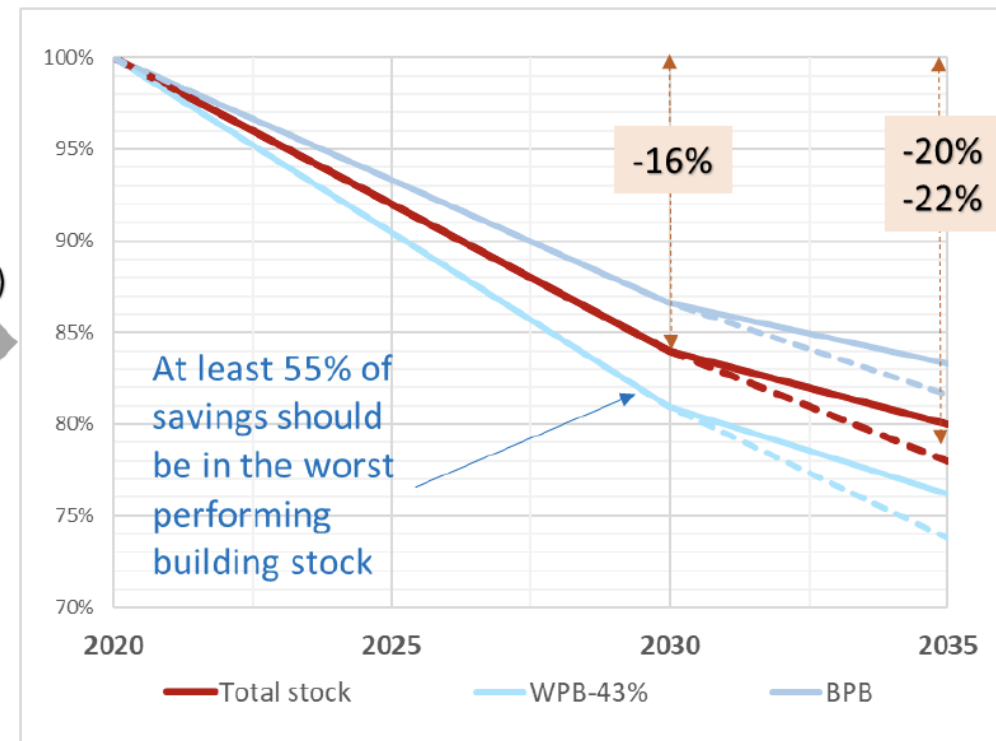


**Eluhooned:** meetmetega saavutada trajektoori, mille puhul keskmine energiakasutus väheneb m<sup>2</sup> kohta 16%/2030 ja 20-22%/2035

Residential building stock 2020



National trajectory for the average primary energy use in kWh/(m2.y)



# TÄNANE OLUKORD

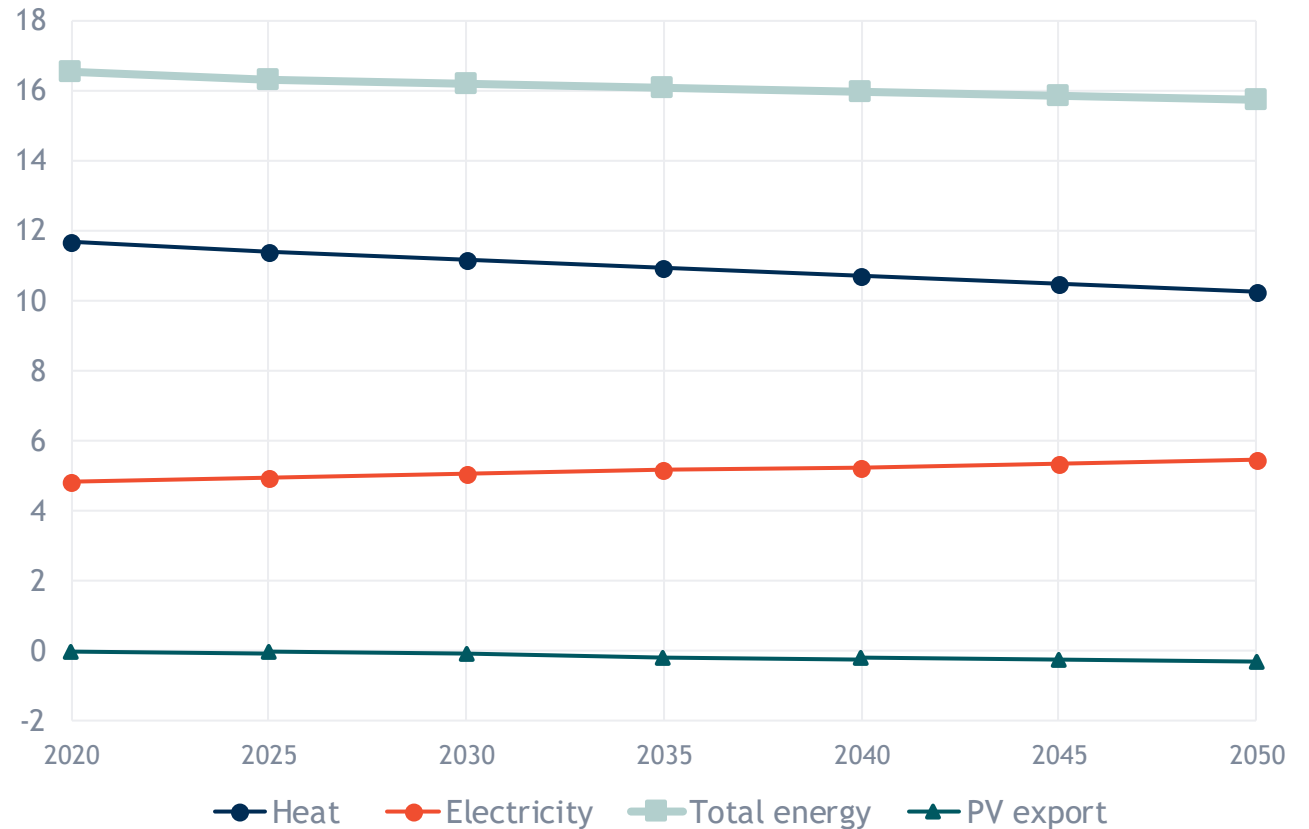
Hooned (elamumajandus ja teenindusektor):

- Vana hoonefond nõrga energiatõhususega – sarnane Kesk-Euroopa olukorrale
- Madalad energiatõhusust parandavad renoveerimise mahud
- Väga suur säästupotentsiaal korterelamute tervikrenoveerimisel (70% eesti elanikest elab korterelamutes)
- Energiatõhususe parandamise motivatsiooni puudumine ärikinnisvaras

# HOONETE BAASJON (RENOWAVE)

- 52-53% energia lõpptarbimisest
- Soojus langustrendis (sõltub tugevalt renoveerimise mahtudest)
- Elekter tõuseb eriti mitteeluhoonetes, osaliselt tasakaalustab kohapealne tootmine
- PV eksport – joonisel negatiivne
- Hoonefondi energiatõhusus paraneb, sest uued liginullenergiahooned asendavad väljalangevaid, renoveerimise mõju tagasihoidlik

Final energy use in buildings, TWh



# HOONETE MEETMED

RenoWave arvutas läbi kõikvõimalikud meetmed, osad on välistavad või dubleerivad

			Cost and savings per year			2024-2030 cumulative			Cost allocation
			Cost (M€/a)	Savings (GWh/a)	Unit cost, first year (€/MWh)	Cost (B€)	Savings (TWh)	Unit cost (€/MWh)	
Residential	nR1	Obligation scheme for residential sector	379.7	109.0	3483	2.4	2.3	1046	Energy provider (billed to end user)
	nR2	MEPS targeting rented + sold dwellings	337.5	55.3	6102	2.1	1.2	1833	Building owner
	nR3	MEPS for all dwelling (regulatory requirements for EPC class E, F, and G or above)	1108.1	181.6	6102	7.0	3.8	1833	Homeowners
	nR4	Renovation grants for single family houses (20-30% support)	10.0	8.0	1250	0.1	0.2	325	30% government 70% homeowners (government cost reported)
	nR5	Tax deduction for renovation works by private persons (=parallel track for single family)	3.0	7.2	417	0.0	0.1	123	Tax deduction to homeowners (lost tax for the government)
	nR6	Renovation grants for multifamily buildings/housing associations (30% support)	150.0	117.6	1275	1.1	3.2	325	30% government 70% homeowners (government cost reported)
	nR7	Property tax (according to EPC levels)	50.0	40.0	1250	0.3	0.8	369	Homeowners
	nR8	CO2 tax for end energy use of residential buildings	50.0	40.0	1250	0.3	0.8	369	Homeowners
Service	nS1	Obligation scheme for service sector	152.6	56.0	2726	1.0	1.2	819	Energy provider (billed to end user)
	nS2	Central government buildings renovation support (100% support)	15.0	1.8	8333	0.1	0.1	2213	80% government
	nS3	Public and municipality buildings renovation support (60% support in average)	66.0	13.2	5000	0.4	0.3	1502	60% central government 40% local government (government cost reported)
	nS4	Commercial buildings energy performance investments support	50.0	72.0	694	0.3	1.5	205	30% government 70% building owners (government cost reported)
	nS5	CO2 certificate sales based on energy savings from commercial buildings renovation, income invested as renovation support	10.0	14.4	694	0.1	0.3	205	Businesses buying certificates
	nS6	CO2 tax for end energy use of commercial buildings	50.0	72.0	694	0.3	1.5	205	Building owners
	nS7	Property tax (according to EPC levels)	50.0	72.0	694	0.3	1.5	205	Building owners
	nS8	Minimum energy performance standards for non-residential buildings (regulatory requirements for EPC class E and F)	70.0	30.2	2315	0.4	0.6	695	Building owners



# NÄIDE MODELLEERIMISEST

Renovation grant for apartment buildings								
Period	2024	2025	2026	2027	2028	2029	2030	Cumulative
Volume of the measure, M€	150	150	150	150	150	150	150	1050
Financial support %	30	30	30	30	30	30	30	
Investment with VAT, €/m <sup>2</sup>	450	459	468	478	487	497	507	
Energy saving heat, kWh/m <sup>2</sup> a	102	102	102	102	102	102	102	
Energy saving electricity, kWh/m <sup>2</sup> a	6	6	6	6	6	6	6	
New energy saving heat, GWh	113.3	111.1	108.9	106.8	104.7	102.6	100.6	
New energy saving electricity, GWh	6.7	6.5	6.4	6.3	6.2	6.0	5.9	
Annual energy saving heat, GWh	113.3	224.4	333.4	440.2	544.9	647.5	748.2	3052
Annual energy saving electricity, GWh	6.7	13.2	19.6	25.9	32.1	38.1	44.0	180
Tax return, M€	160	160	160	160	160	160	160	1120
Total volume of investments mobilised, M€	500	500	500	500	500	500	500	3500
New jobs created, man-year	8500	8500	8500	8500	8500	8500	8500	59500
Unit cost €/MWh	1250	631	425	322	260	219	189	325
Co-benefits rating								
Improved indoor climate and real estate value, reduced DALY and health care cost								

# HOONETE PÕHILISED MEETMED

## **Eluhooned – riigi toetus läbi eelarveneutraalsete renoveerimistoetuste**

- Renoveerimistoetused korterelamute tervikrenoveerimisele (30% toetus)
- Kinnisvaramaks vastavalt energiamärgise klassile toetuste rahastamiseks
- Maksusoodustus/tulumaksu tagastus väikeelamute renoveerimisel (teine tee väikeelamutele)
- Renoveerimistoetused teatud sihtgruppidele väikeelamutes (20-30%)

## **Mitteeluhooned – riigi toetus ei ole vajalik**

- MEPS energiatõhususe miinimumstandardite rakendamine (energiamärgise E ja F klassi miinimumnõue)
- Kinnisvaramaks vastavalt energiamärgise klassile
- Avalike hoonete renoveerimiskohustus (3%/a)

# Buildings Flagship measure: Budget neutral renovation grants in multifamily

Massive savings with deep renovation

- Large volumes of similar buildings
- Standard solutions



Quantification of economic benefits of renovation of apartment buildings as a basis for cost optimal 2030 energy efficiency strategies

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 Tax revenue  
 Job generation

#### 1. Introduction

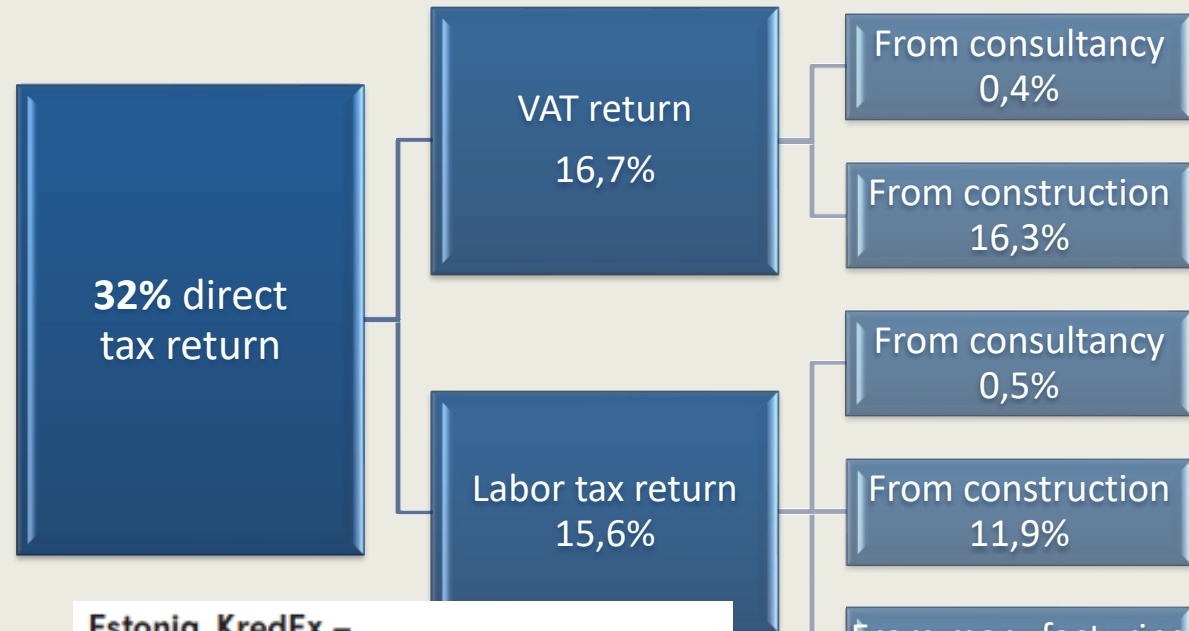
"I believe that renovation of buildings to high energy performance standards could be one of the most effective investments a nation can make, given the benefits in terms of job creation, quality of life, economic stimulus, climate change mitigation and energy security that such investments deliver". Oliver Rafter, Executive Director, BEPE [1].

The Estonian energy roadmap ENMAK 2030<sup>a</sup> is being developed in line with the objectives described in the Green Paper "A 2030 Framework for climate and energy policies" [2]. Developing a national roadmap requires scientific evidence, and on the basis of this evidence, different scenarios may be envisaged. With this in mind, a statistical study involving integrated and energy and

investment analyses of Estonian building stock, including apartment buildings, was carried out [3]. For each building type, three to four different renovation packages were studied to identify cost optimal solutions [3]. However, the study focused only on energy efficiency/energy savings and investment intensity and did not consider the economic impacts of these renovation measures/packages.

Buildings account for a large share of the energy consumed nationally and produce 36% of the EU's CO<sub>2</sub> emissions [4]. In 2010, 20% reduction in both CO<sub>2</sub> emissions and energy consumption by 2050 was set as a target for all EU member states [5], the aim being to maintain energy consumption at a 2010 level. According to the above mentioned study [3], in 2010, Estonian building stock account for up to 50% of total national final energy consumption, significantly above an average 37.5% across all EU countries [3]. Estonian final energy use amounted to 33.0 TWh/a, total primary energy use, 45.5 TWh/a (buildings for 53%), and non-renewable primary energy use, 35.3 TWh/a (buildings accounting for 47%) [3]. The Estonian building stock has clearly played a major role in energy use, exceeding consumption by industries such as transportation and manufacturing. If national measures are not adopted, overall energy consumption of buildings may even increase, due to the relatively low replacement rate of existing buildings (0.3% per year)

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<sup>2</sup> Tel.: +372 561 6205.  
<sup>3</sup> Tel.: +372 520 9657.

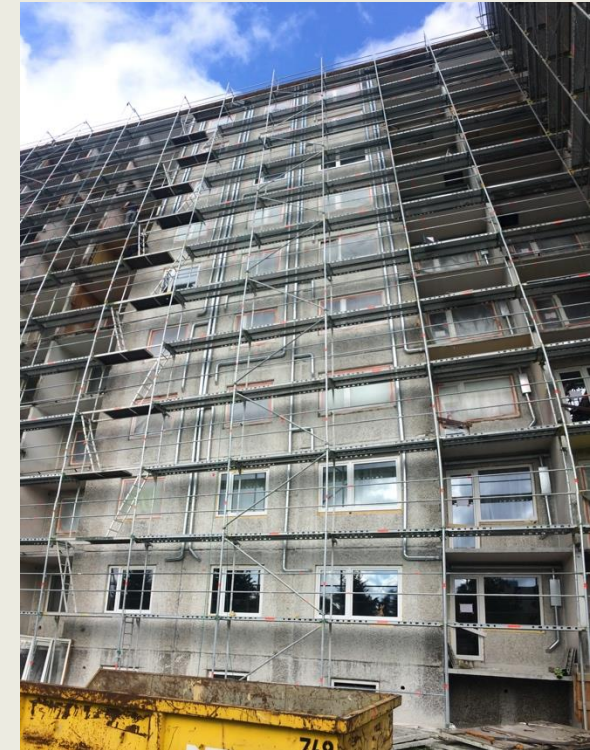


## Estonia, KredEx – A Deep Renovation model for Europe

Estonia has achieved great results in deep renovation, thanks to the KredEx renovation grant system. Backed by the EU since its 2010 kick-off, KredEx features strict technical requirements, focusing on high-level energy efficiency and indoor climate conditions.

## Perpetuum mobile?

- Heating energy savings 60-70%
- Small increase or decrease in electricity depending on PV installation





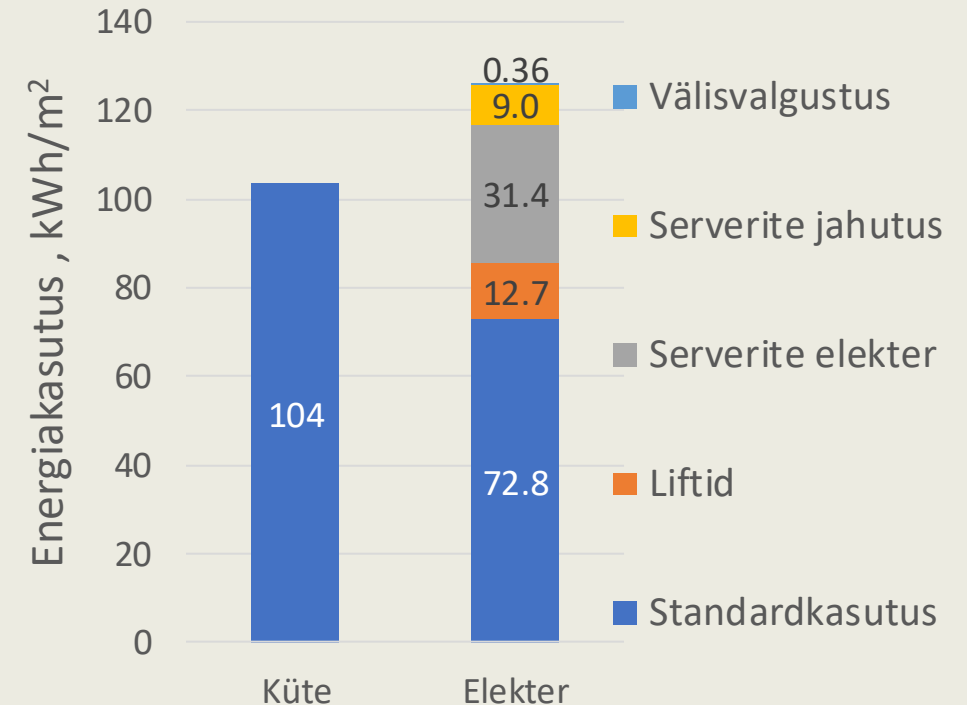
# Buildings Flagship measure: Non-residential MEPS

Commercial building 16 990 m<sup>2</sup>, 2008:

- Metered energy use, gas heating



- EPC class G according to main meters EP=357
- Submetering provides EP=250, class E
- 37 €/m<sup>2</sup> investment to BMS, HVAC and PV results in EPC D
- High saving potential with MEPS

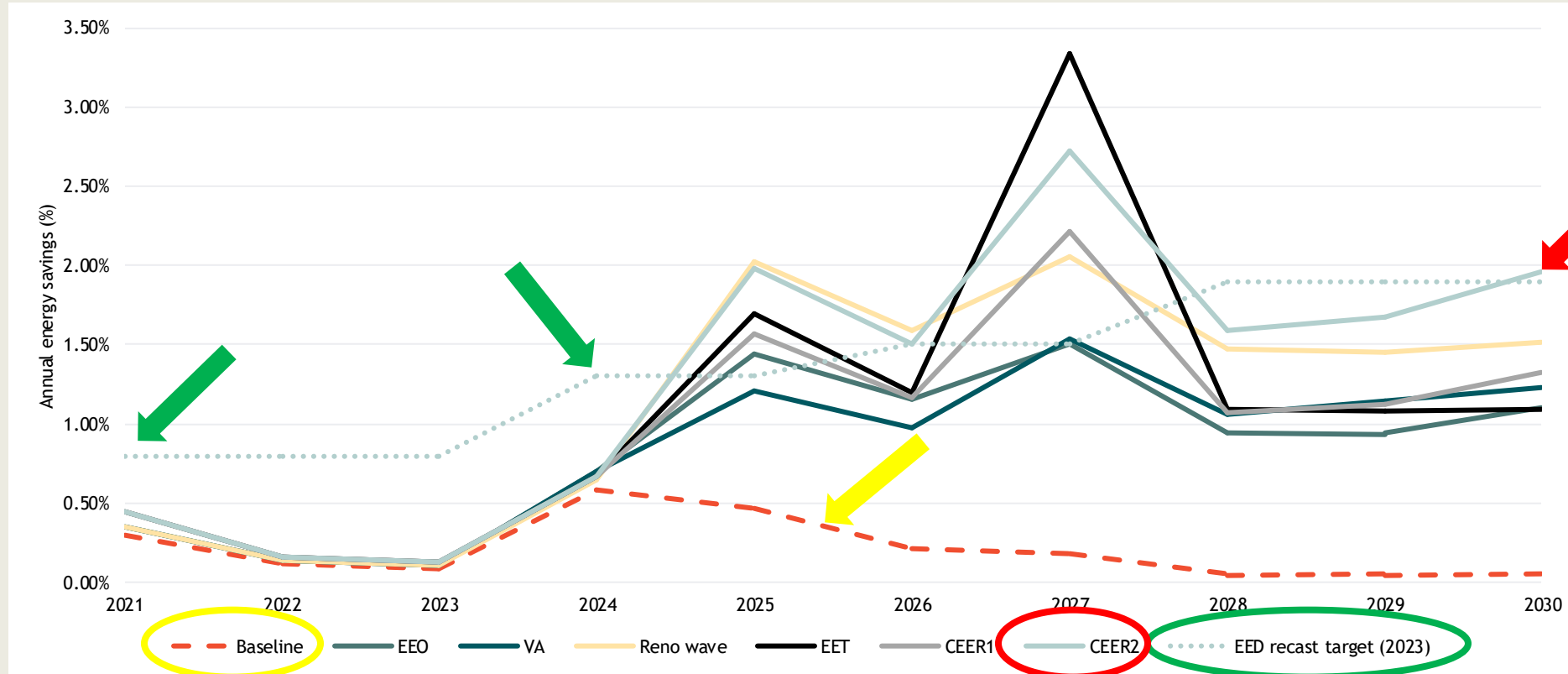


ETA või KEK, kWh/(m <sup>2</sup> a)	Klass
ETA või KEK ≤ 100	A
101 ≤ ETA või KEK ≤ 130	B
131 ≤ ETA või KEK ≤ 160	C
161 ≤ ETA või KEK ≤ 210	D
211 ≤ ETA või KEK ≤ 260	E
261 ≤ ETA või KEK ≤ 320	F
321 ≤ ETA või KEK ≤ 400	G
ETA või KEK ≥ 401	H

Kuivjõgi et al. 2021

<https://doi.org/10.1051/e3sconf/202124605002>

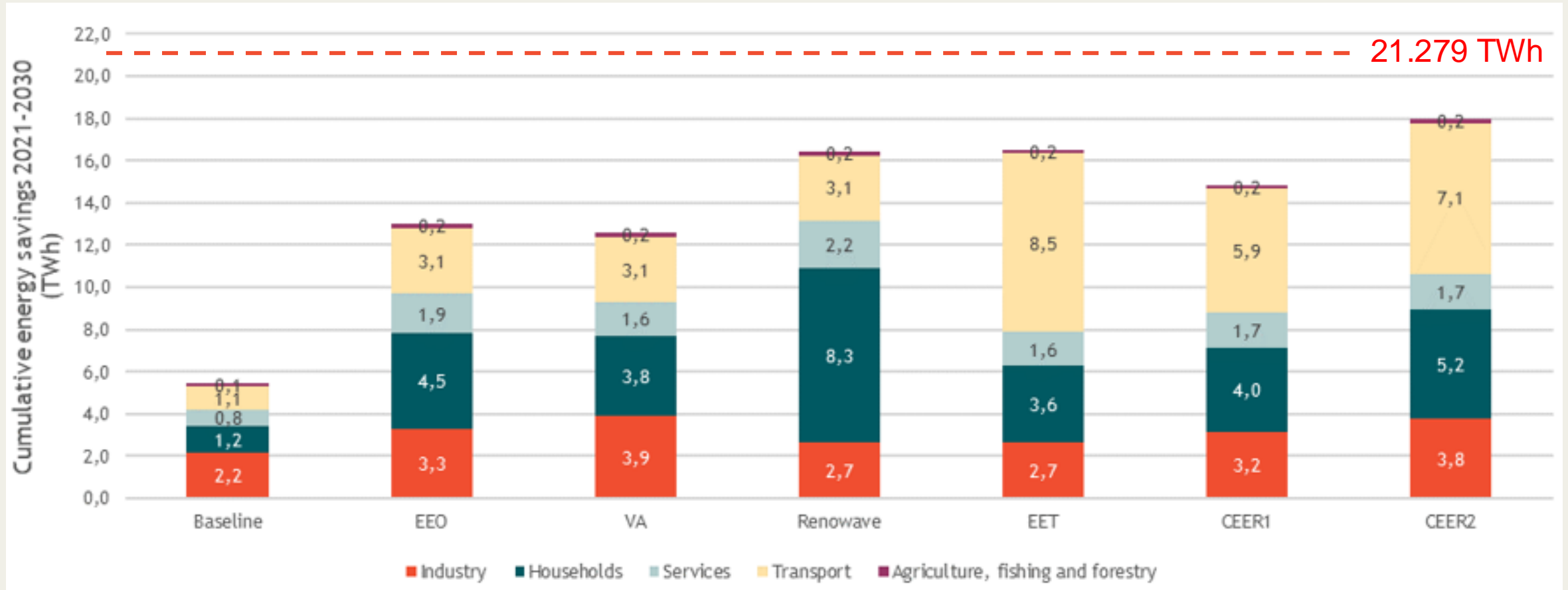
# Comparison of 7 pathways



Only CEER2 is at 1.9% annual savings in 2030

Both Renowave & CEER2 achieve the 1.5% average over 2024-2030

# Comparison of 7 pathways



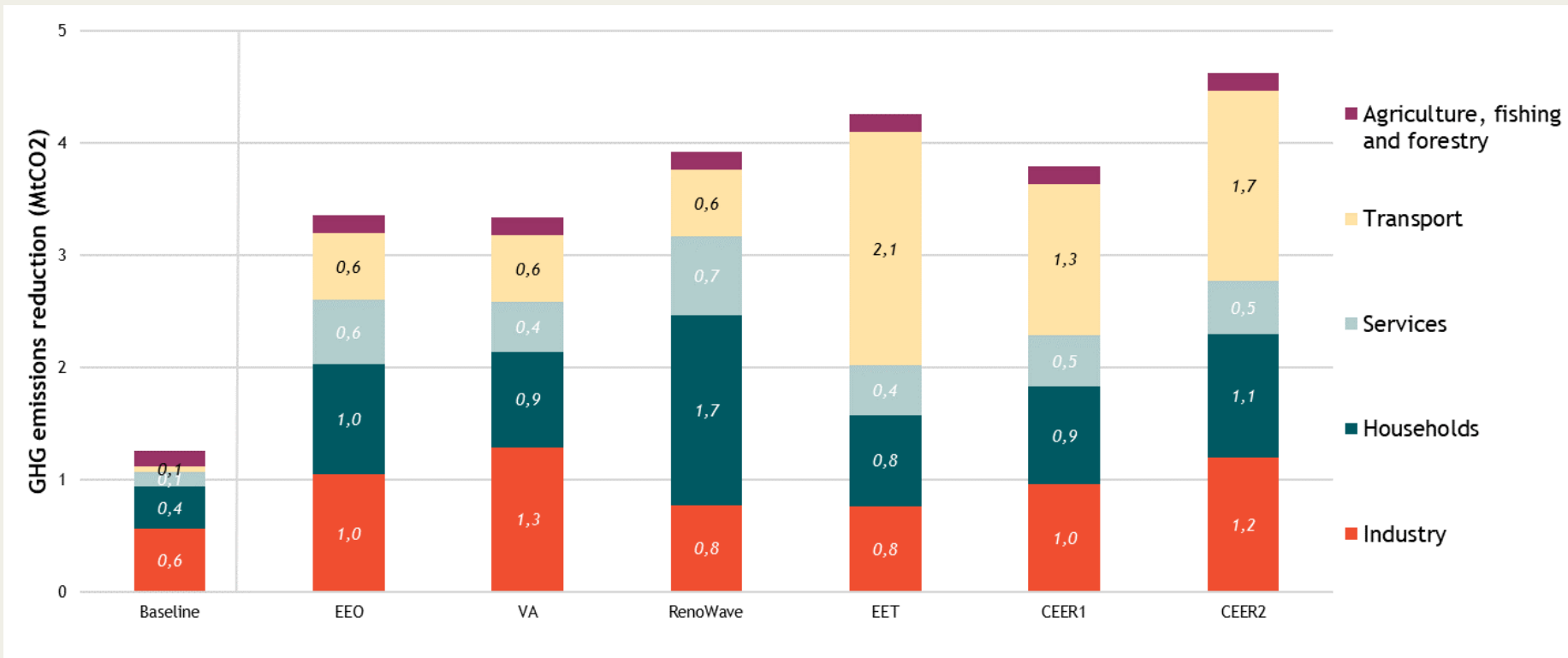
CEER2 achieves the required cumulative savings (~21.3 TWh) at the end of 2031, Renowave and EET by early 2032.

## 7 TEEKAARTI, MILLEST 3-GA ON EESMÄRK SAAVUTATAV

- CEER2, RenoWave (rõhk hoonetel) ja EET (rõhk transpordil) parimad
- Investeerimisvajadus 13,3 mld, millest 5 mld riik
- Tööhõive, SKT ja maksulaekumise mõju suurim RenoWave-s (ehitus on töömahukas)
- Positiivne mõju energia maksumusele kui % kodumajapidamise netosissetulekust

Indicator	Time period	Unit	Baseline	EEO	VA	RenoWave	EET	CEER1	CEER2
GHG emission reduction, cumulative	2021-2030	MtCO2	1,26	3,36	3,34	3,92	4,26	3,79	4,63
Investment costs (total), cumulative	2021-2030	MEUR	1.588	8.660	9.048	16.231	11.262	9.619	13.306
<i>of which public support, cumulative</i>	2021-2030	MEUR	331	2.836	2.929	3.926	5.720	3.874	5.026
Cost savings, cumulative	2021-2030	MEUR	489	1.261	1.206	1.621	1.667	1.476	1.796
Impact on GDP	2021-2030	%	0,6%	2,9%	3,0%	5,2%	3,7%	3,2%	4,4%
Impact on disposable income	2021-2030	%	0,8%	1,4%	2,1%	0,8%	3,8%	2,5%	3,6%
Impact on employment (Average annual job creation)	2021-2030	Thousand employees	0,83	11,96	11,64	24,23	14,80	12,88	17,41
Impact on tax revenue	2021-2030	%	0,6%	1,5%	1,7%	2,8%	1,5%	1,5%	2,1%
Average energy cost as a share of household disposable income	2021-2030	%	7,98%	7,67%	7,67%	7,41%	7,56%	7,63%	7,46%
Average yearly GDP	2021-2030	MEUR	42.823	43.787	43.828	44.761	44.156	43.931	44.423
Average yearly Investment costs (total)	2021-2030	MEUR	159	866	905	1.623	1.126	962	1.331
Average yearly tax revenue	2021-2030	MEUR	16.042	16.186	16.205	16.389	16.183	16.183	16.274
<i>Average yearly public support</i>	2021-2030	MEUR	33	284	293	393	572	387	503

# Comparison of 7 pathways



## CEER2 vs baseline

Transport ~1/3 energy use & 37% GHG savings

Residential ~1/3 energy use & 24% GHG savings → too shallow renovation

Services ~1/6 energy use & ~10% GHG savings → too shallow renovation

Industry ~1/6 energy use & ~26% GHG savings → intense efforts



# Overall action plan for CEER2

Set of measures	Timeline	Responsibility	EE total investment 2024-2030 needed to fill 2030 targets	
<b>BUILDINGS</b>			<b>9 147 Meur</b>	
Existing measures	2021 - 2024	RAM	346 Meur (~30% public)	RRP
Property taxation	2030 ->	RAM	403 Meur (100% private)	
Other taxes (deduction, CO2)	2027 ->	RAM	2 338 Meur (100% private)	
Continue renovation grants for all buildings	2027 - 2035	KLIM	3 875 Meur (~30% public)	ETS & ETS2 revenues
Minimum Energy Performance Standards	2027 ->	KLIM	2 100 Meur (100% private)	
Obligation scheme for <u>non-residential</u>	2030 ->	KLIM	84 Meur (100% private)	

RAM = Finance Ministry; KLIM = Climate Ministry; MKM = Economic Affairs and Communication Ministry

# RENOWAVE SOOVITUSED VS TÄNANE OLUKORD

## **Eluhooned – riigi toetus läbi eelarveneutraalsete renoveerimistoetuste**

- RenoWave peab jätkusuutlikuks eelarveneutraalset renoveerimistoetust korterelamutele (30%), mis on väiksem tänastest toetusmääradest
- Väikeelamutes RenoWave piiraks renoveerimistoetused kitsastele sihtgruppidele ning põhilise meetmena rakendaks maksusoodustust/tulumaksu tagastust (nn teine tee väikeelamutele)
- Pakub välja kinnisvaramaksu vastavalt energiamärgise klassile toetuste rahastamiseks

## **Mitteeluhooned – riigi toetus ei ole vajalik**

- EPBD: MEPS energiatõhususe miinimumstandardite rakendamine (energiamärgise E ja F klassi miinimumnõue)
- EED: Avalike hoonete renoveerimiskohustus (3%/a)
- RenoWave: Kinnisvaramaks motivaatoriks vastavalt energiamärgise klassile

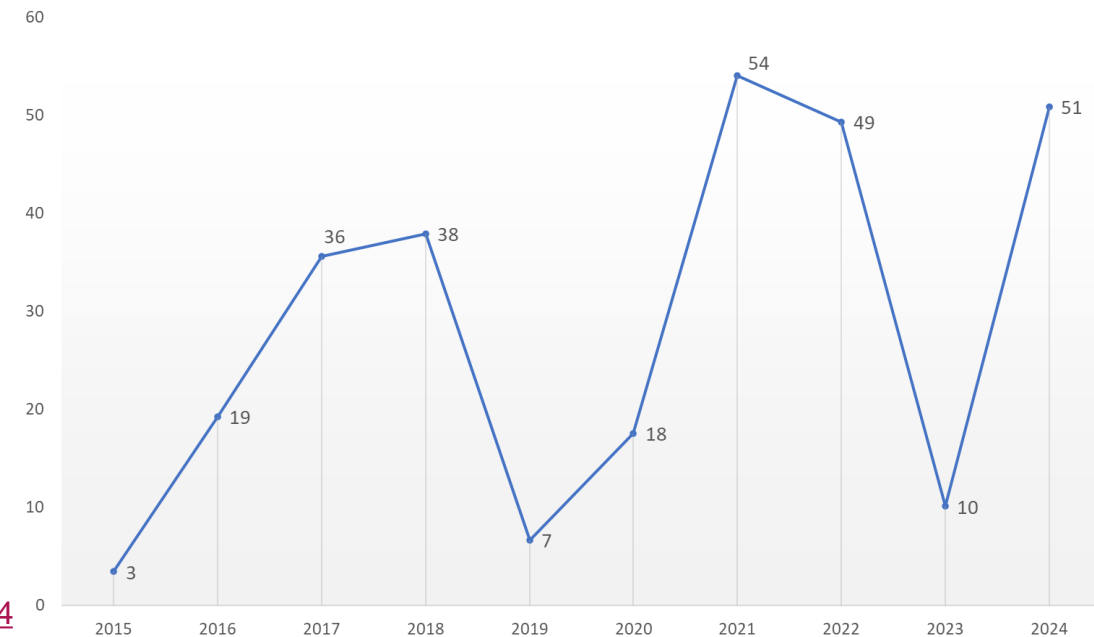
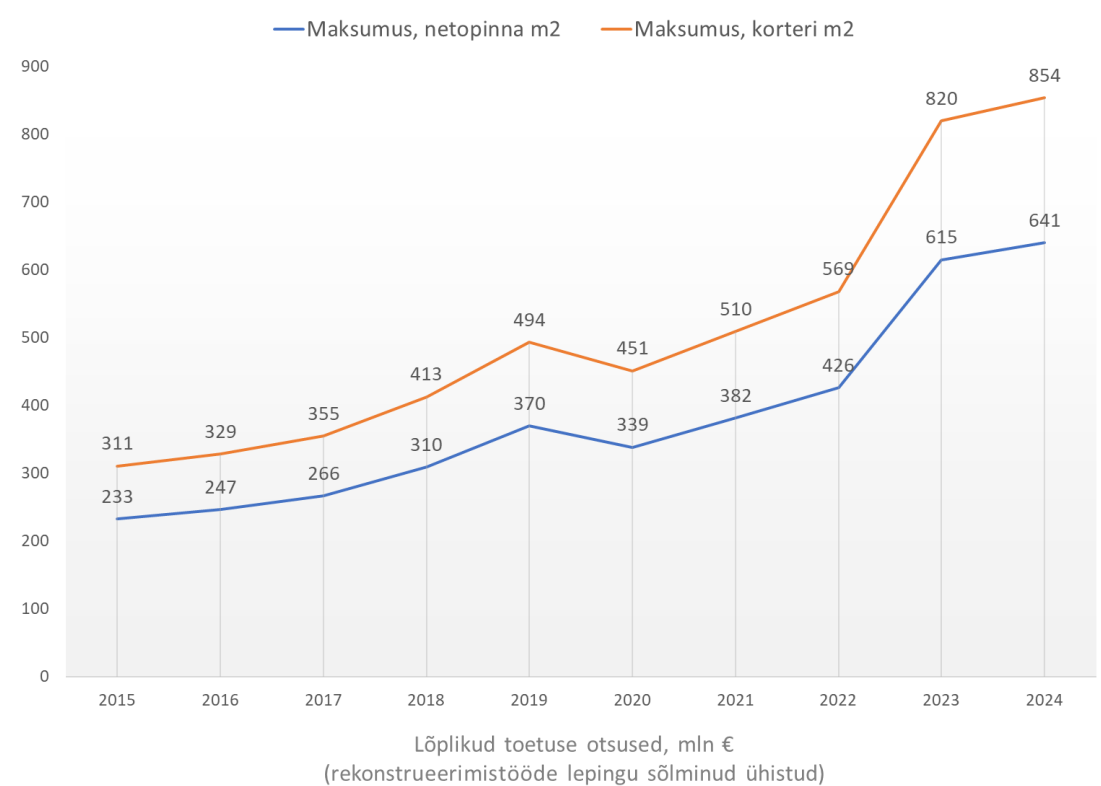
# RENOWAVE SOOVITUSED VS TÄNANE OLUKORD

- RenoWave: korterelamute toetus ca 150 miljonit eurot aastas
- KredEx-i 28.10.2024 taotlusvooru maht 170 miljonit eurot:
  - Taotluse esitamisest rekonstrueerimistööde lepingu sõlmimiseni läheb 1-2 aastat
  - Ebastabiilne rahastus tekitab järjekorrad – kõik on korraga samas protsessi etapis
- KredEx-i meetmed on loonud kõrge tehnilise standardi korterelamute renoveerimiseks – 30 a kestlikkus/tulevikukindlus
- Tervikrenoveerimise maksumus on välja kujunenud ja ei ole odav – omal käel renoveerimist piirab korteriühistute laenuvõimekus

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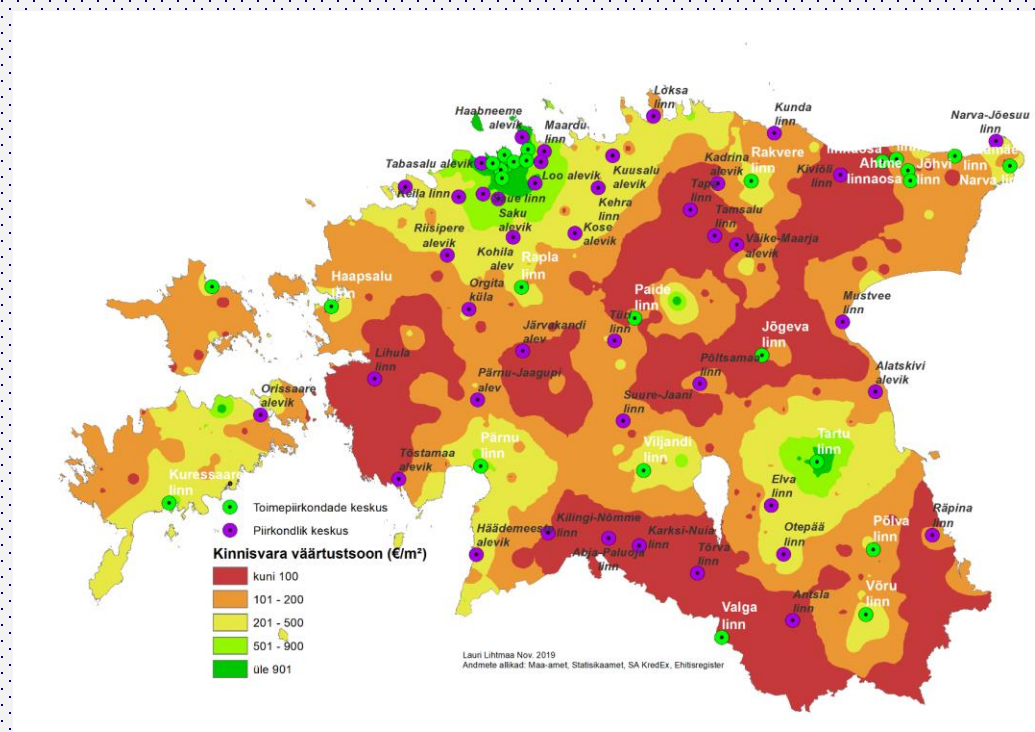
Kalle Kuusk, eis: <https://ekvy.ee/component/framework/event/download/504>



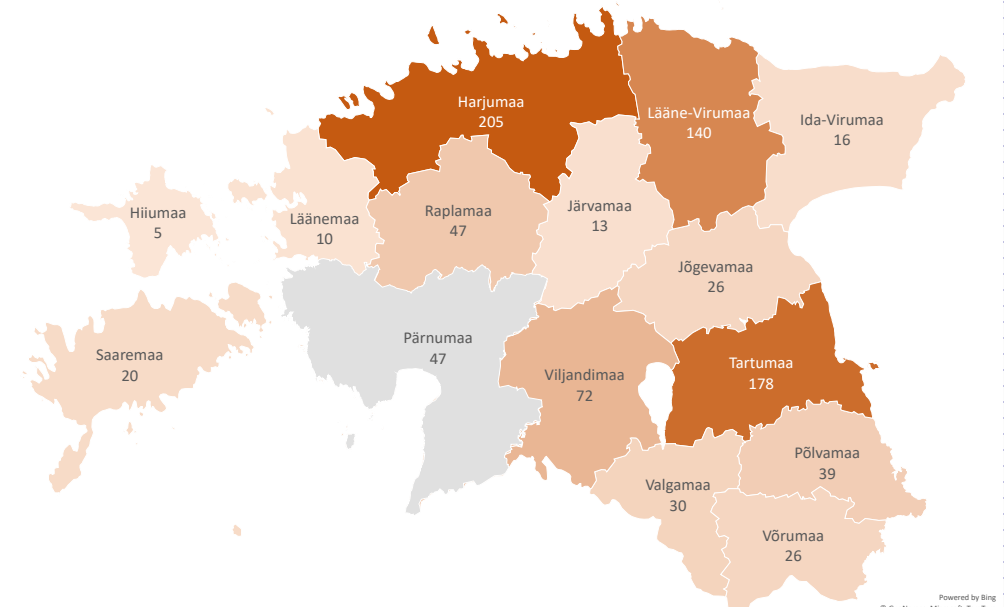
# Rekonstrueerimise toetusmeetmed

+ 2015 – 2023 (tänapäevase standardi loonud voorud)

- Toetus vastavalt energiamärgise klassile (C või D)
- Toetus sõltub piirkonnast (alates 2019)
- 875 korterelamut
- Toetus 305 mln €
- Koguinvesteering ≈700 mln €
- Keskmise toetuse osakaal 44%



Toetuse otsuse saanud korterelamud 2015 - 2023



# 28.10.2024 TAOTLUSVOORU REGIONAALNE JAOTUS



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Avatud voorud 24.11.2024 seisuga

1. Harju maakond, v.a Tallinn - 5 miljonit eurot
2. Tallinn - 10 miljonit eurot
3. Hiiu maakond - 6 miljonit eurot
4. Ida-Viru maakond - 10 miljonit eurot
5. Jõgeva maakond - 7,5 miljonit eurot
6. Järva maakond - 6,5 miljonit eurot
7. Lääne maakond - 5 miljonit eurot
8. Lääne-Viru maakond - 6,5 miljonit eurot
9. Põlva maakond - 6,5 miljonit eurot
10. Pärnu maakond - 6 miljonit eurot
11. Rapla maakond - 5,5 miljonit eurot
12. Saare maakond - 5,5 miljonit eurot
13. Tartu maakond, v.a Tartu linn - 5 miljonit eurot
14. Tartu linn asustusüksusena - 5 miljonit eurot
15. Valga maakond - 7 miljonit eurot
16. Viljandi maakond - 6,5 miljonit eurot
17. Võru maakond - 6,5 miljonit eurot
18. Tehaseline rekonstrueerimine - 20 miljonit eurot
19. Suurte korterelamute rekonstrueerimine - 20 miljonit eurot
20. Naabruskonnapõhine rekonstrueerimine - 10 miljonit eurot
21. Muinsus- ja miljööväärtuslikud - 10 miljonit eurot

# KOKKUVÕTE

- Hoonete renoveerimisel on suur roll riiklikus energiasäästukohustuses – suurim sektor energia lõpptarbimises
- Korteralamute tervikrenoveerimise renoveerimistoetusele ei ole leidunud alternatiivi – suure mõjuga ja lihtsasti teostatav
- 150 mln eur/a toetust (ca 30%) RenoWave hinnangul pikas perspektiivis jätkusuutlik – lisanduv ja eelarvенеutraalne meede + positiivne mõju tööhõivele, SKT-le ja maksulaekumisele
- Väikeelamutele otstarbekam teine tee – stimuleerimine maksusoodustustega, nt tulumaksu tagastus renoveerimistöödelt toetuse asemel
- Kinnisvaramaks vastavalt energiamärgise klassile – loogiline toetuste katteallikas riigieelarve seisukohalt
- Ärikinnisvara ei vaja riigi toetust – EPBD MEPS loob motivatsiooni energiatõhususe parandamiseks, mida saaks võimendada kinnisvaramaksuga
- Renoveerimise mahud peavad saama paika riiklikus renoveerimiskavas (KLIM)