

# Maximizing Benefits and Opportunities: Lessons from the Climate Neutrality Journey: the Estonian Example

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# This is a story in 3 parts

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Addressing the anxieties and building confidence

Assessing pathways and making choices

Following through and moving forwards

# Creating confidence in climate neutrality

# 2019: a lot of anxieties amongst politicians, entrepreneurs, citizens

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- Will the public get behind the decision?
- What about energy security and inflation?
- What does it mean for the competitiveness for our economy?
- What will happen to North-East Estonia (i.e. oil shale region)?
- Is it actually doable or an utopia?
- Who's gonna pay for it?
- Do we all have to become vegans and close agriculture?

# Government procured a study to address these concerns

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## Reaching climate neutrality in Estonia

 [SEI reports](#)  [Climate](#)  [Energy](#)  
 1 October 2019  [Estonia](#)  [EU](#)  
 [Europe](#)  [Northern Europe](#)  [Baltic](#)

Source: <https://www.sei.org/wp-content/uploads/2019/10/kliimaambitsiooni-analüüs.pdf>

# Key expectations for the study

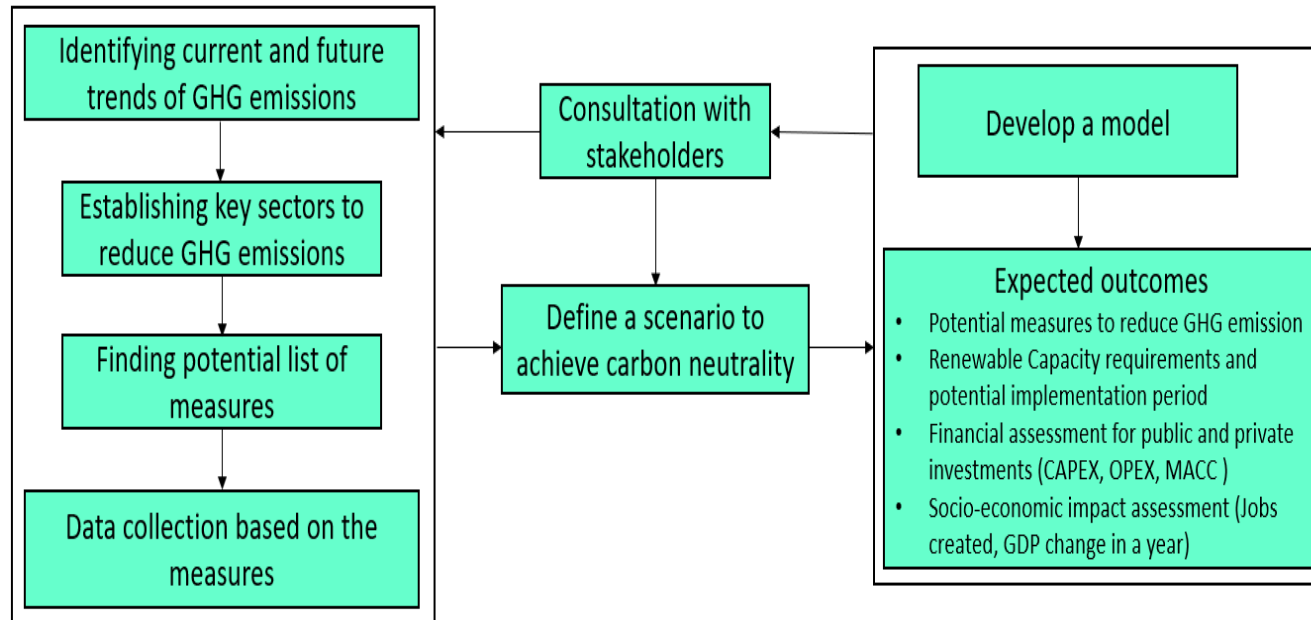
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- Is going to net-zero emissions in Estonia by 2050 doable?
- What additional measures, beyond measures and activities already planned/implemented by Estonia, should be taken in order to achieve the increased total greenhouse gas emissions reduction ambition by 2050?
- What will be the costs and impacts associated with this transition?

# What we delivered?

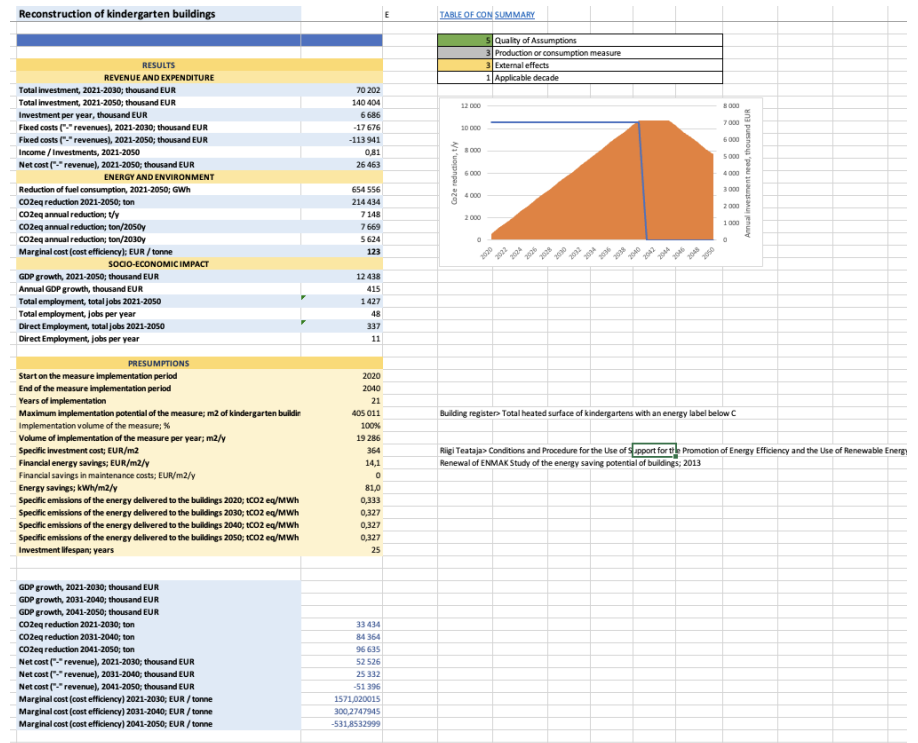
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We built a easy-to-use toolbox and a narrative



# For 60 measures in 6 sectors, we estimated:

- max scaling up potential and optimum period of implementation
- investments required both public and private sector
- impact on GHG emissions
- impact on jobs, and GDP





# Which created basis for comparison between possible actions in various sectors

	Reduction of CO2 emissions 2021-2050 [tCO2ekv/a]	Marginal cost of CO2 emissions reduction 2021-2050 [€/tCO2ekv]	Investments requirement 2021-2050 [M €]	Investments by public sector 2021-2030 [M €/a]	Creation of jobs 2021-2050 [tk/a]	Change in GDP 2021-2050 [M €/a]
Increasing the share of biomethane in transport sector	110 307	5	233	0,8	759	20,5
Renovation of the district heating system	11 077	-123	120	6,0	106	2,7
Renovating district heating boilers and changing the fuel	34 835	-75	140	0,0	194	5,4
Installing heat pumps	1 768	1 947	96	0,0	35	1,2
Replacing district heating with local heating options	2 382	227	16	0,5	8	0,2
Alternative fuels in agricultural machinery	3 586	525	0	0,0	-47	-4,7
District cooling	7 537	-478	36	0,2	-7	-2,7
LED street lighting	3 921	750	150	0,5	-7	-4,3
Production of hydrogen (replacing 10% of natural gas)	18 194	21	11	0,0	2	-0,3
Reducing the carbon intensiveness of energy used in cement industry	17 453	38	0	0,0	2	0,3
Reducing the carbon intensiveness of energy used in lime industry	77	105	0	0,0	0	0,0
<b>TOTAL</b>	<b>211 136</b>	<b>-</b>	<b>803</b>	<b>8</b>	<b>1047</b>	<b>18</b>
<b>Share in all analysed measures</b>	<b>5%</b>	<b>-</b>	<b>5%</b>	<b>4%</b>	<b>34%</b>	<b>-7%</b>

# And showed what the whole story would look like



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What messages emerged from our  
analysis?

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Is climate neutrality doable in  
Estonia by 2050?

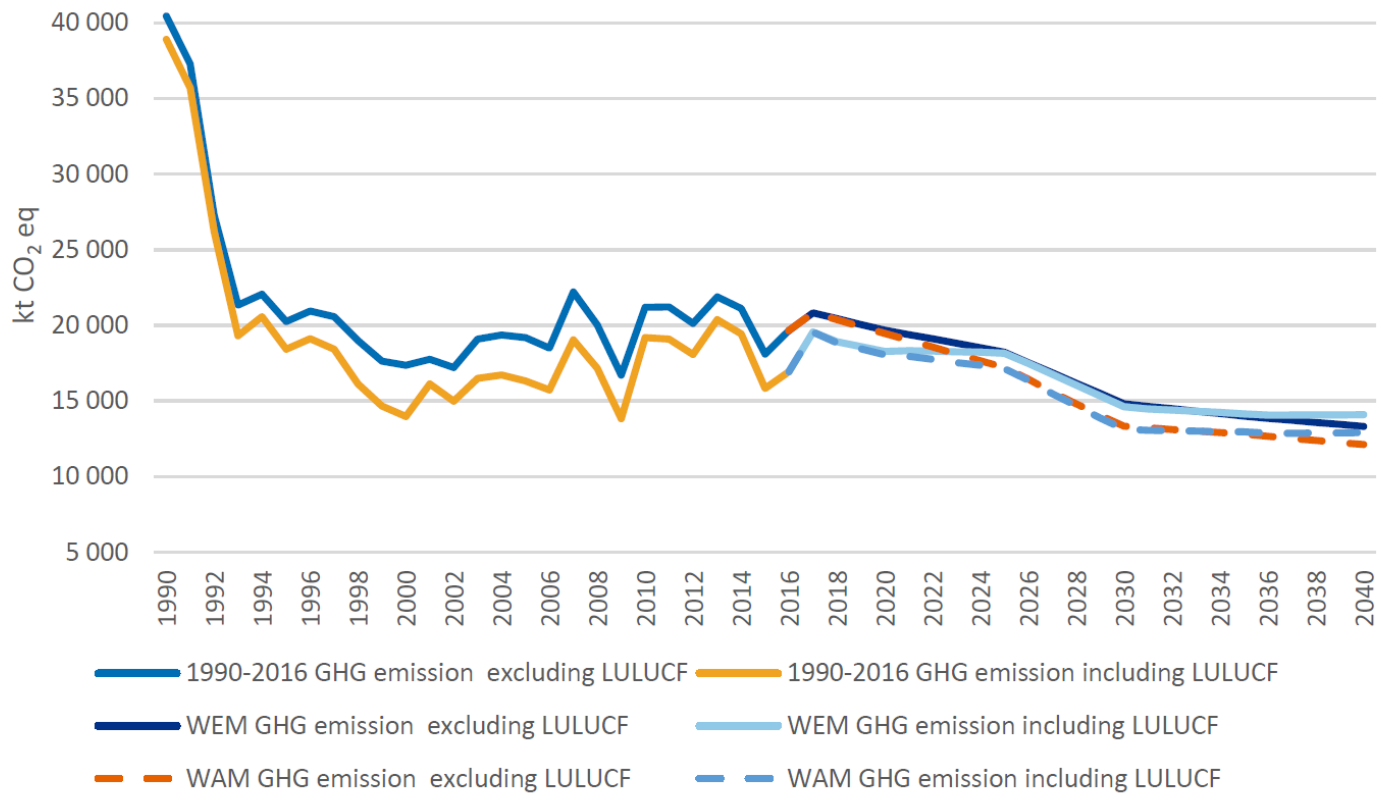
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Yes.

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Are we on track?

# No.



**Figure 4.9.** Total GHG projections until 2040, kt CO<sub>2</sub> eq

Source: „Report pursuant to Articles 13 and 14 of Regulation (EU) 525/2013“ (2019)

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What do we have to do?



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1. Reduce emissions by 2050 to ca 2,2 Mt CO2 eqv
  2. Ensure CO2 removal in LULUCF sector by ca 4 Mt CO2 eqv

# We need to act fast, because:

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- It will increase the chances of actually meeting the goal
- Will bring greater economic savings
- Can create new focus and long-term competitive advantage



# 3 main focuses 2020-2030

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1. Energy efficiency in all sectors
2. Energy carriers/supply towards climate neutral
3. Carbon removal in LULUCF

Kood	Meede	Maht	2020	2025	2030	2035	2040	2045	2050
Hoon 01	Hoolekandevõtted	100%	█	█	█	█	█	█	█
Hoon 02	Lasteaiohooned	100%	█	█	█	█	█	█	█
Hoon 03	Väikeelamud	50%	█	█	█	█	█	█	█
Hoon 04	Korterialamud	50%	█	█	█	█	█	█	█
Hoon 05	Koolimajad	100%	█	█	█	█	█	█	█
Hoon 06	Büroohooned	100%	█	█	█	█	█	█	█
Hoon 07	Kaitseministeerium	100%	█	█	█	█	█	█	█
Hoon 08	Kaubandus-teenindushooned	100%	█	█	█	█	█	█	█
Hoon 09	Tööstushooned	100%	█	█	█	█	█	█	█
En 01	Päikesenergia	100%	█	█	█	█	█	█	█
En 02	Menetulepargid	100%	█	█	█	█	█	█	█
En 03	Maa- ja metsamajandus	100%	█	█	█	█	█	█	█
En 04	Hüdropumpjaamad	100%	█	█	█	█	█	█	█
En 05	Rohugaas transportis	100%	█	█	█	█	█	█	█
En 06	Kaugkütteruutik	100%	█	█	█	█	█	█	█
En 07	Kaugkütetadlad	100%	█	█	█	█	█	█	█
En 08	Soojuspumbad	100%	█	█	█	█	█	█	█
En 09	Soe tarbeveesi kaugküttest	0%	█	█	█	█	█	█	█
En 10	Lokaalsed kütetahendused	100%	█	█	█	█	█	█	█
En 11	Moodureaktorid	100%	█	█	█	█	█	█	█
En 12	Põllumajandusmasinate alternatiivkütus	50%	█	█	█	█	█	█	█
En 13	Kaugjahutus	100%	█	█	█	█	█	█	█
En 14	LED tänavavalgustus	100%	█	█	█	█	█	█	█
En 15	Veinikutootmine	10%	█	█	█	█	█	█	█
En 16	Põlevikivi tootmisahju suurendamine	0%	█	█	█	█	█	█	█
En 17	Eelnevalmistatavate rajamine	0%	█	█	█	█	█	█	█
En 18	Taemenditööd	100%	█	█	█	█	█	█	█
En 19	Lubjätööd	100%	█	█	█	█	█	█	█
CC 01	Tööstusettevõtete jäägaasid (CCU)	0%	█	█	█	█	█	█	█
Ind 01	Fluoritud KHG-de ja mootorõhude kliimaseadmed	100%	█	█	█	█	█	█	█
LULUCF 01	Metsastamine	100%	█	█	█	█	█	█	█
LULUCF 02	Turva- ja looduslikud rohumaa	100%	█	█	█	█	█	█	█
Trans 01	Surveautod	100%	█	█	█	█	█	█	█
Trans 02	Elektriautod	100%	█	█	█	█	█	█	█
Trans 03	Raudtee elektrifitseerimine	100%	█	█	█	█	█	█	█
Trans 04	Kauba- ja reisijate veo vahetamine maanteelt raudteele	100%	█	█	█	█	█	█	█
Trans 05	Elroni elektriringide soetamine	100%	█	█	█	█	█	█	█
Trans 06	Talinnas trammiliikluse arendamine	100%	█	█	█	█	█	█	█
Trans 07	Rail Baltica kohalikud peatused	100%	█	█	█	█	█	█	█
Trans 08	Ühistranspordiradade arendamine	100%	█	█	█	█	█	█	█
Trans 09	Rail Baltic	100%	█	█	█	█	█	█	█
Trans 10	Elektribussid	100%	█	█	█	█	█	█	█
Trans 11	Surveautobusside kasutuselevõtt	100%	█	█	█	█	█	█	█
Trans 12	Veinikuühendused	100%	█	█	█	█	█	█	█
Trans 13	Rattataristu linnades (koos kergliiklustunnelitega)	100%	█	█	█	█	█	█	█
Trans 14	Tartu trammiliikluse arendamine	100%	█	█	█	█	█	█	█
Trans 15	Praamiliikluse elektrifitseerimine	100%	█	█	█	█	█	█	█
Agri 01	Sõnnikukäitluse parandamine	100%	█	█	█	█	█	█	█
Agri 02	Happeliste muldade neutraliseerimine	100%	█	█	█	█	█	█	█
Agri 03	Täppinõuetamise seadmete ostutoetus	100%	█	█	█	█	█	█	█
Agri 04	Kasvuhooned ja köögiviljade lahooned	100%	█	█	█	█	█	█	█
Agri 05	Auditid suuremates põllumajandusettevõtetes	100%	█	█	█	█	█	█	█
Agri 06	Alternatiivkütusel põllumajandusmasinad	100%	█	█	█	█	█	█	█
Agri 07	Rohumaa karjatamise osakaalu kasv	100%	█	█	█	█	█	█	█
Agri 08	Sõda kvaliteedi parandamine põllumajanduses	100%	█	█	█	█	█	█	█
Agri 09	Talvine taimekatte	100%	█	█	█	█	█	█	█
Agri 10	Otsakülv	20%	█	█	█	█	█	█	█

**Climate neutrality is hard:**  
we needed to implement  
85% out of 60 measures in  
energy, buildings,  
transport, agriculture,  
industry, LULUCF sectors  
to reach climate neutrality  
by 2050 – all sectors need  
to contribute

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Does reaching climate neutrality cost  
exactly 17,3 billion euros?

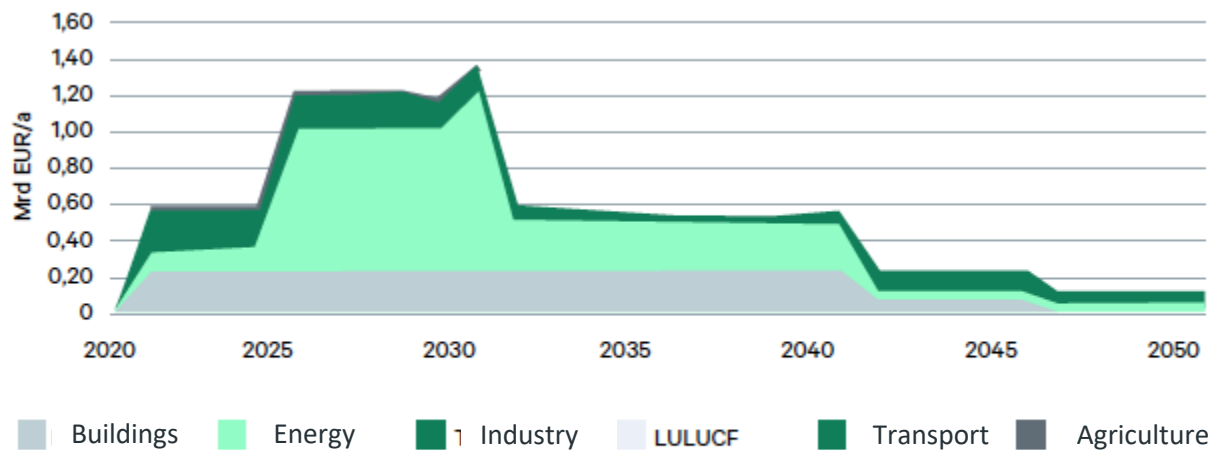
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**No.**

It will depend on policy choices

# Energy, transport and buildings dominate the investment needs

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**Joonis 7. Investeeringud aastate ja sektorite kaupa, miljardit eurot (aasta 2020 investeeringuteks arvestatud 61,8 miljoni eurot).**

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Will all this be additional cost to the  
society?

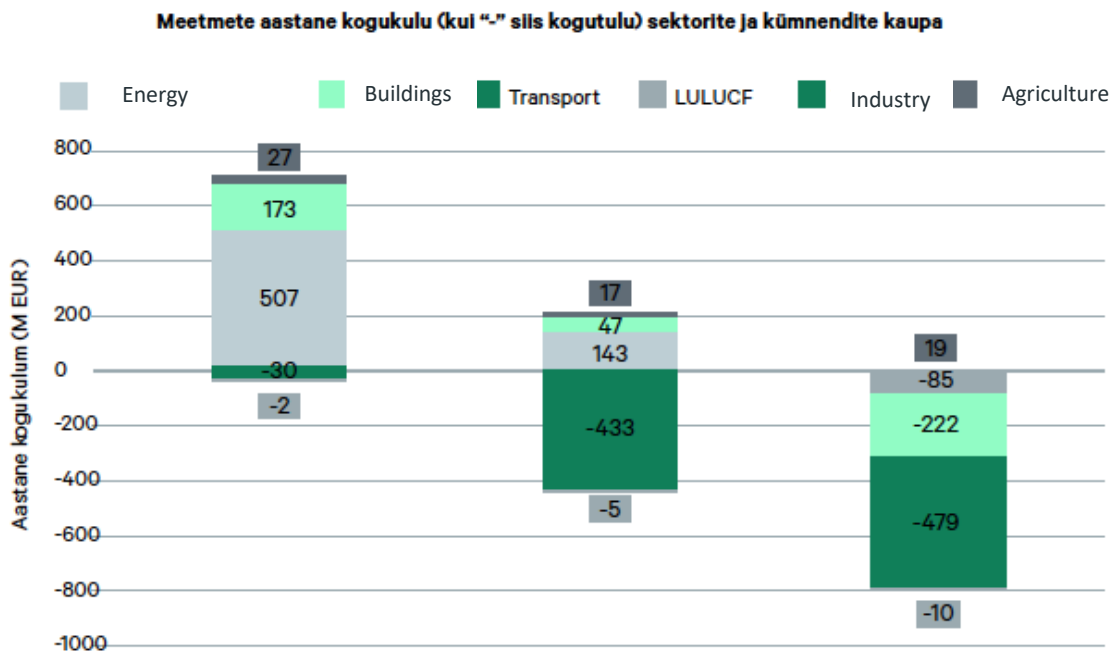


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**No.**

- a) we invest into these areas anyway, we just need to invest more and greener
- b) altogether, these measures would bring economic savings

# Early investments will start to generate economic savings in the last decades



Joonis 8. Meetmete aastane kogukulu ( kui "-" siis kogutulu) sektorite ja kümnendite kaupa.

# The required investments are affordable

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SECTOR	2021–2030		2031–2040		2041–2050	
	Public sector	Private sector	Public sector	Private sector	Public sector	Private sector
Energy	563	4856	58	2574	60	515
Buildings	698	1727	698	1727	138	300
Transport	779	1005	510	39	447	330
Agriculture	88,5	44	-	-	0	-
LULCF	51,5	-	51,5	-	51,5	-
<b>TOTAL</b>	<b>9812 mln €</b>		<b>5658 mln €</b>		<b>1842 mln €</b>	

This means on **average 4% of the GDP in the next decade, 2% of the GDP in the second decade** and less than 1% in the last decade.

# Majority of the investments will be made by the private sector

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	<b>Avallk sektor (miljonit eurot)</b>	<b>Erasektor (miljonit eurot)</b>
Hooned	1 534	3 754
Energeetika	681	7 945
Transport	1 736	1 374
Tööstus (protsessid)	-	4
Põllumajandus	88	44
LULUCF	155	-
KOKKU	4 194	13 121
osakaal (%)	24%	76%

**Tabel 5. Investeeringute indikatiivne jaotumine avaliku ja erasektori vahel.**

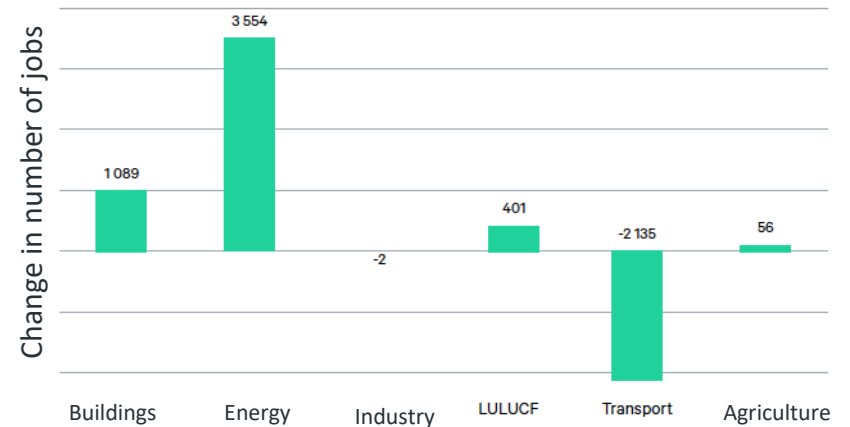
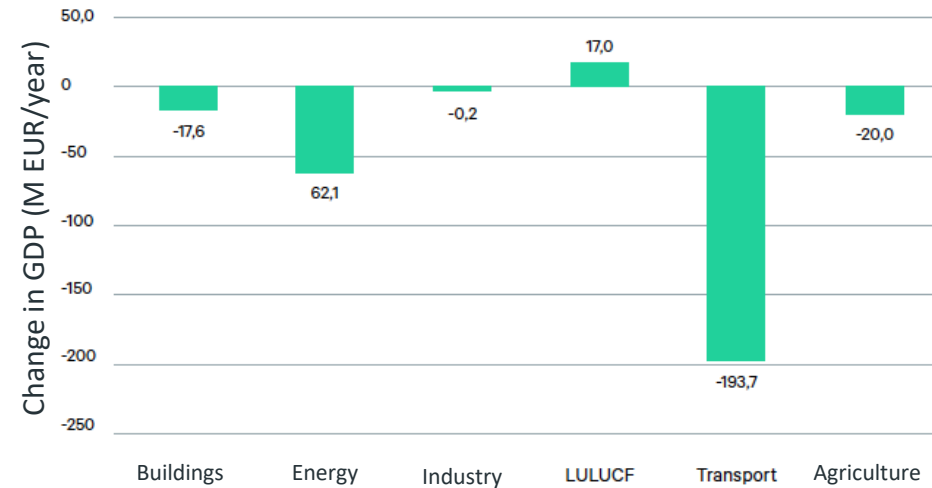
# These investments will not “just happen”

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- Need to remove administrative, regulatory barriers
- Create stimulating investments environment
- Ensure the skill and competence base

# How does climate neutrality impact GDP and jobs?

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# The government supports the achievement of European climate neutrality by 2050

03.10.2019 | 17:19

1 IMAGE

The government supports the achievement of European climate neutrality by 2050  
Photo:

## News

SHARE



Stenbock House, 3 October 2019 – At today's session, the government approved positions on Europe's long-term strategic vision 'A Clean Planet for All', whereby Estonia in principle supports setting the goal of climate neutrality by 2050 for the entire European Union.

According to Prime Minister Jüri Ratas, investing in combating climate change is investing in our future, wealth, and wisdom. 'I am convinced that every euro we invest in combating climate change and new technologies will give us multiple returns, both in wealth and in quality of life. This is supported by the SEI Tallinn analysis released earlier this week. Thanks to the analysis, we have a road map on how to invest wisely in combating climate change,' the prime minister said. The prime minister also considered it important to raise awareness, so that people would make environmentally sound decisions in their daily consumption, transport, and nutrition choices.

**Helping to make strategic  
choices in energy policy**



# To move forward with climate neutrality policies, government...

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- Launched new energy sector development roadmap process
- Initiated several key policy research studies
- Created high level green transition expert group to directly advise prime minister and cabinet members

# 3 major studies – 1) electricity 2) heating and cooling 3) gas sector



Transitioning to a climate-neutral electricity generation

Deliverable 8 Report:  
Final report



## Transitioning to a carbon neutral heating and cooling in Estonia by 2050

Summary report

23<sup>rd</sup> November 2022

Written by:

Tayyab Ehsan Butt – SEI  
Adil Aslam – SEI  
Gowtham Muthukumaran – SEI  
Javad Keypour – SEI  
Lauri Tammiste – SEI  
Frank Gerard – Trinomics  
Nora Cheikh – Trinomics  
Ülo Kask – Pilvero  
Olavi Grünvald – Finantsakadeemia

In Association with:

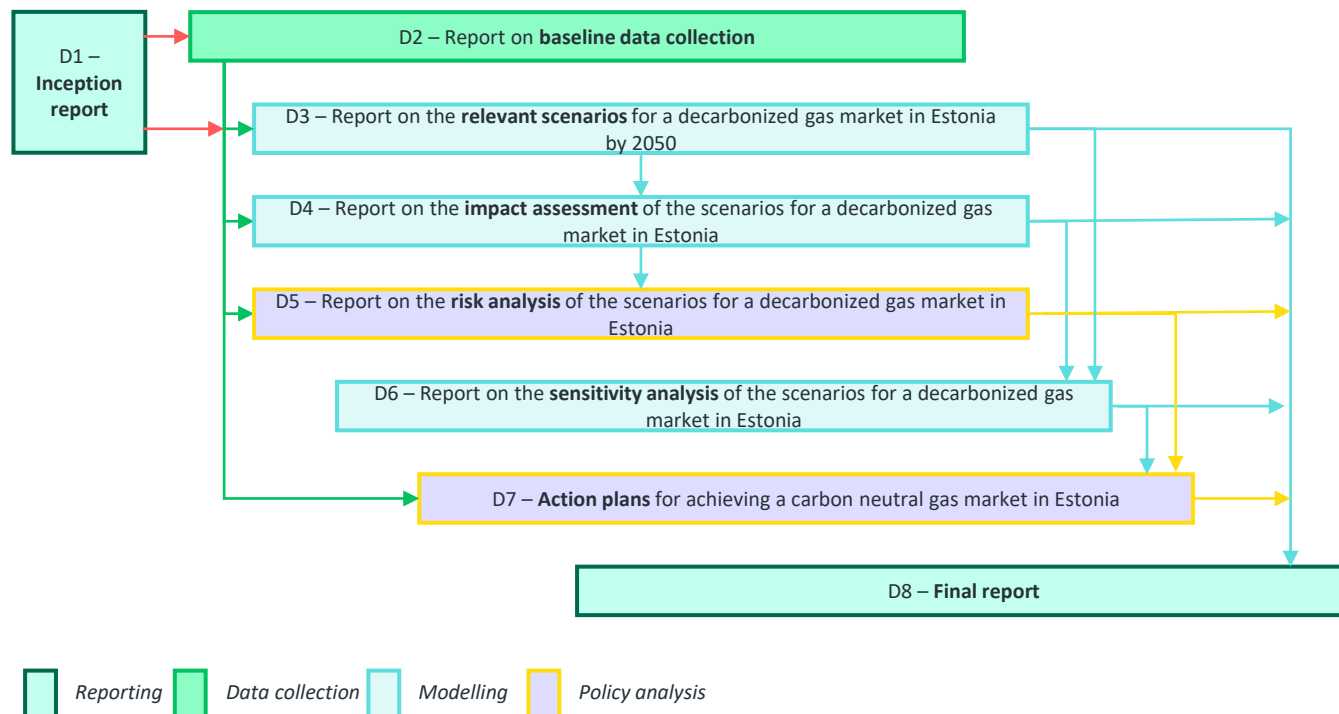


## Decarbonisation of regional gas market



<http://basrec.net/projects/development-of-the-eastern-baltic-regional-gas-market/>

# From pathway modelling – to economic impacts – to policy action plan

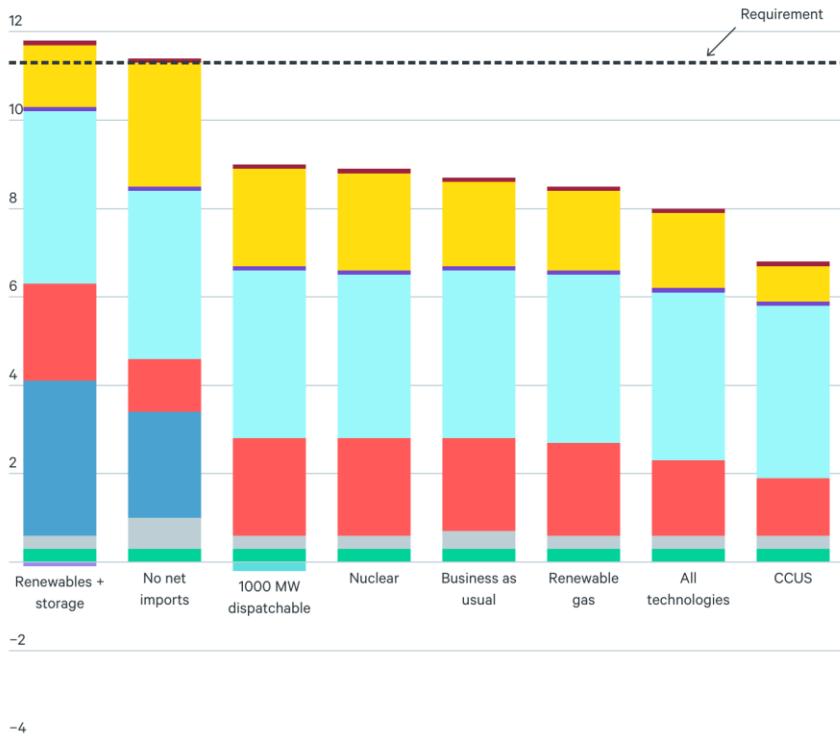


# We can ensure security of supply with clean technologies

## Generation 2030

### Generated TWh

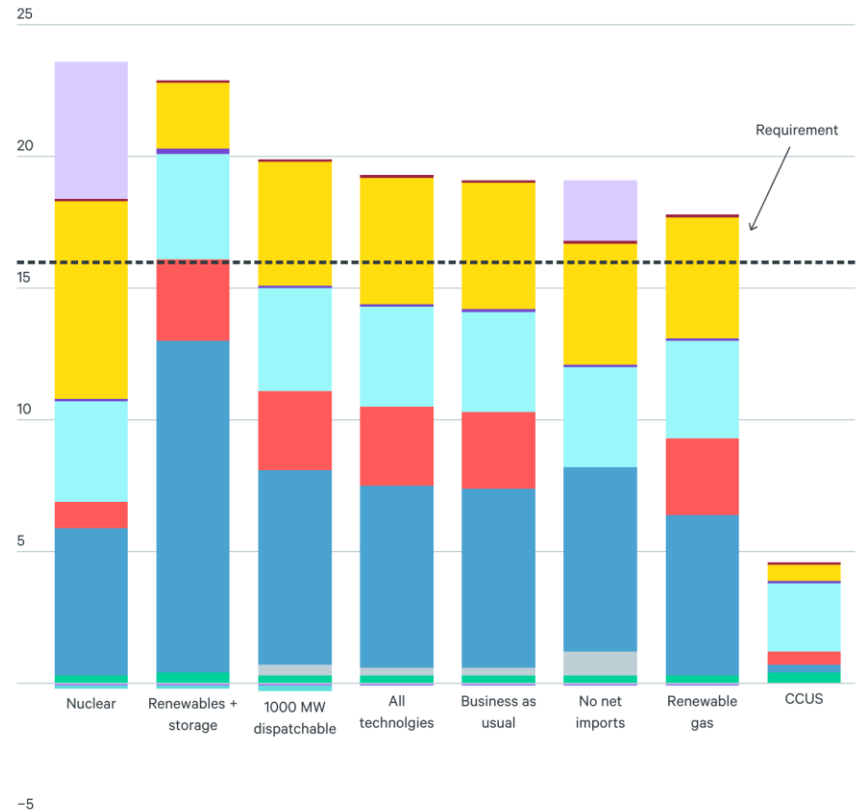
- Batteries
- Biomass
- Fossil gas
- Hydro
- Offshore wind
- Biomass in oil shale plant
- Onshore wind
- Other renewables
- Solar
- Waste
- DSM
- Nuclear
- Pumped hydro



## Generation 2050

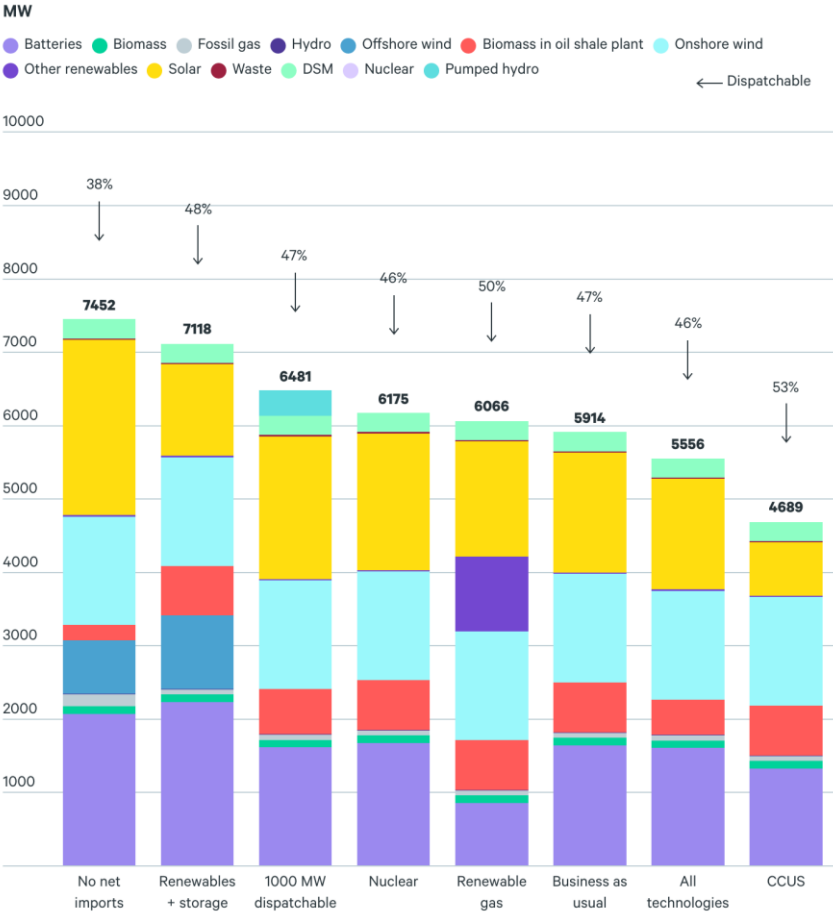
### Generated TWh

- Batteries
- Biomass
- Fossil gas
- Hydro
- Offshore wind
- Biomass in oil shale plant
- Onshore wind
- Other renewables
- Solar
- Waste
- DSM
- Nuclear
- Pumped hydro

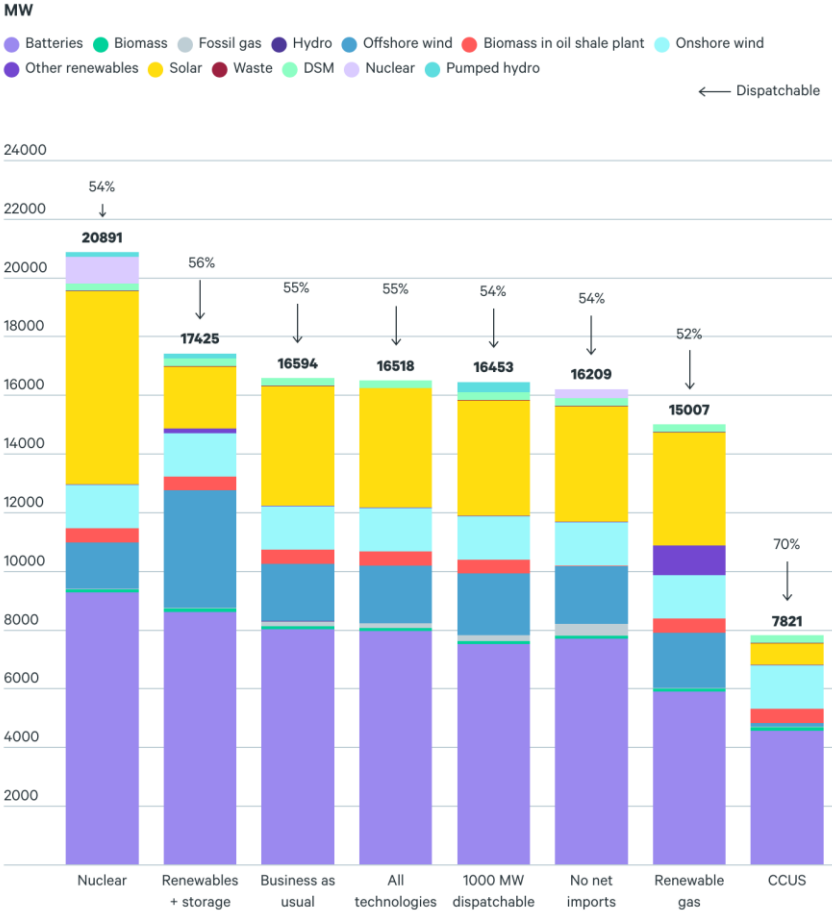


# Wind, solar and batteries were economically the most competitive technologies

## Capacity 2030



## Capacity 2050



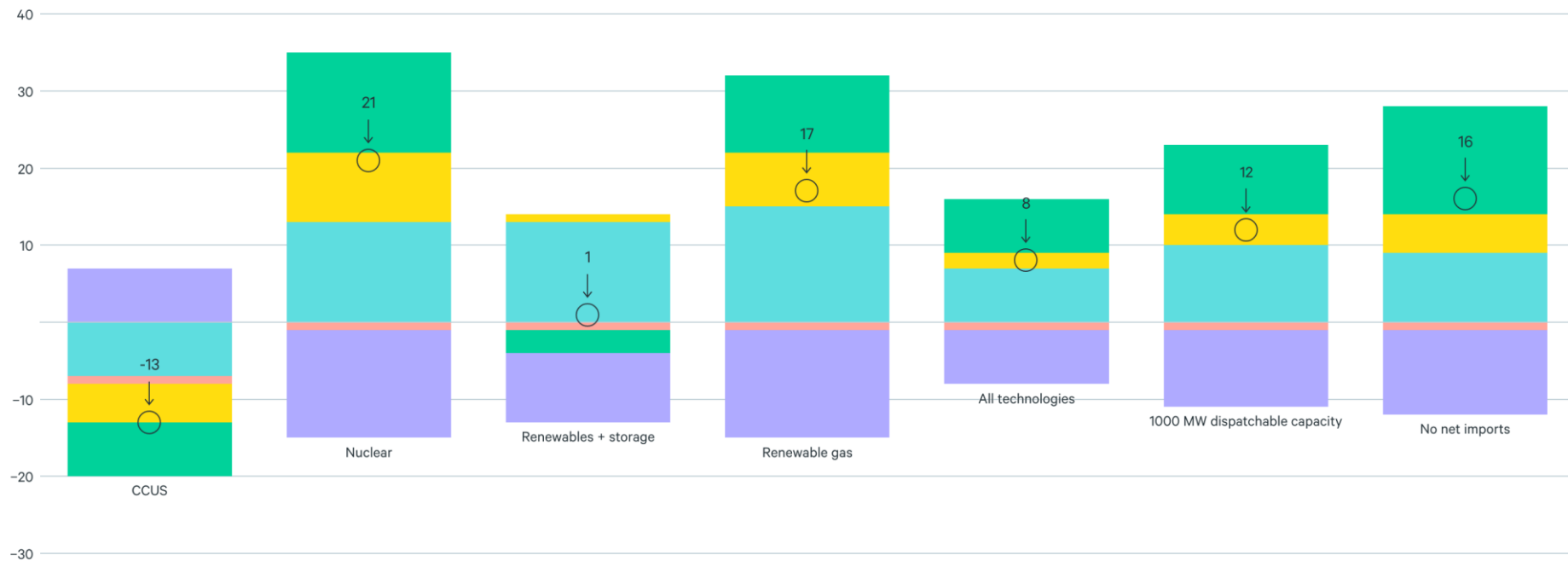
# Out of all the scenarios, only oil shale pathway had negative economic impact

Macroeconomic adjustment of the different pathways (demand & price effects), cumulative GDP (2025-2050) based on S1 base case results

billions of euros difference compared to the business as usual pathway

Investment Public consumption Private consumption Export Import

○ ← GDP



# Green policy expert group delivered to government:

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- Memo-style report to decision-makers
- Building on existing research and strategies
- Our role is to be the spotlight and focus on systematic, inter-connected problems
- Priority recommendations for governance and 9 topical areas
- Create sense of urgency and mobilize action in 1-2 years to speed up transition



<https://www.valitsus.ee/media/4870/download>

# Commitment from cabinet and cooperation was vital

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- One on one with cabinet members
- Without press, without extra media activities
- Taking time – 2 hour sessions, covering limited number of topics





**Following  
through and  
pushing forward**

# New coalition government has in 2023

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- Approved holistic green policy action plan that covers ca 80% of high-level expert group recommendations
- Created Climate Ministry and brought all key topics under one umbrella
- Simplified planning procedures for wind parks
- Increased investments grids
- Increased investments into Energy efficiency
- Carried out biggest auction for renewable electricity
- Gearing up green agenda actions in across all sectors

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Modelling can give you tools and a way forward,  
but it will not replace political courage and  
commitment!

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Thank you for your  
attention!