



PROSESS21

- an industrial strategy for the Norwegian process industry

Lars Petter Maltby, Director Prosess21

October 25th. 2022

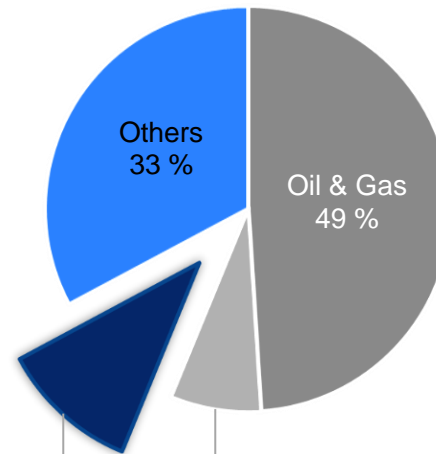
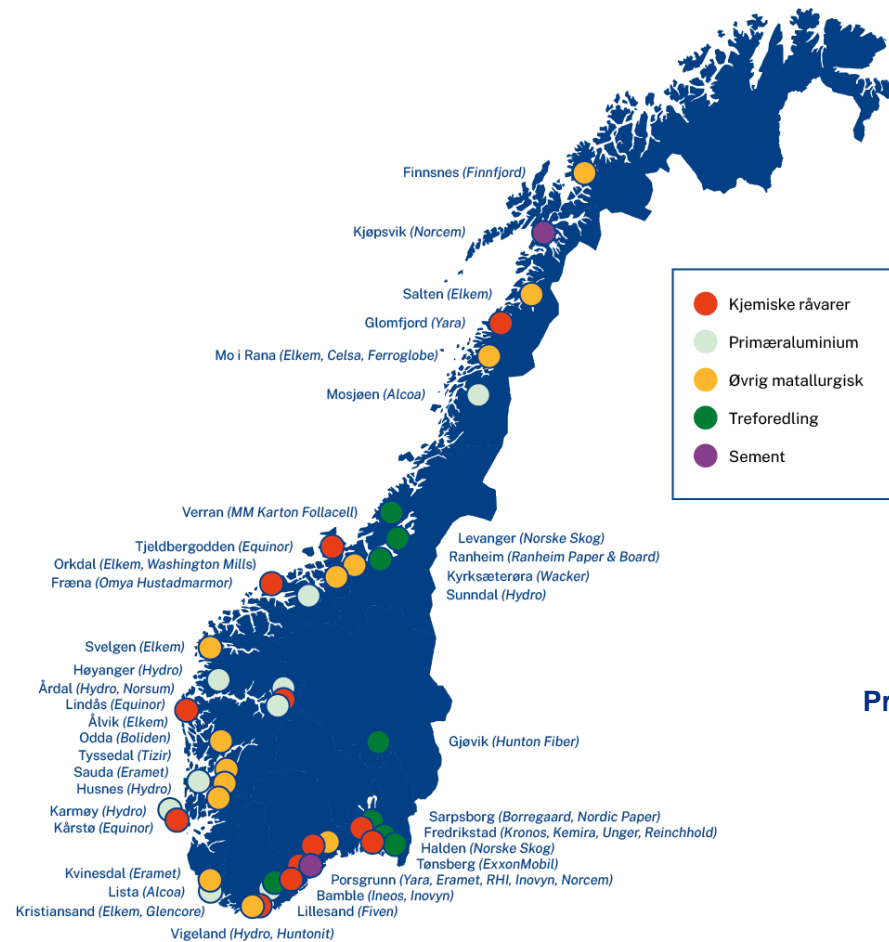
The process industry

An important export oriented sector for Norway

Non-urban employment

Export oriented

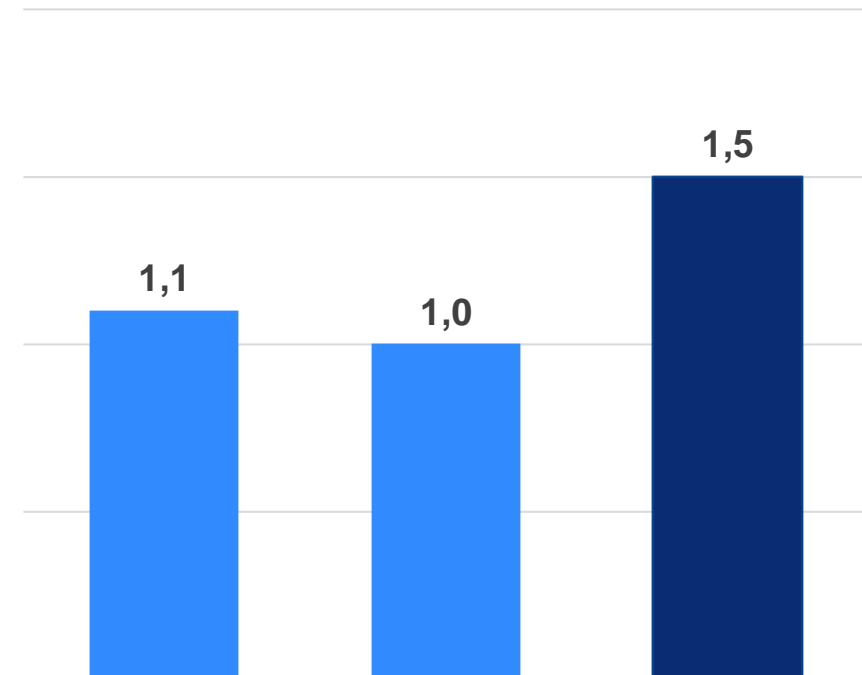
Value creation



Process industry
11 %

Rafineries
7 %

Exports of physical goods
(2019)



Business
in general

Business
in general
w/o oil/gas

Process
industry

Value creation per people
employed in the process industry
and Norwegian business in
general

The green transition requires access to raw materials



New clean energy demand will transform several global metals markets

Fact

All based on metals:
Batteries, Electric Cars, Solar Panels, Wind Turbines, Hydrogen

Question

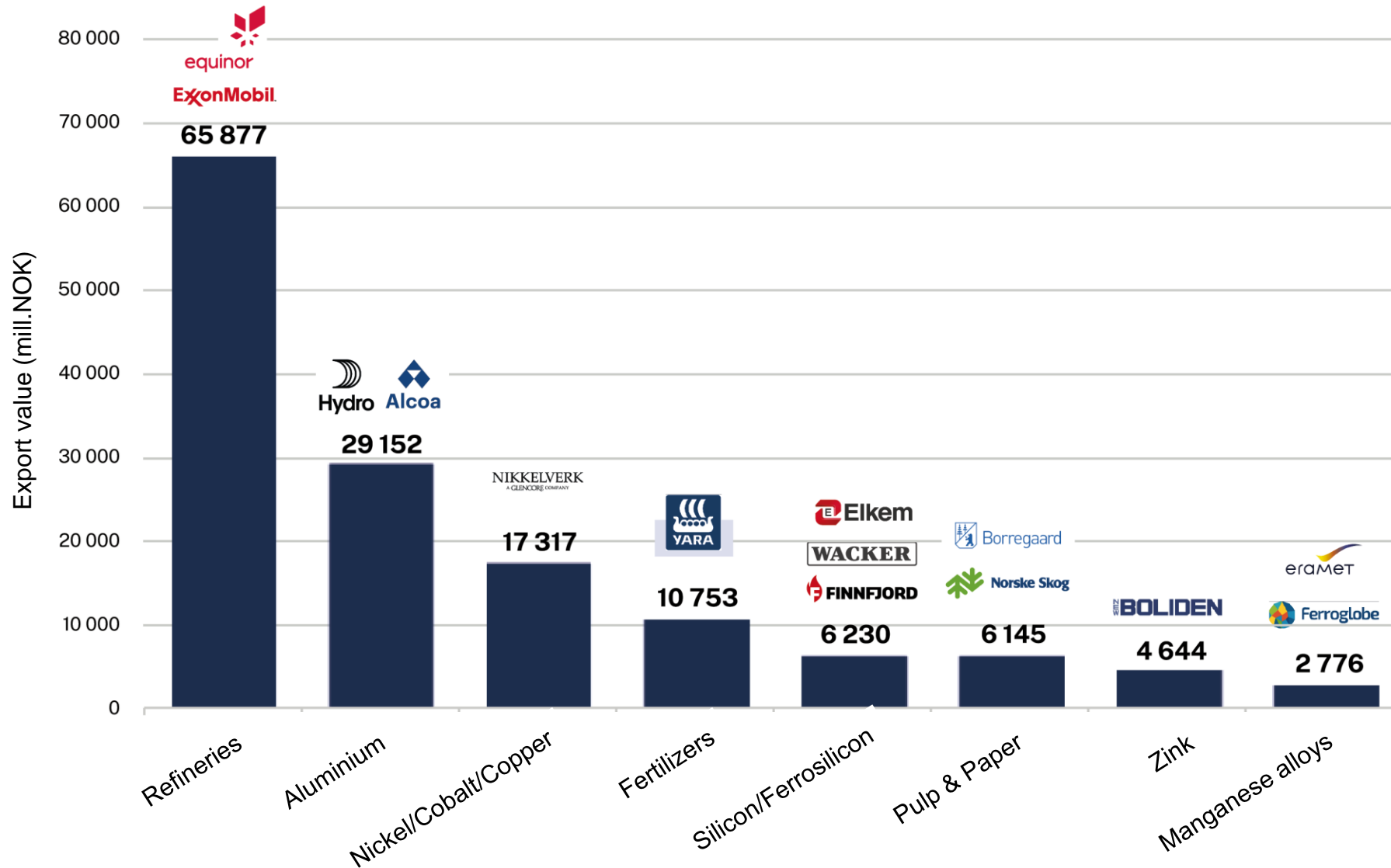
How will global demand for metals shift?

% metal required in 2050 for clean energy technologies vs. 2020 overall use (SDS ambitious climate scenario).

Li Lithium	2109%	Si Silicon	62%	Aluminium Copper Zinc Silicon
Dy Dysprosium	433%	Tb Terbium	62%	
Co Cobalt	403%	Cu Copper	51%	
Te Tellurium	277%	Al Aluminium	43%	
Sc Scandium	204%	Sn Tin	28%	Lithium Nickel Cobalt
Ni Nickel	168%	Ge Germanium	24%	
Pr Praseodymium	110%	Mo Molybdenum	22%	Dysprosium Neodymium Praseodymium
Ga Gallium	77%	Pb Lead	22%	
Nd Neodymium	66%	In Indium	17%	
Pt Platinum	64%	Zn Zinc	14%	
Ir Iridium	63%	Ag Silver	10%	

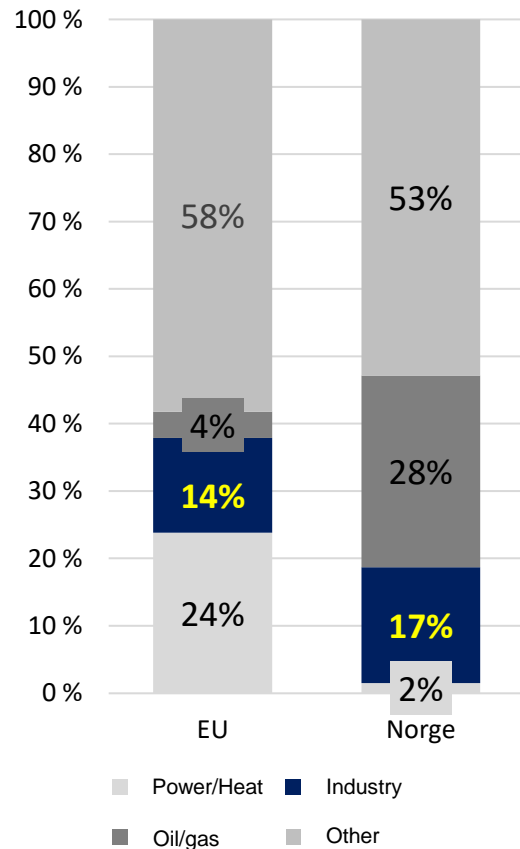
Production in Norway

Exports by type (process industry)

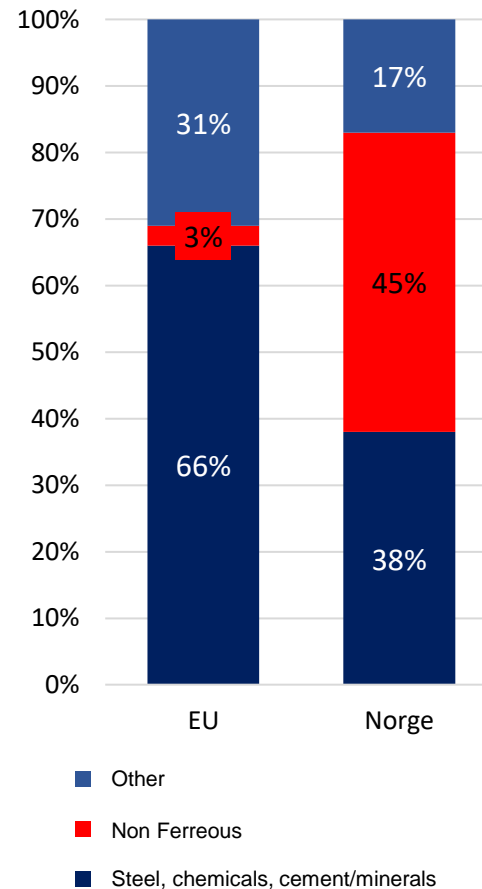


Climate gas emissions

Total emissions EU / Norway



Industrial emission



Norway is Europe's largest producer of non-ferrous alloys

National emissions

- 41% reduction of climate gasses since 1990
- 45% of industrial emissions comes from non-ferreous processes
- All major emissions is included in European Emissions Trading scheme (EU ETS)

National strategy for the Norwegian process industry

The main task for Process 21 is to provide strategic advice and recommendations on how Norwegian process industry can move towards minimal emissions in 2050 and at the same time facilitate that companies in the industry have sustainable growth during this period.

Expert Group Project Managers



Entrepreneurship

Product and services development

Biobased Process industry

Circular economy

New Process technology
With lower carbon emissions
incl. CCU

Carbon Capture

Digitalization

Foreign investments

Competence

Power & Power market



Lars Petter Maltby
Eyde-kyngen

Gisle Løhre Johansen
Borregaard

Nina Dahl
Sintef

Håvard Moe
Elkem

Per Holdø
Hydro



Hans Erik Vatne
Hydro

Kathrine Næss
Yara











Geir Vollsæter
Industri Energi

Rolf Jarle Aaberg
Treklyngen

Ole Løfsnæs
Alcoa

Work process overview

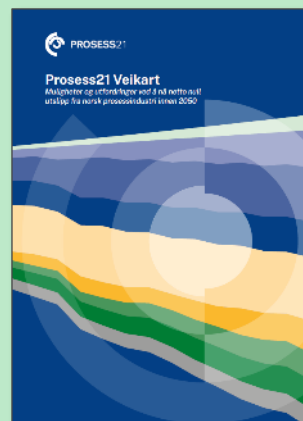
Expert group reports

-  Entrepreneurship
-  Product development
-  Bio-based Process industry
-  Circular economy
-  New Process Technology
-  Carbon capture
-  Digitalization
-  Foreign investments
-  Competence
-  Energy

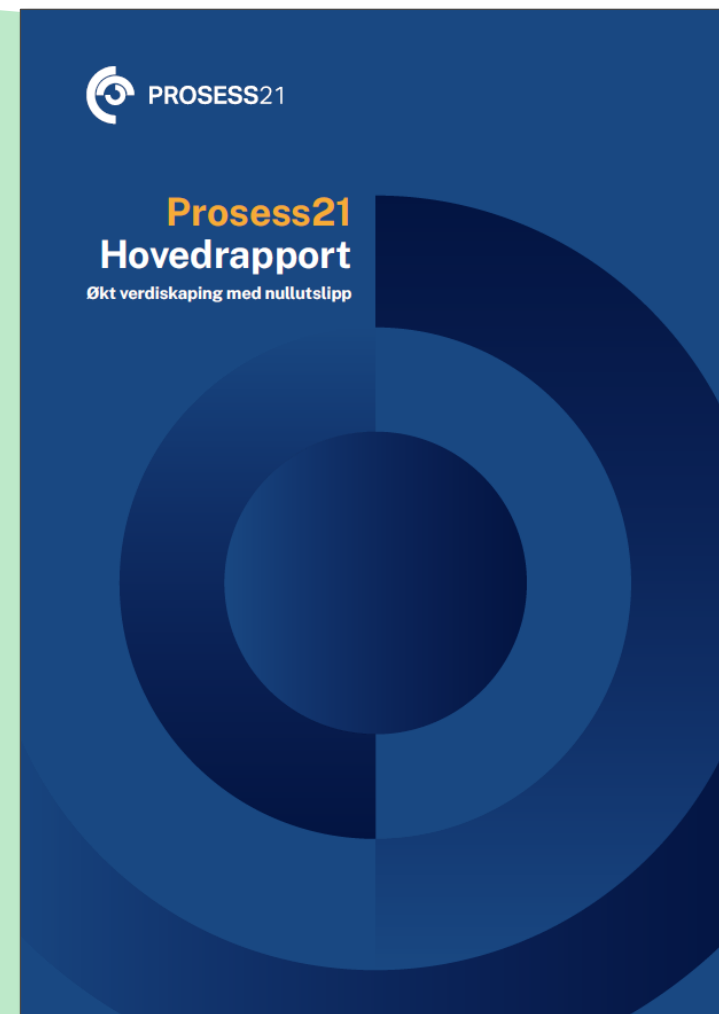
Resource effort



Prosess21 Roadmap



Thematic reports





Overall recommendations

www.prosess21.no

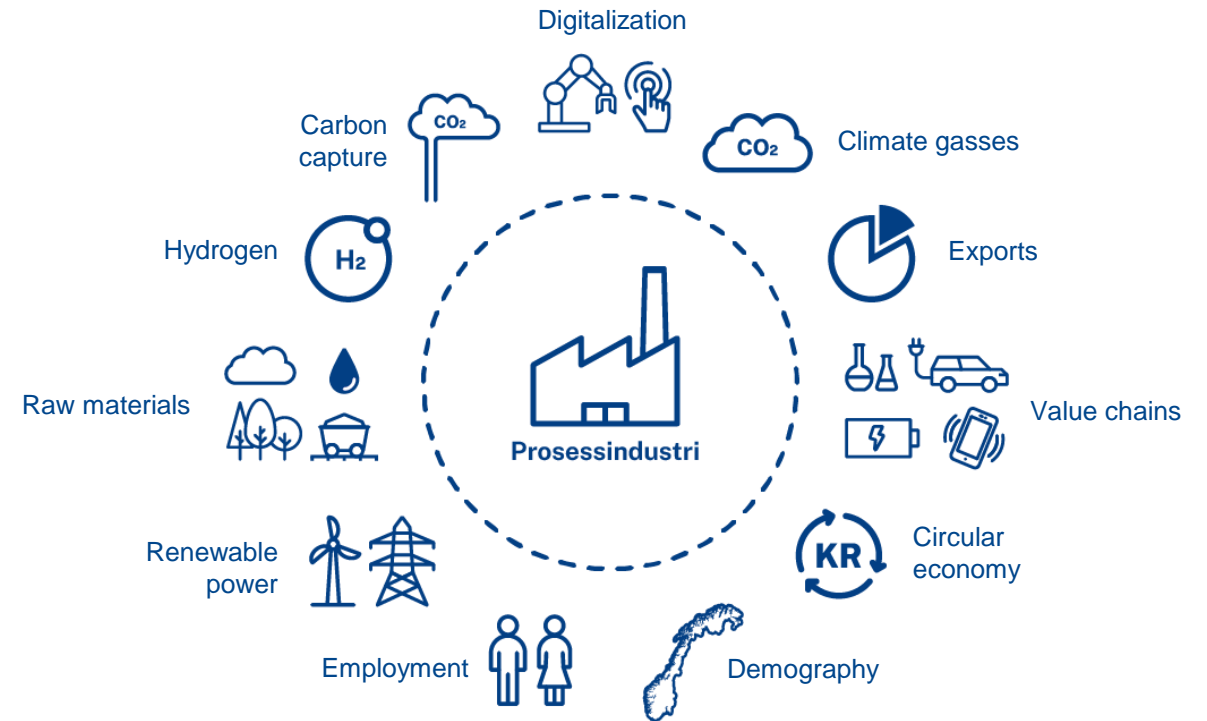
Close European cooperation is a prerequisite for further development of the Norwegian process industry

Partner with EU

- Protecting the EEA agreement
- Utilize Norway's comparative advantages and industrial strength

Policy for green industrial development

- Separate unit in the Ministry of Trade and Industry
- Comprehensive platform for dialogue with the Norwegian authorities
- Agreement between industry, the social partners and political authorities setting goals and determining the effects of funding mechanisms.



Close European cooperation is a prerequisite for further development of the Norwegian process industry

Partner with EU

- Protecting the EEA agreement
- Utilize Norway's comparative advantages and industrial strength

Policy for green industrial development

- Separate unit in the Ministry of Trade and Industry
- Comprehensive platform for dialogue with the Norwegian authorities
- Agreement between industry, the social partners and political authorities setting goals and determining the effects of funding mechanisms.



Policy plattform 2021-2025
«Hurdalsplattformen»



Roadmap – The Green
Industrial Initiative (2022)

Offshore wind
Batteries
Hydrogen
CO₂ management
Process Industry
Maritime industry
Forest & Timber

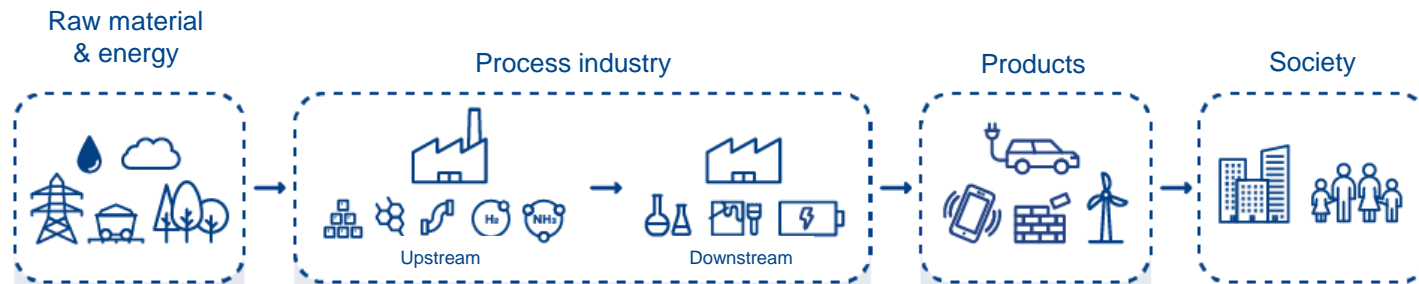


Norway's battery
Strategy (2022)

Green growth - Establishment of a robust Norwegian export portfolio

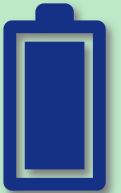
The Norwegian process industry exports for 160 bNOK and under the right conditions double its exports in 2030 by :

- Further reduce the carbon intensity of the products
- Develop and produce highly specialized, green products, preferably in combination with advanced services
- Initiate a Norwegian battery strategy (in line with Sweden/Finland)
- Take new positions both upstream and downstream in the value chains
- Norway must be an attractive host for green value chains



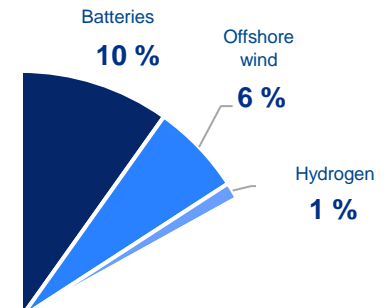
Norwegian capabilities in the battery value chain:

- Leading in electrification, share of electric cars and maritime sector
- Clean and competitive power
- Process & material competence
- High labor productivity
- Build and operate large facilities



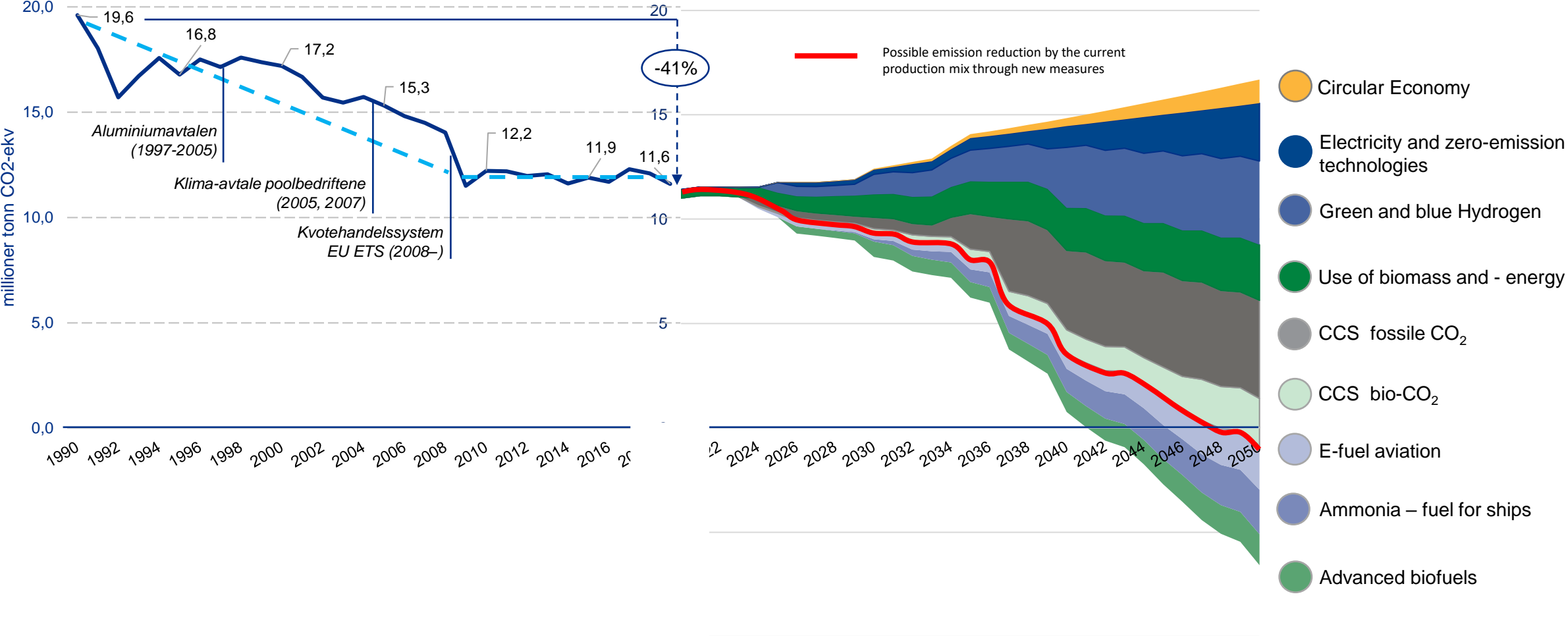
2030 potential

Source: NHO Grønne elektriske verdikjeder



Percentages based on 2019 total export values

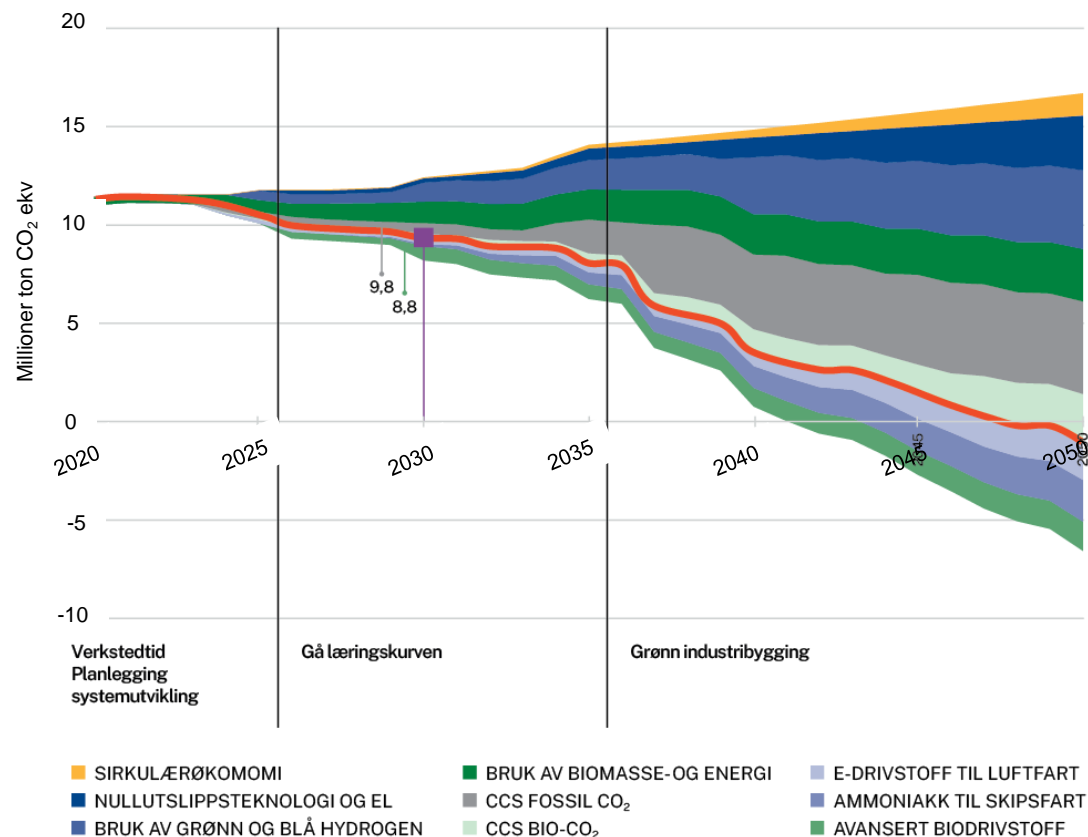
Climate gas emissions / Norwegian Process Industry



To achieve the goal of zero emissions in 2050, far-reaching measures are required

Updated roadmap with climate reduction technologies

(Updated based on Prosess21 expert group reports)



2030

The process industry can achieve greenhouse gas reduction of ~ 2.5 MT CO₂ eq through CO₂ capture, Biocarbon, Electrification / hydrogen / ammonia

“Longship” (CCS) will enable more projects, nationally and in Europe

However, the project costs is higher than the current quota price. Today's quota price is mainly determined by the cost of de-carbonising energy production in Europe

2050

We expect that future solutions will consist of a combination of new process technology and carbon capture. However, the new process technology is immature.

- The industry should determine their zero emission technology and climate strategy well before 2030
- There is an increased need for R&D efforts to realize zero-emission solutions
- New process technology that replaces fossil sources with renewable energy, will increase the need for renewable energy significantly



PROSESS21

Questions

www.prosess21.no



Iceland: Roadmap for sustainable construction industry



Thora Margret Thorgeirsdottir

Until 2019

- Authorities had **limited interest and awareness** of environmental impact from the construction industry.
- **Iceland Green Building Council (NGO)** established in 2010 to encourage sustainable construction
- **Limited statistics** for the construction industry:
 - ✓ Emission from **construction sites**
 - ✓ **Waste** generation

Environmental impact of the construction industry is significant!

30-40% of world wide emission

49% of all waste in Iceland 2017

50% of all resource utilisation

Until 2019

- Authorities had **limited interest and awareness** of environmental impact from the construction industry.
- **Iceland Green Building Council (NGO)** established in 2010 to encourage sustainable construction
- **Limited statistics** for the construction industry:
 - ✓ Emission from **construction sites**
 - ✓ **Waste** generation

2020

- **Formal cooperation public/private project - Building Greener Future:** Iceland Green Building Council, The Federation of Icelandic Industries and HMS – with a back up from the ministry of environment and the ministry of infrastructure.
- A formal action in **Iceland's Climate Action Plan:** Roadmap for Sustainable Constructions 2030



Roadmap for Sustainable Constructions 2030

- Emission today
- Goals for 2030
- Actions 2021-2030

Roadmap for Sustainable Constructions 2030

bgf.is

I. PART: Emission
(18 page)

II. PART: Goals and
Actions (102 pages)

III. PART: Summary - Emission,
Goals & Actions (9 pages)



I. hluti (18 bls)

Losun

Lestu þennan hluta til að vita meira um kolefnislosun íslenskra bygginga.

[Smelltu hér til að nálgast I. hluta](#)



II. hluti (102 bls)

Markmið og aðgerðir

Lestu þennan hluta til að vita meira um markmið um vistvænni mannvirkjagerð og aðgerðirnar svo þau markmið náist.

[Smelltu hér til að nálgast II. hluta](#)



III. hluti (9 bls)

Samantekt: Losun, markmið og aðgerðir

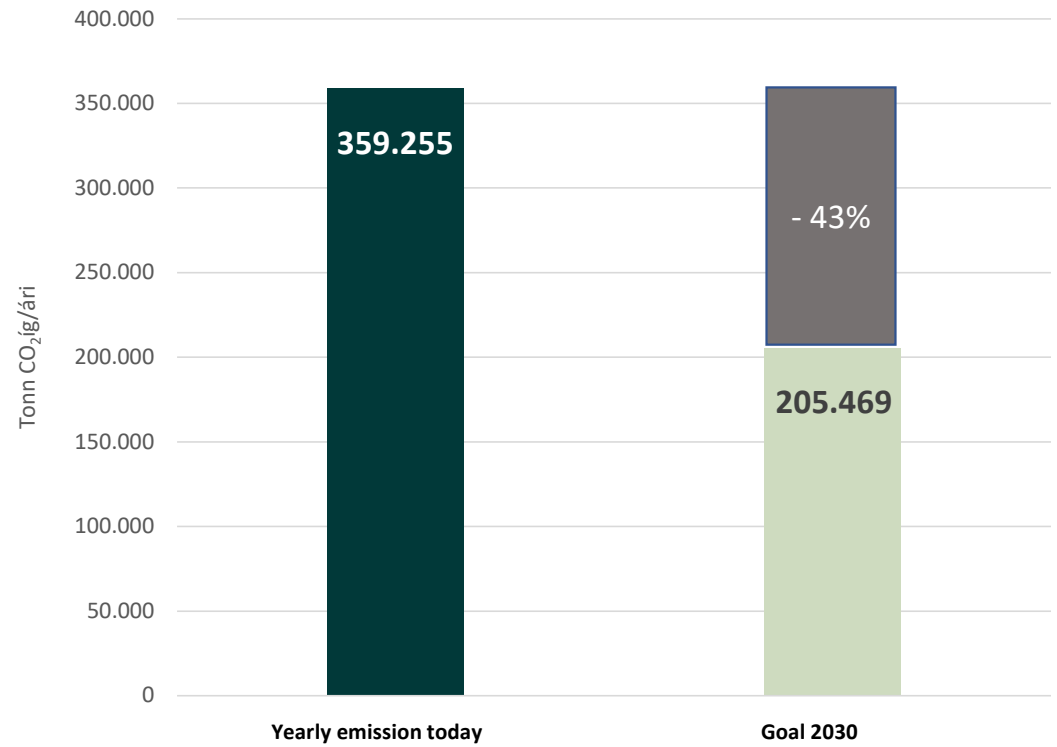
Byrjaðu hér! Lestu þennan hluta til að fá yfirsýn yfir losunina, markmiðin og aðgerðirnar í I. og II. hluta.

[Smelltu hér til að nálgast III. hluta](#)

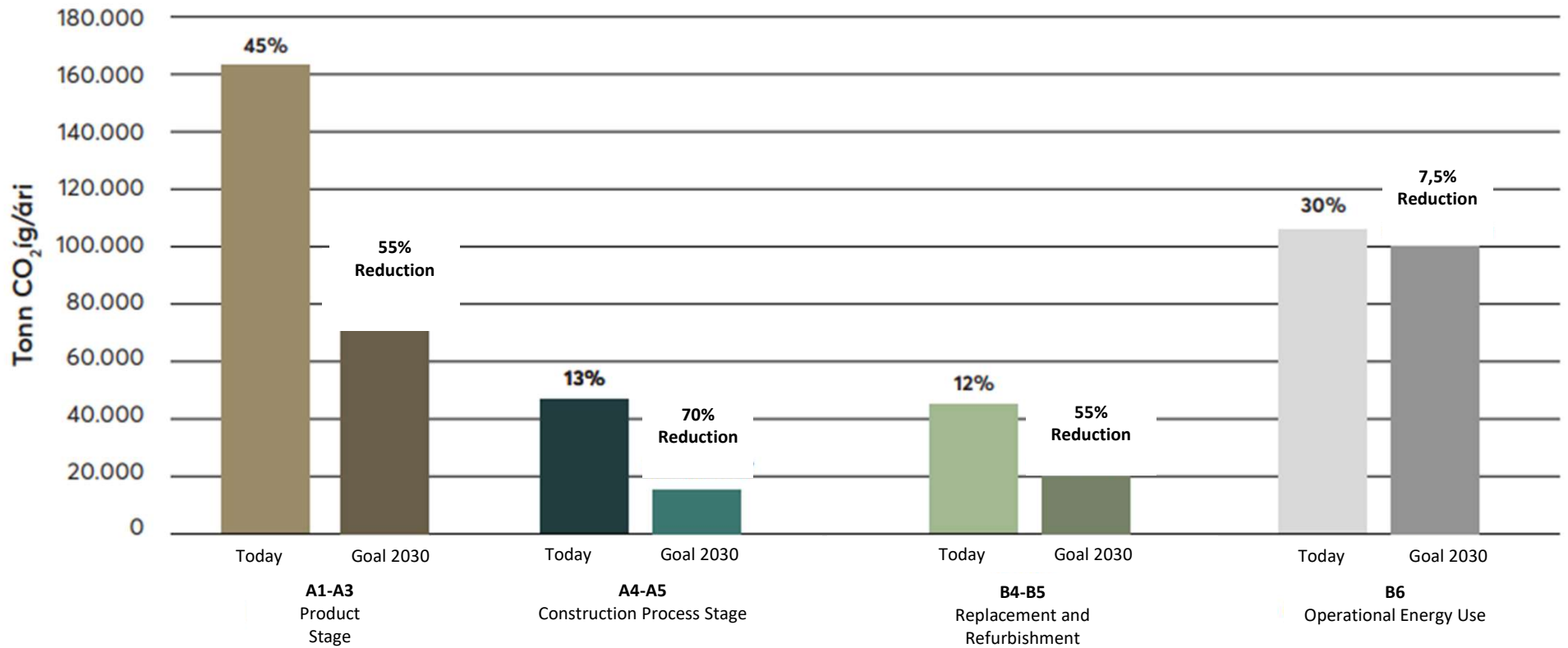


Roadmap for Sustainable Constructions 2030

Goals



Yearly emission from Icelandic buildings today and goals for 2030



74 Actions

May 2022

21 actions in process

2 actions finished

Not started

1. Byggingarefni	1.1. Steypukafli byggingarreglugerðar endurskoðaður	1.2. Rannsóknir á vistvænu byggingarefni	1.3. Átak um rétta geymslu og meðhöndlun byggingarvara	1.4. Gagnabanki um umhverfis- og loftslagsáhrif byggingarefna	1.5. Uppbygging á úrvinnslu skógarafurða	1.6. Þróun á loftslagsvænni steypu		
	2.1. Greining á samsetningu vinnuvélaflotans	2.2. Betri upplýsingar um vinnuvélaflotann	2.3. Samtal um orkuskipti á vinnuvélum	2.4. Umbunarkerfi í Rvk fyrir vistvæna orkugjafa á frkvsv.	2.5. Lykilhugtök um umhverfisáhrif frkvs. skilgreind	2.6. Samtal um tryggja orkuinnvið frá upphafi framkv.	2.7. Fordæmi: Framkvæmda-svæði án losunar	2.8. Skoða nýskrán. á olíuknúnum vinnuvélum
3. Notkunartími mannvirkja	3.1. Upplýsingar um raunnotkun hita, rafmagns og vatns	3.2. Samræmdir orkuútreikningar og orkuflókar bygginga	3.3. Krafa um orkuútreikninga	3.4. Fræðsla um orkusparnað í byggingum	3.5. Krafa um loftþéttleikapróf virkjuð	3.6. Leiðbeiningar um hönnun hita-, kæli- og loftræstikerfa	3.7. Rannsóknir á orkunýtingu eldri bygginga	
	3.8. Samræmdir varma- og rafalæðisútreikningar	3.9. Skoða kröfu um stýrd loftræstikerfi með varmaendurvinnslu	3.10. Krafa um orkunýtni nýbygginga	3.11. Stefna um vistvænt viðhald opinberra bygginga	3.12. Virkja Handbók hússins	3.13. Leiðbeiningar um vistvænt viðhald		
4. Lok líftíma / Hringrásar-hagkerfið	4.1. Söluvegur fyrir jarðveg og jarðefni (Mölpundur)	4.2. Rannsóknir og leiðb. um nýtingarmöguleika byggingarúrgangs	4.3. Kynningarátak um nýjar flokkunarkröfur byggingarúrgangs	4.4. Aðgengileg svæði undir notað byggingarefni	4.5. Greinargerð hönnuða um hámarksnýtingu byggingarefna	4.6. Leyfi til niðurrifs skráð í Mannvirkjaskrá		
	4.7. Skil á rauntölum um magn byggingarúrgangs	4.8. Byggingarregluverk endurskoðað m.t.t. hringrásar	4.9. Leiðbeiningar um endurnýtingu byggingarefna	4.10. Leiðbeiningar um ábyrgt niðurrif	4.11. Áhersla á byggingastarfsemi í Saman gegn sóun			
5.1. Lífsferils-greiningar	5.1.1. Losun framkvæmda Vegagerðarinnar metin með uppsprettugreiningu	5.1.2. Lífsferilsgreiningar á BREEAM-vottuðum nýbyggingum Rvk-borgar	5.1.3. Samræmd aðferðafræði við gerð lífsferilsgreininga bygginga	5.1.4. Fræðsluefni um lífsferilsgreiningar	5.1.5. Skilyrði fyrir útreikninga á kolefnisspori opinberra verkefna	5.1.6. Grunnviðmið fyrir kolefnisspor ólíkra mannvirkjaflokka skilgreind		
	5.1.7. Kolefnishlutlaus bygging fyrir íslenskar aðstæður skilgreind	5.1.8. Grunnviðmið fyrir kolefnisspor ólíkra mannvirkjaflokka uppfærð	5.1.9. Skilyrði fyrir útreikninga á kolefnisspori mannvirkja á almennum markaði	5.1.10. Krafa að kolefnisspor opinberra verkefna sé 30% lægra en grunnviðmið	5.1.11. Krafa að kolefnisspor almennra verkefna sé 30% lægra en grunnviðmið	5.1.12. Grunnviðmið fyrir kolefnisspor allra verkefna uppfærð og lækkuð		
5.2 Umhverfis-vottanir	5.2.1. Fjárhagslegur og umhverfislegur ávinningur vottana	5.2.2. Leiðb. um Svansvottunar-viðmið	5.2.3. Umhverfis-vottaðar byggingar í Mannvirkjaskrá	5.2.4. Fleiri umhverfisvottuð mannvirki í Rvk	5.2.5. Námskeið fyrir fagaðila um vottunarkerfi	5.2.6. Fræðsla til sveitarfélaga um vottanir	5.2.7. Fræðsla til birgja um vottanir	5.2.8. Aðlaga vottunarkerfi að ísl. aðstæðum
5.3 Loftslagsvæn byggð og landnotkun	5.3.1. Fyrirliggjandi innviðir í Reykjavík samnýttir	5.3.2. Leiðbeiningar um útfærslu 20 mínútna bæja og hverfa	5.3.3. Handbók um skipulag og hönnun í kringum hringrásarhagkerfið	5.3.4. Landsskipulagsstefna 2015–2026 endurskoðuð	5.3.5. Löggjöf um skipulag rýnd m.t.t. til loftslagsmála	5.3.6. Leiðbeiningar og gagnabanki um loftslagsmiðað skipulag		
6. Hvatir til umskipta	6.1. Tillaga til fjármálaráðuneytis um opinbera hvata fyrir vistvæna mannvirkjagerð	6.2. Umræða meðal sveitarfélaga o.fl. um græna fjárhagslega hvata	6.3. Grænt húsnaði framtíðarinnar hjá Reykjavíkurborg	6.4. Leiðbeiningar og sýnidæmi um umhverfisskiyrði í opinber útboð	6.5. Umhverfisvænar kröfur og valforsendur í útboð á vegum FSRE			
	6.6. Lánaframboð opinb. fjármálast. til vistvænnar mannvirkjagerðar	6.7. Skoða samræmd viðmið fyrir græna fjármögnun	6.8. Samkeppnisjóður fyrir byggingariðnaðarinn (Askur)	6.9. Verðlaun fyrir vistvæna mannvirkjagerð (Græna skóflan)	6.10. Átaksverkefni um vistvæna skref innan byggingariðnaðarinn			

Participants in the 74 actions



Stjórnarráð Íslands
Innviðaráðuneytið



Stjórnarráð Íslands
Umhverfis-, orku- og loftslagsráðuneytið

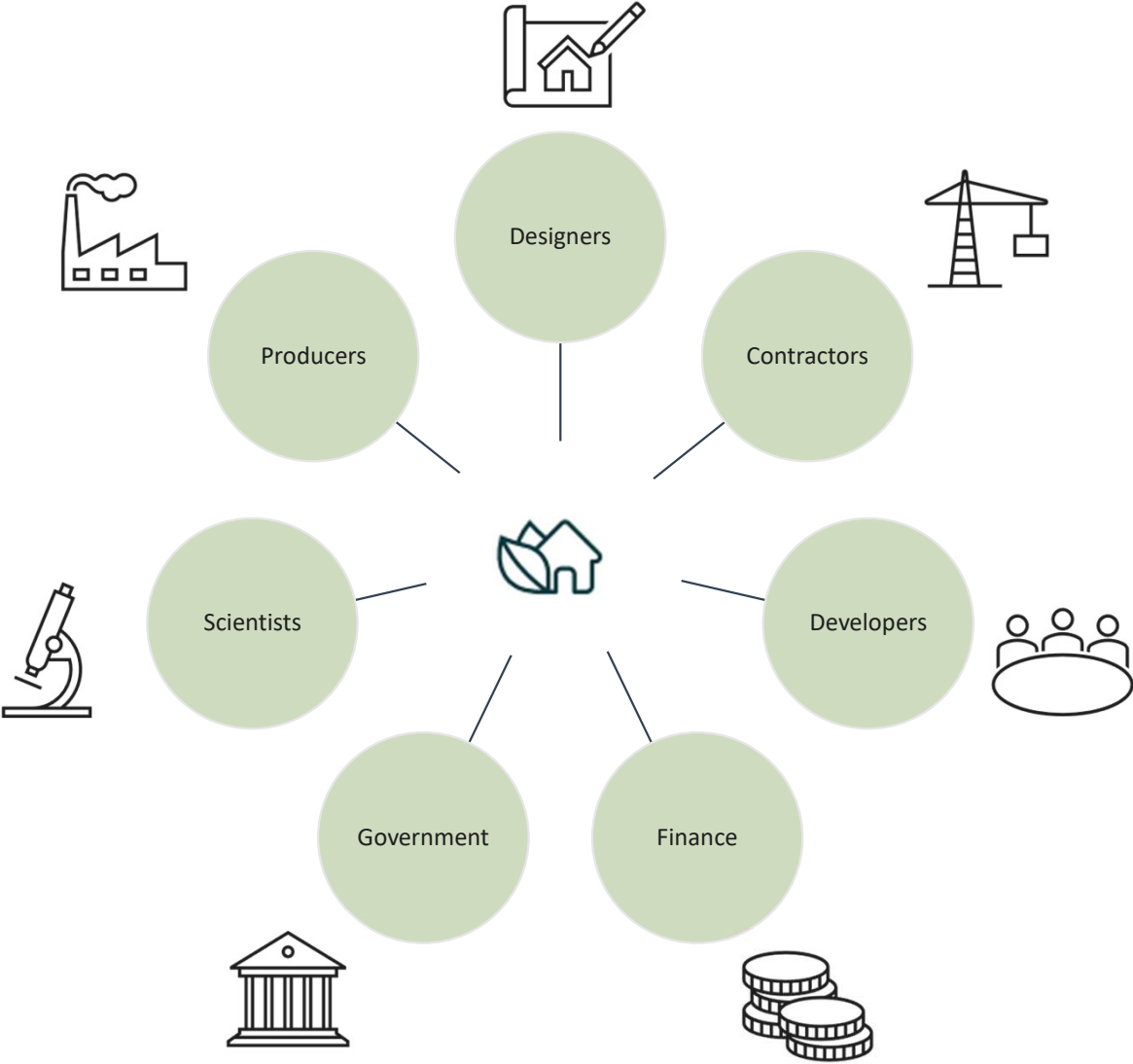


Stjórnarráð Íslands
Háskóla-, iðnaðar- og nýsköpunaráðuneytið



Stjórnarráð Íslands
Fjármála- og efnahagsráðuneytið

Stakeholders
from the whole
value-chain





Emission - Goals - Actions

- Stakeholders involved
- Roadmap defined

Sep 20 - May 22



Roadmap published

- Roadmap published

9. June 2022



Implementation

- New Project Management Team
- Open Consultation
- Input from Consultation taken into account
- Implementation according to Roadmap

2022-2024



Revision

- Emission, Goals, Actions

Before end of 2024



Implementation cont.

- New Project Management
- Open Consultation
- Revision ca 2027

2025+



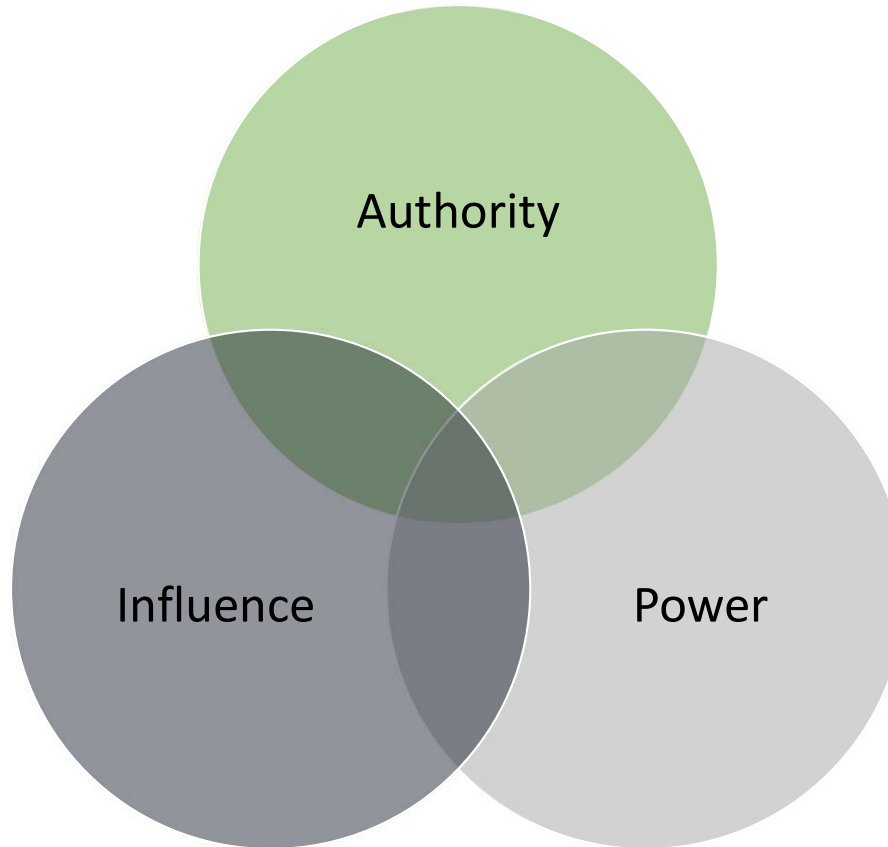


Government of Iceland
Ministry of Infrastructure



Government of Iceland
Ministry of the Environment, Energy and Climate

HMS Húsnæðis- og
mannvirkjastofnun



The Federation of Icelandic
Industries (SI)



GRÆNNI
BYGGÐ
GREEN BUILDING
COUNCIL ICELAND

Project Management September 2020 – May 2022



The Federation of Icelandic
Industries (SI)



The Environment Agency of Iceland



Samband íslenskra
sveitarfélaga

Icelandic Association of Local
Authorities



Icelandic Housing and Construction
Authority (Project Manager)



The Icelandic Road and Coastal
Administration



Government of Iceland
Ministry of Infrastructure

Ministry of infrastructure

6 Working-groups Jan-May2021

Group 6: Emission
Groups 1-5: Defining actions



Group 1 – Product Stage

- **Helga Jóhanna Bjarnadóttir - Efla (leader)**
- Gyða Mjöll Ingólfadóttir - Reykjavíkurborg
- Helgi S. Ólafsson - Vegagerðin
- Hildur Hrólfadóttir - NLSH
- Hrólfur Karl Cela - Basalt arkitekta
- Logi Unnarson Jónsson - Límtré Vírnet

Group 2 – Construction Process Stage

- **Haukur Þór Haraldsson - Verkís (leader)**
- Bergur Helgason - ÞG verk
- Birgir Kristjánsson - Íslenska gámafélagið
- Ólafur Sveinn Haraldsson - Vegagerðin

Group 3 – Use Stage

- **Sandra Rún Ásgrímsdóttir - Mannvit (leader)**
- Alma Dagbjört Ívarsdóttir - Mannvit
- Ástrún Eva Sívertsen - Reykjavíkurborg
- Halldór Eiríksson - T.ark
- Harpa Sif Gísladóttir - Efla
- Ragnar Ómarsson - Verkís

Group 4 – End of Life / Circular Economy

- **Alexandra Kjeld - Efla (leader)**
- Bryndís Skúladóttir - VSÓ
- Freyr Eyjólfsson - Terra
- Gyða Sigríður Björnsdóttir - Sorpa
- Þorbjörg Sævarsdóttir - Vegagerðin

Group 5 – Planning & Design

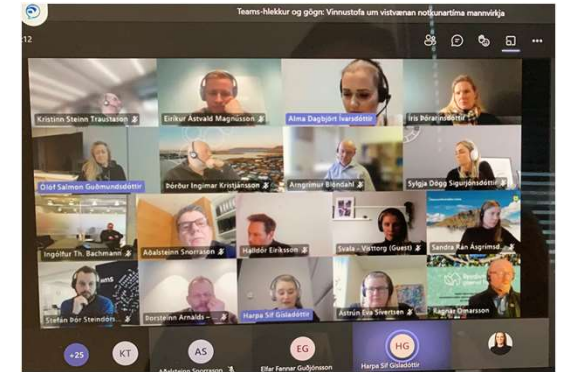
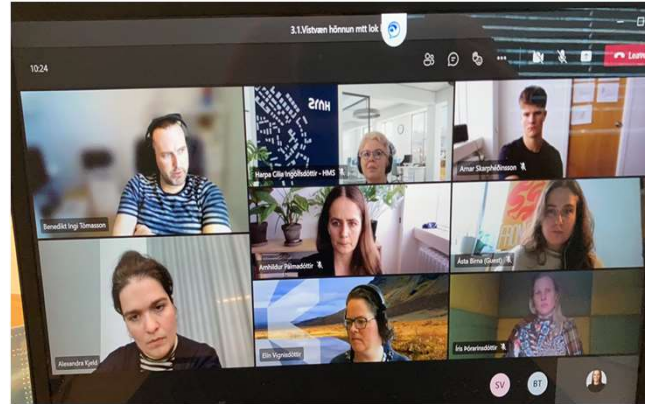
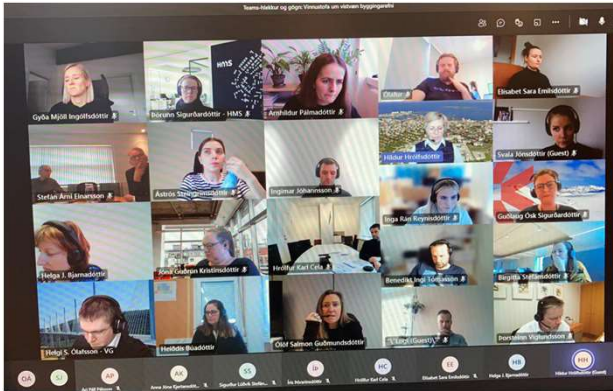
- **Stefán Gunnar Thors - VSÓ (leader)**
- Björn Guðbrandsson - ARKÍS
- Hafþór Ægir Sigurjónsson - KPMG
- Hólmfríður Bjarnadóttir - Veitur
- Ólöf Kristjánsdóttir - Mannvit
- Sólveig Helga Jóhannsdóttir - Garðabær

Group 6 – Emission

- **Sigríður Ósk Bjarnadóttir - VSÓ/HÍ (leader)**
- Björn Marteinnsson - HÍ
- Jukka Heinonen - HÍ
- Ólafur Wallevik – HR/RB
- Sigurður Thorlacius - Efla

5 workshops 9.-18. March 2021

160 participants



74 Actions

May 2022

■ 21 actions in process

■ 2 actions finished

■ Not started

1. Byggingarefni	1.1. Steypukafli byggingarreglugerðar endurskoðaður	1.2. Rannsóknir á vistvænu byggingarefni	1.3. Átak um rétta geymslu og meðhöndlun byggingarvara	1.4. Gagnabanki um umhverfis- og loftslagsáhrif byggingarefna	1.5. Uppbygging á úrvinnslu skógarafurða	1.6. Þróun á loftslagsvænni steypu		
2. Framkvæmda-svæði	2.1. Greining á samsetningu vinnuvélaflotans	2.2. Betri upplýsingar um vinnuvélaflotann	2.3. Samtal um orkuskipti á vinnuvélum	2.4. Umbunarkerfi í Rvk fyrir vistvæna orkugjafa á frkvsv.	2.5. Lykilhugtök um umhverfisáhrif frkvs. skilgreind	2.6. Samtal um tryggja orkuinnvið frá upphafi framkv.	2.7. Fordæmi: Framkvæmda-svæði án losunar	2.8. Skoða nýskrán. á olíuknúnum vinnuvélum
3. Notkunartími mannvirkja	3.1. Upplýsingar um raunnotkun hita, rafmagns og vatns	3.2. Samræmdir orkuútreikningar og orkuflókar bygginga	3.3. Krafa um orkuútreikninga	3.4. Fræðsla um orkusparnað í byggingum	3.5. Krafa um loftþéttleikapróf virkjuð	3.6. Leiðbeiningar um hönnun hita-, kæli- og loftræstikerfa	3.7. Rannsóknir á orkunýtingu eldri bygginga	
	3.8. Samræmdir varma- og rafalæðisútreikningar	3.9. Skoða kröfu um stýrd loftræstikerfi með varmaendurvinnslu	3.10. Krafa um orkunýtni nýbygginga	3.11. Stefna um vistvænt viðhald opinberra bygginga	3.12. Virkja Handbók hússins	3.13. Leiðbeiningar um vistvænt viðhald		
4. Lok líftíma / Hringrásar-hagkerfið	4.1. Söluvegur fyrir jarðveg og jarðefni (Mölpundur)	4.2. Rannsóknir og leiðb. um nýtingarmöguleika byggingarúrgangs	4.3. Kynningarátak um nýjar flokkunarkröfur byggingarúrgangs	4.4. Aðgengileg svæði undir notað byggingarefni	4.5. Greinargerð hönnuða um hámarksnýtingu byggingarefna	4.6. Leyfi til niðurrifs skráð í Mannvirkjaskrá		
	4.7. Skil á rauntölum um magn byggingarúrgangs	4.8. Byggingarregluverk endurskoðað m.t.t. hringrásar	4.9. Leiðbeiningar um endurnýtingu byggingarefna	4.10. Leiðbeiningar um ábyrgt niðurrif	4.11. Áhersla á byggingastarfsemi í Saman gegn sóun			
5.1. Lífsferils-greiningar	5.1.1. Losun framkvæmda Vegagerðarinnar metin með uppsprettugreiningu	5.1.2. Lífsferilsgreiningar á BREEAM-vottuðum nýbyggingum Rvk-borgar	5.1.3. Samræmd aðferðafræði við gerð lífsferilsgreininga bygginga	5.1.4. Fræðsluefni um lífsferilsgreiningar	5.1.5. Skilyrði fyrir útreikninga á kolefnisspori opinberra verkefna	5.1.6. Grunnviðmið fyrir kolefnisspor ólíkra mannvirkjaflokka skilgreind		
	5.1.7. Kolefnishlutlaus bygging fyrir íslenskar aðstæður skilgreind	5.1.8. Grunnviðmið fyrir kolefnisspor ólíkra mannvirkjaflokka uppferð	5.1.9. Skilyrði fyrir útreikninga á kolefnisspori mannvirkja á almennum markaði	5.1.10. Krafa að kolefnisspor opinberra verkefna sé 30% lægra en grunnviðmið	5.1.11. Krafa að kolefnisspor almennra verkefna sé 30% lægra en grunnviðmið	5.1.12. Grunnviðmið fyrir kolefnisspor allra verkefna uppferð og lækkuð		
5.2 Umhverfis-vottanir	5.2.1. Fjárhagslegur og umhverfislegur ávinningur vottana	5.2.2. Leiðb. um Svansvottunar-viðmið	5.2.3. Umhverfis-vottaðar byggingar í Mannvirkjaskrá	5.2.4. Fleiri umhverfisvottuð mannvirki í Rvk	5.2.5. Námskeið fyrir fagaðila um vottunarkerfi	5.2.6. Fræðsla til sveitarfélaga um vottanir	5.2.7. Fræðsla til birgja um vottanir	5.2.8. Aðlaga vottunarkerfi að ísl. aðstæðum
5.3 Loftslagsvæn byggð og landnotkun	5.3.1. Fyrirliggjandi innviðir í Reykjavík samnýttir	5.3.2. Leiðbeiningar um útfærslu 20 mínútna bæja og hverfa	5.3.3. Handbók um skipulag og hönnun í kringum hringrásarhagkerfið	5.3.4. Landsskipulagsstefna 2015–2026 endurskoðuð	5.3.5. Löggjöf um skipulag rýnd m.t.t. til loftslagsmála	5.3.6. Leiðbeiningar og gagnabanki um loftslagsmiðað skipulag		
6. Hvatir til umskipta	6.1. Tillaga til fjármálaráðuneytis um opinbera hvata fyrir vistvæna mannvirkjagerð	6.2. Umræða meðal sveitarfélaga o.fl. um græna fjárhagslega hvata	6.3. Grænt húsnaði framtíðarinnar hjá Reykjavíkurborg	6.4. Leiðbeiningar og sýnidæmi um umhverfisskipti í opinber útboð	6.5. Umhverfisvænar kröfur og valforsendur í útboð á vegum FSRE			
	6.6. Lánaframboð opinb. fjármálast. til vistvænnar mannvirkjagerðar	6.7. Skoða samræmd viðmið fyrir græna fjármögnun	6.8. Samkeppnisjóður fyrir byggingariðnaðarinn (Askur)	6.9. Verðlaun fyrir vistvæna mannvirkjagerð (Græna skóflan)	6.10. Átaksverkefni um vistvæn skref innan byggingariðnaðarinn			

Winter 2021-2022 - Participants in the 74 actions



Stjórnarráð Íslands
Innviðaráðuneytið



Stjórnarráð Íslands
Umhverfis-, orku- og loftslagsráðuneytið



Stjórnarráð Íslands
Háskóla-, iðnaðar- og nýsköpunarráðuneytið



Stjórnarráð Íslands
Fjármála- og efnahagsráðuneytið

June 2022: Roadmap for Sustainable Constructions 2030

bgf.is

I. PART: Emission
(18 page)

II. PART: Goals and
Actions (102 pages)

III. PART: Summary - Emission,
Goals & Actions (9 pages)



Public Consultation July and August 2022



I. hluti (18 bls)

Losun

Lestu þennan hluta til að vita meira um kolefnislosun íslenskra bygginga.

[Smelltu hér til að nálgast I. hluta](#)

II. hluti (102 bls)

Markmið og aðgerðir

Lestu þennan hluta til að vita meira um markmið um vistvænni mannvirkjagerð og aðgerðirnar svo þau markmið náist.

[Smelltu hér til að nálgast II. hluta](#)

III. hluti (9 bls)

Samantekt: Losun, markmið og aðgerðir

Byrjaðu hér! Lestu þennan hluta til að fá yfirsýn yfir losunina, markmiðin og aðgerðirnar í I. og II. hluta.

[Smelltu hér til að nálgast III. hluta](#)

Project Management Team Oktober 2022 -



The Federation of Icelandic
Industries (SI)



The Environment Agency of Iceland



Samband íslenskra
sveitarfélaga

Icelandic Association of
Local Authorities



Icelandic Housing and Construction
Authority (Project Manager)



City of Reykjavík



The Icelandic Road and Coastal
Administration



Government of Iceland
Ministry of Infrastructure

Ministry of infrastructure

Factors for a good progress so far



Government of Iceland
Ministry of Infrastructure



Government of Iceland
Ministry of the Environment, Energy and Climate



- 2023 mission: Reduce emission from constructions
- Emphasis on broad cooperation and initiative
- Participation in other Public/Private projects
- Trust and support
- Development in the Nordic countries

- 10 years of operation
- Knowledge
- Network

- A will to act

- Consultation
- Project interests instead of political interests
- Trust and support
- Finance
- Permission to develop the project according to the needs of the building industry

- Ambition
- Knowledge and experience

- Enthusiasm and need
- Knowledge

- Teams meetings = More efficiency

Factors for a good progress so far



Government of Iceland
Ministry of Infrastructure



Government of Iceland
Ministry of the Environment, Energy and Climate



- 2023 mission: Reduce emission from constructions
- Emphasis on broad cooperation and initiative
- Participation in other Public/Private projects
- Trust and support
- Development in the Nordic countries

- 10 years of operation
- Knowledge
- Network

- A will to act

- Consultation
- Project interests instead of political interests
- Trust and support
- Finance
- Permission to develop the project according to the needs of the building industry

- Ambition
- Knowledge and experience

- Enthusiasm and need
- Knowledge

- Teams meetings = More efficiency

Top priority:
The project
interests

Some final recommendations

Look for good examples:

- Learn from other programmes, industries and countries

... and adapt it to your project

Take some time to form the project:

- Learning period
- Networking
- Broader ownership

Participants

- Bottom-up process
- Diverse parties from the whole value-chain
- Select key-participants to promote the project

Events and presentations

- Promote the project as much as possible
- Share information - give the audience a „Scoop“
- Praise participants who are doing a great job

Elements in project management

Trust, cooperation, enthusiasm, optimism, passion, dynamic, dissemination, promotion, active listening, gratitude, problem-solving





Byggjum
grænni framtíð



Carbon neutrality 2035 and market creating in Finland

Ympäristöneuvos Jarmo Muurman

Carbon neutrality: carbon reduction within the sectors

Webinar 25.10..2022

Climate Change Act

- The new Climate Change Act (423/2022) entered into force on 1 July 2022
 - Sets the national climate objectives: climate neutral by 2035, decrease by at least 60 % by 2030, at least 80 % by 2040 and at least 90 % but aiming at a reduction of 95 per cent by 2050 compared to the 1990 levels
 - Lays down provisions on climate change policy planning and the related monitoring
 - Imposes obligations on the authorities
 - Ensuring sustainable development and justice of the climate measures
 - Ensuring the prerequisites for the Sámi people to maintain and develop their own language and culture.



Other legislation

- Coal ban for energy generation (416/2019)
 - Coal-fired power and heating generation will be banned as of 1 May 2029.
 - Public support if the change to non-fossil fuel will be made earlier than 2025
- Distribution obligation of biofuels, transport fuels (446/2007), biofuel (418/2019)
 - Raise distribution obligation of transport biofuels to 34 % in 2030
 - Raise distribution obligation of biofuel oil to 30 per cent by 2030. Light fuel oil is used in heating, machinery and stationary engines.
- Electricity tax for industry, mining, data centers and agriculture reduced to the EU's minimum level (1215/2021) from the beginning of the year 2022
 - The electricity tax reduction would affect almost 10 000 industrial companies and over 30 000 agricultural companies.
 - At the same time, the energy tax refund for energy-intensive companies will be phased out by 2025.



In permit and appeal procedures priority given to investment projects

- Challenge: long permit procedures
 - A priority to the permit applications concerning investment projects that are important for the green transition at the Regional State Administrative Agencies in 2023–2026
 - Priority given to certain projects related to renewable energy, low-carbon hydrogen production, electrification of industry, carbon capture and utilization and battery industry that follow the principle of No Significant Harm.
- Challenge: long appeal procedures on local detailed plans and master plans
 - In 2023–2028 appeals related to investments in the green transition would be considered as urgent by administrative courts.
 - Relevant for energy production, especially wind power construction
- More personnel resources will be allocated to speed up and support the processing of permits by the authorities and the appeal processes in administrative courts.
- Automatization environmental permit and inspection procedures



Sustainable and innovative public procurement

- Network-based Competence center for Sustainable and Innovative public procurement (KEINO) was established in 2018
- Keino offers free guidance and information on strategic management of public procuring, developing public procurement competence and cooperation and networking in public procurement
- Services and activities:
 - Advisory service and funding opportunities
 - The green deal Agreement for Public Procurement
 - KEINO Change Agents
 - KEINO Academy
 - Innovation Broker, an international operating model



Sectoral low-carbon roadmaps

- The preparation of sectoral low-carbon roadmaps was included in the Government Programme in summer 2019
- The roadmaps' purpose was to provide a more accurate picture of the scale, costs and conditions of the measures needed to move to a carbon neutral Finland by 2035.
- A total of 14 sectors have prepared their roadmaps.
- Roadmaps show electrification, clean energy and RDI investments play key roles
- The carbon handprint – the positive climate impact – of the current and upcoming products is considerable - offer great opportunities for exports and new business ventures.
- Roadmap work continues – results to be used in strategy work and further steps
- Public Private Partnership (PPP), to avoid for example economic risks and share risks with society



Funding

- Over 50 % of the Recovery and Resilience Plan's (RRF) funding, a total of more than one billion euros, will be allocated to green transition.
- Agreed on 700 million euros additional funding on clean solutions because of the energy crises caused by Russian armed attack to Ukraine
- Climate fund was set up in 2020, focus on combatting climate change, promoting digitalisation and boosting low carbon operations in manufacturing industries.
- Public funding alone will not be not enough to make the urgently needed transition to a climate neutral society happen. Fortunately, Finnish businesses and industries largely see investing in climate friendly, energy efficient circular solutions beneficial for their activities.



Thank you!

Senior environmental adviser Jarmo Muurman
jarmo.muurman@ym.fi

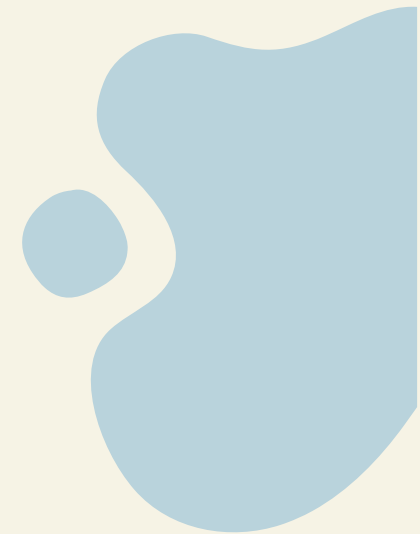
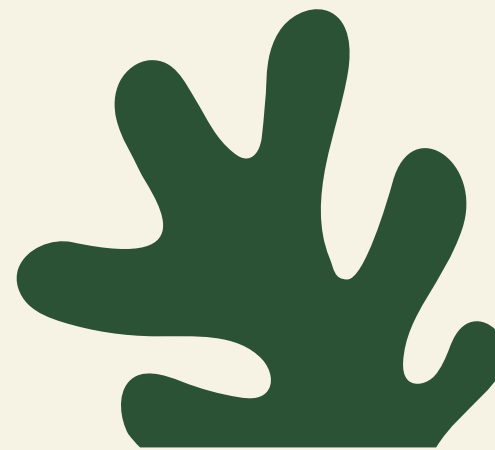


Ympäristöministeriö
Miljöministeriet
Ministry of the Environment

Aleksanterinkatu 7, Helsinki | PL 35, FI-00023 Valtioneuvosto | ym.fi



Ympäristöministeriö
Miljöministeriet
Ministry of the
Environment





Road to 70%

Klimapartnerskaber by Torsten Hasforth



CONCITO

DENMARK'S GREEN THINK TANK

Halvvejs mod målet om 70% CO₂-reduktion

Udledning af drivhusgasser fordelt på sektorer 1990-2030

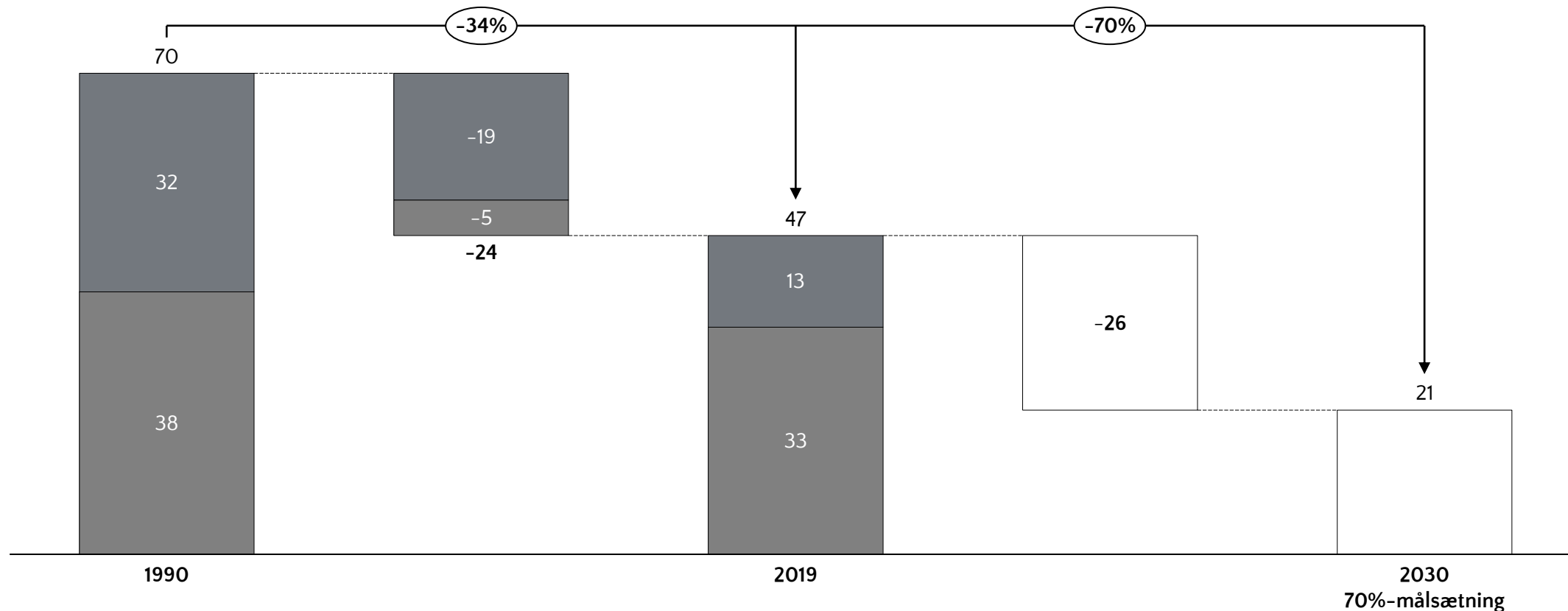
Millioner ton CO₂-ækvivalenter (CO₂e)

■ Energi- og forsyningssektoren

■ Øvrige sektorer

○ X% Reduktion ift. 1990

○ X% Reduktion ift. 1990



Note: Viste udledningstal er faktisk udledning ekskl. LULUCF (Land Use, Land-Use Change and Forestry), som opgjort i Basisfremskrivning 2019. "Energi- og forsyningssektoren" omfatter udledning ved udvinding, konvertering til el og varme og ved endelig opvarmning.

Kilde: Basisfremskrivning 2019; Energistatistik 2017; QVARTZ-analyse



CONCITO

DENMARK'S GREEN THINK TANK

Energi- og forsyningssektorens vision

Vejen mod 70%-målsætningen i 2030

Udfasning af fossile brændsler i egen sektor

Halvering af udledningen i øvrige sektorer

Nye grønne brændsler og styrkepositioner

Udbygning af vedvarende energi

Fremtidssikret infrastruktur

Fundament til et klimaneutralt Danmark og EU i 2050



Store mængder af grøn energi, teknologi og viden til hele verden



Grøn vækst og grønne arbejdspladser – en grøn arbejdsstyrke i verdensklasse



Made in Denmark er lig bæredygtighed – uanset branche



Høj forsyningsikkerhed og konkurrencedygtige priser



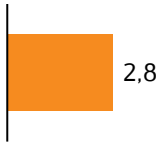

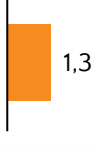




Energieffektivitet, fleksibilitet og smarte løsninger



CONCITO

DENMARK'S GREEN THINK TANK


Reduktion (2019–2030)	Situationen i 2019	Situationen i 2030 (70%)	Reduktion (%)
Kul i kraftvarme 	Kul i centrale kraftvarmeanlæg udleder i dag 5,8 mton CO ₂ om året	Kul er helt udfaset af centrale kraftvarmeanlæg og erstattes af grønne teknologier, fx havvandsvarmepumper, geotermisk energi, udnyttelse af overskudsvarme mv.	100%
Naturgas og olie 	Naturgas og olie i el-og fjernvarme udleder i dag 1,1 mton CO ₂ om året	Naturgas og olie er udfaset af fjernvarmen med undtagelse af olie til opstart. Dette erstattes ved en udbygning af solvarme, kollektive varmepumper, luft-til-vand varmepumper mv.	99%
Olie og naturgas i individuel rumvarme 	Oliefyur i ca. 80.000 husstande og naturgasfyur i ca. 375.000 husstande udleder i dag ca. 3,2 mio. ton CO ₂ om året, hvoraf 0,4 antages reduceret som følge af energieffektiviseringer.	95% af alle individuelle oliefyur og 70% af alle individuelle naturgasfyur er udfasede og primært erstattet af varmepumper samt fjernvarme. Resterende gasfyur bruger kun biogas.	99%
Plast i affaldsenergi 	Fossilt affald (plast) i affaldsenergianlæg udleder i dag ca. 1,7 mio. ton CO ₂ om året	Halvdelen af fossilt (plast) affald udsorteres og genanvendes i affaldsenergianlæg og erstattes med mere biogent materiale.	-50%
Fangst og lagring af CO ₂ 	CO ₂ -fangst finder i Danmark kun sted ved Kors Kro Biogasanlæg, og der foregår ikke i dag lagring af CO ₂ i Danmark	Ca. 1,3 mio. ton CO ₂ årligt fra energiproduktion indfanges og deponeres	N/A
Naturgas i Nordsøproduktion 	Naturgas anvendes i drift af turbiner til indvinding af olie og naturgas i Nordsøen. Driften udleder ca. 1,6 mio. ton CO ₂ om året	Potentiel reduktion på 1,1 mio. ton årligt. Heraf ca. 0,5 mio. ton gennem effektivisering af produktionen og op mod 0,6 mio. ton ved elektrificering	-70%
Σ 			



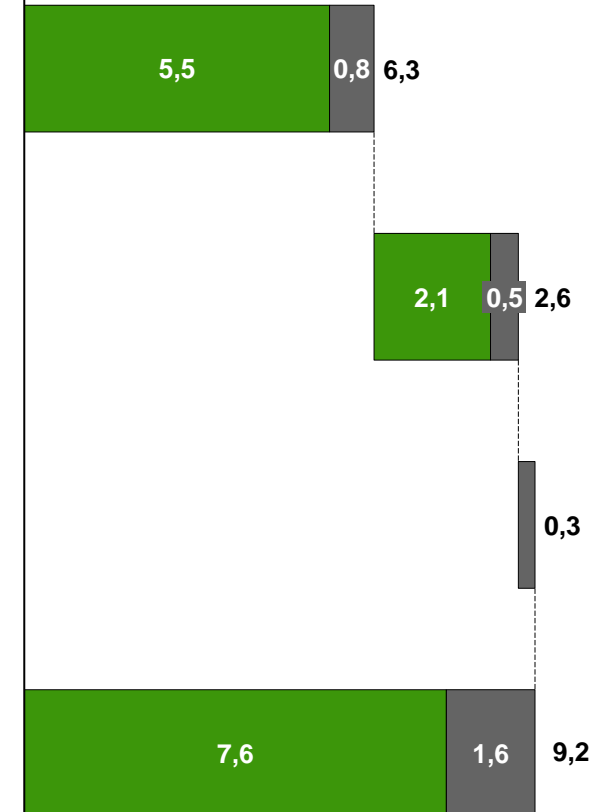
Behovet for grøn energi i 2030

Fortrængning per sektor 2019-2030 for at indfri 70%-målsætning

Millioner ton CO₂-ækvivalenter (CO₂e)

 Kræver grøn el-produktion

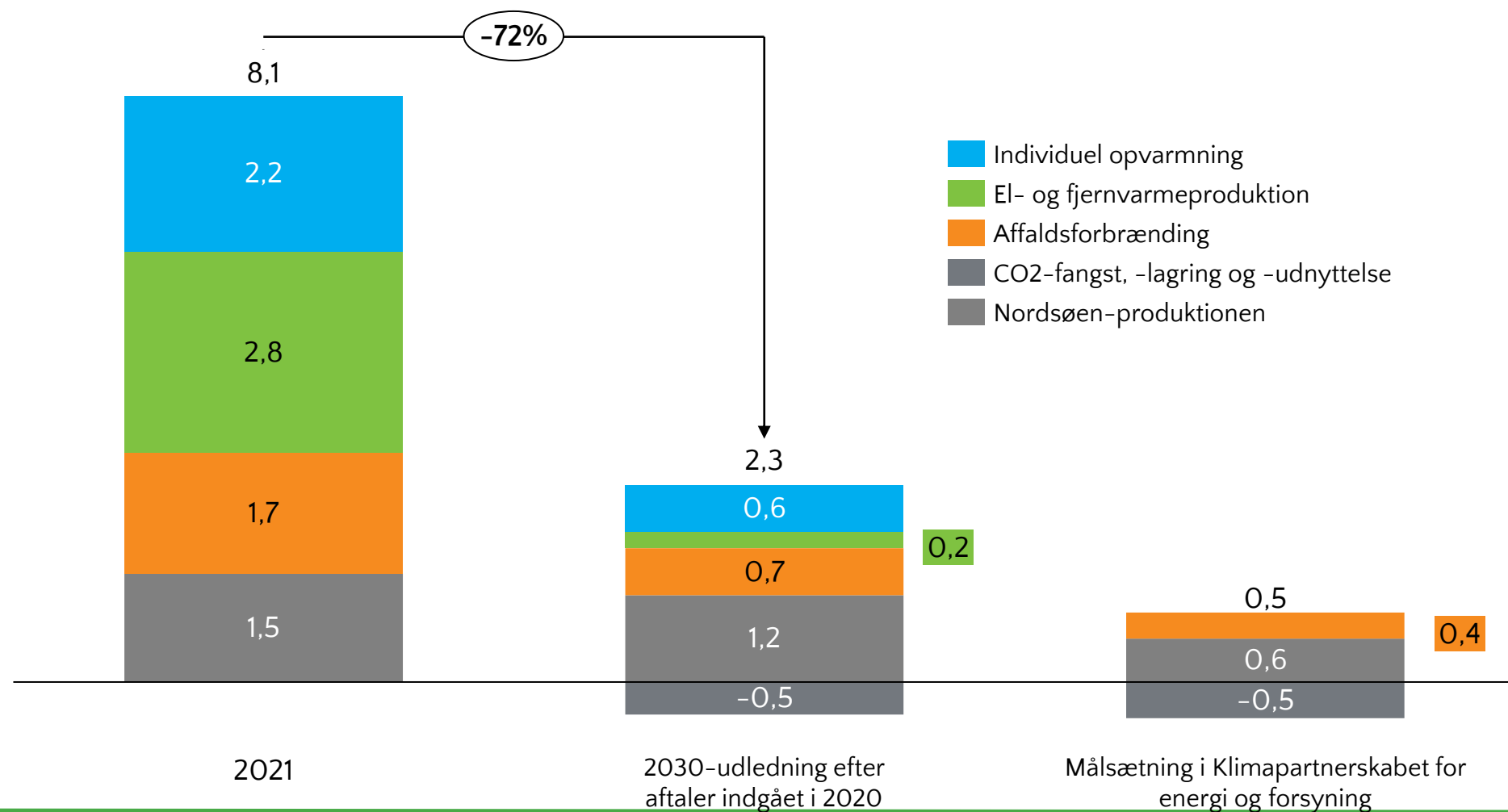
Transport	0,6 Allerede forudsat reduktion i basis- fremskrivningen ¹	2,1 1,5 mio. el- eller hybridbiler	1,9 PtX i tung transport ²	0,9 Elvarevogne, elbusser og ellastbiler	0,8 Biobrændstof, bl.a. biogas og - biodiesel
Industri	-0,2 Allerede forudsat reduktion i basis- fremskrivningen	1,5 Varmepumper i procesvarme ³	0,6 Energi- effektiviseringer	0,6 On-location transport	0,1 Biogas og -diesel til proces
Bygninger	- Allerede forudsat reduktion i basis- fremskrivningen	0,2 Bygnings- installationer ⁴	0,1 Bygningsisolering ⁵		
TOTAL	83% af den samlede reduktion på 9,2 mio. tons kræver grøn elproduktion				



CONCITO

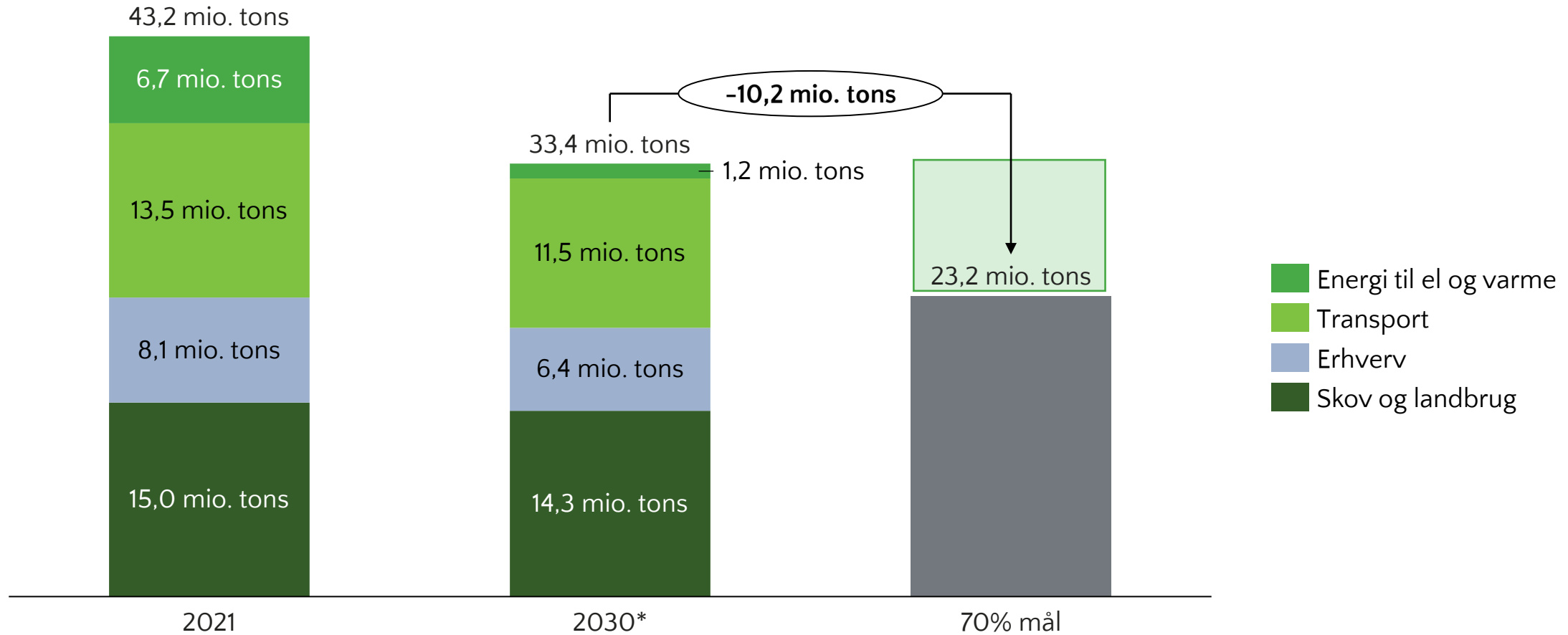
DENMARK'S GREEN THINK TANK

Mod 0 tons fra energisektoren i 2030



Udledning i sektorer i 2030

CO₂-udledning (mio. ton)



*Note: Indeholder reduktioner fra implementeringssporet i regeringens landbrugsudspil



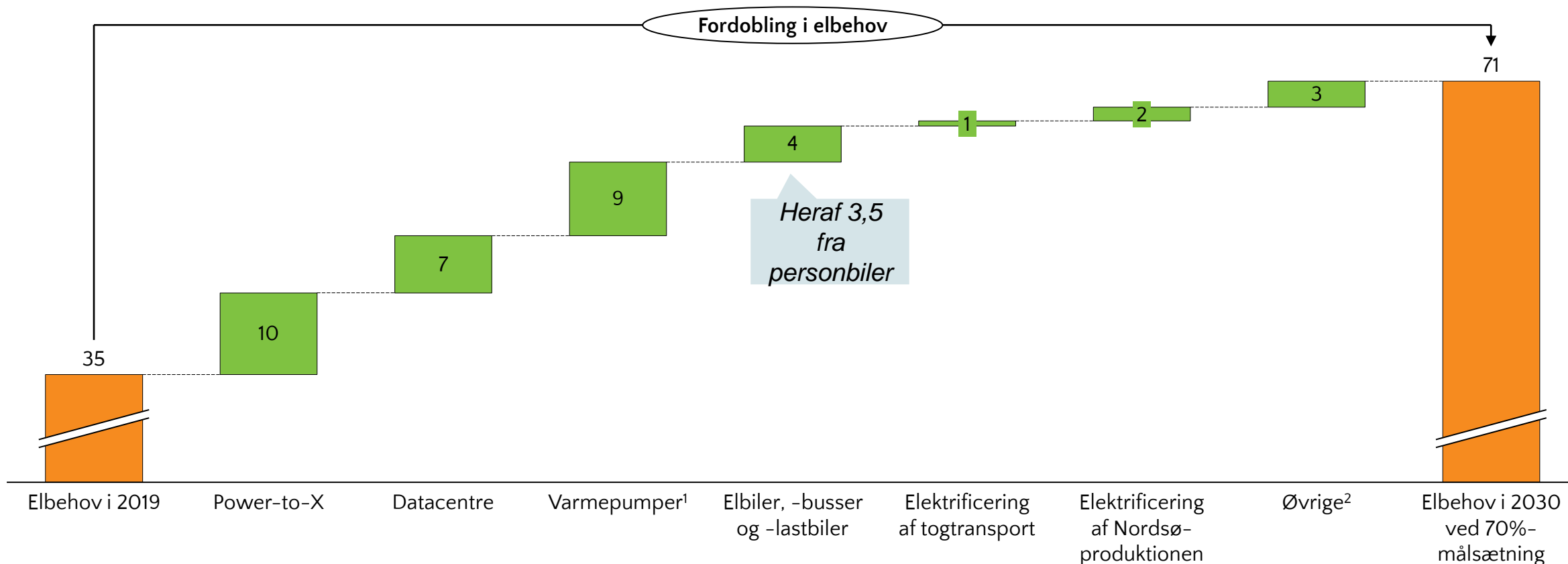
CONCITO

DENMARK'S GREEN THINK TANK

Det danske elbehov forventes at fordobles mod 2030

Øget elbehov fra 2019 til 2030 (70%-målsætningen)

TWh



¹ Varmepumper i husholdninger (3,5 TWh), varmpumper i fjernvarme (3,1 TWh) og varmpumper i industrien (2,4 TWh)

² Øvrige dækker over et generelt øget elbehov i industri, byggeri og offentlig service (0,9 TWh), intern transport i landbruget (2,2 TWh) samt elektrificering af søtransport (0,01).

Køreplanen kræver omfattende investeringer

Økonomiske konsekvenser af indfrielse af 70%-målsætning

	HVAD	HVOR MEGET (kr.)	HVEM
Investeringer Samlet 2019-2030	Merinvesteringer i grøn teknologi (fx varmepumper og elbiler) til omstillingen i perioden 2019-2030	100 – 135 mia.	Alle samfundets aktører (borgere og virksomheder)
	Ekstrainvesteringer i vedvarende energi (fx vind, sol, biogas) og infrastruktur i perioden 2019-2030	194 – 258 mia.	Energi- og forsyningssektoren¹
Omkostninger Årligt i 2030	Årlige meromkostninger for samfundet ved grøn i stedet for fossil teknologi i 2030	12 – 17 mia. (~5.000 kr. pr husstand)	Alle samfundets aktører (borgere og virksomheder)
	Årligt tabt statsprovenu ved uændrede afgiftstrukturer i 2030 samt behov for tilskud til at drive den grønne omstilling	21 – 25 mia. i provenutab 5 – 7 mia. i tilskud	Staten

¹ For enkelte investeringsposter også landbruget (biogas) og andre private aktører (offentlige ladestandere til el- og hybridbiler)
 Kilde: Beregninger af Dansk Energi samt Energinet pba. Reinvesterings-, Udbygnings- og Saneringsplan (RUS-plan) 2018; QVARTZ-analyse



Svære beslutninger forude...

Tilskuds- eller afgiftsvejen?	Landbrugsforhandlingerne	CO2 fangst, lagring og udnyttelse	Elinfrastruktur
<p>Ekspertudvalg skal komme med anbefalinger til fremtidige CO2 afgifter.</p> <p>Bliver CO2 afgiften lav skal tilskud trække mere.</p> <p>Bliver der ikke konkluderet vil energisektor og energikunderne stå tilbage med massiv usikkerhed</p>	<p>Forhandles før sommer. Når måske ikke frem til en konklusion.</p> <p>Bliver det straf eller gulerod – vigtigt for erhvervets fremtid.</p> <p>Bliver reduktionen lille skal andre sektorer leverer mere – industri og transport.</p> <p>Skal "udviklingssporet" trække det meste øges risikoen for manglede målopfyldelse – men nøj hvor fedt hvis det lykkes.</p>	<p>Delstrategi- og forhandling før sommer. Mange usikkerheder vil bestå.</p> <p>Ændre vi syn på biomasse så der kan bygges på de store kraftværker og dermed fanges CO2 som kan give CO2 neutral transport og industri?</p> <p>Får lagringsindustrien subsidier før anvendelsessiden</p> <p>Taler vi lagring i national eller industriel logik.</p> <p>Sættes der krav om anvendelse i transport og industri?</p>	<p>Fremtidssikring af rammerne for investeringer forhandles før sommer</p> <p>Bliver det muligt at udbygge nettet før elforbruget stiger?</p> <p>Vil det være muligt at opbygge marked for den fleksible forbruger eller skal det løses med tariffer?</p> <p>Vil erhvervslivet opsøge mulighederne?</p>





The Swedish Forest Industries Roadmap for Fossil Free Competitiveness

Karin Tormalm

Forest Policy Expert

The Swedish Forest Industries – business organization for Swedish pulp, paper and woodworking industries

Pulp and paper; ~ 50 mills in 23 groups / companies

Sawn timber; ~120 sawmills in 60 groups / companies

Other; ~ 40 companies closely connected to the
production of pulp, paper and sawn timber.



Fossilfree Sweden

- National initiative to make Sweden the first fossil-free welfare nation in the world
- 22 sectors has presented roadmaps since 2018
- The Forest Sector is one of them



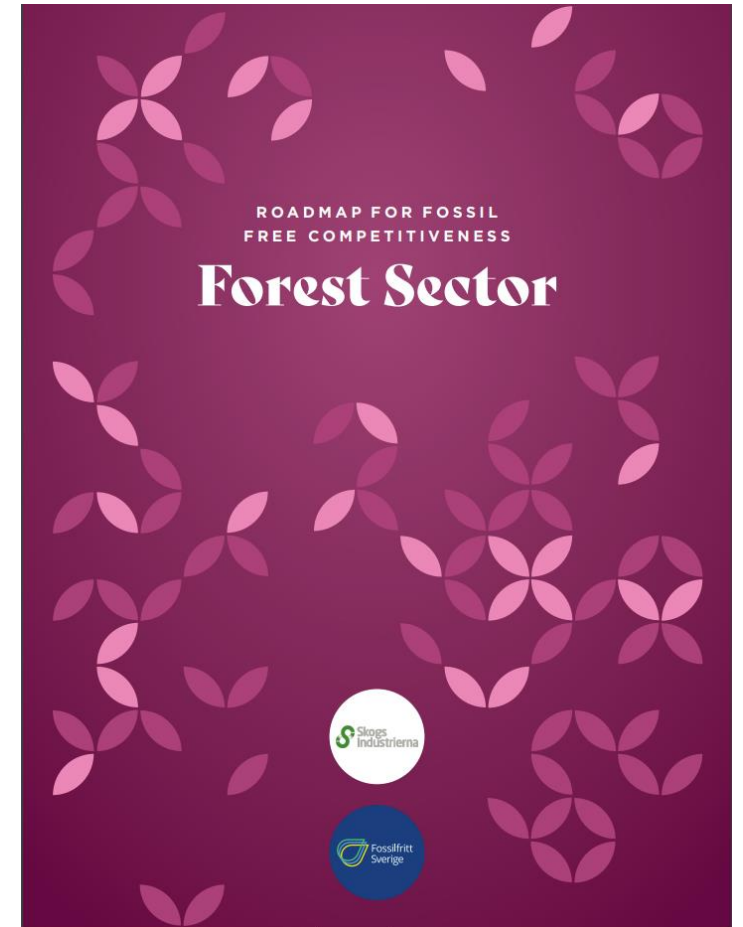
The process to develop the roadmap

- Internal working group
- Reference group including member organizations
- Hearings and workshops including a broad range of stakeholders
- Discussion with other sectors
- Board decision



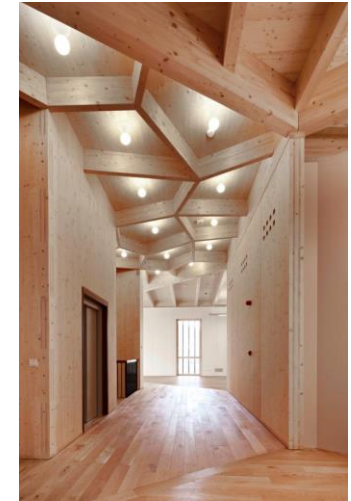
Content of the roadmap

- Vision
- Goal
- Targets
- What we need from politics to be able to implement the roadmap
- Very clear that the forest sector have not the same challenges as many other sectors...



The forest sector contributes to climate change mitigation in three overriding ways:

- Carbon capture in bio-based products and in the forests
- Substitution, where biobased products replace fossil-based products or products which cause major fossil emissions during production
- Reducing the sector's own use of fossil energy sources



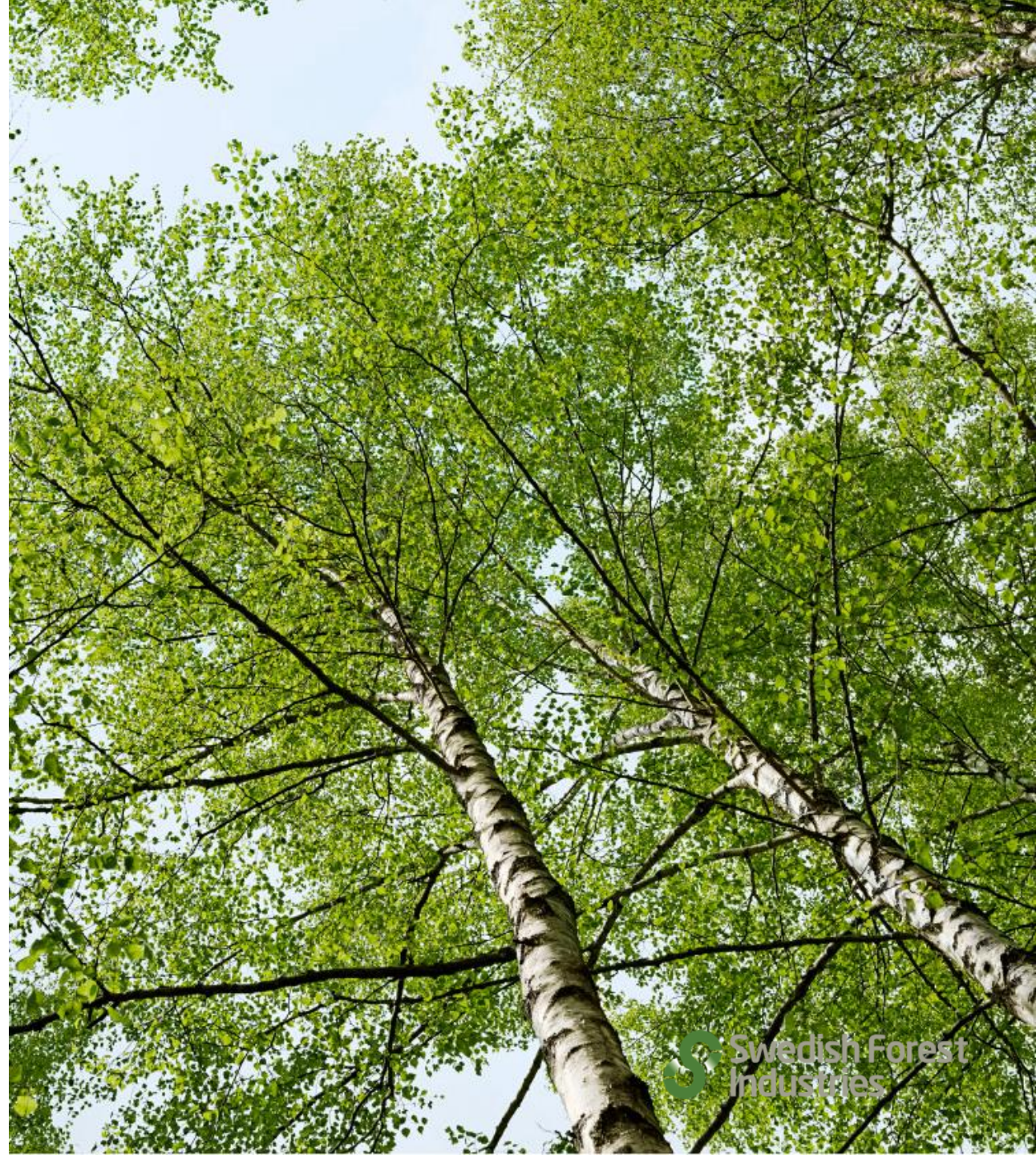
VISION



the vision entails a transformation of all of society to a biobased economy

GOAL

The overall climate benefits of the forest sector and its contributions to a fossil free society has increased by 2045



Targets to 2030

Climate benefits and competitiveness through:

- growth in the bioeconomy
- phasing out fossil energy in the sector



What is needed for the implementation?

- **A political ambition for a biobased society**
- **Competitive conditions for the sector**
- **Assured access to biomass from sustainable managed forest**
- **Increased focus on freight transports**
- **Improving efficiency of transportation**
- **Continued investments in research and innovation**



Upgrading the roadmap during 2023

Technical carbon sinks

Increased production of fossilfree and renewable products

Decreased transportrelated fossil emissions

Increased substitution for society through a competitive forest sector



Thank you!