
Nuuk 14.-15. maj
FUTURE
GREENLAND
2024

Ippassaq susoqarpa?

Hvad skete der i går?

About yesterday

Potentialet for et bæredygtigt Grønland
Hvorfor, Hvordan og Hvad?

Unlocking the potential for a sustainable Greenland
Why, How and What?

Kalaallit Nunaanni piujuaannartitsineq aallaavigalugu ingerlatsinermi periarfissaq
Sooq, Qanoq aammalu Suna?

www.futuregreenland.gl

So what happened yesterday?

Funding is available... but!

Alliances are a must

Future of Greenland 2024

The future is in good hands

The airport investment is attracting attention

Greenland has a global role in the green transition


GrønlandsBANKEN
Erhvervsfonden
INUSSUK
Travel by Heart
Greenland
FLIES
WE WORK WITH PASSION FOR PEOPLE
AL
ARCTIC LAW
Greenland
SBS
Serviceorienteret IT
NAVIAIR
meetings
SISA Pension
STARK
Sammen bygger vi professionelt
cBRAIN
ARCTIC IMPORT
SFAI
GREENLAND

Kalaallit Nunaanni inuussutissarsiutit nutaat

De nye erhverv i Grønland

The new businesses in Greenland

Pisortaq, Sulisitsisut

Direktør, Grønlands Erhverv

Director, Greenland Business Association

Naalakkersuisoq

Naalakkersuisoq

Minister

Christian Keldsen & Naaja H. Nathanielsen

Sulisut nunaqavissut

Den grønlandske arbejdskraft

The Greenlandic work force

Siu Tsiu-mut pisortaq

Siu Tsiu Direktør

Director of Siu-Tsiu

Allattoqarfimmi

Sekretariatschef

Head of Secretariat at Siu-Tsiu

Hanne Danielsen &
Pilu Samuelsen

SIU TSIU

SiuTsiu

Siunnisaq-Tsiunisar
Future Greenland 2024

CEO Hanne Danielsen - COO Pilo Samuelsen

Økonomisk bundlinje

Miljømæssige bundlinje

Sociale bundlinje

Erhverv

CSR

Social økonomi

Investering

Partnerskaber

Støtte

Tasiilaq

SIU TSIU

SIU TSIU

Bestyrelsen
Malene Vahl Rasmussen
Minik Gerstrøm
Ann Andreasen
Katrine Hjelholt Nathanielsen
Jørgen Aqe Møller
Ellen Lerch Høj
Kasper Skare

Fondene:
Oak Foundation Denmark
Bikubenfonden
Hempel fonden
Østifterne

Nuuk
Pilo Samuelsen

De unge

Qaqortoq
Margrethe Thårup Andersen
Nina-Vivi Andersen
Karl Ole Knudsen

De unge

Tasiilaq
Birthe Mikaelsen
Karl Bianco
Mati Larsen

København
Hanne Danielsen

SIU TSIU

Tasiilaq Qaqortoq

Unge uden uddannelse eller beskæftigelse

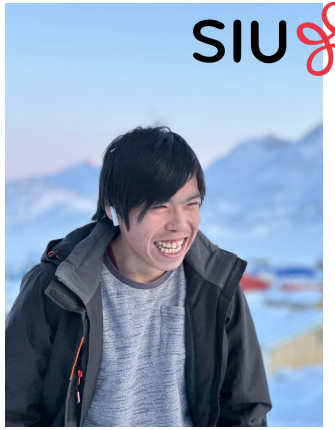
Ledighed og manglende arbejdskraft

En fælles, national problematik

SIU TSIU







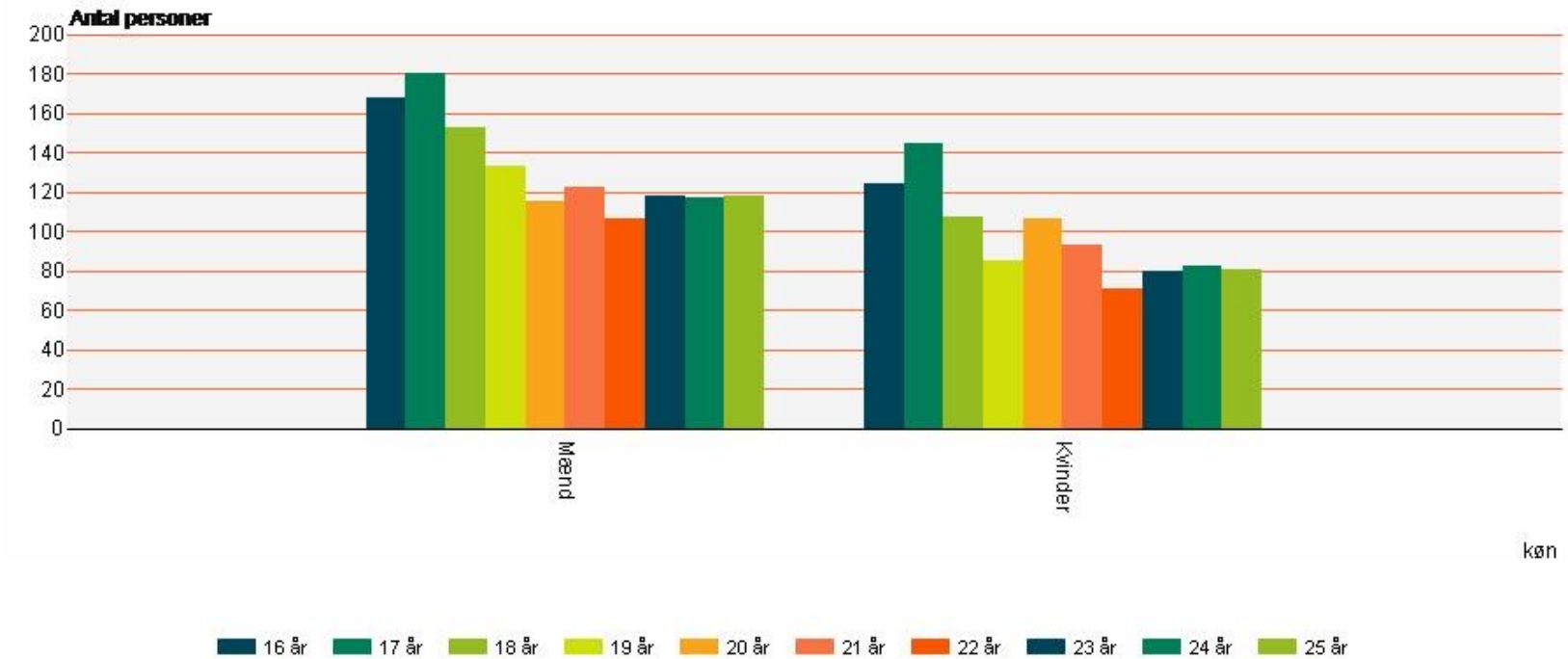






Motivation skaber deltagelse og beskæftigelse

Uddannelse og beskæftigelse for 16-25 årige efter alder og køn. Ikke i uddannelse eller beskæftigelse, 2022.



Kilde: Grønlands Statistik

SIU TSIU

Autonomi

Kompetence

Samhørighed

Forhindringer, hvordan ser de ud?

Hvordan balancerer vi de forskelle der er

i problematikker og ressourcer?

Overgange fra indsats til beskæftigelse

Store afstande

Visionen

Vi har en drøm…

Et job til alle, en plads i samfundet til alle

Overskud på den sociale bundlinje


SIUTSIU

Aallarnisaasartut akornanni arnat angutillu akornanni oqimaaqatigiinnginneq

Kønsuligheden i iværksætteriet

Gender diversity in entrepreneurship

Roccamore Shoesimik tunngaviliisoq nutaaliortartutullu pisortaasoq

Stifter af og kreativ direktør i Roccamore Shoes

Founder and creative director at Roccamore Shoes

Frederikke Schmidt

roccamore

DANISH DESIGN ITALIAN ATTITUDE

roccamore, comfortable high heeled shoes

Copenhagen, Denmark Footwear

DKK 330,050
pledged of DKK 150,000 goal

306


MODE KULTUR

Til kamp mod dræberhæle

Mange kvinder har et had/kærlighedsforhold til de højhælede. Skoene er smukke og giver pondus, men kan være en lidelse at have på. Dansk designer vil løse problemet med ortopædisk korrekte højhælede sko.

SKO

Det er sæson for ømme fødder. Ikke bare dem, der traver stroggaderne igennem i jagt på julegaver, men særligt de fødder, som går til julefrokost klædt i høje hæle.

Stiletterne har et stærkt visuelt udtryk, der dog på ingen måde matches på sundhedsskalaen. Det kommer næppe bag på nogen, at det er usundt for fødderne at gå i høje hæle, og hvis man konsekvent vinder svangen op på en skråkkes af en sål, kan det føre til store smerter.

Næsten 50 pct. af alle kvinder får i løbet af livet en fodlidelse i stil med knyster, nedsunket forfod eller hælspore, og den største synder i den sammenhæng er fodtøjet.

Frederikke Schmidt går dagligt i høje hæle. Hun arbejdede som designer i skobranchen, og det var op på stiletterne, når der var møder, messer og rejser. Efter tre års intensivt hælbrug havde hun konstant smerter i fødderne.

»Vi kan sende raketter til Mars, men ikke lave et par højhælede sko, man kan tåle at gå med. Jeg tænkte, at der måtte findes en anden vej.

Det blev begyndelsen på et udviklingsprojekt, hvor hun sammen med en ortopædisk skomager satte sig for at fremstille en højhælet sko, der både er smuk og moderne. Der har taget tid, og i begyndelsen af 2015 stifter Frederikke Schmidt og hendes mærke, Roccamore, de første modeller på markedet.

af en højhælet sko hviler hele kroppens vægt på tre små punkter i hælen, på siden af foden og på knoglen mellem fodballerne, som slet ikke er skabt til at gå på. Hvis man gør det hele tiden, endda med korte sener, og det bliver umuligt at gå selv i flade sko uden smerter.

Helt at droppe stiletterne var ikke en mulighed for hende. »Jeg er træt af, at man kun kan vælge det ene eller andet. Fodformet eller højhælet. Mærker som laver behagelige sko, kunne være flotteree.

»I en højhælet sko hviler hele kroppens vægt på tre små punkter i hælen, på siden af foden og på knoglen mellem fodballerne«

Frederikke Schmidt

NIELS PEDERSEN

Fascination og afsky

Designeren taler om høje hæle som noget, der ikke kun handler om fødder. Som noget sanseligt. De sætter i hvert fald fornuften ud af spil, for skulle hjernen alene udvælge fodtøjet, ville minushælen have en anden status i dag.

Man kan opleve samme fascination, hvis man kigger ud i verden. De høje hæle er for eksempel »killer Heels« er et hit på Brooklyn Museum.

Her viser man, hvordan hælen gennem historien er blevet brugt til andet end blot at bære kvinden.

New York Times beskriver udstillingens sko som såvel dragende som modbydelige.

FAKTA

ROCCAMORE

Dansk skoforms stiftet af Frederikke Schmidt, der er skodesigner fra designskolen Polimoda i Firenze og desuden uddannet i markedsføring.

Hovedproduktet er højhælede sko med ortopædiske såler, der hjælper foden med at gå ordentligt, så man undgår ømme fødder. Målet er at kombinere komfort med moderne design.

Roccamore har netop rejst 200.000 kr. via Kickstarter i en kampagne, der slutter i morgen.

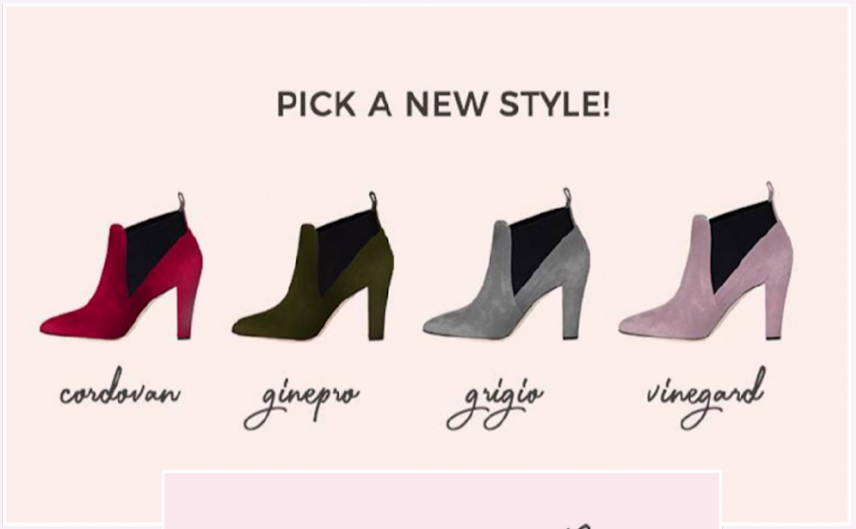
Skoene, der produceres i Spanien, kommer på markedet i 2015.

roccamore.com

RED LUCY. Frederikke Schmidts sko er resultatet af et langt udviklingsforløb, hvor anatomisk korrekte såler er blevet integreret i skoen. Sammen med et stødabsorberende materiale i tåen giver de foden en bedre støtte. 'Red Lucy' er navnet på denne model. Pr-foto

Almindeligt tøj

32
shows er på det officielle program til næste udgave af Copenhagen Fashion Week

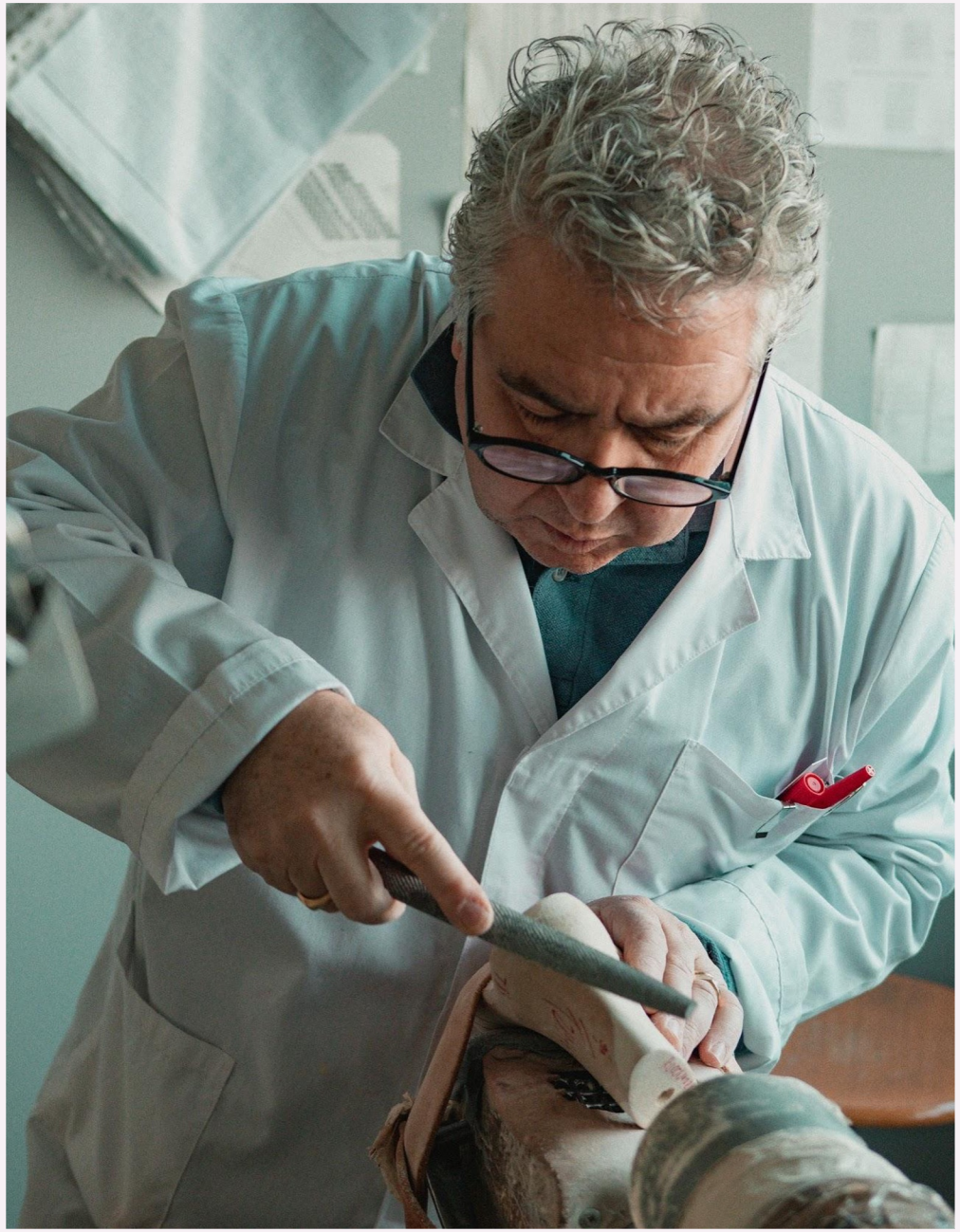

PICK A NEW STYLE!
cordovan
ginepro
grigio
vinegard


this girl is looking
for a name


pre-order
now

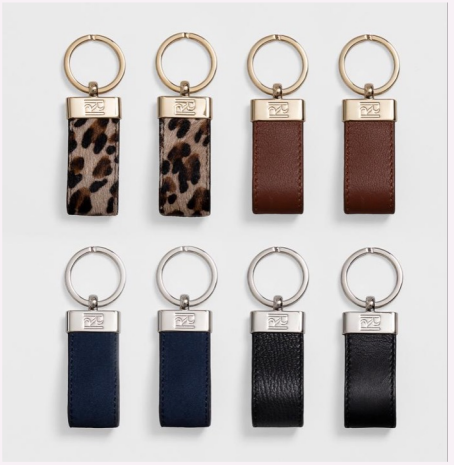

Fotobe
stway


roccamore_shoes
roccamore
Synes godt om fra by_frederikkeschmidt og 552 andre
roccamore_shoes The new girls on the block, that have the most amazing colors. Which one is your fave this spring? Red Laila ❤️ or Dusty 💜? .




HyFlex®
HyFlex®


roccamore
DANISH DESIGN ITALIAN ATTITUDE

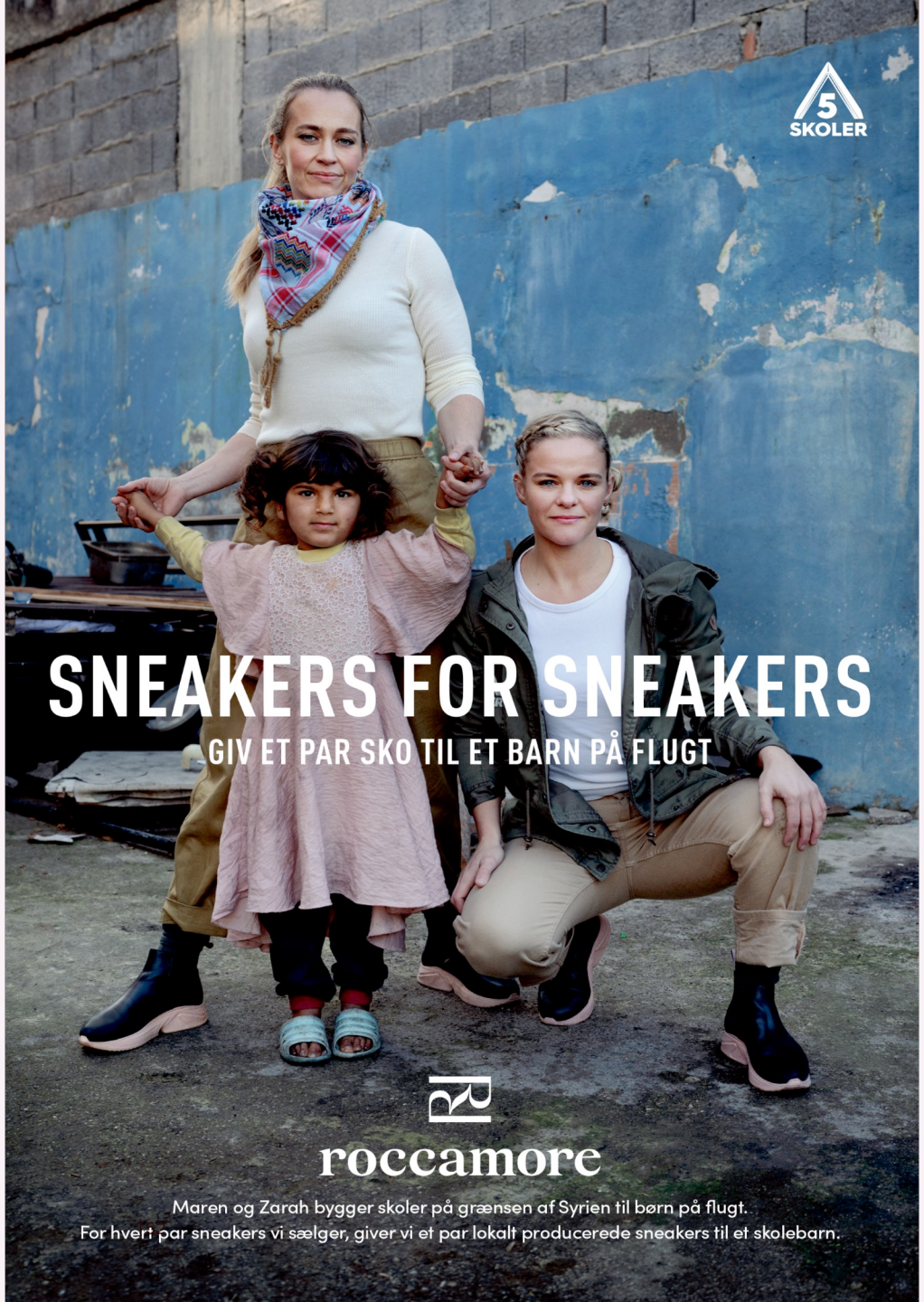



roccamore
COLOURING
BOOK
CHRISTMAS 2020 EDITION


10 CM OF
PURE PLEASURE
#RoccamoreRebel
roccamore
Elisa Lykke, PR agent, mother and erotic fiction writer.


TAKE THE STAGE
#RoccamoreRebel
roccamore
Sandra Yi Sencindiver, actor and stage director


UNICORNS ROCK
#RoccamoreRebel
roccamore
Stine Sara, singer and entrepreneur living with Tourette Syndrome


5
SKOLER
SNEAKERS FOR SNEAKERS
GIV ET PAR SKO TIL ET BARN PÅ FLUGT
roccamore
Maren og Zarah bygger skoler på grænsen af Syrien til børn på flugt.
For hvert par sneakers vi sælger, giver vi et par lokalt producerede sneakers til et skolebarn.


ALL I WANT FOR X MAS
is the right to wear whatever
makes me comfortable


ALL I WANT FOR X MAS
is the right to wear
whatever makes
me comfortable


ALL I WANT FOR X MAS
is the right to wear whatever
makes me comfortable


MOMS ROCK
roccamore


MOMS ROCK
roccamore


MOMS ROCK
roccamore

TAK

Nuuk 14.-15. maj

FUTURE GREENLAND 2024

Show imalt. business?

Show eller business?

Show or business?

Ánorâk Film & Polarama Greenland

Emile Hertling Péronard

Savalimmiut suliffeqarfiillu mikisut akunnattumillu angissusillit (SMV)

Færøerne og SMV´erne

The Faroe Islands and the SMEs

Faroese Sustainability Initiative

fra Faroese Sustainability Initiative

from the Faroese Sustainability Initiative

Eva Skeel Nolsø

The Faroe Islands and the SMEs –how do we make sustainability part of the agenda?

Future Greenland 2024

Wedensday 15th may

Eva Skeel Nolsø


ARCTIC OCEAN
Greenland
(Denmark)
Svalbard
(Norway)
ARCTIC OCEAN
United States
Canada
Iceland
Norway
Sweden
Finland
Russia
U.K.
Ireland
Den.
Neth.
Belg.
Germany
Poland
Belar.
Estonia
Latvia
Lithuania
Ukraine
Mol.
Kazakhstan
Mongolia
United States
ATLANTIC OCEAN
France
Spain
Portugal
Italy
Rom.
Bul.
Geor.
Az.
Armenia
Turkey
Cyprus
Uzbek.
Turkm.
Kyrgyzstan
Tajikistan
China
N. Korea
S. Korea
Japan
Greece
Syr.
Lebanon
Iraq
Iran
Afghan.
Kuwait
Qatar
Nepal
Bhutan
Pakistan
India
Laos
Vietnam
Taiwan
Bur.
Bangl.
Thai.
Cambodia
Philippines
Mexico
Caribbean
Morocco
Tunisia
Algeria
Libya
Egypt
Israel
Jordan
Saudi Arabia
U.A.E.
Oman
Yemen
Djibouti
Western Sahara
Senegal
Maurit.
Mali
Niger
Chad
Eritrea
Sudan
The Gambia
B. Faso
Guinea-Bissau
Guinea
Sierra Leone
Liberia
Cote d'Ivoire
Nigeria
Ghana
Benin
Togo
Equatorial Guinea
Gabon
Cam.
C.A.R.
South Sudan
Ethiopia
Somalia
Ken.
Uganda
Rwanda
Burundi
Tanz.
Dem. Rep. of Congo
Congo
Angola
Zambia
Zim.
Bots.
Namibia
South Africa
Lesotho
eSwatini
Malawi
Mozambique
Madagascar
Sri Lanka
Malaysia
Indonesia
Timor-Leste
Papua New Guinea
Solomon Islands
New Caledonia
Fiji
Australia
New Zealand
PACIFIC OCEAN
PACIFIC OCEAN
Central America
Guyana
Suriname
French Guiana (France)
Venez.
Colombia
Ecuador
Peru
Brazil
Bolivia
Paraguay
Chile
Argentina
Uruguay
ATLANTIC OCEAN
INDIAN OCEAN

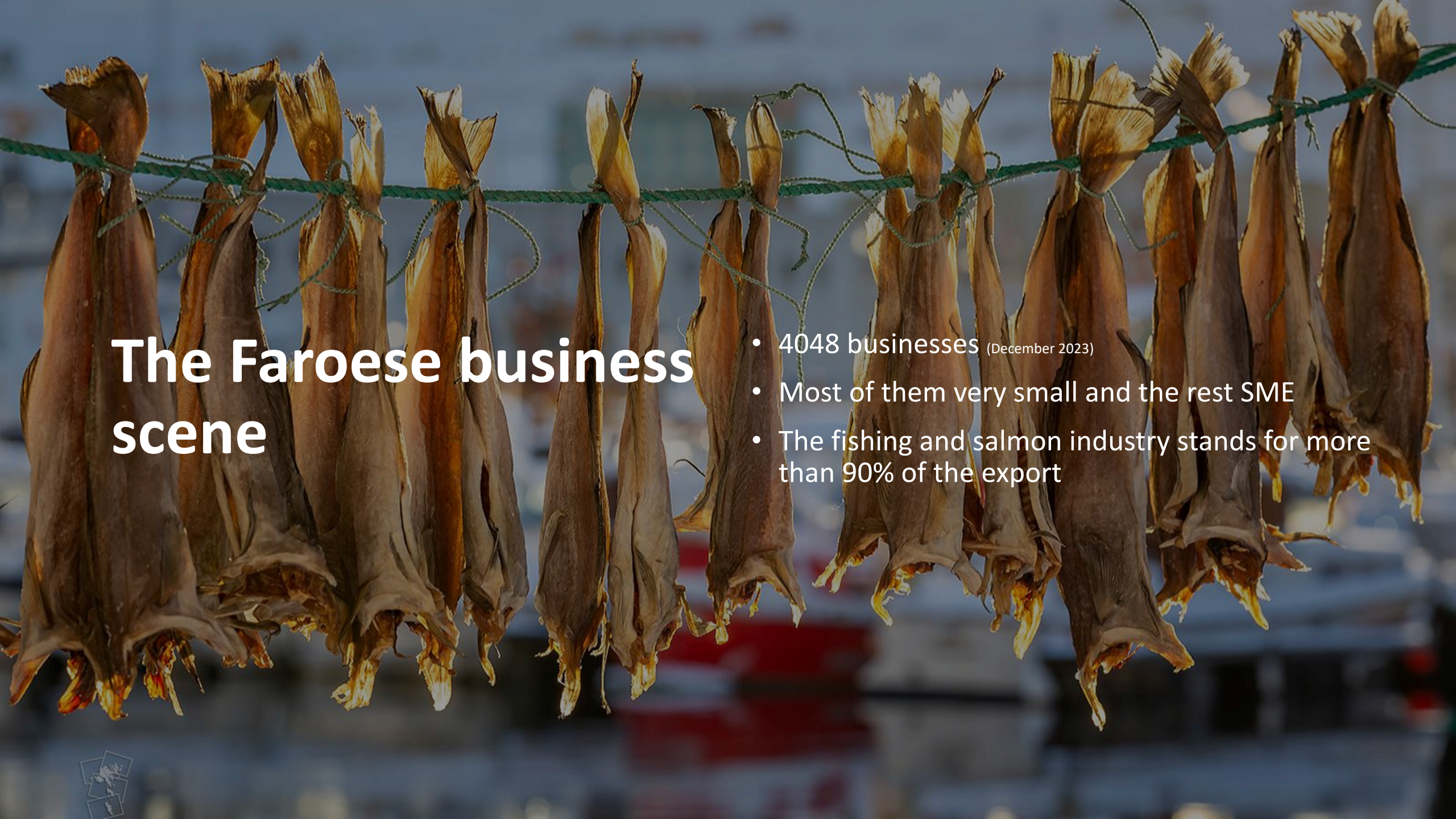
Population 54.476 (March 2024)

Area 1.399 km2

Sea area 275.000 km2

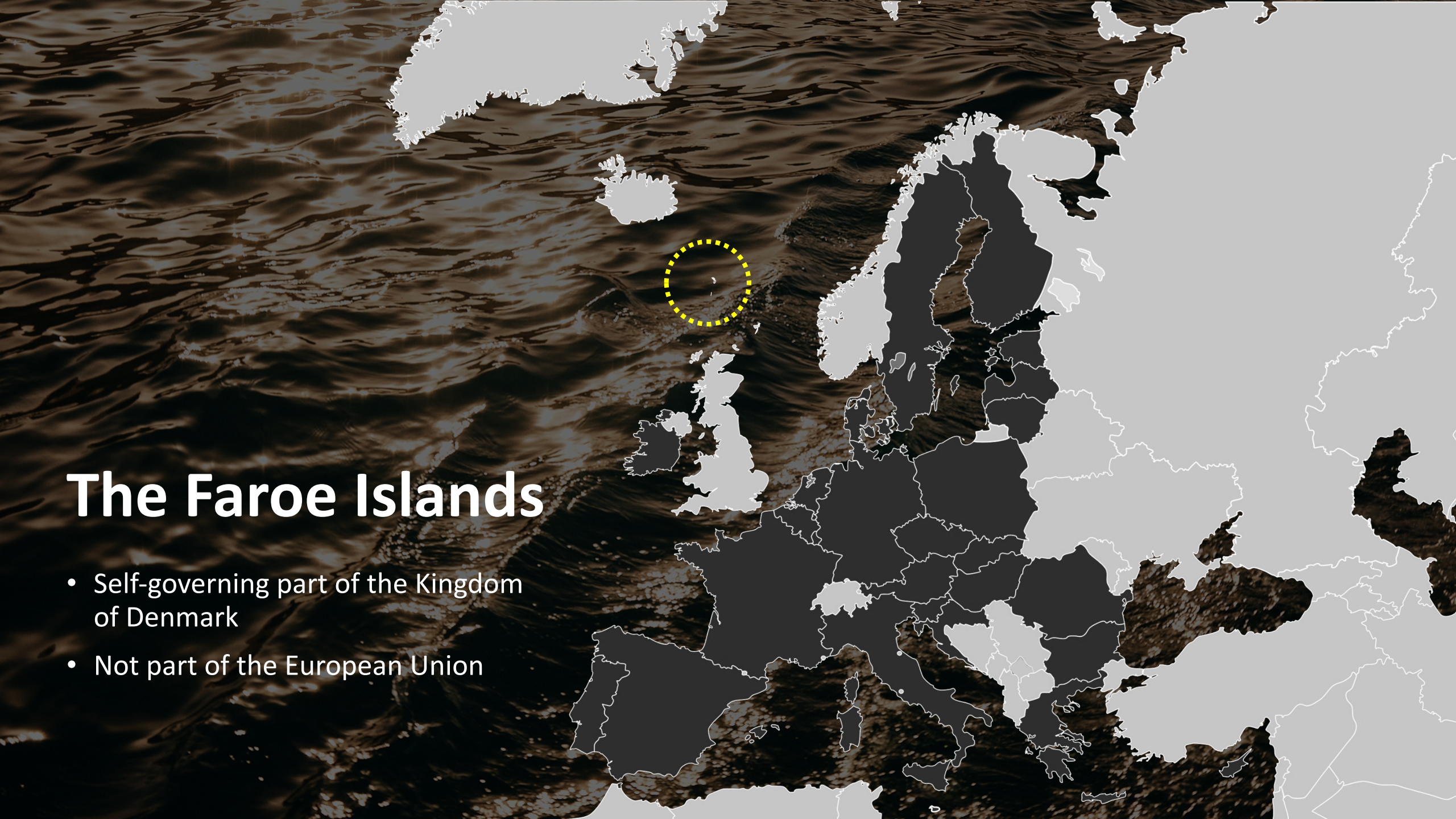
GDP pr. capita 467.000 DKK (2022)

Unemployment rate 1,1% (April 2024)



The Faroese business scene

- 4048 businesses (December 2023)
- Most of them very small and the rest SME
- The fishing and salmon industry stands for more than 90% of the export



The Faroe Islands

- Self-governing part of the Kingdom of Denmark
- Not part of the European Union

Sustainability on the Faroe Islands

- A long history routed in geography and scarcity
- Driven by external factors and frugality
- Come a long way in short time

BURÐARDYGT VINNULÍV

About the initiative

- CEO network of 12 businesses
- Launched in January 2021 for 3 years
- Paid membership basis
- Shared opportunities and challenges

Structure and focus

CLIMATE CHANGE

BIODIVERSITY AND OCEANS

COMMS AND ENGAGEMENT

Burðardygt Vinnulív
Steering Committee

Climate Change Workstream

Biodiversity & Ocean Health Workstream

Comms & Engagement Workstream

Why these issues?

These issues have been selected as key material issues:

- High societal interest
- Growing risk
- Growing regulatory focus
- Growing investor demands
- Growing customer expectations

Companies in the network accounted for 11% of national emissions in 2021 (baseline year)

Progress against our objectives

Objective: 1. To build our **knowledge** of, and **capability** to respond to the challenges.

Progress: Over 40 sessions with local and international experts since January 2021.

Progress against our objectives

Objective: 2. To advance **sustainable business practice** through long-term strategic plan.

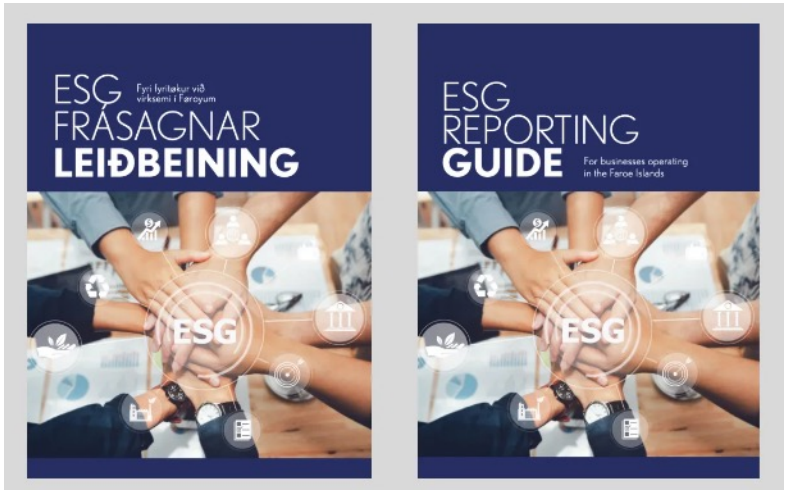
Progress: Developed long-term strategic goals related to climate and nature.

Progress against our objectives

Objective: 3. To **collaborate** for faster progress.

Progress: Since 2021, the network has:

- Collaborated with the Faroese Environment Agency to create a GHG calculator for the Faroe Islands.
- Developed Faroese ESG Reporting Guide with Ministry endorsement.
- Funded research in collaboration with waste management companies.



Progress against our objectives

Objective: 4. To engage with society.

Progress: Active engagement with the Government and other national bodies and held open events for the public to attend.

Progress against our objectives

Objective: 5. To ultimately inspire others in the Faroe Islands to prioritise this agenda.

Progress: Numerous sessions with the Faroese Employers Association and media appearances to promote business action on climate and nature.

Company goals and progress

Climate change

- **Goal**: 50% reduction in scope 1 and 2 emissions by 2030, scope 3 reduction, SBTi submission
- Progress: combined 17% reduction in scope 1 & 2 emissions in 2022, 7 SBTi verified

Biodiversity & ocean health

- **Goal**: one net-positive impact goal by 2030
- **Progress**: all companies made waste reduction commitment and 50+ other commitments to reduce impact on nature

Communications & engagement

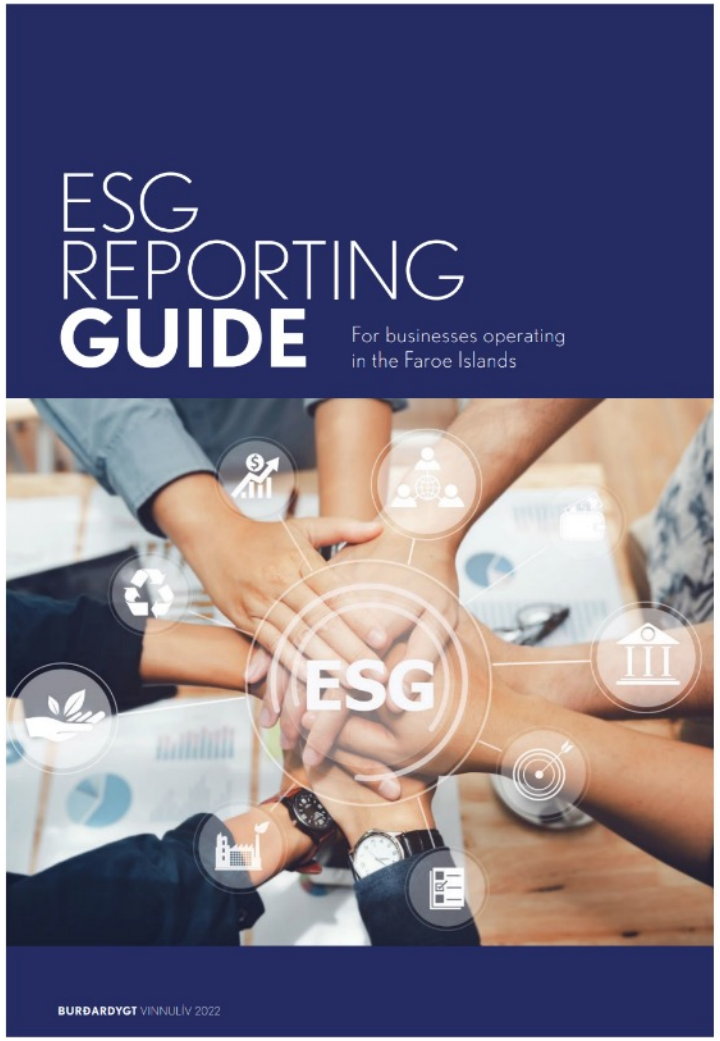
- **Goal**:Transparency to be held accountable and influence system-change; report using the Faroese ESG Reporting Guide
- **Progress**: all companies reporting scope 1, 2 and some 3 emissions, 4 against the guidelines

Recognition

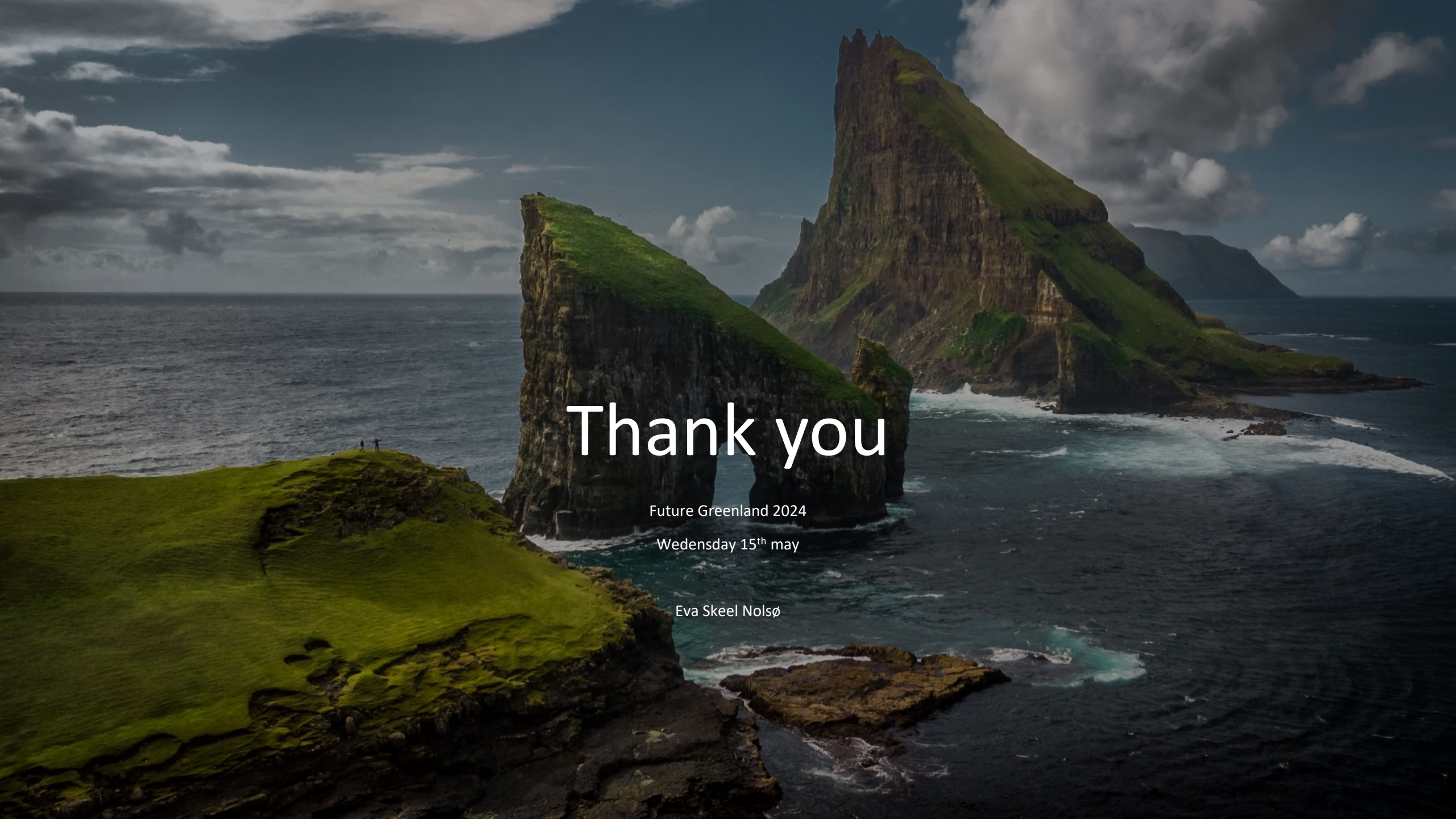
Winner of the 2023 edie Sustainability Leadership international award
Partnership and Collaboration Award

The judges said: “This collaboration has achieved significant, impressive progress in its first year. it has brought together diverse set of partners to take the initiative and fill a void where regulations were not present; working together for ambitious goals. We were impressed by the highly systemic and participative approach taken by such a small community, making this initiative a worthy winner of a very popular category.”

And now what?



More information on progress made by the group can be found on BurðardygtVinnulív.fo


Thank you
Future Greenland 2024
Wedensday 15th may
Eva Skeel Nolsø

UNIKKALLARNEQ

PAUSE

BREAK

Nuuk 14.-15. maj
FUTURE GREENLAND 2024

Suliffeqarfiit piujuartitsisut, kattuffiit nunamullu katinnggassutaasut

Det bæredygtige arbejdsmarked, organisationerne og landets sammenhængskraft

The sustainable labour market, the organizations, and the cohesion of Greenland

SIK

GE/GBA

IMAK

Jess G. Berthelsen,
Krissie Winberg &
Elna Heilmann

Piujuartitsineq aamma aningaasaqarnermut isumaginninnikkullu tunngassutilinnut attuumassuteqarpoq

Bæredygtighed handler også om økonomiske og sociale forhold

Sustainability also involves economic and social components in society

Siulittaasoq,
Aningaasaqarnermut
Siunnersuisoqatigiit

Formand for
Økonomisk Råd

Greenland's Economic
Counsil

Tusagassiortoq

Journalist

Journalist

Torben M. Andersen & Merete Lindstrøm

Bæredygtighed handler også om økonomiske og sociale forhold

Torben M. Andersen

Future Greenland 2024

DEPARTMENT OF ECONOMICS
AND BUSINESS ECONOMICS
AARHUS UNIVERSITY

TORBEN M. ANDERSEN
PROFESSOR

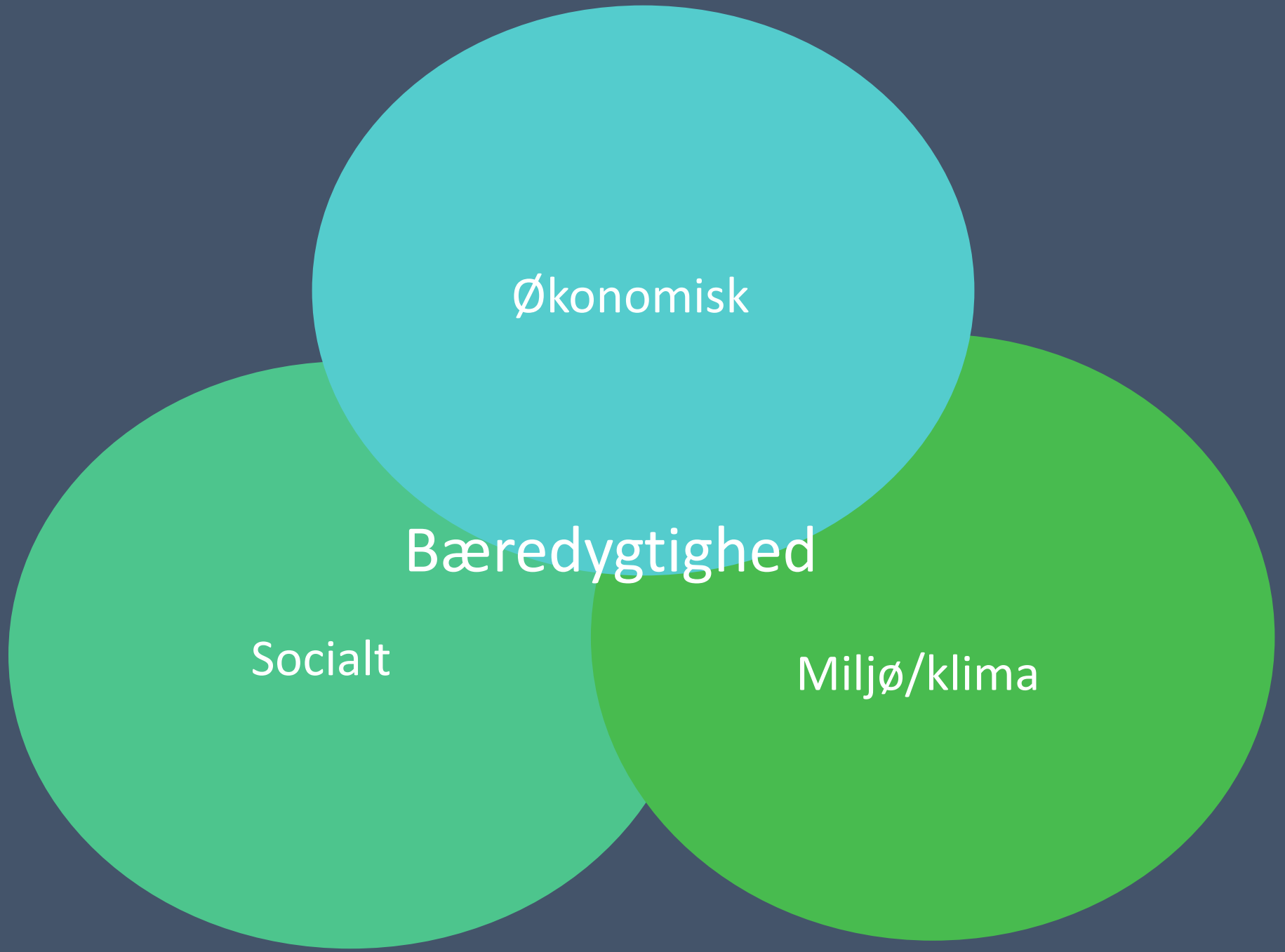
STATUS

- Den økonomiske udvikling har været gunstig igennem en årrække
- Pæn vækst og indkomstfremgang
- Lav ledighed/ ”fuld” beskæftigelse
- Selvstyret – balance på de offentlige budgetter og ingen gæld

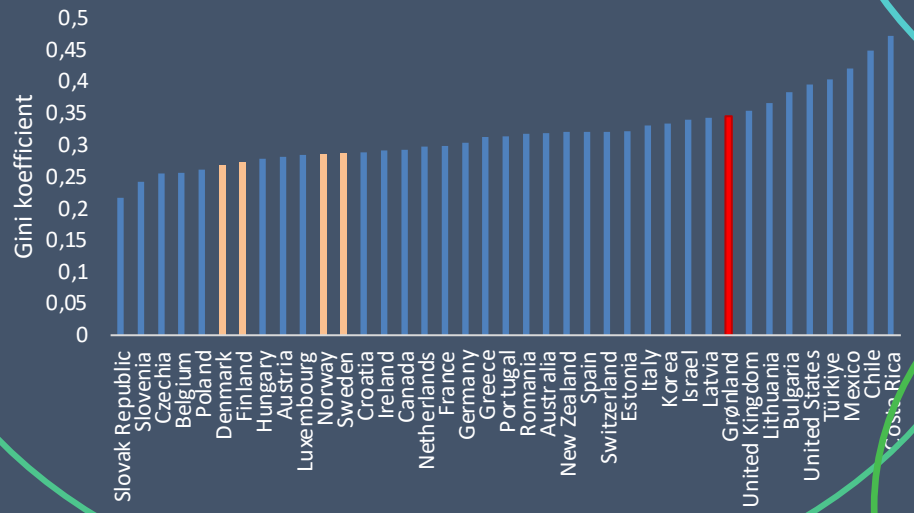
UDSIGTERNE

- Beskedne vækstudsigter
- Fortsat stor afhængighed af fiskeriet -Ikke udsigt til væsentlige nye erhvervsaktiviteter (minedrift) i den nærmeste fremtid
- Stagnerede uddannelsesfremskridt
- Uløst holdbarhedsproblem

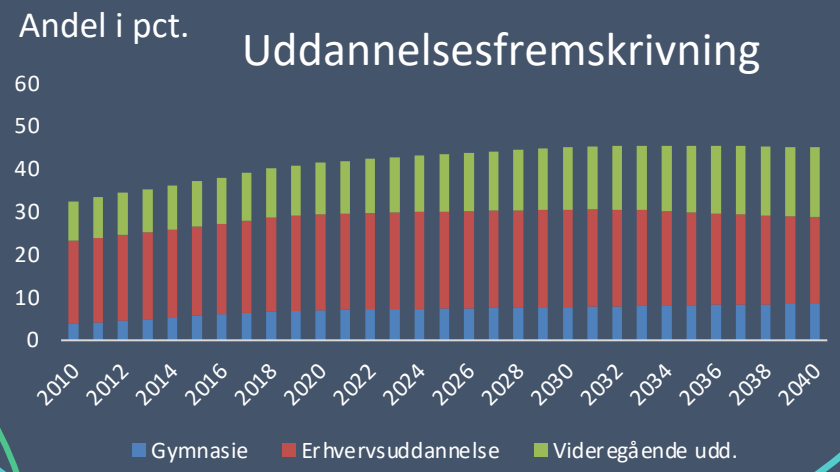

Velstand
Turisme
Geopolitiske forandringer
Velfærd
Udvandring
Produktivitet
Aldring
Afhængighed
Bæredygtighed
Uddannelse
Bosætning
Sociale forhold
Reformer
Selvbærende økonomi
Finanspolitisk holdbarhed
Ulighed
Selvforsyning
Fiskeri
Minedrift
Flerstrenget erhvervsstruktur
Sundhed
BNP
Selvstændighed
Bloktilskud
Klimaforandringer
Indvandring


Økonomisk
Bæredygtighed
Socialt
Miljø/klima

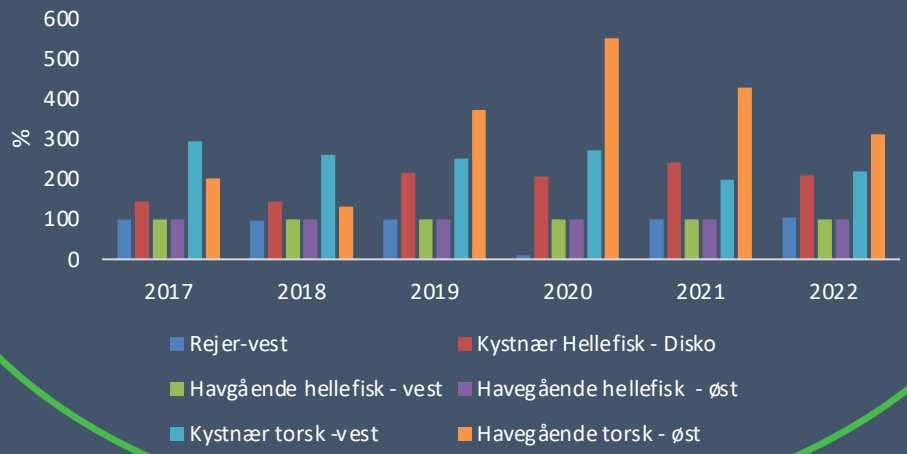
Indkomstulighed



Uddannelsesfremskrivning

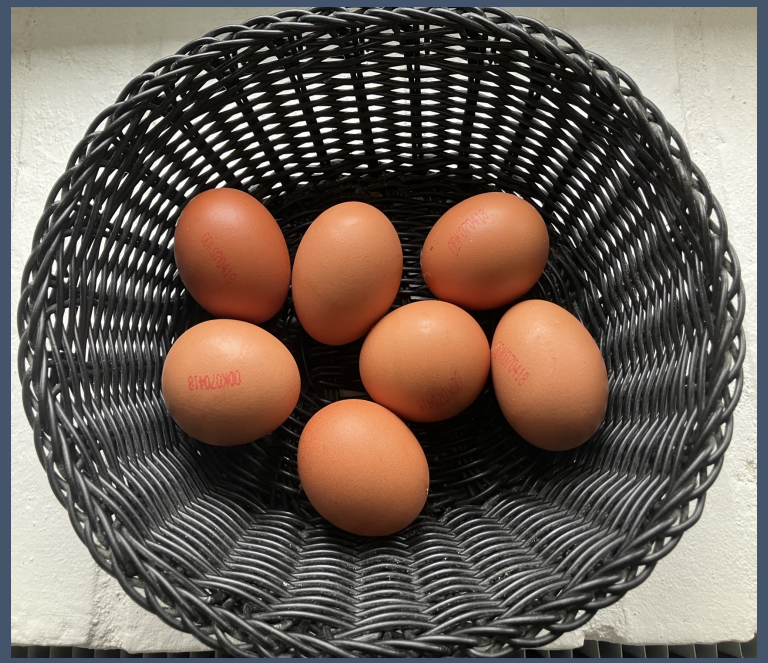


TAC i forhold til biologisk rådgivning udvalgte bestande



Bæredygtighed – mindre sårbarhed

Bredere erhvervsstruktur-
Risikospredning – også investeringer



Selvbærende økonomi
≠ selvforsyning

International handel er
ikke et nul-sumsspil

Selvstyret – holdbarhedsproblem
og risikoeksponering via
Selvstyreejede selskaber


Uddannelse
Forvaltning af naturressourcer
Selvbærende økonomi
Holdbare offentlige finanser
Boligforhold og bosætning

Nuuk 14.-15. maj

FUTURE GREENLAND 2024

Doughnuts piujuartitsinermut sanaartornermullu qanoq attuumassuteqaramik?

Hvad har doughnuts med bæredygtighed og byggeri at gøre?

What do doughnuts have to do with sustainability and construction?

Pisortaq, Rambøll

Direktør Rambøll

Director Rambøll

Inooraq Brandt

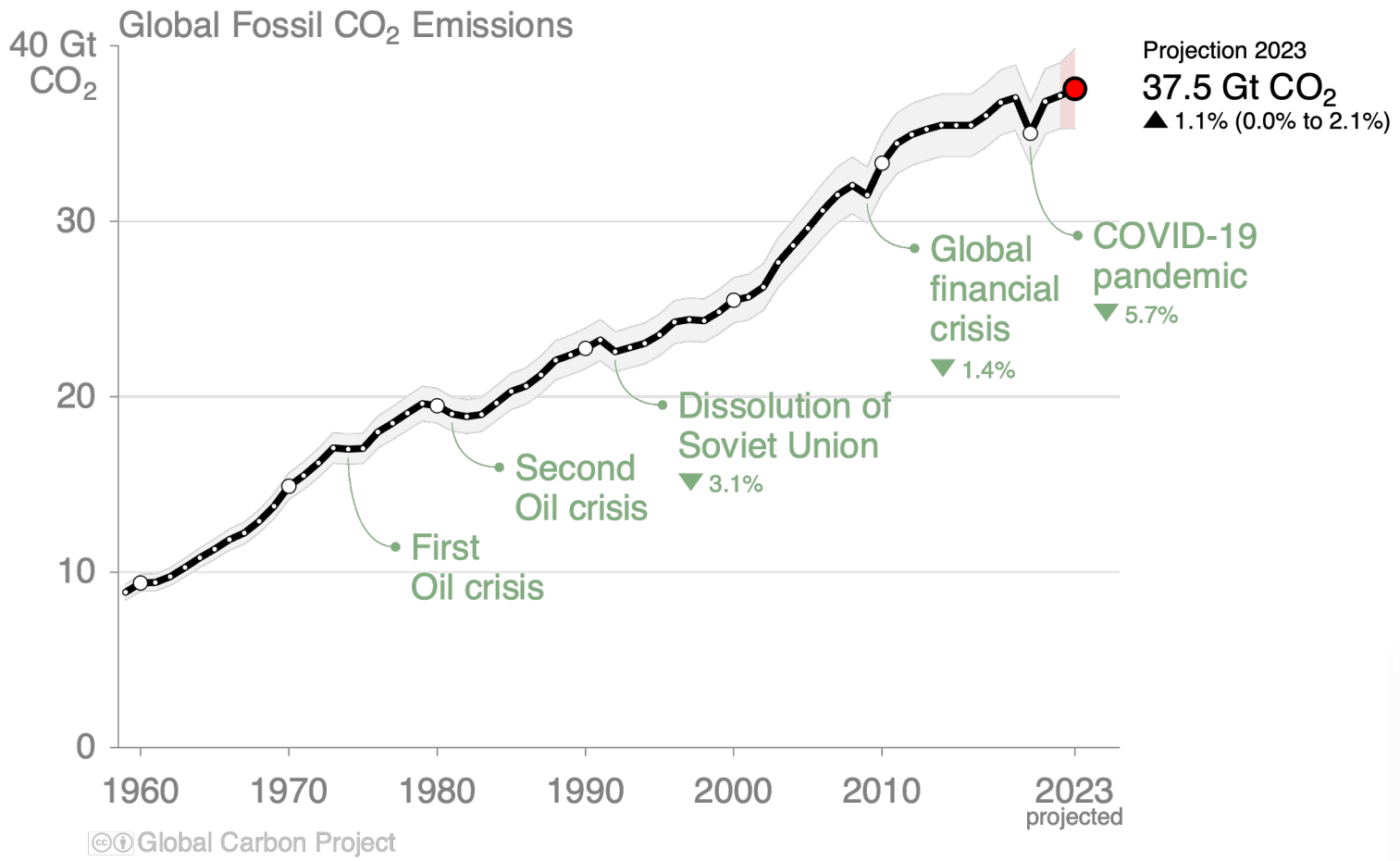
Hvad har doughnuts med bæredygtighed og byggeri at gøre?

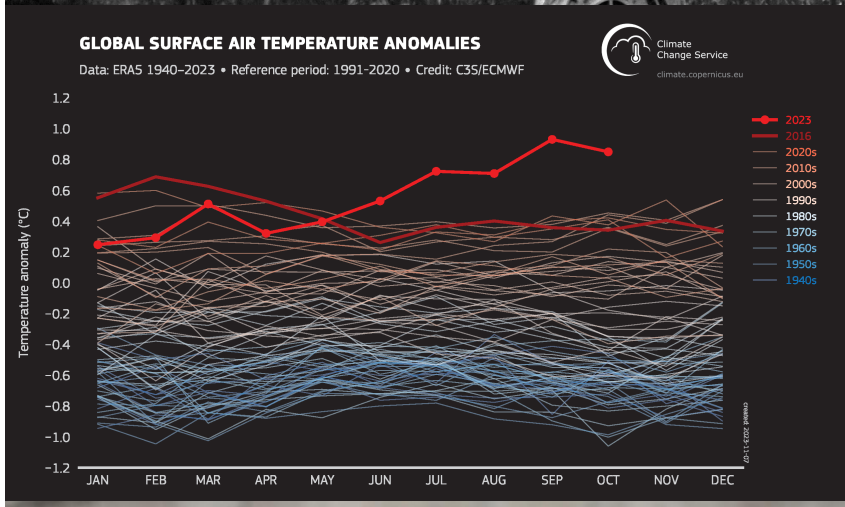
Oplæg v. Inooraq Brandt
Administrerende direktør, Rambøll Grønland

RAMBØLL

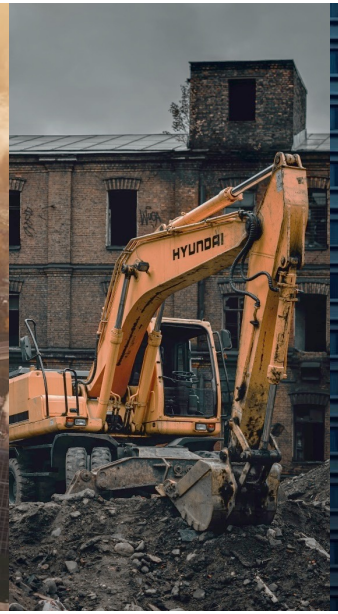
Bright ideas.
Sustainable change.

De globale fossile CO2-udledninger stiger fortsat





Udfordringer omsat til byggeri






Climate change

Collectively, buildings in the EU are responsible for 40% of our energy consumption and 36% of GHG emissions

Circularity

Construction and demolition waste (CDW) accounts for 35% of all waste generated in the EU (450 – 500 million tonnes per year)

Health

Due to poor indoor air quality alone, 120.000 Europeans die prematurely every year incurring an annual cost of €260 billion

Water use

Due to increasing pressures from population growth and pollution, 29% of total groundwater in the EU lacks sufficient capacity to meet the needs of ecosystems and people

Value & cost

In the EU alone, climate change-related events caused over €145 billion in economic losses in the past decade

Resilience

Failure to mitigate and adapt to climate change is ranked as the most severe threat to humanity, but is the global risk we are seen to be the least prepared for

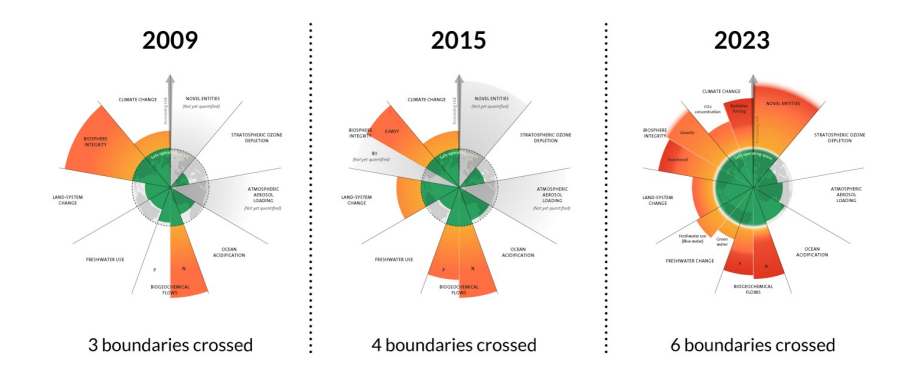
Biodiversity

55% of global GDP is at risk due to nature dependency, with the building sector being the industry that depends most on nature ($4 trillion)

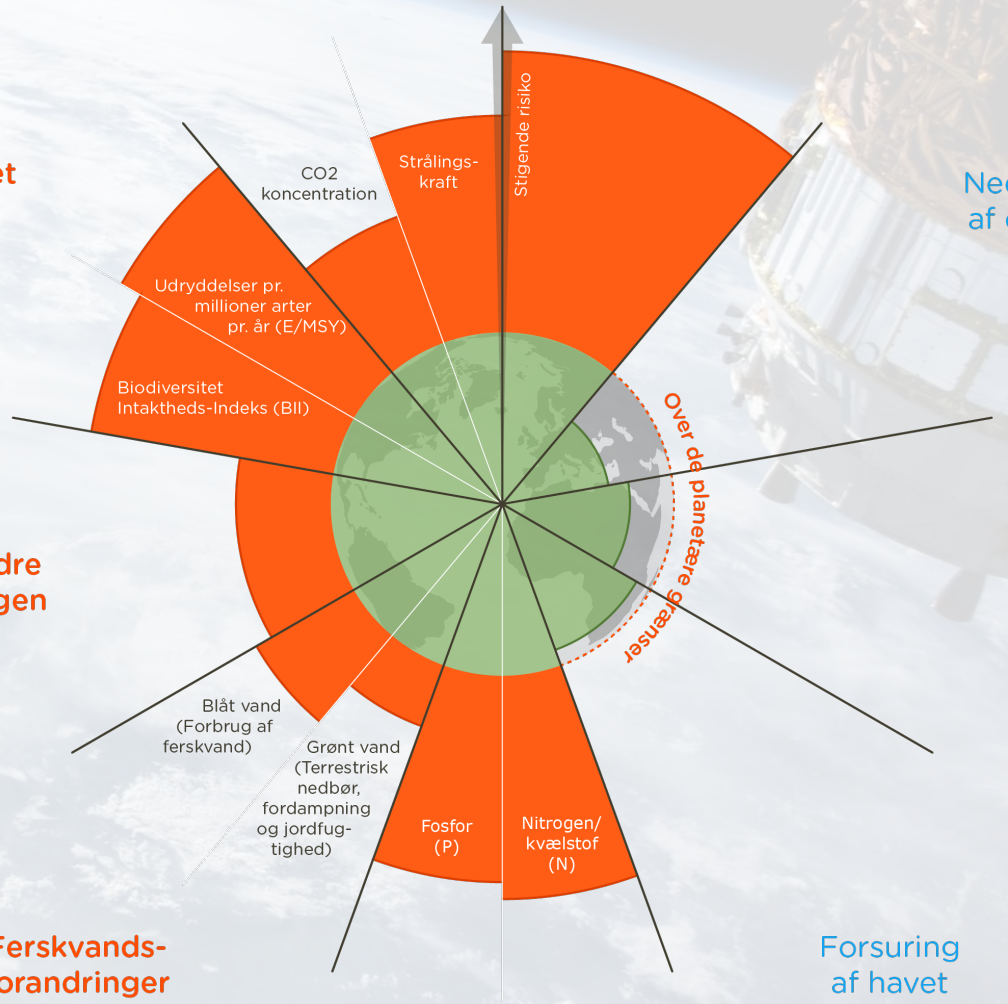
Just transition

8% of EU population are unable to keep their homes adequately warm, while 72% feel that it is increasingly difficult to buy the first property

6 ud af 9 planetære grænser er overskredet



2023



Grænsen for sikre planetære niveauer

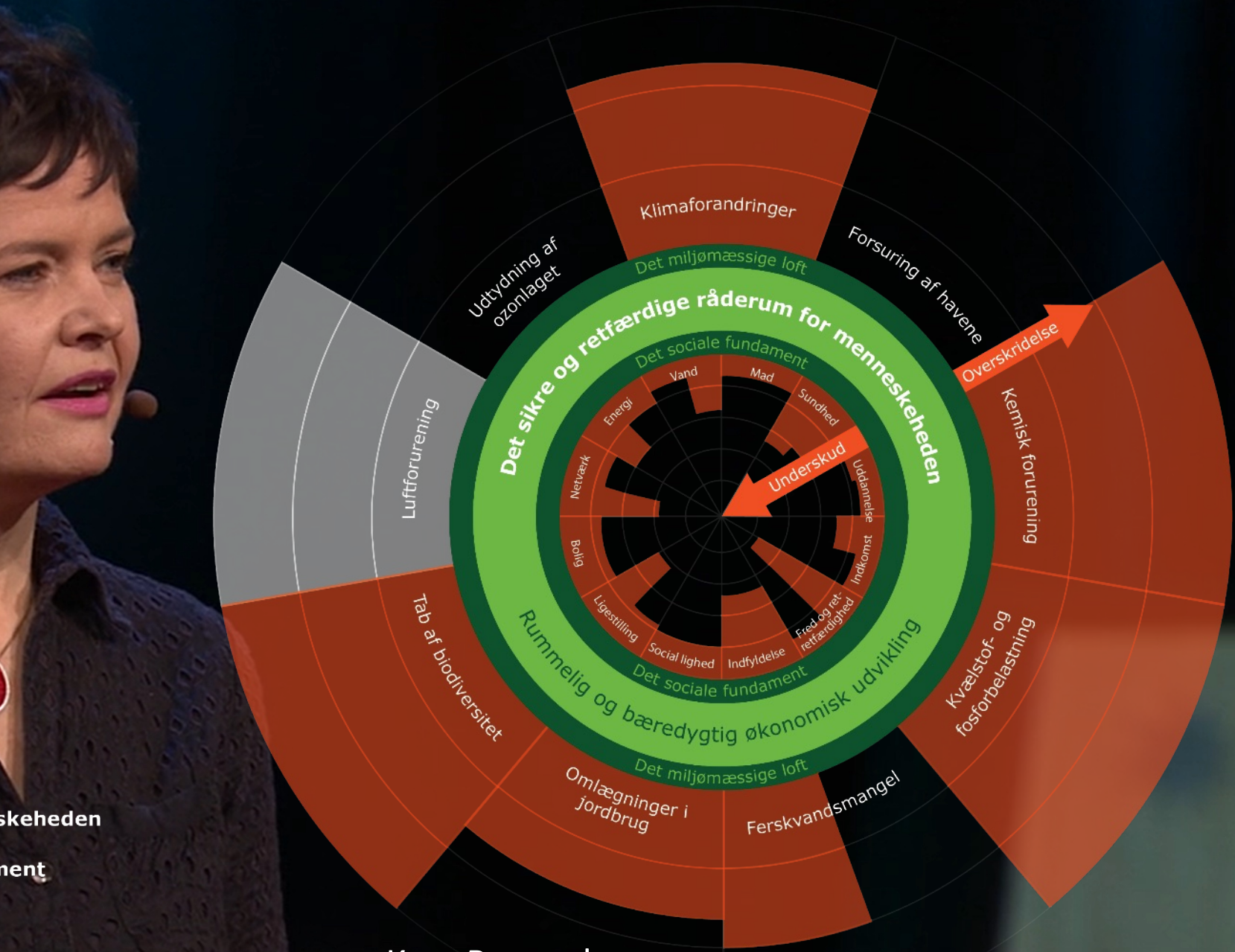
Videnskabeligt observerede niveauer, hvor de planetære grænser er overskredet

Stockholm Resilience Centre
Sustainability Science for Biosphere Stewardship

Stockholm University

Doughnut økonomi

Sociale og planetariske grænser



- Det sikre og retfærdige råderum for menneskeheden
- Det miljømæssige loft og det sociale fundament
- Over eller under grænsen
- Grænsen er ikke kvantificeret

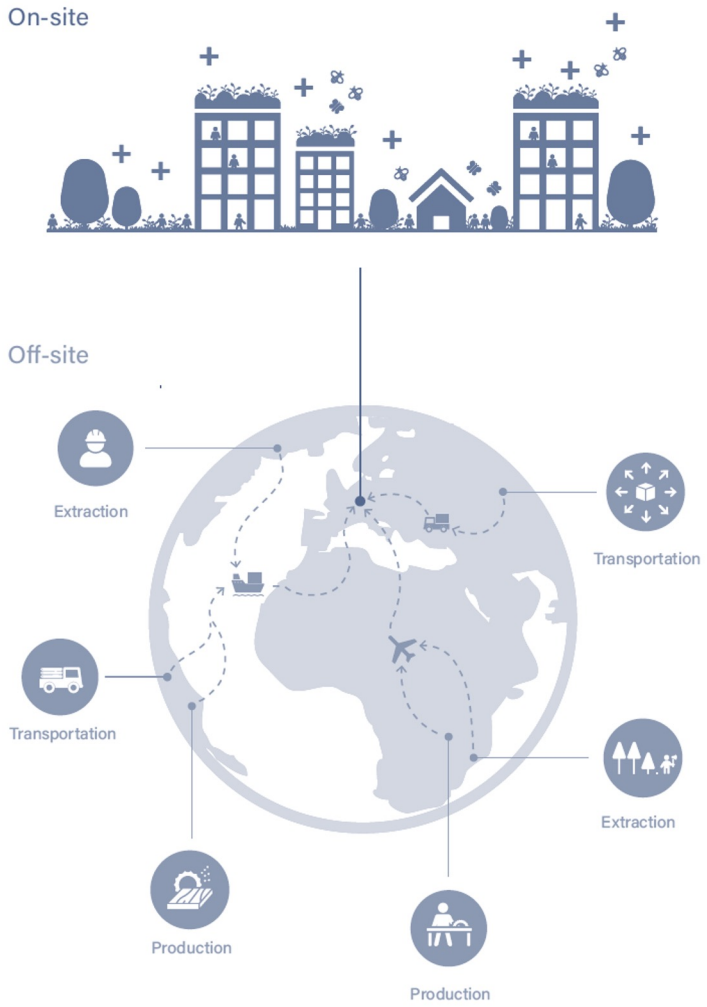
Obs! Illustrationen viser ikke de opdaterede 2023 planetære grænser

Kate Raworth
Oxford økonom, Doughnut Economics

Foto: ted.com

Doughnut-model

Absolut bæredygtighed on-site og off-site

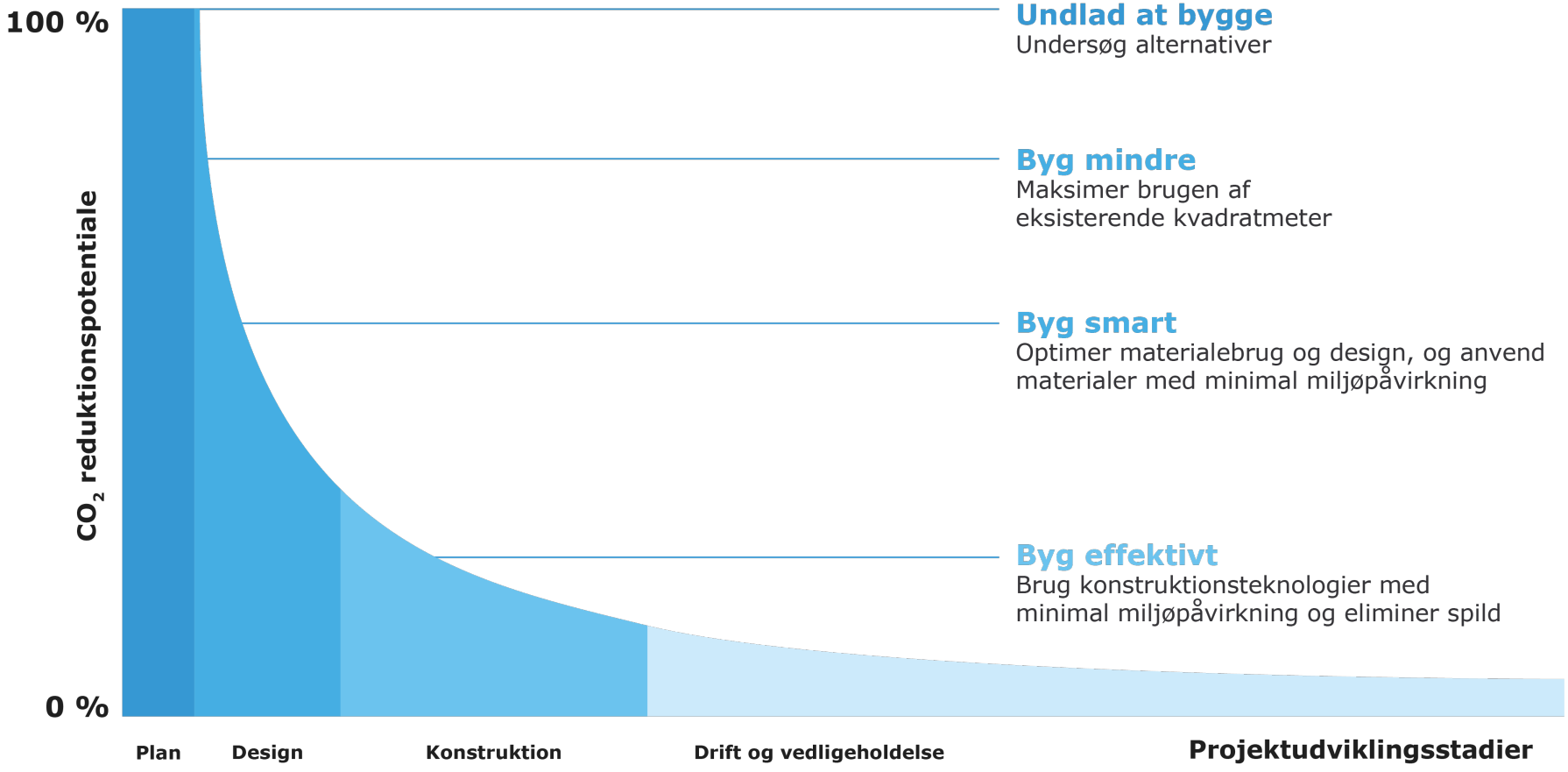


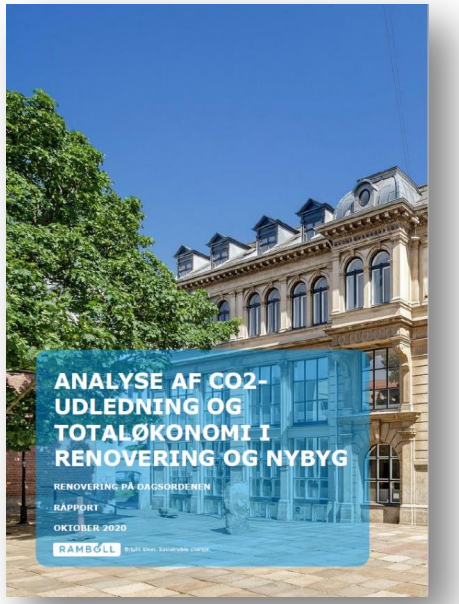
A **regenerative approach** to real estate development should consider both the project's on-site and off-site impacts through **3 key objectives**:

- Absolute targets for **CO2 emissions**
- Absolute targets for **biodiversity (on-site and off-site)**
- Transparent assessment and targets for **social impact (on-site and off-site)**

Kilde: The Doughnut for Urban Development

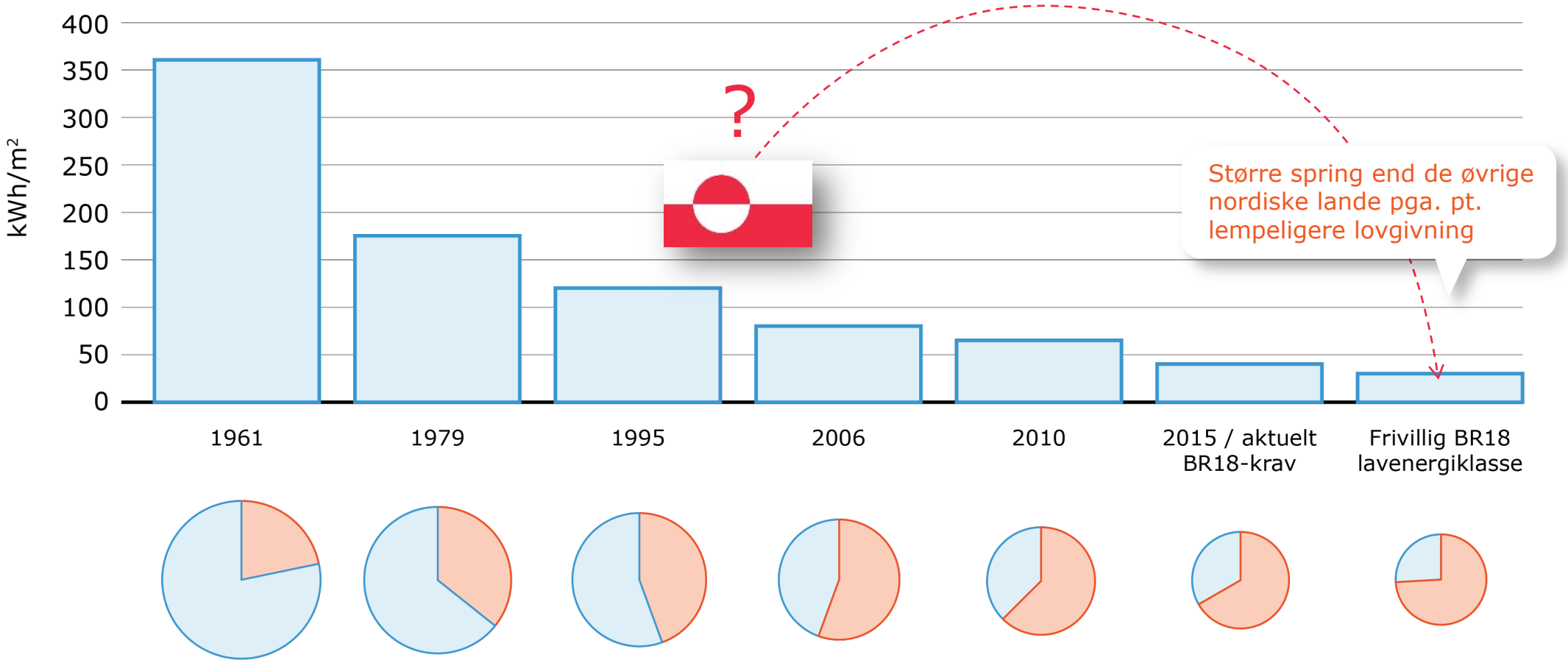
Miljømæssigt og totaløkonomisk fordelagtigt at renovere frem for at rive ned og bygge nyt





Analysen viser, at det er mest fordelagtigt – både miljømæssigt og total-økonomisk - at renovere frem for at rive ned og bygge nyt.

Forholdet mellem den operationelle (drift) og den indlejrede klimapåvirkning (bygning) har flyttet sig markant siden 1961…



Kilde: Energistyrelsen

Større fokus på at bevare og udvikle

- **Genbrug af betonkonstruktioner**
- **Materialer udskiftes kun hvis de er udtjente**
- **Renovering/ombygning giver flere muligheder** for, at mindre lokale håndværksmestre kan byde på opgaverne
- **Mulighed for byfortætning**
- **Placering af byggefelter**
- **Bæredygtig energiforsyning**
- **Fokus på indeklima** – tættere bygninger kræver bl.a. skarpt fokus på balanceret ventilation med varmegenvinding

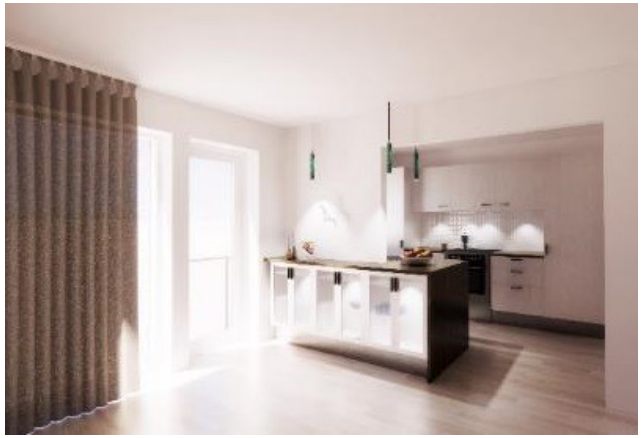
Kompetencer og fælles løsninger

- Kompetenceløft relevant på **tværs af branchen**
- Både **energirammeberegning og LCA** er nye designparametre
- **EPD og generisk EPD-data** er ikke retvisende i en Grønlandsk kontekst, bl.a.
  - Transporten
  - Materialernes egnethed i Grønland
  - Bortskaffelse af materialerne

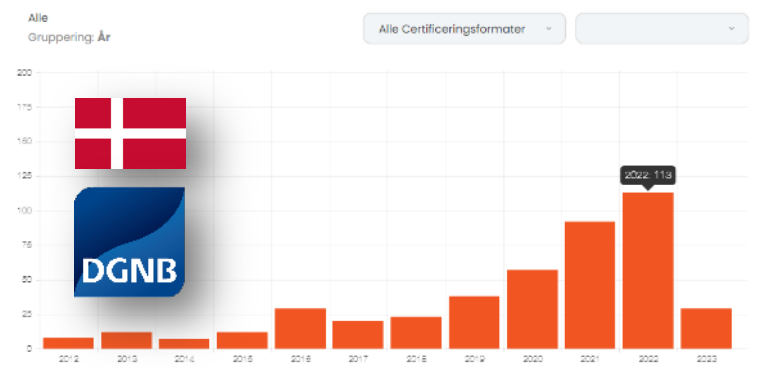
Almennyttige boliger i Ilulissat

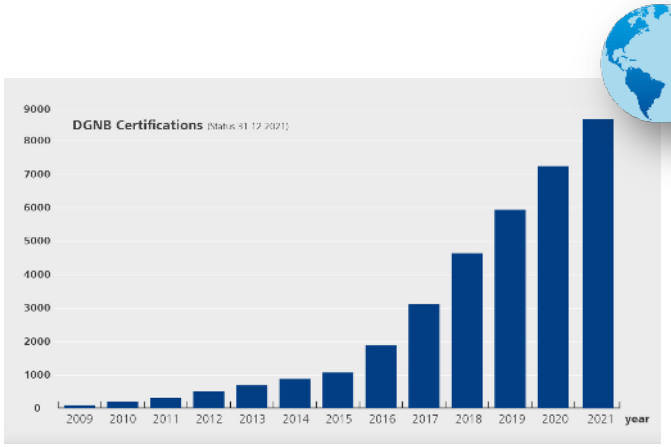
- Genbrug af de bærende konstruktioner
- Bevarer identitet
- Tilgodeser også de mindre aktører inden for entreprenørbranchen
- Bedre indeklima
- Bedre dagslys og udsyn
- Højere livskvalitet

Almennyttige boliger i Ilulissat

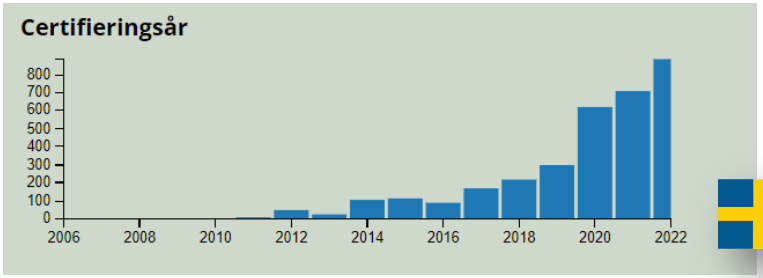


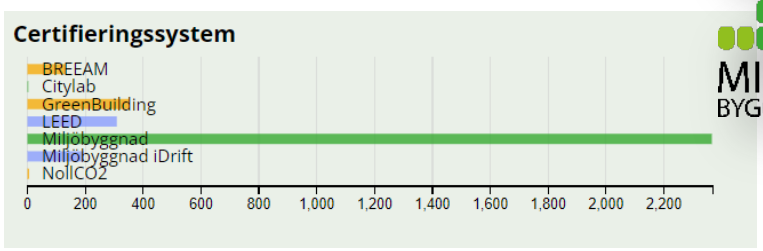
Certificeret byggeri i vækst på tværs af de nordiske lande og globalt



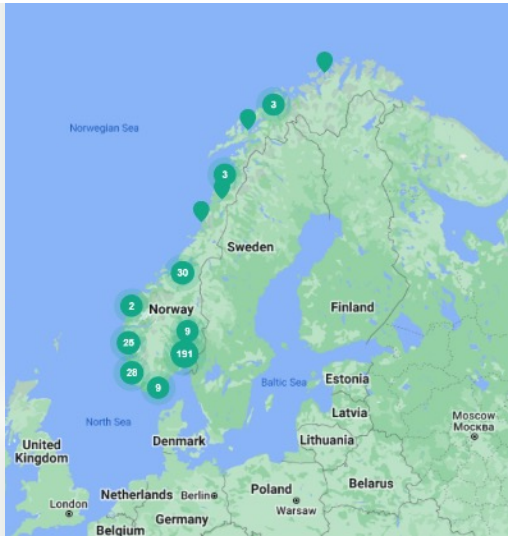


rfbb.dk
sgbc.se
byggalliansen.no





MILJÖ BYGGNAD



DGNB Grønland

- Certificering af bæredygtigt byggeri, tilpasset grønlandske forhold
Bæredygtighed er ikke det samme i Grønland og Danmark

- Fordi:
- Ønske fra branchen bredt
- Politisk ønske
- Kommende krav til finansiering (EU's taksonomi

DGNB Grønland er et bredt initiativ fra

GrønlandsBANKEN

DTU

DTU Construct

tnt nuuk

inuplan

engineering the arctic

RAMBØLL

EMJ-ATCON

Greenland A/S

Grønlands Selvstyre
Departementet for
Boliger og Infrastruktur

I samarbejde med:

RÅDET FOR BÆREDYGTIGT BYGGERI

INSTITUT FOR BYGGERI, BY OG MILJØ

- samt alle de interessenter i Grønland, som har meldt sig til at deltage med viden, kommentarer m.m.

Finansiering af arbejdet kommer fra

Grønlands Selvstyre
GrønlandsBANKEN
GrønlandsBANKENS erhvervsfond
Nykredits Fond

- men der skal findes en driftsfinansiering

Bright
ideas.
Sustainable
change.

RAMBØLL

Nuuk 14.-15. maj

FUTURE GREENLAND 2024

Fuelling the Future

Pisortaq, DTU

Professor fra DTU

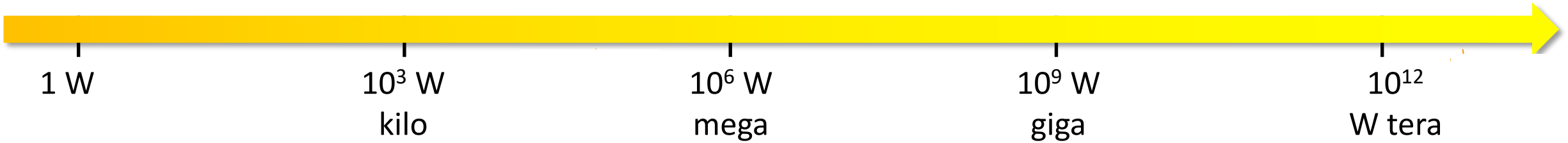
Professor from DTU

Peter Christian Kjærgaard

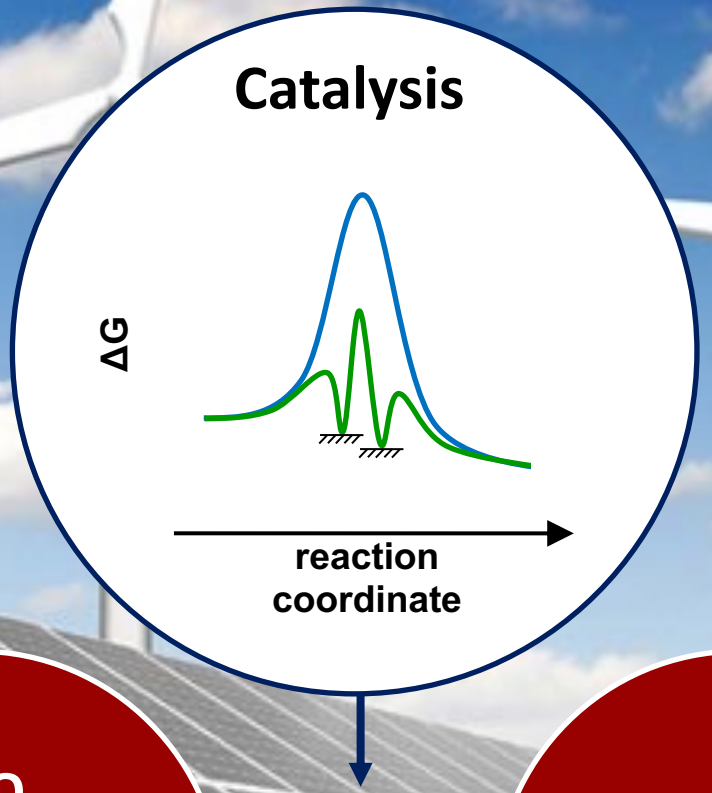
Fuelling the future.
- and Power-2-x in Greenland

Peter C. K. Vesborg

Professor of Physics
&
Scientific director of VPX


1 W
10³ W
kilo
10⁶ W
mega
10⁹ W
giga
10¹²
W tera

(Modern) Power-2-X



Sustainable electricity

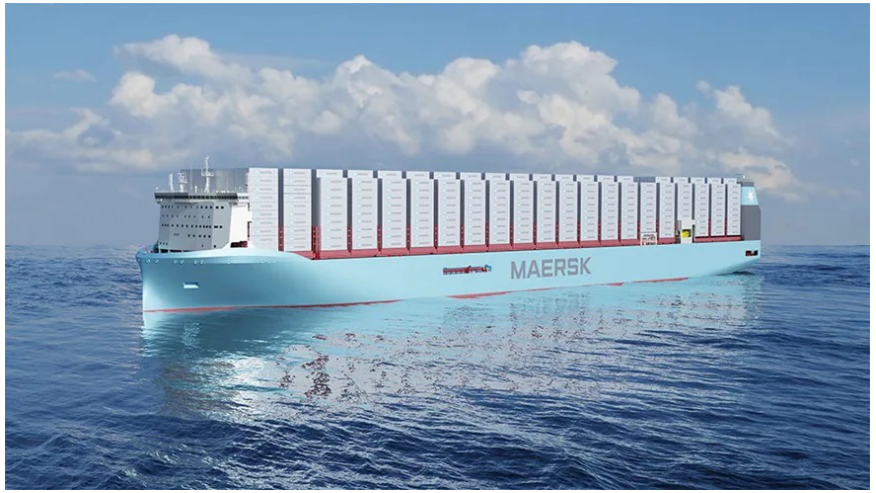
+

H_2O
CO_2
N_2
...

H_2
$C_xH_yO_z$
NH_3
...

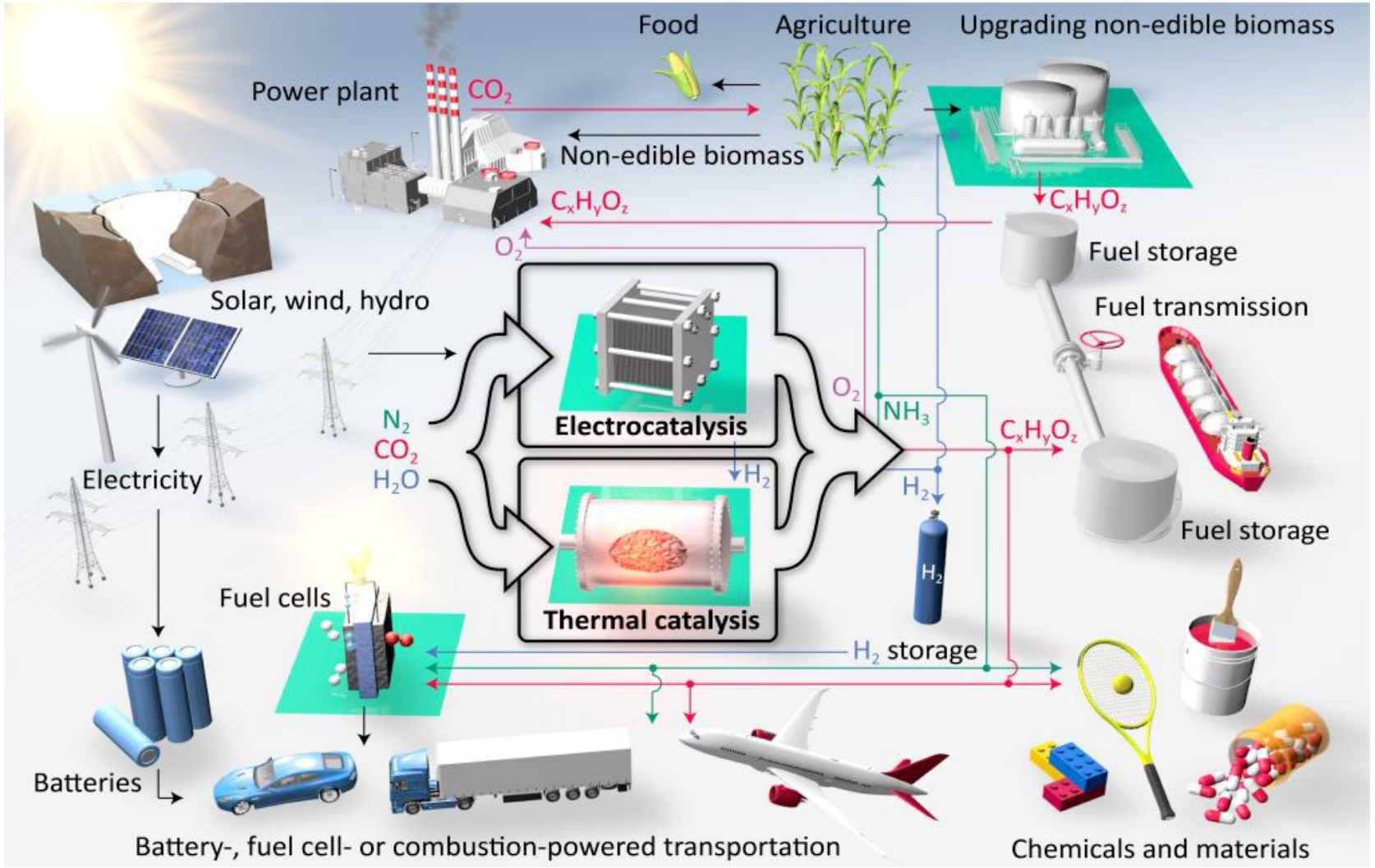
Fuels without fossil - 2nd generation P2X
Not everything can be electrified

- Un-electrifiable necessities:
  - Air transport (except very short-haul, perhaps)
  - Heavy industrial equipment such as ocean-going ships and perhaps some fraction of trucks
  - Chemical industry (agricultural products, textile production, plastics, pharmaceuticals, paints and pigments, lubricants, electrical insulation, etc. etc.)



Peter.Vesborg@fysik.dtu.dk

2nd generation P2X: Research needs for a fossil free future



Europe uses:
Total 2.2 TW

~ 5 % for Chemicals

~ 5 % for Steel prod.

~ 3 % for Aviation fuel

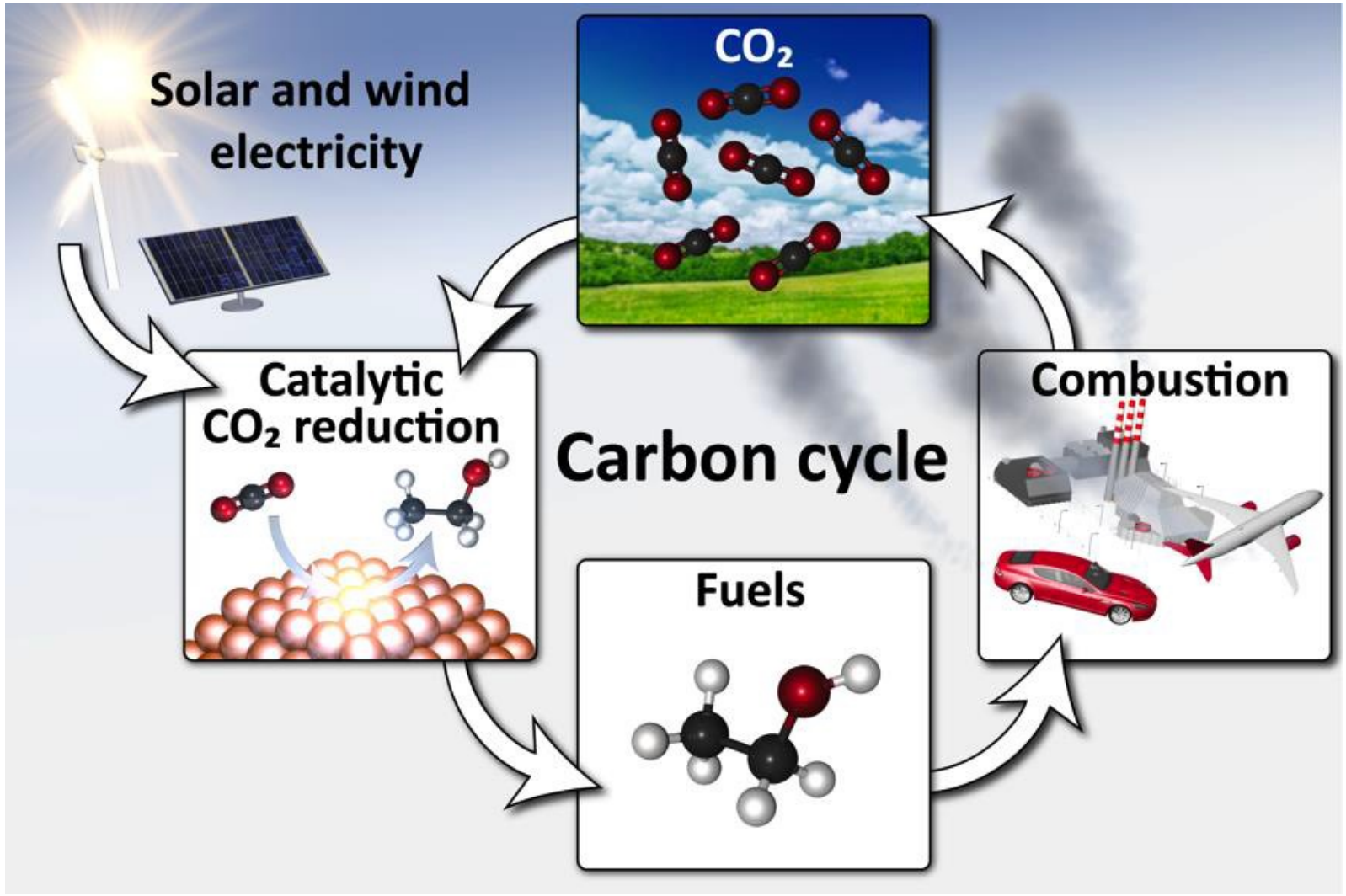
~ 3 % for Shipping

Where will the CO_2 come from?

- Concrete production
- Biomass using O_2 from Electrolysis
- Direct air capture?

Peter.Vesborg@fysik.dtu.dk

P2X:
A circular CO_2 economy



This could perhaps be done – even better – with ammonia.

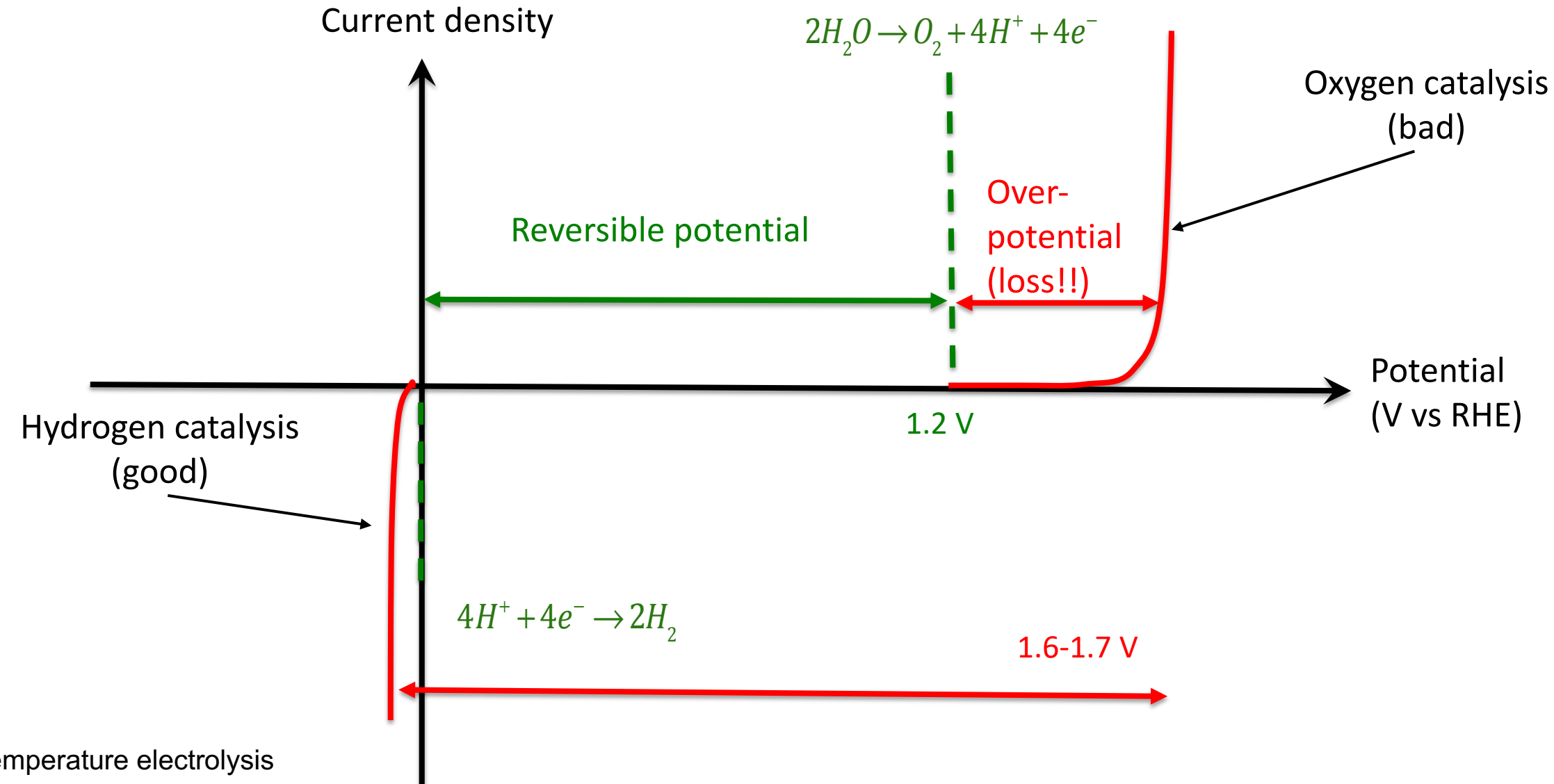
0.04% CO_2 vs

79% N_2

in the atmosphere

Peter.Vesborg@fysik.dtu.dk

P2X - The oxygen problem affecting all† fuels incl H_2



† low-temperature electrolysis

Energy consumption in Greenland

Energy forms

Total electricity consumption:	41 MW	(360 GWh)
Total oil consumption:		228 MW (2000 GWh)
Total district heating:		26 MW (230 GWh)

Main users

Households:		74 MW (electrifiable)
Fishing:		72 MW (needs Diesel?)
Road transport:	22 MW	(electrifiable)
Aviation:		21 MW (needs Jet fuel)

Maniitsoq:

Tasersiaq:
300 MW, 2500 GWh/yr.
Søndre Isortup Isua:
125 MW, 1000 GWh/yr
Umiiviit:
100 MW, 900 GWh/yr

Nuuk:

Kangerluarsussuaq (Grædefjord):
110 - 160 MW, 900 - 1300 GWh/yr
Allumersat (Bjørnesund):
40 - 85 MW, 300 - 700 GWh/yr

Paamiut:

Isorsua:
45 - 100 MW, 340 - 850 GWh/yr

Kangaarsuuptasersua:
65 - 125 MW, 500 - 1000 GWh/yr

Narsaq:

Johan Dahl Land:
40 MW, 300 GWh/yr

Ilulissat:

Nuussuaq:
45MW, 350 GWh/yr

Bottom line:
Ca 10 sites offer at least 40 MW 24/7 power.

Total resource (only including large sites) is ca 1 GW

1 GW is more than 3x Greenland's current TOTAL energy consumption (295 MW before massive electrification).

Source: Nukissiorfiit, "Grønlands vandkraftressourcer
En oversigt – August 2005"

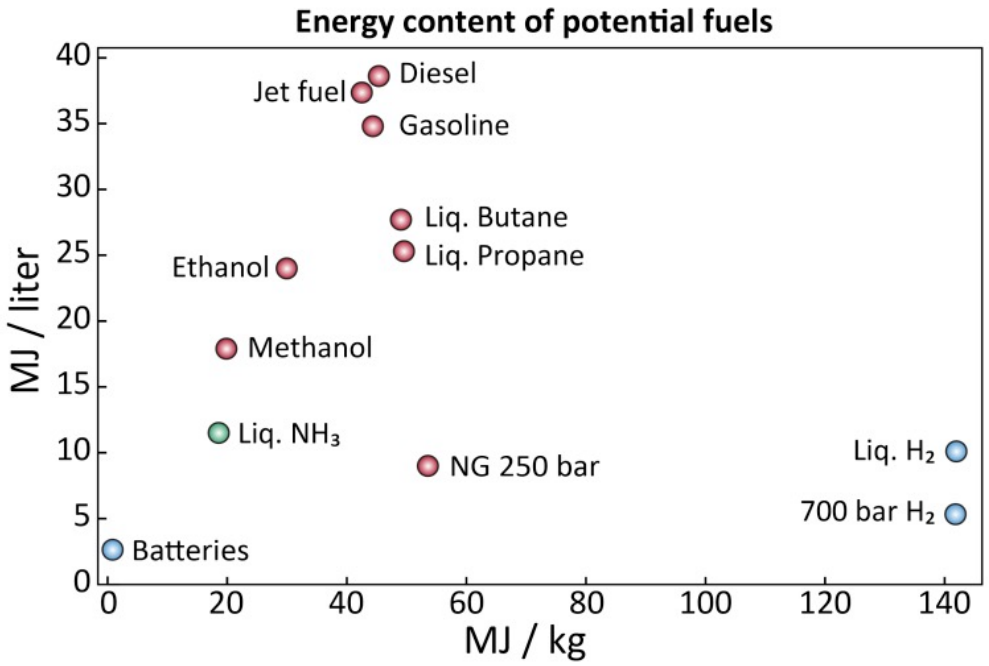
What to make? Different metrics

P2X product	Formation energy	Hist. Price	Annual Prod.	Market value
	GJ/ton	$/GJ	mega ton/yr	giga $/yr
Jet A / Jet A1	42	14	570	320
Ammonia /Urea	23 / 11	16 / 24	200	50
Methanol	22	16	100	35
(Poly)Ethylene	42	36	50	75
Ammonium Nitrate	4.8	62	50	15

Low volume, high price

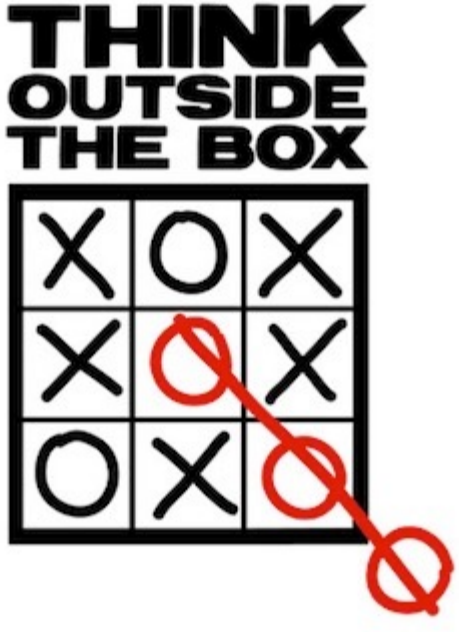
Solvents, pigments, monomers, pharma precursors, halogenates, lubricants,...

P2X - value per contained energy



X	CH_4	H_2	CO	Jet fuel hydrocarbons	NH_3	Urea	Base polymers PE, PP, PVC	NH_4NO_3	Al	Mg	Cl_2 & NaOH	Perf. polymers PC, PEEK, PTFE
$/GJ	3	4	5	12	15	24	35	60	100	140	140	(high)
¢/kWh	1.0	1.4	1.8	4.3	5	9	13	22	37	50	50	(high)

P2X - what to make in Greenland



Does anyone in Greenland need **hydrogen**?
If not - how to get it to customers?

Greenland clearly needs fuel for ships (for example), but where is the CO_2 to make **hydrocarbons** going to come from?

Aluminium (easy to ship, requires alumina import, large unit size)

Alternatives which only require air, water or seawater:
Ammonia (semi-easy to ship, medium value)
Ammonium nitrate (easy to ship, higher value, higher complexity)
Magnesium (& chlorine) (resource is seawater, medium unit size, high value)
Chlorine+Caustic soda (resource is seawater, medium unit size, high value)
Sodium chlorate (easy to ship, resource is seawater, medium unit size, high value)
...


Fjarðaál, East Iceland
Large aluminium electrolysis (350.000 ton/year)
Energy: ca 600 MW (ca 5300 GWh/yr)
Ca 450 jobs

vs

- All P2X products are commodities - ultimately only production price matters for competitiveness
- China is the main producer of magnesium (via the non-electrolytic "Pidgeon process" (reduction via Si))
- Ammonia is a massive global commodity with significant "economy of scale" (Haber-Bosch process)
- Hydrogen seems impractical to ship from Greenland?
- For local use (in Greenland) the best P2X product would be fuel (for ships), but that demands CO_2

Greenland has a massive opportunity in P2X

but projects must carefully be evaluated for

- local participation and ownership (stakeholder management)
- prevention of pollution
- changing global prices for input and products
- potential for self sufficiency
- useful bi-product streams (e.g. pure CO_2 from Aluminium production)

Kalaalimerngit pillugit ilisimatusarnermit misilittakkat

Erfaringer fra forskning i grønlandsk mad

Lessons learned from research in Greenlandic Indigenous foodways

Professoritut tapertaasoq Ilimatusarfik

Lektor fra Ilimatusarfik

Associate Professor from Ilimatusarfik

Aviaja Lyberth Hauptmann

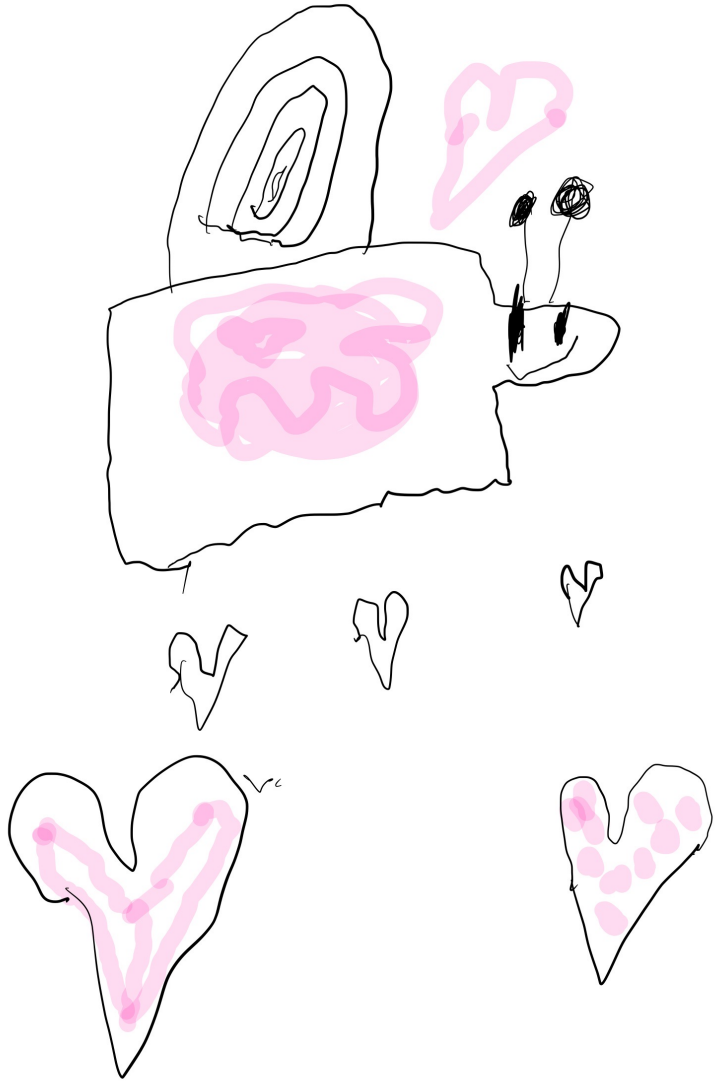
Lessons from research in
Greenlandic Indigenous foodways

The potential for a stronger sustainability concept

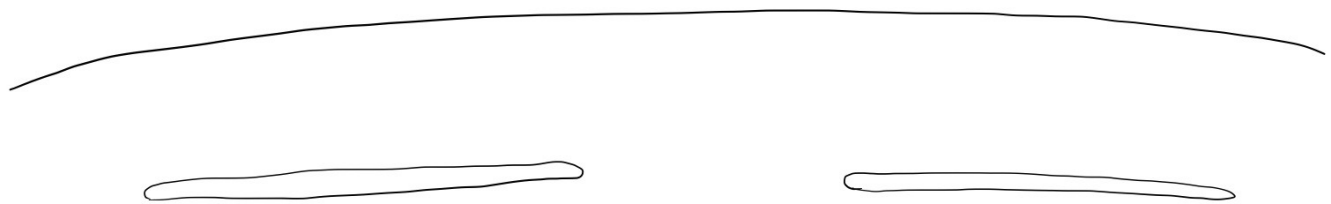
Aviâja Lyberth Hauptmann, PhD
Associate Professor,
Ilisimatusarfik

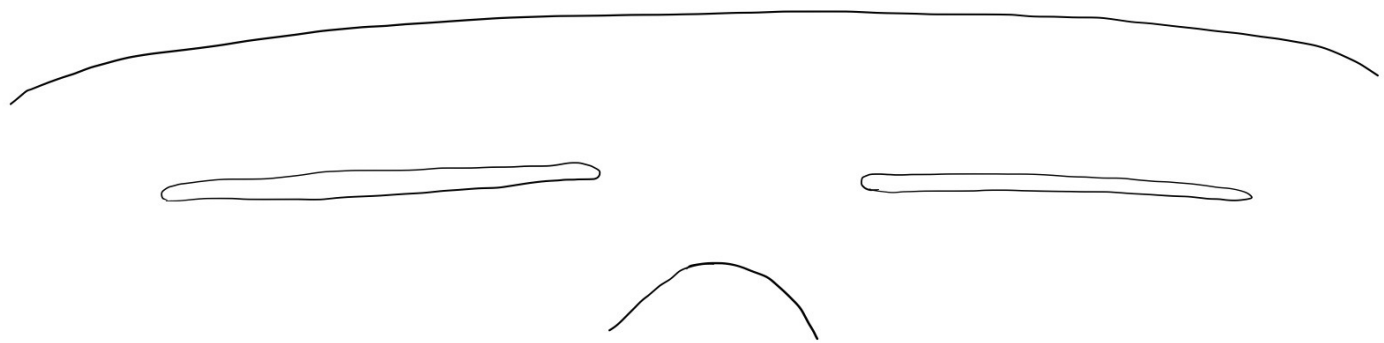
"*Unlocking the potential for a sustainable Greenland – Why, How and What?*"

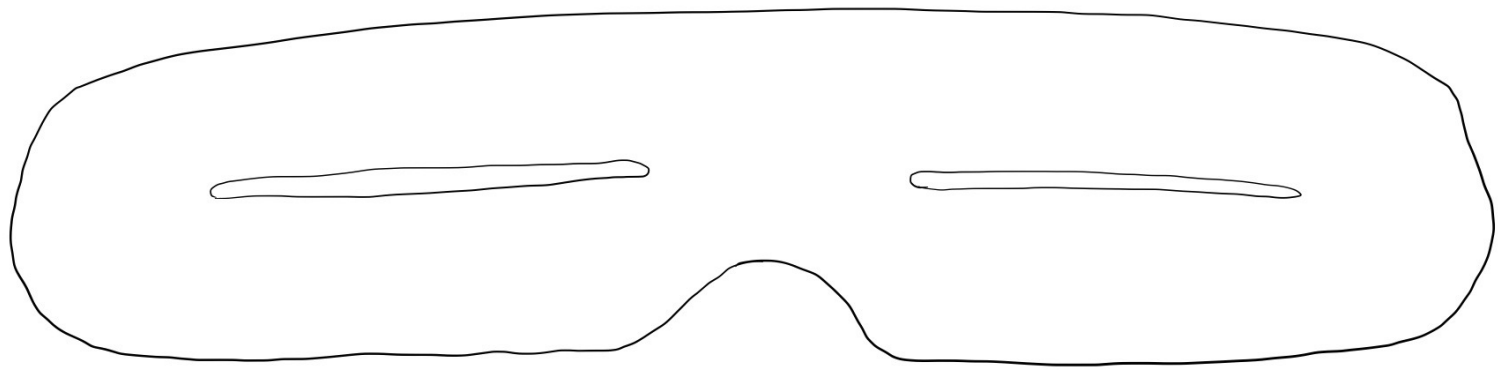
An experiment



Ivik Hauptmann, 5 years







Inuit sunglasses

LUCAS JACKSON/REUTERS/CORBIS

TAKEAWAY

We view the world from different perspectives

Lessons from research in Greenlandic Indigenous foodways

Photo: Carsten Egevang

The dietary and normal metabolism of Eskimos.

The Eskimos are probably the most exquisitely carnivorous people on earth, living, as most of them do, almost exclusively on meat and fish. At the Danish trading stations bread and flour can be bought, but the Eskimos living at a distance from these places use very little of it and may for long periods be absolutely without vegetable food.

A STUDY OF
THE DIET AND METABOLISM OF ESKIMOS
UNDERTAKEN IN 1908 ON AN EXPEDITION
TO GREENLAND

BY

AUGUST KROGH AND MARIE KROGH

1913


forest
Go fresh
Go Vegan
Save THE PLANET
Green Vibes
SAVE THE EARTH
Stop GLOBAL WarminG
THERE IS NO PLANET B
LOCALLY GROWN
Green IS THE New Black

Plant-based foods are nutrient dense and affordable, whilst having a lower impact on the environment than animal-based foods.

Willett *et al*. 2019. **Food in the Anthropocene: the EAT–*Lancet* Commission on healthy diets from sustainable food systems**

Diets inextricably link human health and environmental sustainability. The scientific targets for healthy diets and sustainable food systems are integrated into a common framework, the safe operating space for food systems, so that win-win diets (ie, healthy and environmentally sustainable) can be identified. We propose that this framework is universal for all food cultures and production systems in the world, with a high potential of local adaptation and scalability.


FOOD IS MORE
THAN WHAT'S
ON YOUR PLATE

The White/Wiphala Paper on Indigenous Peoples' Food Systems.

FAO. 2021.

"Food is more than just eating: For Indigenous Peoples, food carries nutritional, medicinal, healing, spiritual, social, cultural, relational and emotional dimensions and values. Food is an expression of the linkages between Indigenous Peoples, lands, waters, non-human relatives (species), and the spiritual world."

FOOD IS THERAPY

‘Forest bathing’ is latest fitness trend to hit U.S. — ‘Where yoga was 30 years ago’

By Meeri Kim

"… a number of scientific studies emphasize that reveling in the great outdoors promotes human health. Spending time in natural environments has been linked to lower stress levels, improved working memory and feeling more alive, among other positive attributes."

WWW.WASHINGTONPOST.COM

FOOD IS FITNESS

Lyt til denne artikel

Grønlandske børn og unge blandt verdens mest aktive

Mere end halvdelen af de grønlandske børn og unge er fysisk aktive mindst én time om dagen, og det placerer dem helt i verdenstoppen.

Photo: Ivaaq Kriegel

FOOD IS SHARING

"a distinction that Inuit regularly make about the ways Inuit depend on one another for support versus the ways in which Qallunaat do not. Whereas the former is **a world of continuous sharing and redistribution of wealth**, practices that strengthen the ties of interdependence, the latter is a world of continuous accumulation of personal wealth, practices that lead to social stratification and isolation."

Searles (2002) Food and the making of modern Inuit identities. Food and Foodways 10:55-78


FOOD IS
ENVIRONMENTAL
CONSCIOUSNESS

NEWS

Over 40% of Children Think Bacon Comes from Plants and French Fries Are Some Kind of Meat, According to a New Study

https://www.foodandwine.com/news/children-meat-plant-sources-survey

TAKEAWAY

A strong sustainability concept
is a diverse sustainability concept

QUJANAQ!

Ullup qeqqasiorneq

Frokost

Lunch

Ullup qeqqasiorneq

Sideevent 2

Lunch

Borgmesterit peqatigalugit politikikkut oqallinneq

Politisk rundbord med borgmestrene

Political roundtable with the Mayors

Aqutsisoq / Moderator

Merete Lindstrøm

Tusagassiortoq

Journalist

Journalist

Ane Hansen

Qeqertalik

Stine Egede

Kujalleq

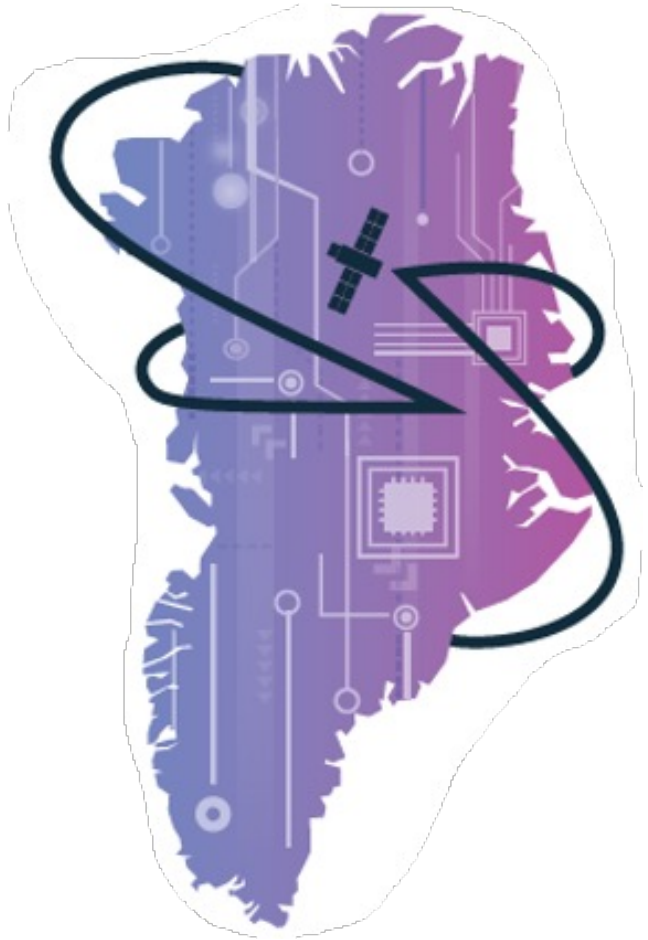
Avaaraq S. Olsen

Sermersooq

Bendt K Kristiansen

Avannaata


GrønlandsBANKEN
Erhvervsfonden
INUSSUK
Travel by Heart
Greenland
FLIES
WE WORK WITH PASSION FOR PEOPLE
AL
ARCTIC LAW
Greenland
SBS
Serviceorienteret IT
NAVIAIR
meetings
SISA Pension
STARK
Sammen bygger vi professionelt
cBRAIN
ARCTIC IMPORT
SFAI
GREENLAND



THE FUTURE IS GREENLAND

19-20. MAJ 2026

Sulisitsisut

Qujanaq

Tak

Thanks

Future Greenland is organized by
Greenland Business Association

Stay connected...

Future Greenland is organized by
Greenland Business Association

FG24 qujanaq – 2026-mi takus'

Tak til FG24 – vi ses i 2026

Thank you – see you in 2026