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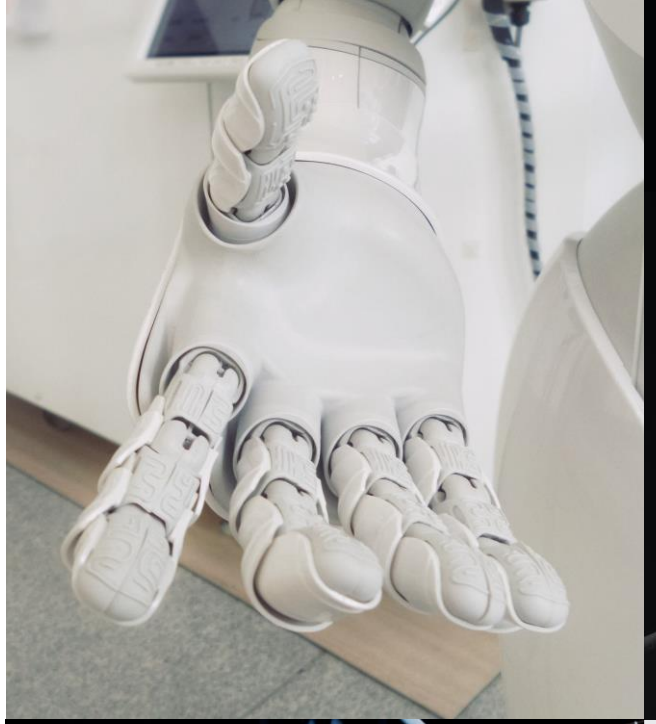
SKOL LEAVING A LEGACY

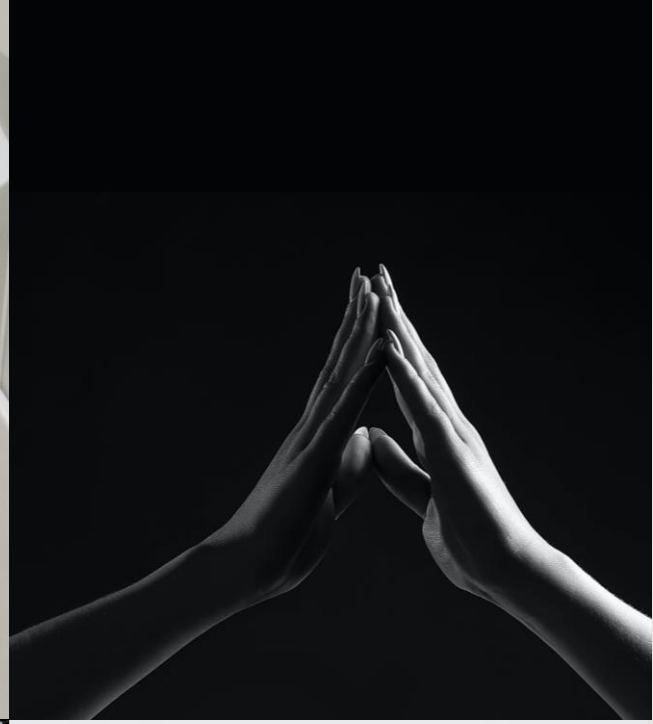
Consulting’s every-day legacy through foot- and handprints

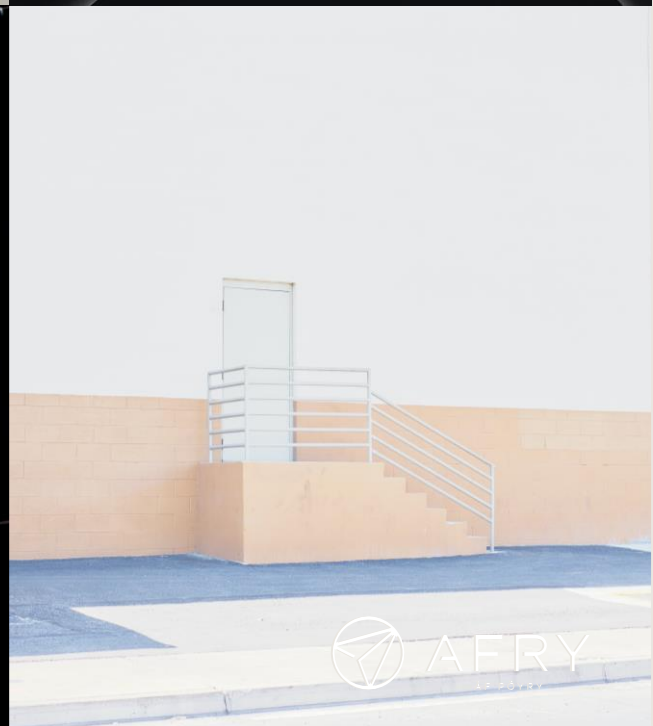
DRAFT REPORT/PARTIAL

VASARA/LEHTINEN/TAKAMÄKI/LE

Agenda







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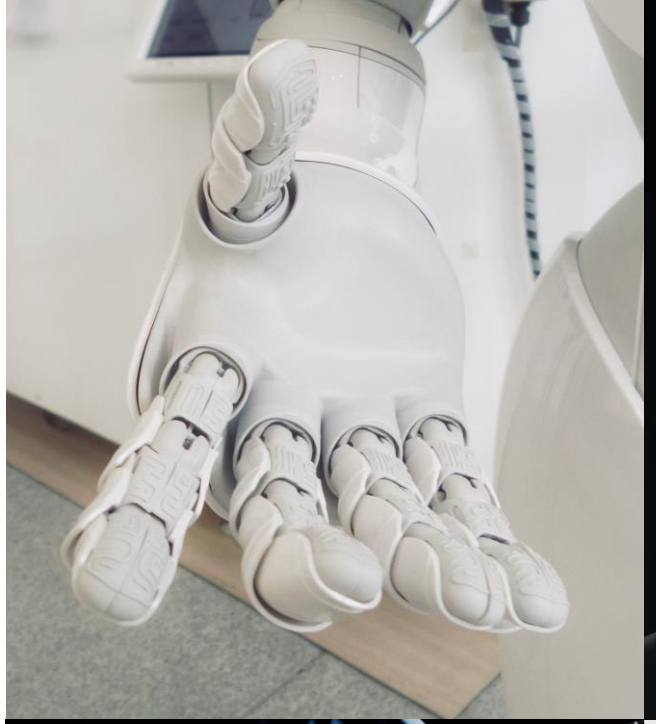

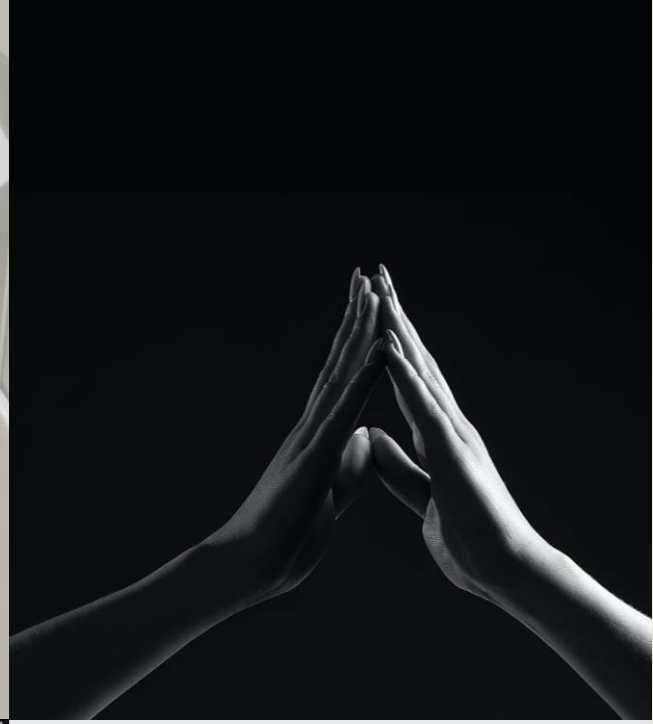

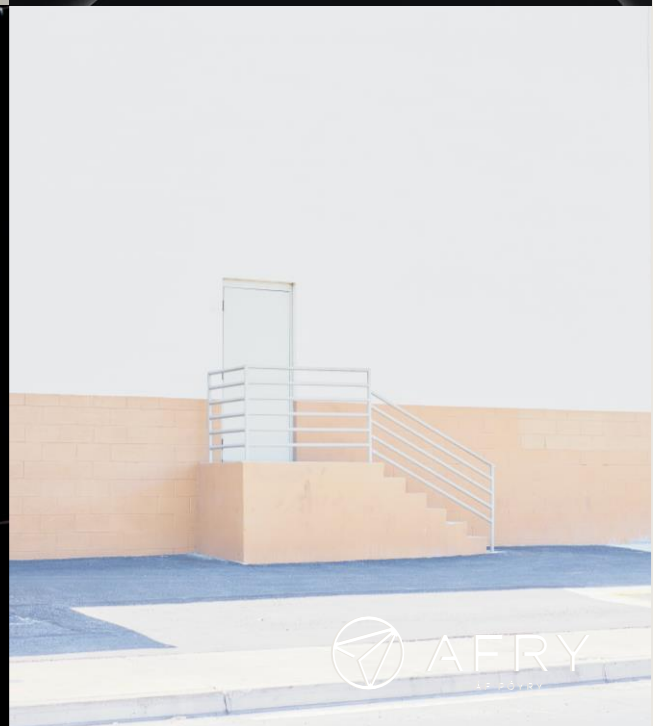

FINNISH CONSULTING SUSTAINABLE VALUE ADDED

Key messages

Three key messages

1. **SKOL and Finnish consulting is successful in markets, where sustainability levels and ambitions are high**

2. **SKOL has a "light" footprint itself, 1.9tCO_2/a per employee – COVID made this even lighter due to less travel**

3. **Every SKOL member consultant participates now or in the near future as a necessary part in generating a handprint which is 1300 times the size of the consultant's work footprint. This does not "100 % belong" to SKOL. Consulting is done based also on the work of others, and together with other players in the value chain. The core message: <u>without consulting, this handprint would not happen.</u>**

High sustaina-bility ambition = large SKOL presence

Footprint 1.9tCO_2/a per employee

Each SKOL consultant is part of a handprint 1300 times bigger than footprint

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WHAT DOES THIS MEAN?

SKOL planning and consulting industry can create sustainable added value by providing world-class solutions domestically and internationally

1

WHERE AMBITIONS ARE HIGH, SKOL SUCCEEDS

SKOL currently sells more expert services to countries which are advanced in sustainable development – and we make them even more advanced.

2

THERE ARE MARKET GAPS BOTH IN SERVICES AND IN REGIONS

Sustainable Development Goals (SDGs) are a commonly accepted concept. Finnish consulting only covers part of the SDGs. Furthermore, the less sustainably developed a country is, the less SKOL currently is present.

3

KEEPING UP THE HIGH VOLUME OF ENGINEERING SERVICES DEMANDS QUICK AND CONTINUOUS ADAPTATION TO A CHANGING BUSINESS ENVIRONMENT

4

CIRCULAR ECONOMY OF INFORMATION IS A KEY ASSET IN KEEPING UP SKOL EXPERT POOLS

SKOL to generate more information and add value to the information in a "circular economy of information".

5

THERE'S A FOURTH WAVE OF CONSULTING COMING AND THE SKOL HANDPRINT IS A KEY ELEMENT OF IT

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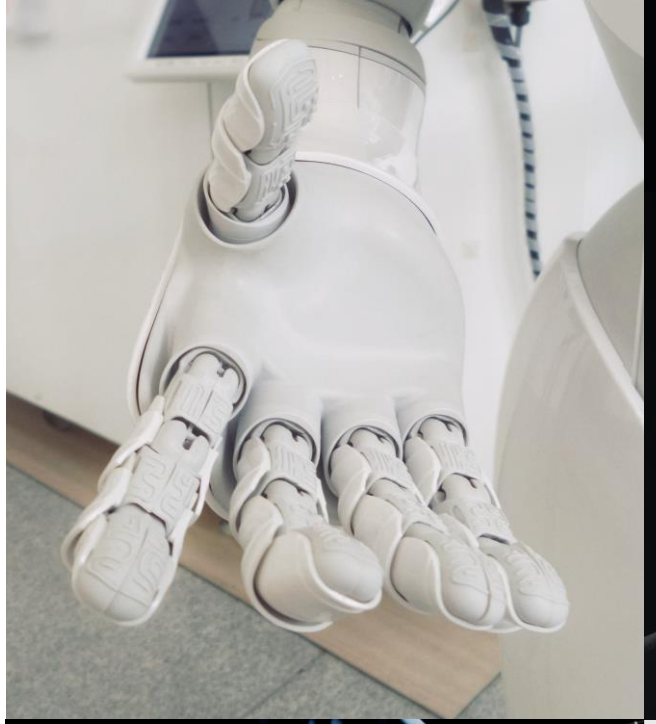
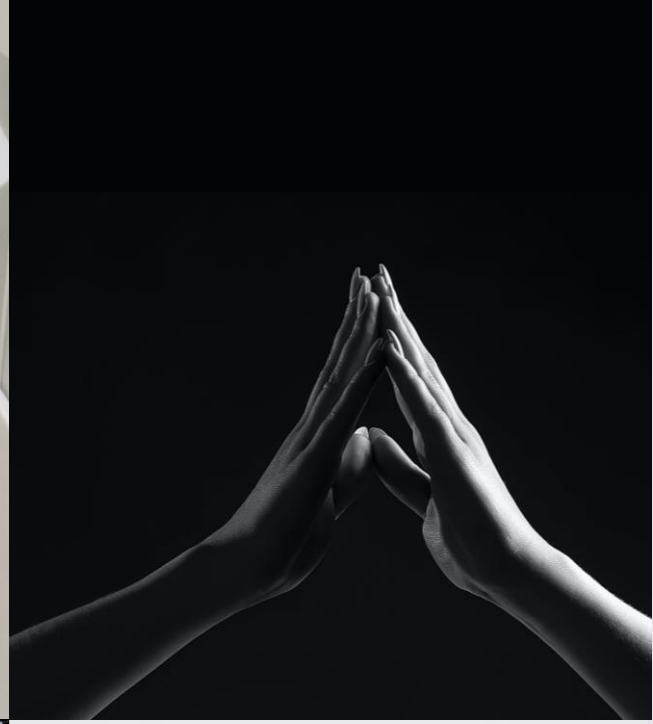
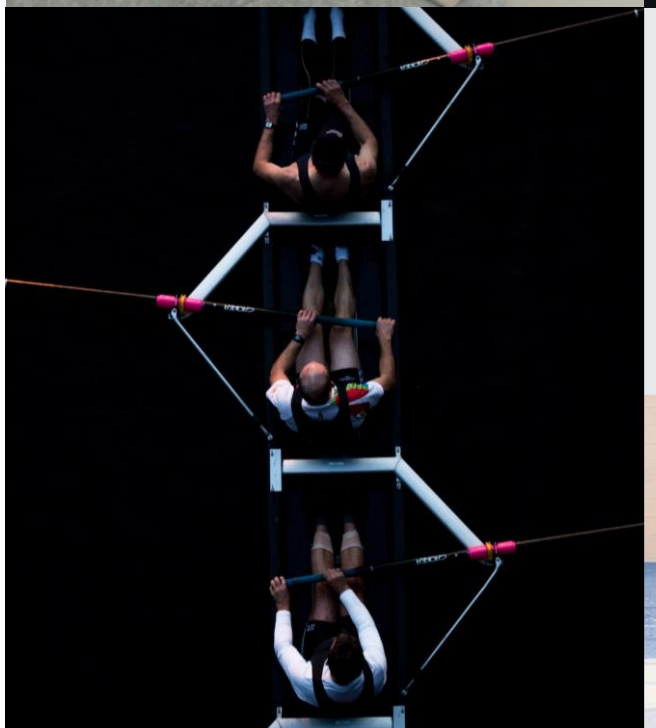
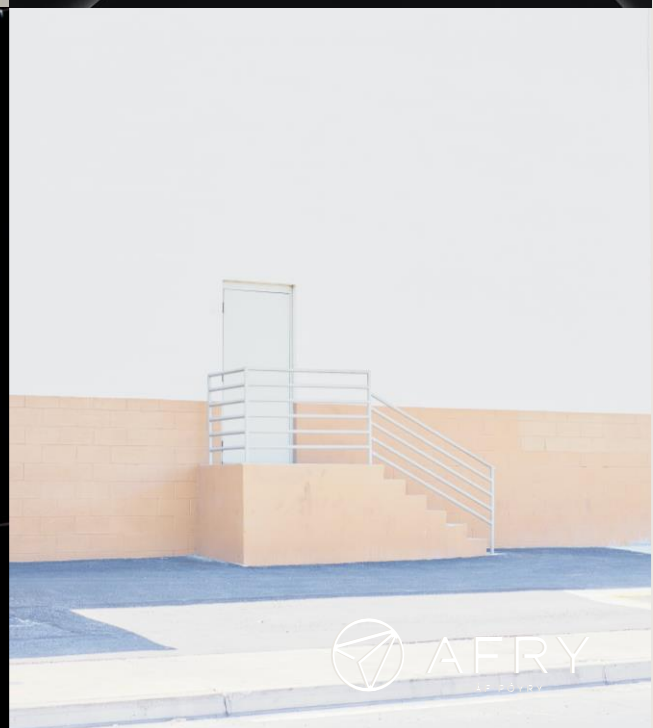
Agenda









Why does consulting exist?

There are good reasons…

The target and why it is somewhat elusive

WHAT TO SHOW IN ADDED VALUE?

AN ACTIVITY

Analysing a clearly defined activity, consulting

THE OUTCOME OF THAT ACTIVITY

What is the impact of consulting?

LET'S TALK ABOUT "COLLABORATIVE IMPACT"

Consulting, global policies, national authorities, local authorities, local population, technology developers etc – all contribute

THE CONSULTING VALUE CHAIN IMPACT

Consulting goes from vision to a concrete plant or building/transport medium built and running as optimally as possibly. Without the beginning, the end is different; without the end, nothing tangible happens.

THE MAIN THING IS **NOT TO BE TOO CONCERNED BY WHICH CONSULTING TYPE DESERVES CREDIT** FOR HOW MUCH OF REAL WORLD EVENTS

WHY A PARTICULAR ASPECT IS DIFFICULT?

...BUT WHAT IS THE ACTIVITY?

Defining consulting also for outsiders

DEFINING SHARE OF CONSULTING

On a general level in SDGs, hard to show what part of improvement comes from consulting activity and what has another rootcause

IT IS A JOINT OUTCOME

Especially in difficult-to-split cases, let's describe joint impact. E.g. on national level: if an SDG has improved, and consulting has increased, how much of the additionality is consulting? Consulting is part of it, but too clear boundaries are hard to draw

IT IS A VALUE CHAIN – AND FINLAND HAS IN MANY CASES ALL COMPONENTS

Choosing strategic ideas vs a building site supervised: all have their place.

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What is meant by SKOL?

In this study, SKOL refers to the member companies of SKOL, not the organization SKOL, which does not do consulting

SKOL

Finnish Technology Industries of Finland

Technology Industries of Finland

The Finnish Association of Consulting Firms SKOL

SKOL member companies

From hence on, SKOL = Member companies of SKOL, unless otherwise stated

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Who are the SKOL members and how do they contribute to society?

- SKOL is the industry and employers' **organization for independent consulting firms**
  - Members of the Finnish Association of Consulting Firms SKOL provide consultancy in technical matters applying engineering, design and architectural expertise to solve problems
  - The SKOL consulting companies work at **municipal, building, service and industrial sectors** covering a broad scope of activities listed in the appendix. However, this is not
    - the full scope possible (Finnish consulting does not cover all)
    - the scope is changing also in areas where Finnish consulting is strong
  - 150 member companies of SKOL employ about 19 000 people in Finland
  - SKOL members cover over 2/3 of the total engineering consulting capacity in Finland
- SKOL promotes professional, independent, sustainable and ethical design and consulting engineering

SKOL Mission

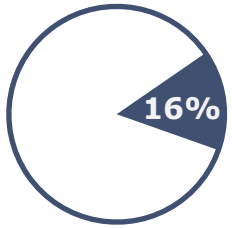
We promote good Finnish planning and consulting that solves significant future challenges for society and business.

SKOL Vision

SKOL is renewing a socially significant planning and consulting industry that succeeds in creating value for customers.

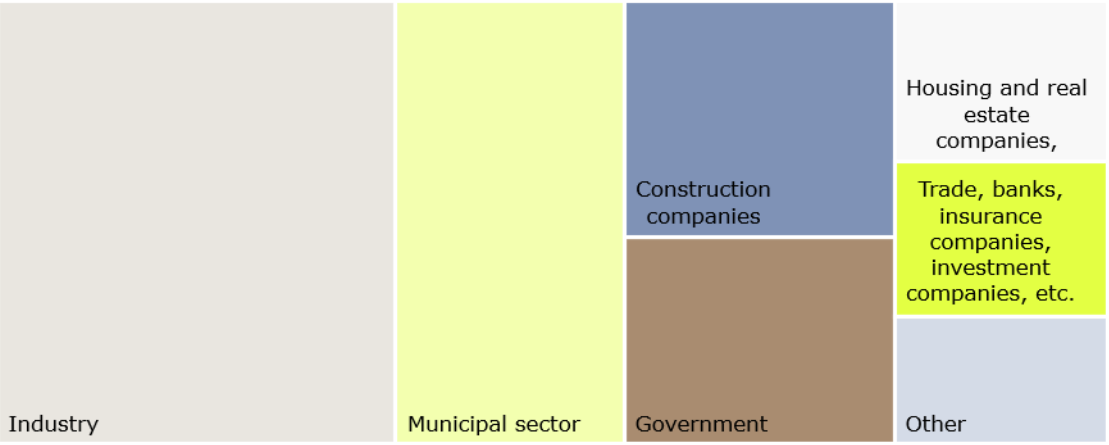
TURNOVER OF SKOL MEMBERS

- Industry
- Buildings
- Infrastructure



Share of **exported services** by SKOL members

CLIENTS OF SKOL MEMBERS



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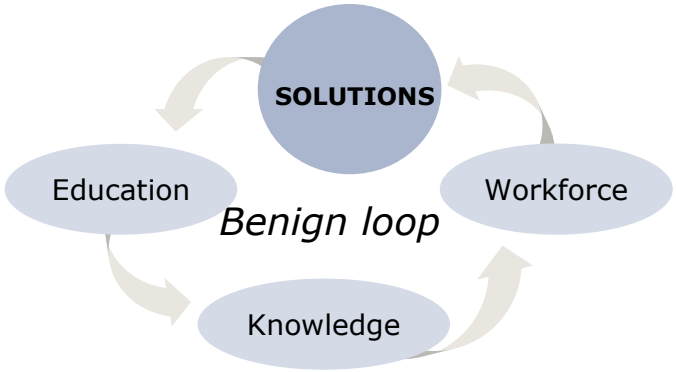
What is SKOL's role as part of society?

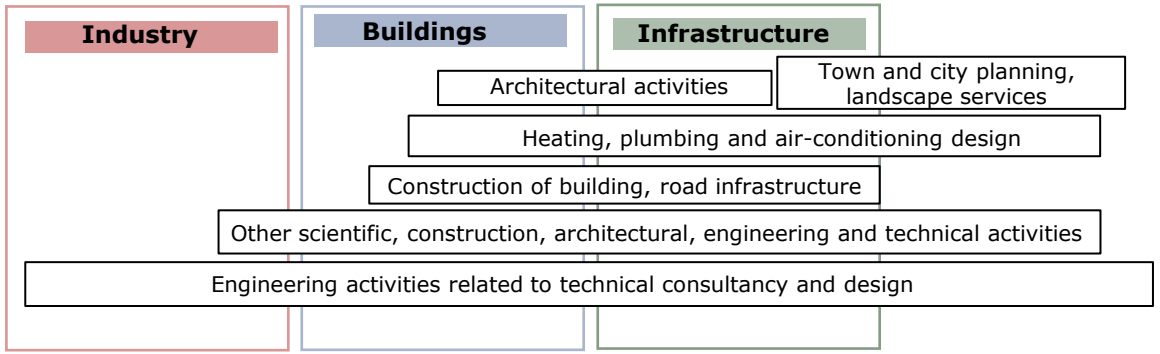
- SKOL's strategy 2019-2021 showcases and highlights the significance of consulting as part of societal development
  - For a strategy that strongly relies on sustainable developmen, it is valuable to establish a framework to define sustainable value added and an overview of the sector's contributions and to align the activity with the vision and mission of SKOL
- There is a "**benign loop**" possibility: society needs certain solutions; consulting provides those solutions; society changes to need more advanced solutions – and consulting keeps providing the more and more demanding answers



SKOL STRATEGIC THEMES

1. The voice of experts is in the best interests of the development of society.
2. The best knowledge and skills drive growth and development.
3. Multidisciplinary ecosystems create vitality for the sector.
4. SKOL will be strengthened to provide better service to members

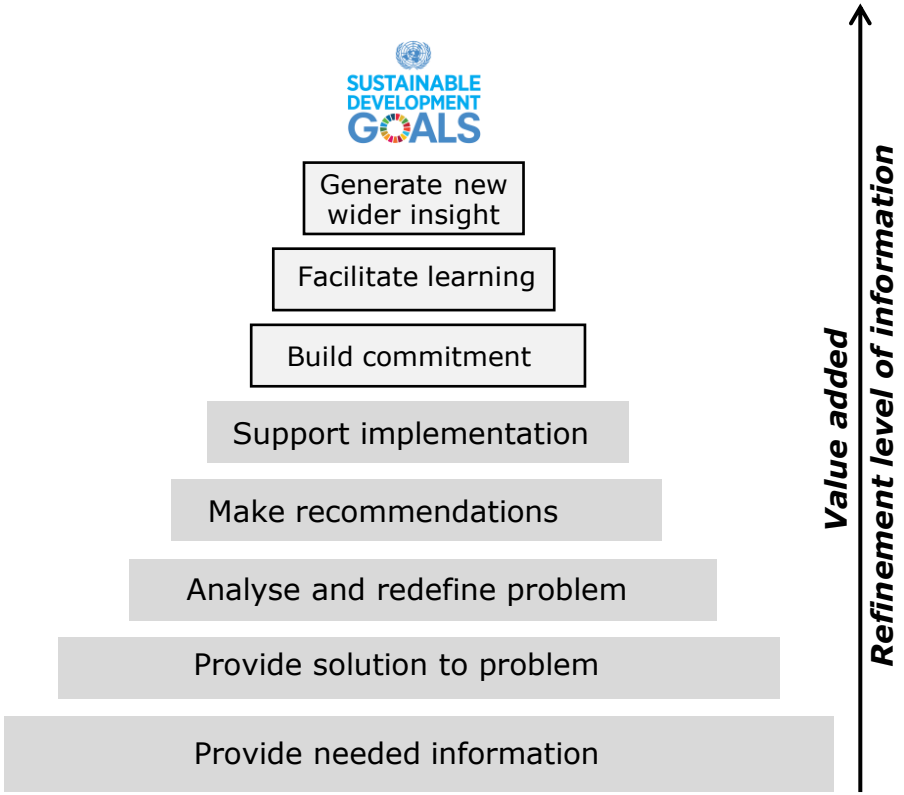
SKOL SUB-SECTORS AND PROVIDED PROFESSIONAL SERVICES



What is the role of consulting in a society? Abstract pyramids.

- Consultants **facilitate change in entities** (from individuals via companies to nations and unions of nations) and enables them to reach desired outcomes whether these are related to expansion of financial productivity, changes in production capacity or innovation
- **Companies contribute to sustainability only if the value created exceeds the external cost caused**
- "Opposite of sustainable added value" is consulting that helps to destroy value. In the values and principles of SKOL and its members, this is already excluded, but it is not always easy to assess whether a specific project adds value.

HIERARCHY OF CONSULTING TARGETS



https://hbr.org/1982/09/consulting-is-more-than-giving-advice, https://docs.google.com/viewerng/viewer?url=https://www.acenet.co.uk/media/4458/foc-a5-overview-2019.pdf

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Collaborative impact via sustainable value added by SKOL companies

DO YOU MAKE BUSINESS SUSTAINABLY OR MAKE SUSTAINABLE BUSINESS?

- Companies contribute to sustainability only if the value created exceeds the external cost caused

- Sustainable value added is understood as **additional sustainable features that are added on top the features provided by the baseline assignment**. Features may be economic, social or environmental benefits that contribute to Sustainable development goals

→ Sustainable value added provides long-term benefits for the client, society and consultant

- Shared value is defined as practices that enhance the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities in which it operates

The four waves of Finnish consulting and SDGs

A growing wave to surf, with amount of SDGs consulted in increasing

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SDGs were not the starting point of consulting, but they have gained an increasing role even in strategic decisions

- **Consulting existed long before SDGs**
- **Consultants help clients solve problems and meet goals. When SDGs are part of clients' goals, they become part of consultants' goals. Likewise, consultants may be proactive and propose to clients solutions steered by SDGs**
  The overarching principle of consulting is to help clients meet their goals, and thus, they become an integral part of design and consulting services when SDGs reshaped clients' business strategies
- **The SDG pressure is likely to increase and develop from at least four directions**
  The role of SDGs is increasing for consulting.
  - **The world** has developed in a direction where especially e.g. climate SDGs cannot be ignored.
  - **The clients,** whether leaders or followers, have to have a "license to operate" on markets following SDGs.
  - **The consumers** bring further pressure onto clients and politicians.
  - **The consulting companies themselves**, SDGs have been and are being adopted by many.
- **SDGs are 18 in number, and an 18-pronged strategy is not easy**
  Although consulting influences all the SDGs either directly or indirectly, the most relevant SDGs shall be prioritized in our analysis. SDGs are linked in multiple ways, but still it is possible to compare the focus of Finnish consulting and SDGs
- **Which SDGs should be prioritised?**
  To provide a comprehensive approach for analysing the impact of consulting and design companies for society, the following criteria is used **identify most relevant SDGs and SDG targets to be prioritized in analysing Finnish consultancy:**
  - Is it already a focus of Finnish consulting, domestically and abroad?
  - Is it seen as an emerging area with consulting opportunities?
  - Is it simply something that is a "license to operate" for Finnish consulting companies?

PRIMARY TO SKOL

EMERGING SDG AREAS FOR SKOL

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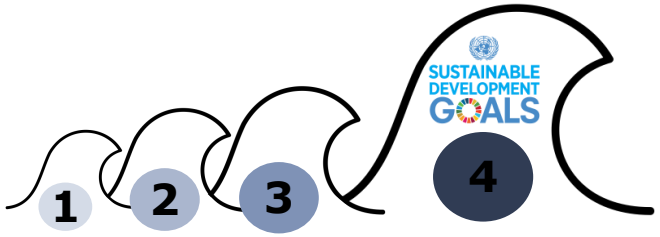
ROLLING AHEAD

What are the waves of Finnish consultancy?



	CONTRIBUTIONS TO KEY SDGS
1st wave of consultancy ~1930-1970 **"Building and rebuilding"**	
A few stably growing consultants, with strong Finnish industries (e.g. forest) and infrastructure) particularily at paper industry, mainly domestic	6 CLEAN WATER AND SANITATION; 8 DECENT WORK AND ECONOMIC GROWTH; 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
2nd wave of consultancy ~1970-2010 **"Globalising and widening scope"**	
Globalisation starting from forest industry. Growing number of market players, with international chains taking root, more sectors covered and Nokia pulling ICT along	11 SUSTAINABLE CITIES AND COMMUNITIES; 7 AFFORDABLE AND CLEAN ENERGY; 17 PARTNERSHIPS FOR THE GOALS; 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
3rd wave of consultancy ~2010-2025 "**Complex solutions with even greater focus on sustainability**"	
Finnish domestic market still dominates, but Finnish issues are very much global issues. Consultants likewise work globally on difficult and complex issues, special focus on climate change, energy and material transition, emergence of artificial intelligence and smart applications	12 RESPONSIBLE CONSUMPTION AND PRODUCTION; 3 GOOD HEALTH AND WELL-BEING; 13 CLIMATE ACTION; 8 DECENT WORK AND ECONOMIC GROWTH; 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
4th wave of consultancy ~2025- **"Reshaping consultancy for change in a changing world"**	
Consultants reorganise their workways, the focus of consulting, apply digital solutions and AI, and maximize their (global) handprint to reduce emissions and tackle biodiversity losss, large-scale societal electrification, alternative lifestyles, zero-emission technologies. Education, justice, poverty take on a larger role	14 LIFE BELOW WATER; 10 REDUCED INEQUALITIES; 15 LIFE ON LAND; 5 GENDER EQUALITY; 13 CLIMATE ACTION

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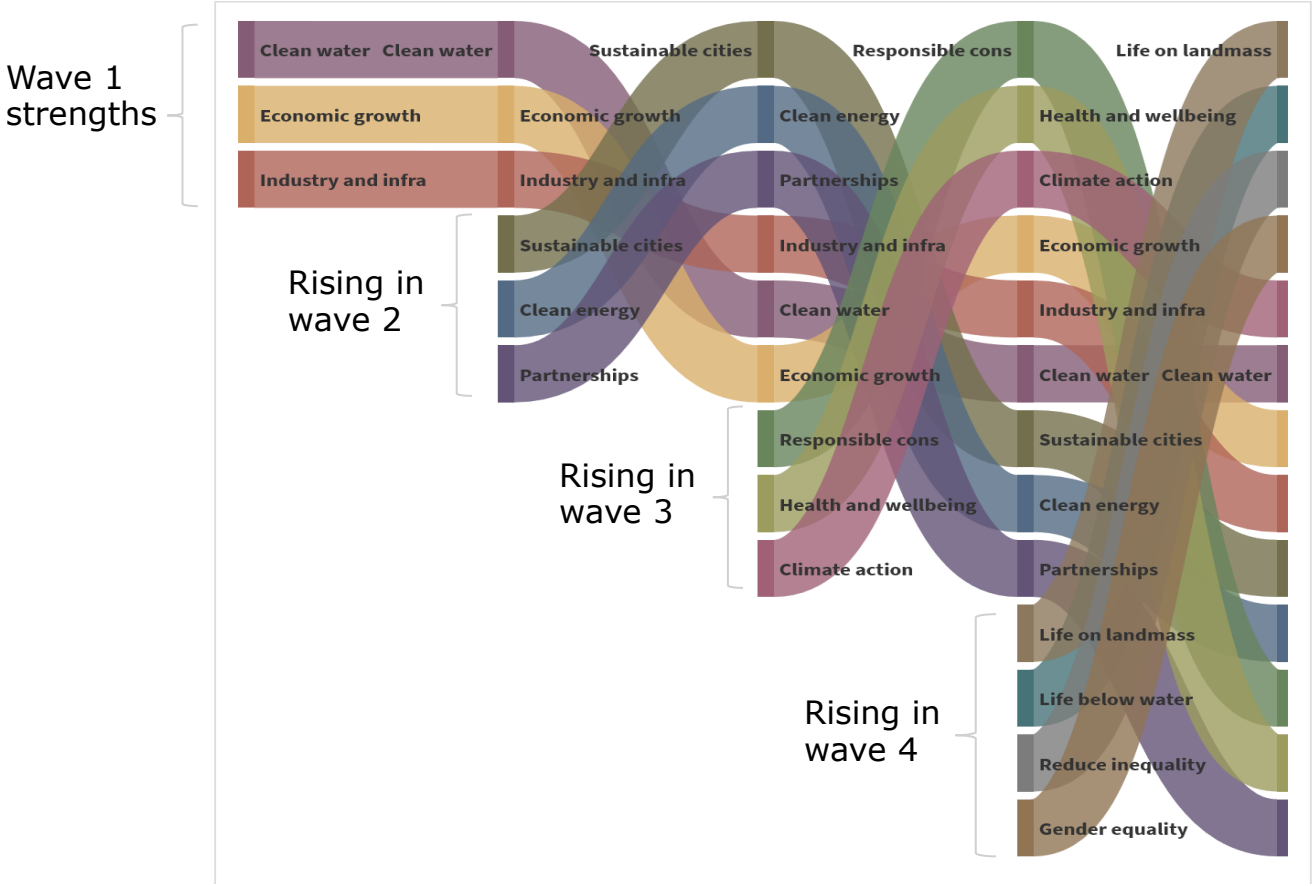
”Cresting the wave”: cumulating knowhow and consulting by SDGs

BUILD AND KEEP UP

- Again, markets determine a great deal of the action
- However, SKOL has to
  - keep up knowledge in existing consulting
  - build up new consulting, **with emphasis in development** changing by wave

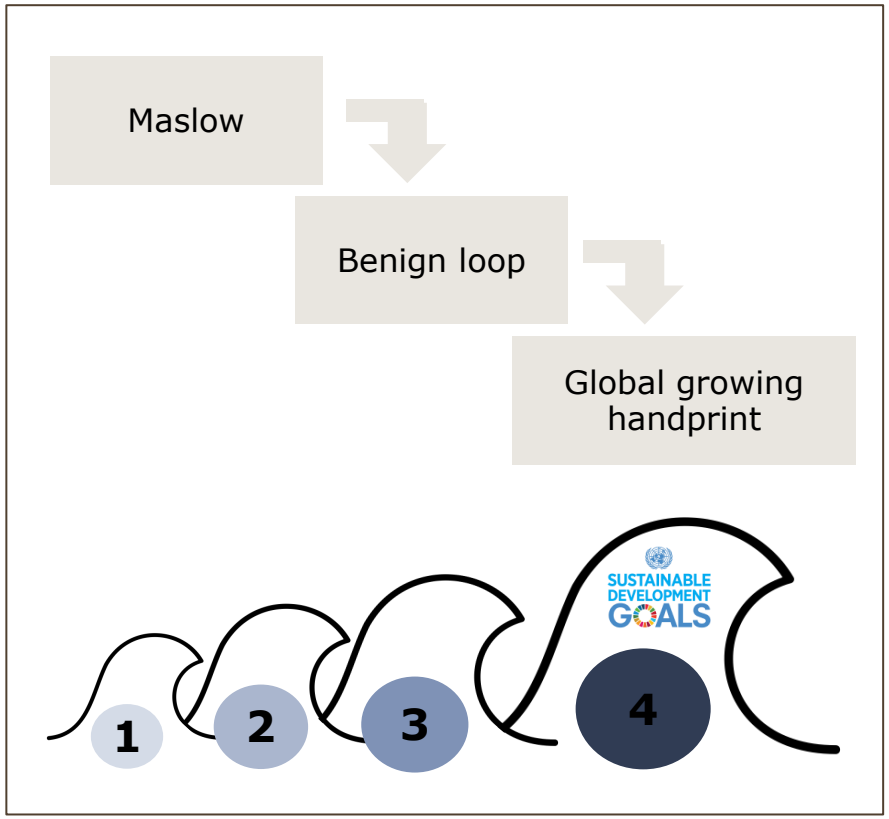
SDG’S PER WAVE OF CONSULTING



How has Finnish consulting managed to surf these waves?

GLOBAL POSITIONING OF FINNISH CONSULTING

- **Finland is in a lucky position where basic human needs are to a very great degree met**; water, sanitation, shelter, energy, nutrition and a decent living standard is provided to the members of society. Consultancy has had its role in improving the Finnish standard of living, with major contributions in increasing the economic growth, developing the infrastructure and industry.
- **Again, a "benign loop"**
  Again, a "benign loop" in action. If needs are met, including education, more knowledge can be generated among a larger pool of the workforce. The knowledge brings solutions, and solutions improve Finland and can be exported. An improved Finland breeds further knowledge, and the loop continues.
- **Growing handprint**
  Due to the above, **Finnish consultancy companies have potential to deliver solutions aligned with the SDGs to the other parts of the world**. These solutions are emphasized particularly in the 2nd, 3rd and 4th wave of Finnish consultancy.
- **Danger of breaking the "benign loop"**
  The competition is intense, and exponentially more knowledge is created. For a small pool of talent, a slowing down or diminishing of knowledge acquisition of education slows down and potentially stops the knowledge growth. Unfortunately, it does not take much to destabilise the current good situation, but a lot to restore it.

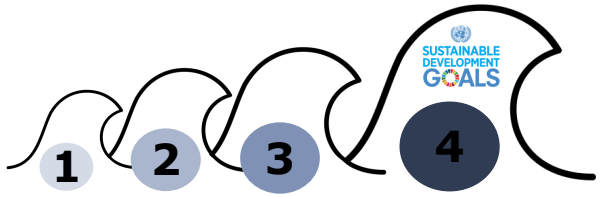


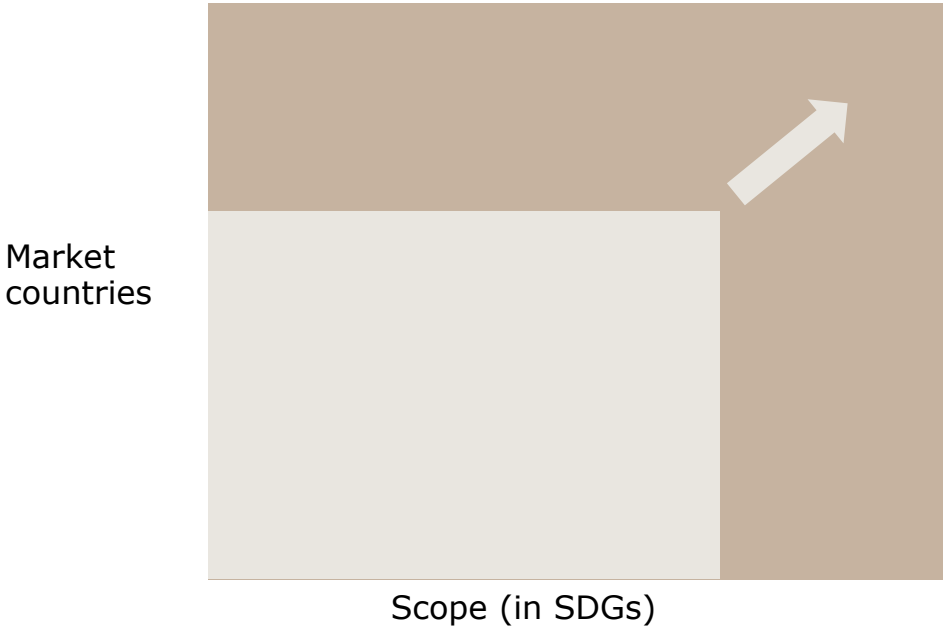
EXPANSION AHEAD

Wave 4: Expanding in scope and regionally, with ever greater handprint

- **Scope**
  - continuous improvement of stable and growing markets with focus SDGs; expanding by market demand and growth opportunity

- **Market countries**
  - a wider basket, partly assuring stability against cycles, partly filling gaps in markets and opening new areas





The cake of policy and consulting goals

Business, policy and sustainability are tightly interwoven

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How do SDGs, Finnish policy goals and consulting strategies go hand in hand?

- **No central planning authority**
  There is no "central authority" that coordinates national consulting with 5-year plans
- **Acting according to values of society**
  However, consulting exists to improve things in a way that the world, starting with our own Finnish society, accepts and promotes
- **Equation:**

Domains adaptation	**+ Goals**	**+ Policy**
What to consult in	How to act	Where to fit in

DOMAINS

Domains to consult in

ECONOMY

Companies strive to be economically viable to while paying taxes, creating jobs and increasing societal well-being

SOCIETY

Society encompasses the physical surroundings (infrastructure and biosphere) and human members, in addition to the activity that takes place between these two

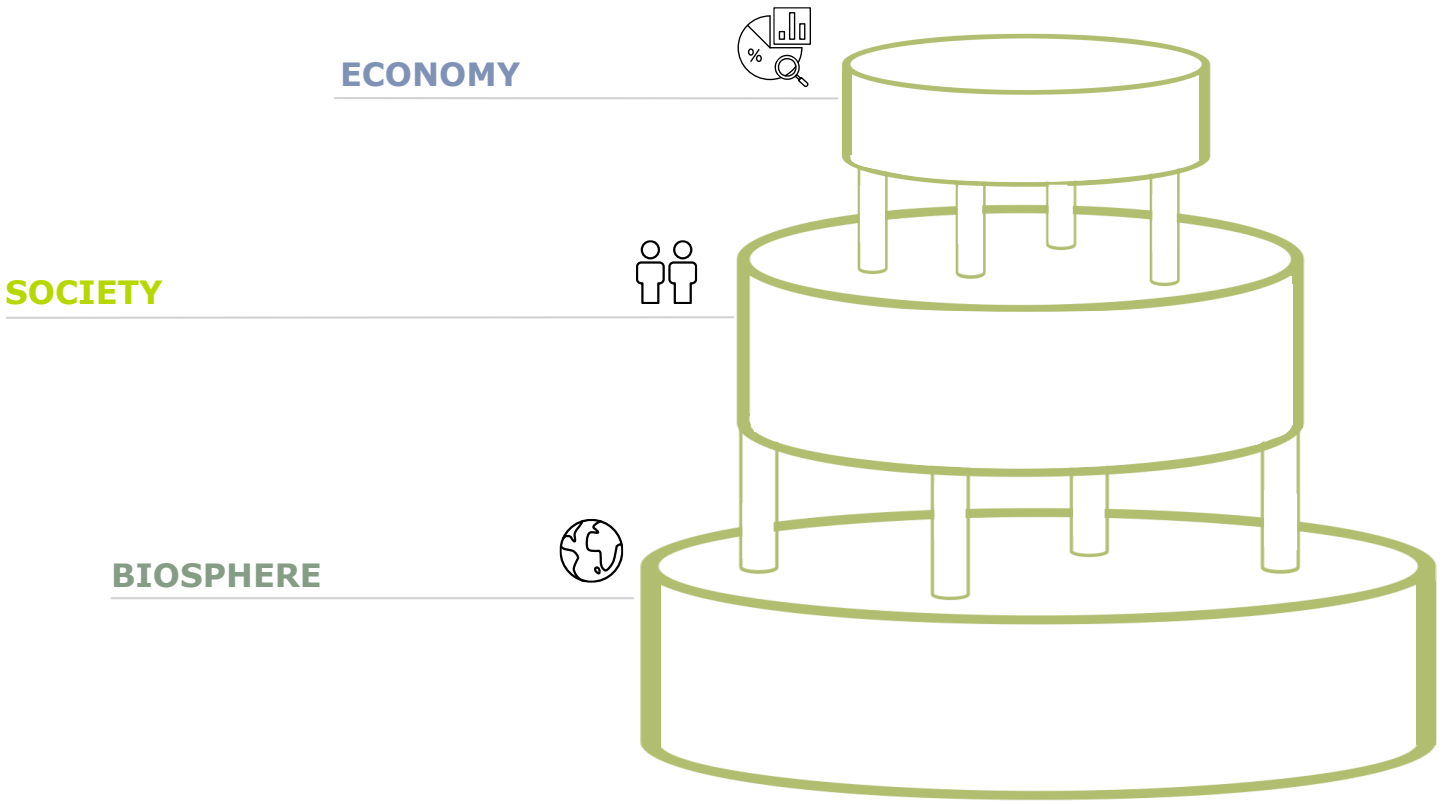
BIOSPHERE

Biosphere refers to the flora and fauna as well as the biogeochemical cycle in the Earth that provide the foundations for life

WEAVING THE BIG PICTURE

Goals to target: a wedding of strategic directions and actions

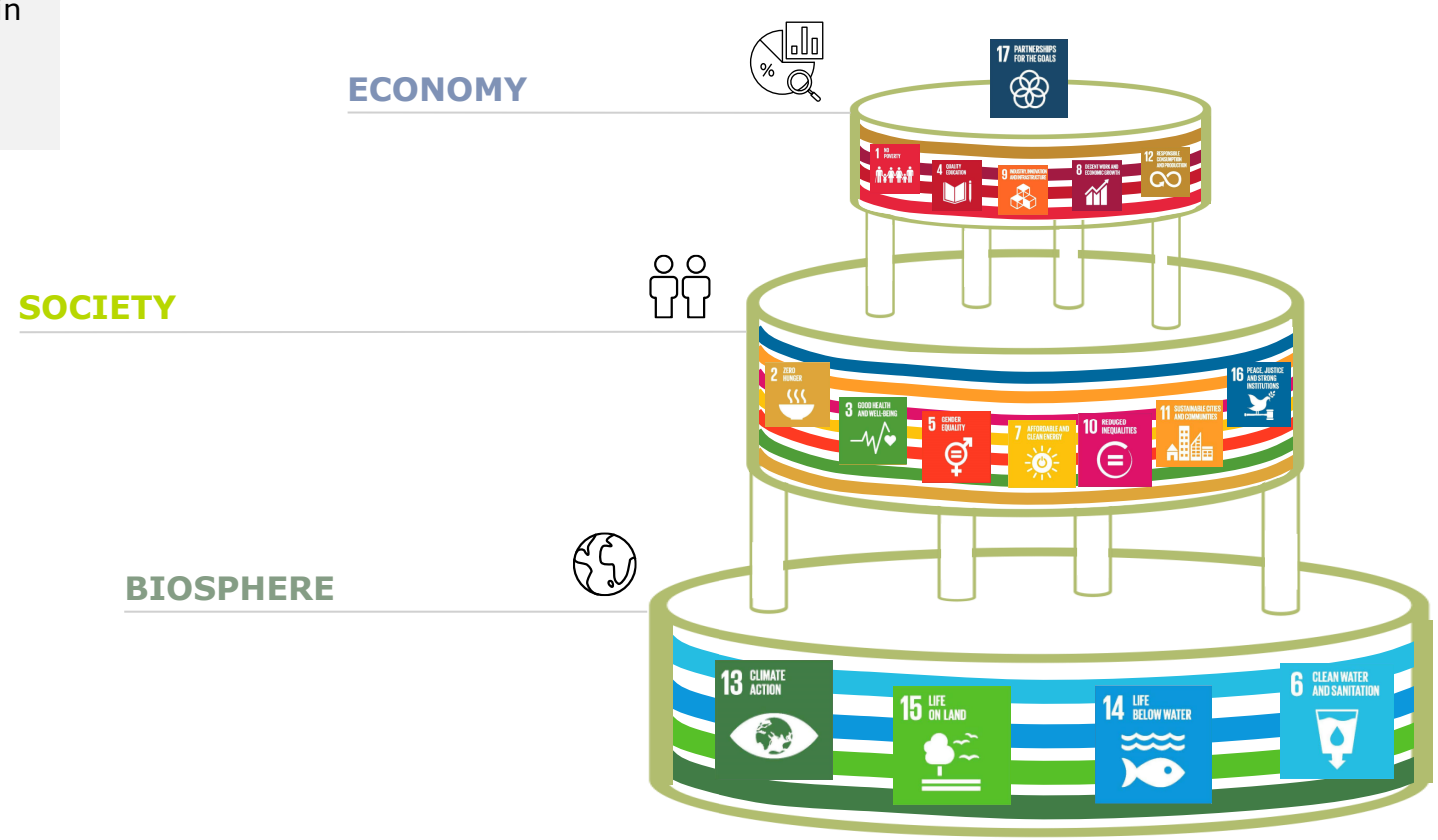
The "Wedding cake" model was originally introduced by Stockholm Resilience Center (2016) to illustrate how economy serves society within the boundary limits and aims to move away from the narrative where economical, social and ecological developments are seen as separate entities



WEAVING THE BIG PICTURE

Goals to target: a layered cake of directions and actions

The "Layered cake" model prioritizes SDGs and puts them in a hierarchical order to highlight economic dependence on biosphere



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DOMAINS

Finnish policy goals – what do they mean?

ECONOMY

- Sustainable **employment**
- **Resource-wise economy**

SOCIETY

- **Participatory society** for citizens
- Equal prospects for **well-being**
- Sustainable **society and local communities**
- **Carbon-neutral** society

BIOSPHERE

- **Lifestyles** respectful of the carrying capacity of nature
- **Decision-making** respectful of nature

EXAMPLES

- Improved employment rate
- Decreased pay gap between men and women
- Skillful workforce
- Multi-purpose use of the existing resources
- Sharing economy and circular economy
- Inclusion of externalities

- Participation in civil society
- High voting activity
- Low income disparities
- Life satisfaction
- Equality between residential areas
- Adaptation to ageing population, urbanisation and climate change
- Low GHG emissions and growing carbon sinks
- Energy efficiency and renewable energy

- Healthy lifestyles, resource wise and plant-based lifestyles
- Sustainability as a basis of all decision-making, planning and budgeting both in private and public sector

Finland wants to make policy decisions that support the achievement of Sustainable Development goals

→ The 8 objectives of the Society's Commitment carry out the 17 goals of the 2030 Agenda.

Prime Minister's Office. (2020). Towards the Finland we want by 2050 – State of Sustainable Development.

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Domains where to consult → **Goals** to targets → **Policies** to adapt to

Finnish policy goals from Government program are aligned with SDGs

FINNISH POLICY GOALS

ECONOMY

- Sustainable **employment**
- **Resource-wise economy**

SOCIETY

- **Participatory society** for citizens
- Equal prospects for **well-being**
- Sustainable **society and local communities**
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BIOSPHERE

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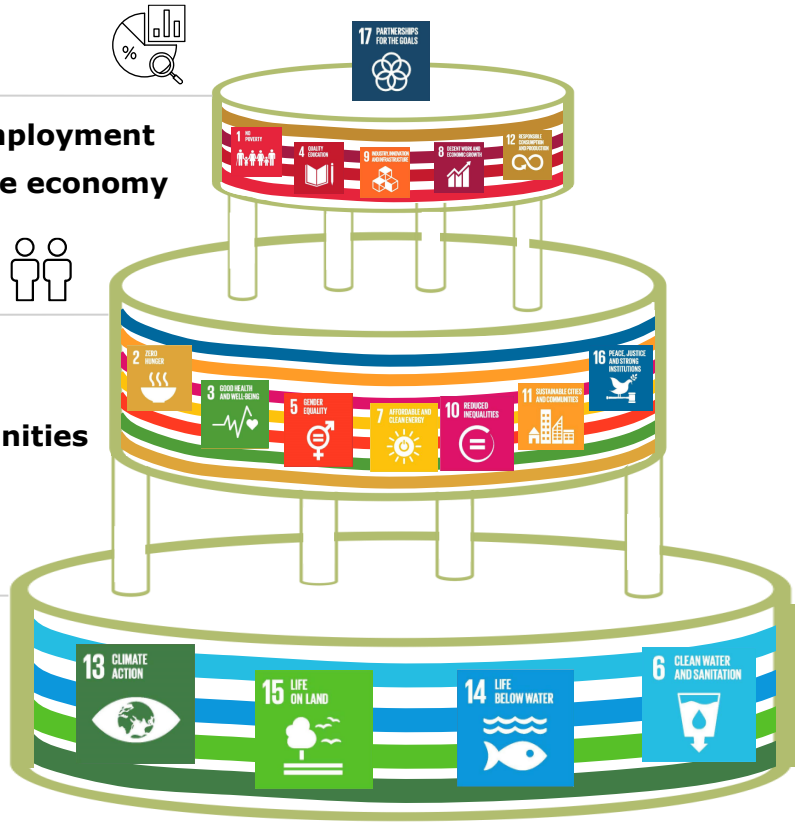

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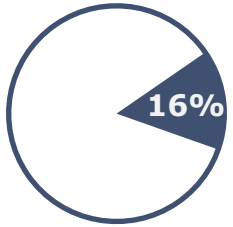
Link between SDGs, sustainability ambitions and SKOL success

SKOL thrives where sustainability levels and ambitions are already high

The current focus of professional services exports

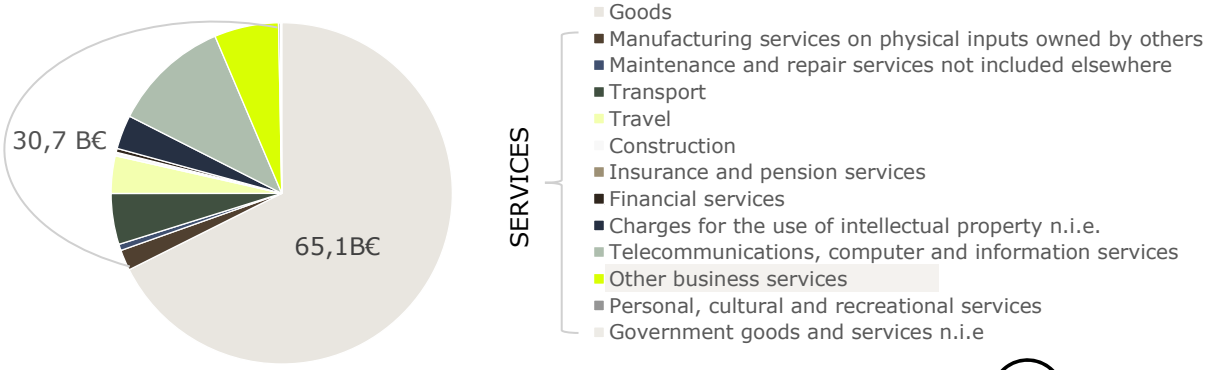
- In 2019, Finnish exports were 95,6 B€, where services accounted for 32% of the exports and the role ”other business services” was around 6%
  - Other business services include Professional and management consulting; Technical, trade-realated; and R&D services



Share of **exported services** by SKOL members

FINNISH EXPORT OF PROFESSIONAL SERVICES (2019)

FINNISH EXPORT OF PROFESSIONAL GOODS & SERVICES (2019)



https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=bop_its6_det&lang=en

As opposed to normal parliaments, the ”SKOL Parliament of Services” is meant to grow the amount of seats

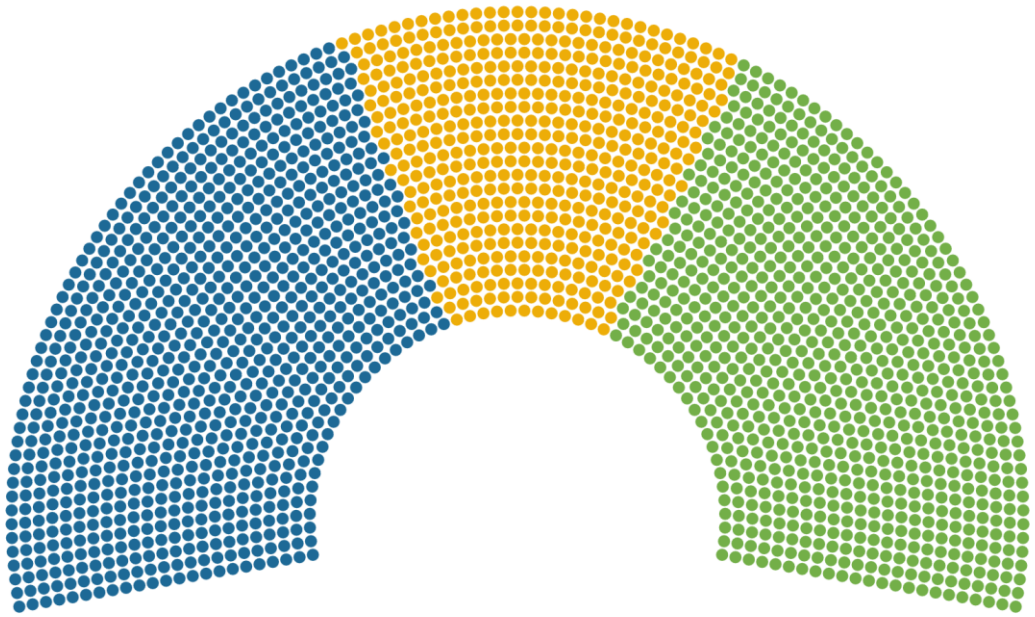
THE POWER TO CHANGE

- **The power to change**
  The power to change and have a positive handprint depend on the markets, turnover and the green ratio of ”tCO2/EUR”

- **”The SKOL Parliament”**
  As has been seen, the *EU Parliament and country parliaments* in Finland and elsewhere define, with legislation, how well SKOL can influence by a large handprint. *Inside SKOL, the larger a sector and the more impactful its offerings, the greater the potential*. On the right, the ”SKOL Parliament” by 1 seat = 1 MEUR turnover.

- **A growing parliament with more impact from each seat**
  If a member of the SKOL Parliament is 1 MEUR of SKOL services – the desire is to get more seats, and that each seat generates a greater handprint

SKOL PARLIAMENT OF SERVICES (1 SEAT = 1 MEUR OF TURNOVER)

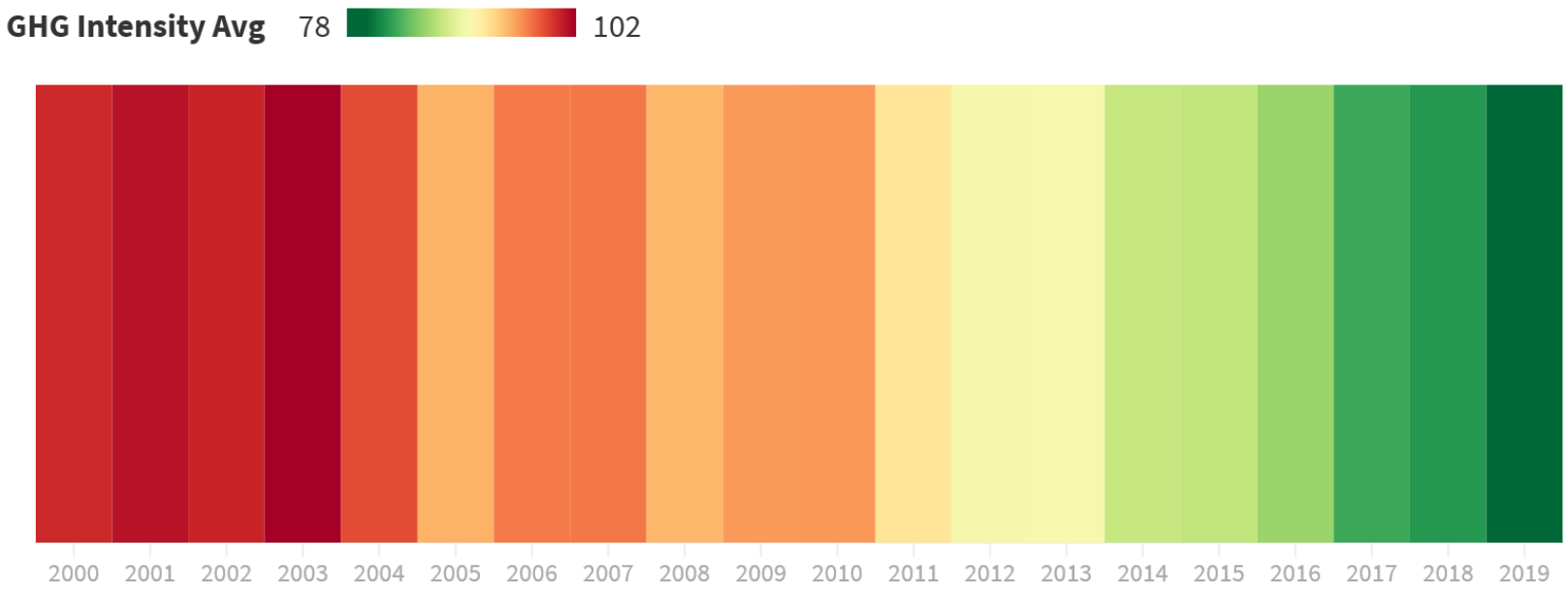


SKOL Sector	2019	Seat change
Industry	848	0
Infrastructure	488	0
Buildings	784	0

”Climate stripes" for key client countries

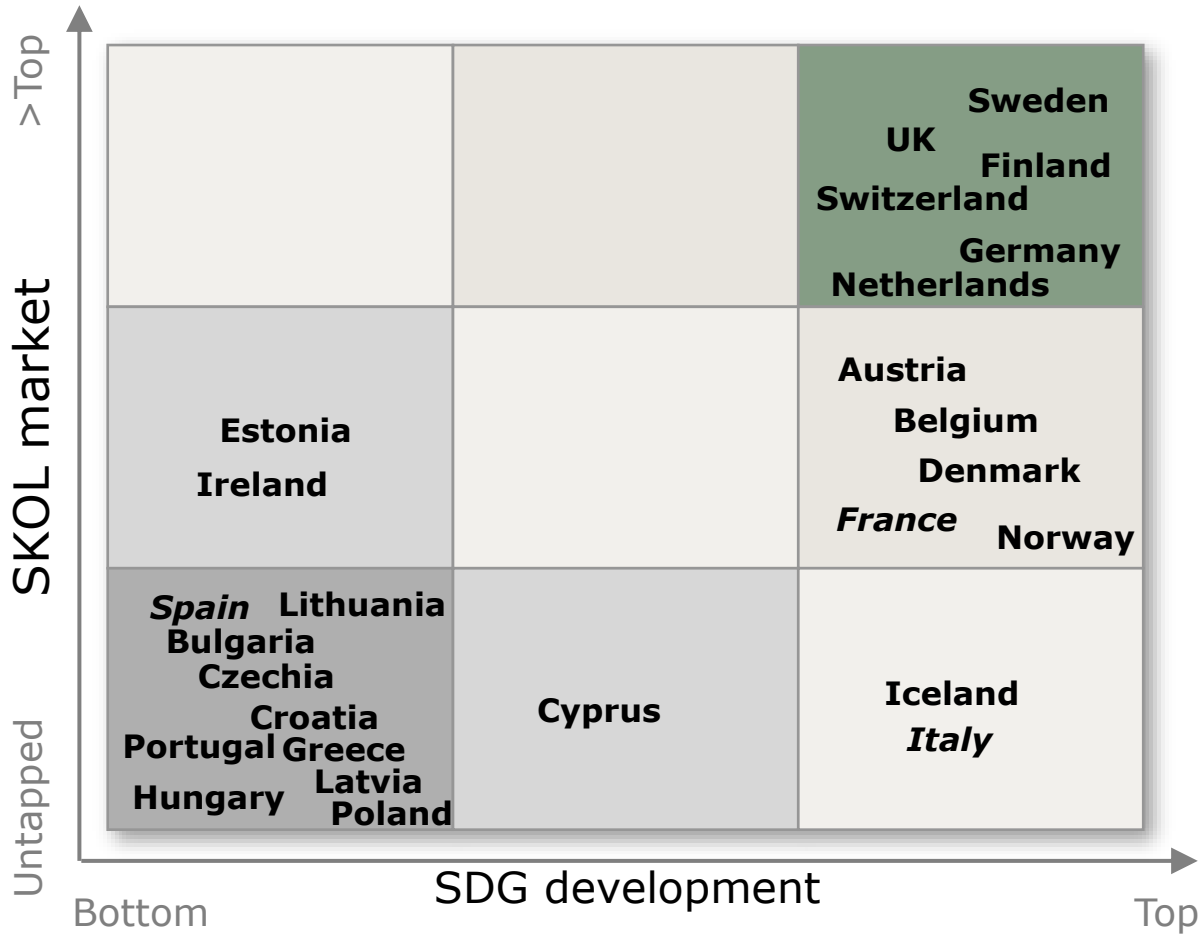
- ”Climate stripes” is a visualisation made popular by Ed Hawkins.
- Here, we have taken the 2000-2019 development of the SDG subindex ”GHG Intensity”, averaged over 5 top market countries for SKOL: Finland, Sweden, UK, Germany, Netherlands.
- **GHG intensity of energy consumption** expresses how many tons CO2 equivalents of energy-related GHGs are being emitted. The year 2000 is the indexed to 100.

”GHG INTENSITY STRIPES” FOR TOP SKOL MARKETS



Source: Eurostat

The country spread in SDGs and as SKOL markets leads to conclusions…



- **Top square:**
  Very dense and logical?
- **Its opposite:**
  Dense, with surprises, too.
- **To develop:**
  Rising opportunities

A CLEAR BEST MARKET CHARACTERISTIC

… ”SKOL does well where SGD development is good” and others from just the data and nothing else

CONCLUSIONS

1) If it is a SKOL top market, it has top SDG development.

Meaning: strict sustainability attitudes and regulations are an advantage for SKOL

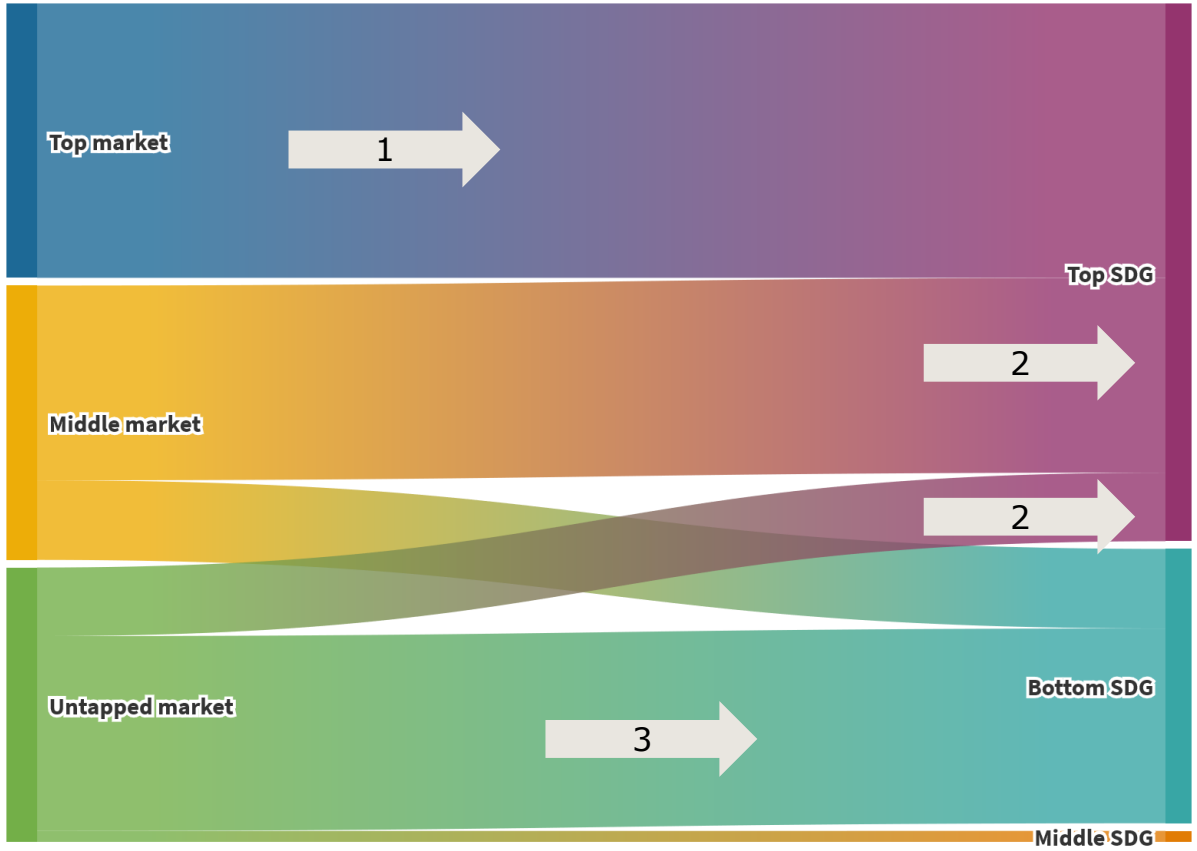
2) All top SDG countries have not been succesfully penetrated by SKOL

Meaning: some top SDG countries could be picked for special attention.

3) Most of the untapped markets have poorer SDG development

Meaning: what is the best way to bring SKOL to boost less developed SDG countries?

RELATIONSHIP BETWEEN SKOL MARKETS AND SDG DEVELOPMENT



Overall development in Europe is at two speeds – circular economy rises from the numbers for Top SDG's; the move to renewable is delayed at the bottom

CONCLUSIONS

1) As an average, 2010-2015 was mostly energy efficiency, water and soil improvement

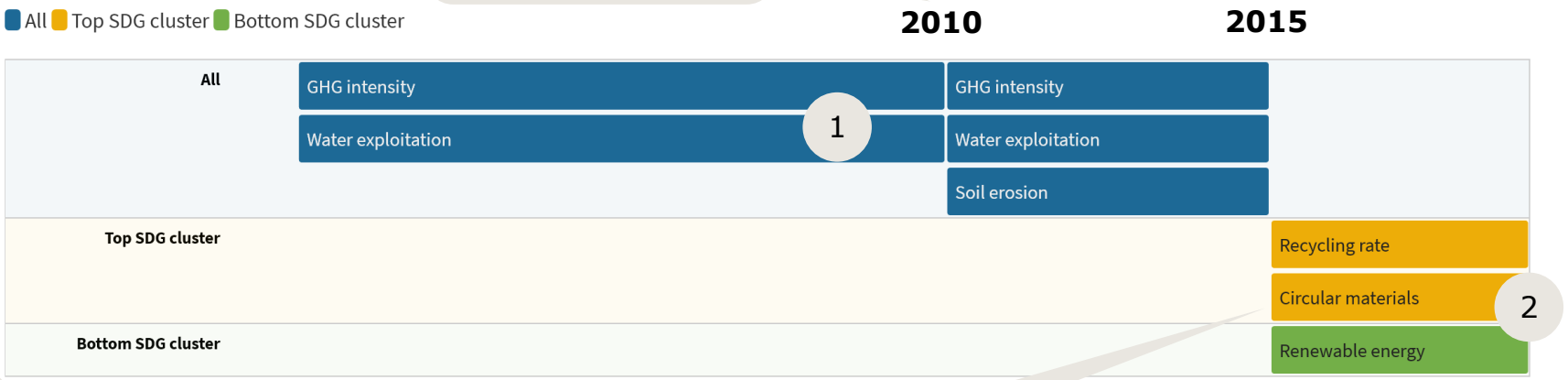
Meaning: the mainstream of consulting was very dominant – but knowhow in SKOL evolved and was used

2) Since 2015, the different development stages seem very clear, with circular economy vs. renewables

Meaning: The advanced markets' moves are circular, renewables are catching up – full spectrum markets

SDG DEVELOPMENT IN EUROPE

On average for all: long period of GHG intensity with water and soil operations



Separate stages: circular materials vs renewables

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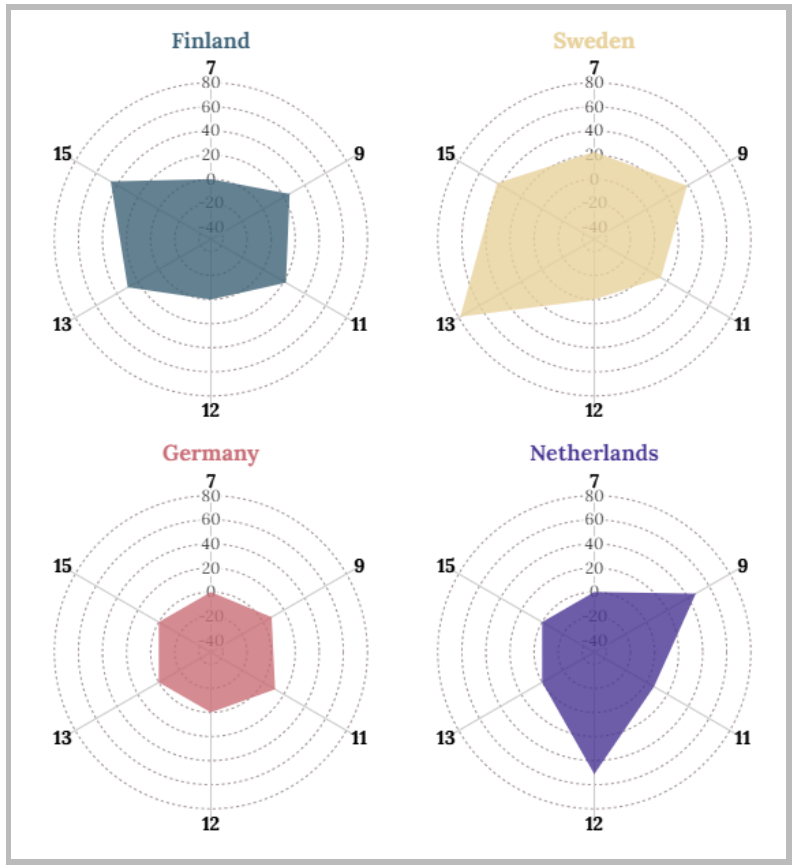
Profiles in SDGs of Finnish consulting focus countries

HOW IS THE SDG PERFORMANCE LIKE IN THE COUNTRIES WITH MOST SKOL EXPORTS COMPARED TO FINLAND?



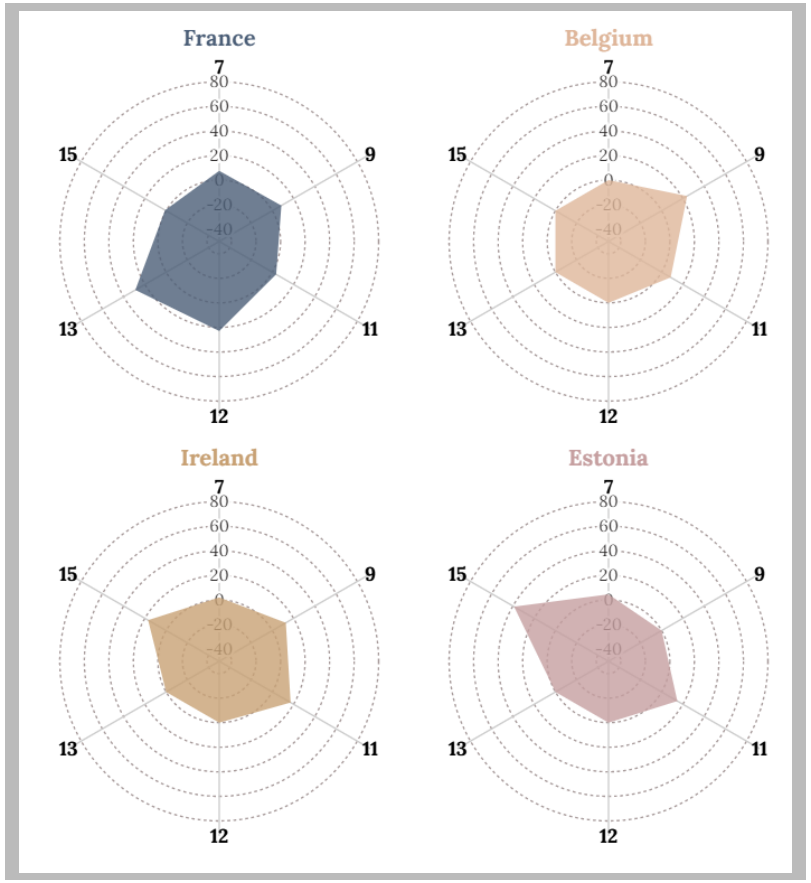
How to read the SDG spider charts?

- Higher the value on the axis, the better the country's performance
- The values on the axis reflect country's status in achieving the SDG compared to EU Average (100 being the highest, and -100 being the lowest)
- Numbers in the outer circle reflect the selected key SDGs where SKOL companies operate the most

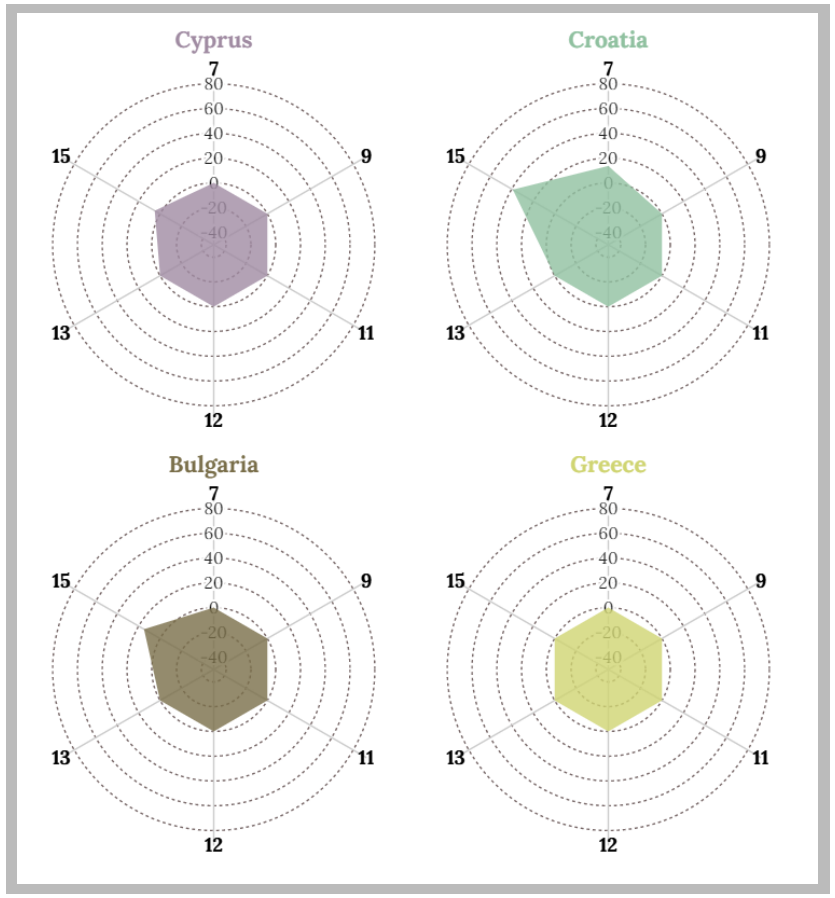
FINNISH CONSULTING GAPS

SDG profiles of countries where Finland less active

HOW IS THE SDG PERFORMANCE LIKE IN MID-SIZED MARKETS SKOL EXPORTS COMPARED TO FINLAND?

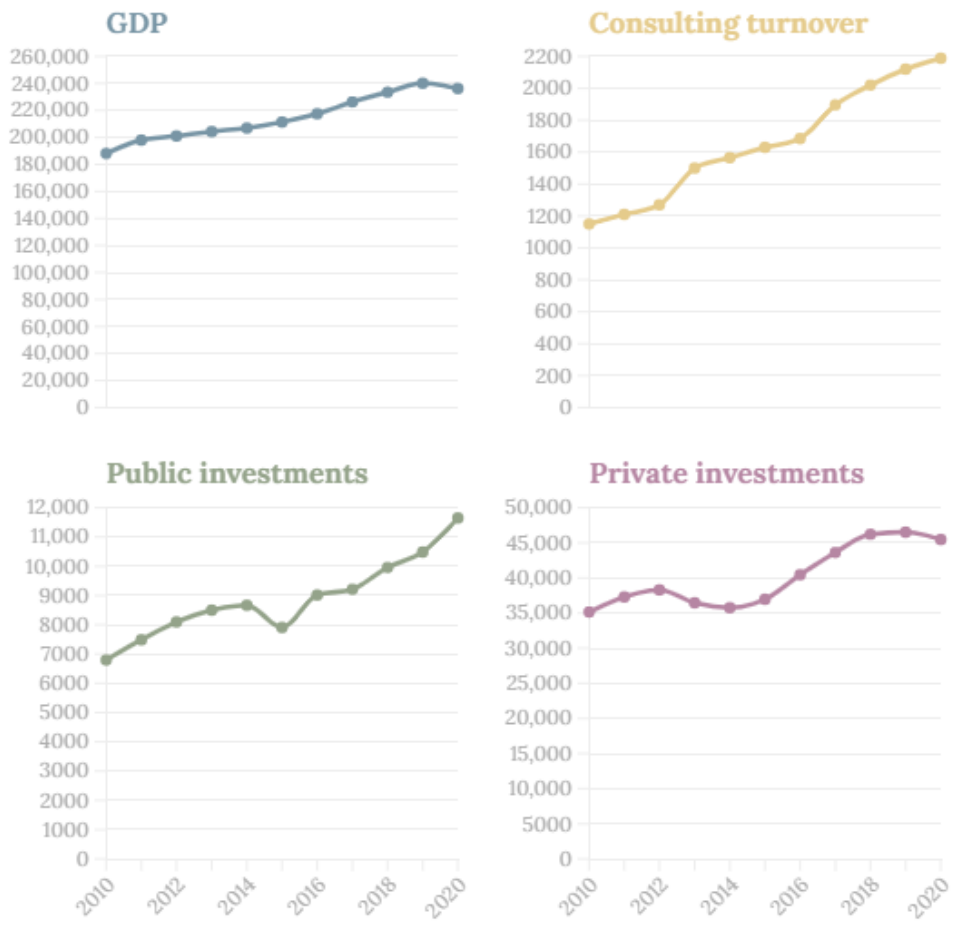


HOW IS THE SDG PERFORMANCE LIKE IN THE COUNTRIES OUTSIDE OF SKOL EXPORT FOCUS COMPARED TO FINLAND?



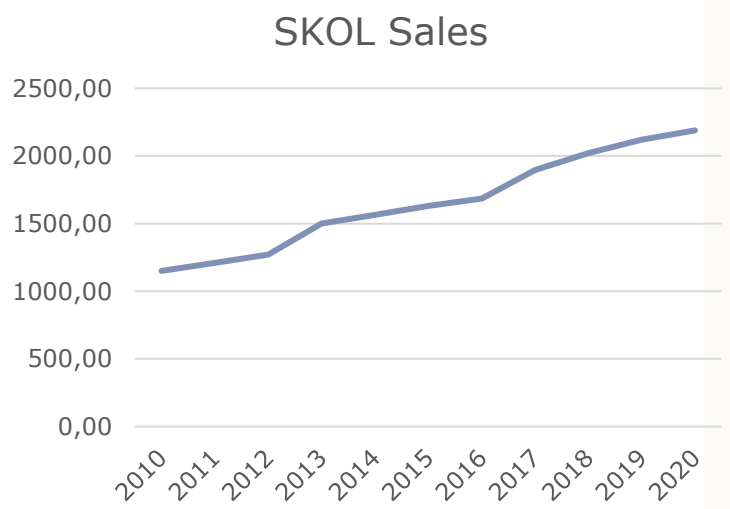
Traditionally consulting is seen to depend only on macroeconomic indicators. However: what is the relationship to SDG performance?

– N.B. We have to be careful with causality. Correlation is not causality, parallel development may rather be two factors reinforcing each other than one leading the other

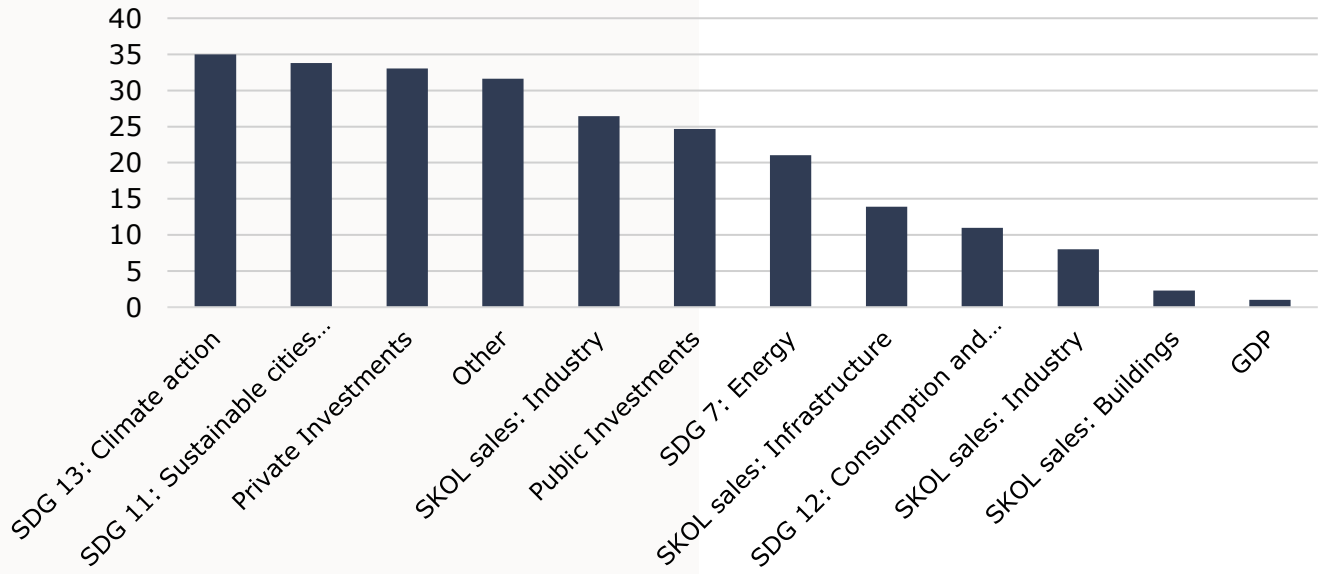


WHAT BEST MATCHES GROWTH

When forecasting Finnish consulting turnover development, climate, cities and investments actually best explain growth



IMPORTANCE OF DIFFERENT VARIABLES AND GDP AS A REFERENCE LEVEL



SKOL sales: what explains growth?

We made an AI forecast model of SKOL growth and a group of different factors

Climate and sustainable cities drive SKOL
The best forecasting elements: climate action and sustainable cities development

Investments come next
Yes, SKOL members' turnover is still very dependent on investment projects

GDP has little direct explaining power
As opposed to "old-school GDP forecasting", GDP by itself has very little explanatory power on SKOL growth

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Why tightening climate policy actually creates opportunities for SKOL companies

THE LOGIC

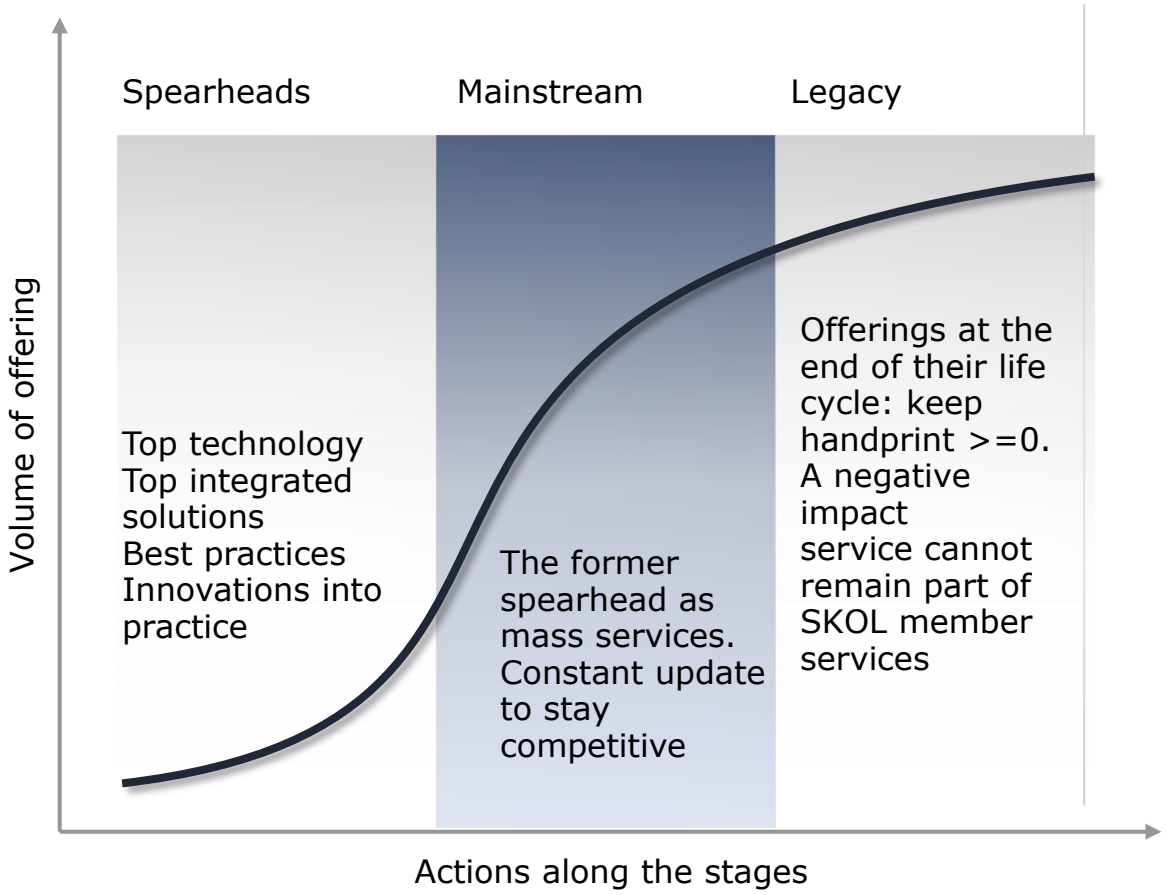
If it is a top SKOL market, it is advanced in SDG development

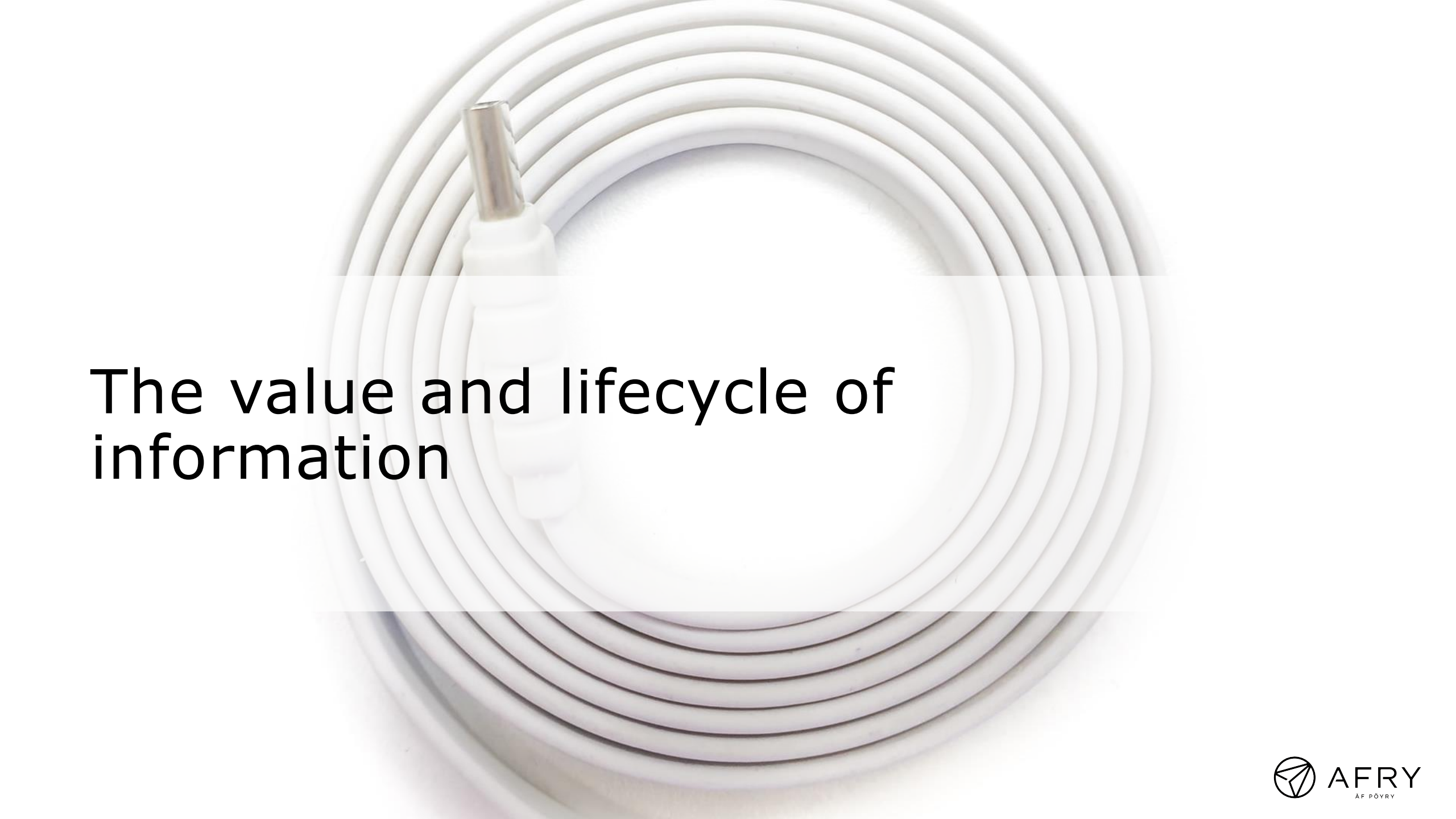
A market needs to advance in sustainability to be a good SKOL narket

Measures that promote SDG development are good for SKOL business

> **NEVER GET SELF-SATISFIED**
>
> A permanent imbalance is needed – SKOL members as a whole must be on top in changes in sustainability to even keep their position, let alone grow. SKOL has to have enough offerings that lean ahead of the mainstream to succeed.

THE OFFERING S-CURVE





The value and lifecycle of information

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Data value in an industrial project

LOWER RANGE

10 000 files of drawings

UPPER RANGE

100 000 files of drawings

Value of consulting encapsulated in files:

0.0004 EUR/bit

or

400 EUR/Megabit

Data mobile transfer of the example project **final results**: 4G and towards pure 5G

2017 IN FINLAND

2017 mobile data transfer in Finland (no 5G)

0.3 kWh/GB

1 iteration of the final files in the example project sent over mobile then

0.75 kWh

with emissions

0.07 kg CO_2 eqv.

PURE 5G IN 2025

Pure 5G transfer in 2025

0.03 kWh/GB

1 iteration of the final files in the example project sent over mobile then

0.075 kWh

with emissions

0.004 kg CO_2 eqv.

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The data multiplier effect

The final data encapsulating the results is **only part of all data** generated during a project.

How much more data is generated than the final results? Based on sampling of different types of projects, a **multiplier of 100** seemed realistic. That is, during a project all the intermediate versions and different data files altogether accumulate to about 100 times the size of the final deliverable.

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Data mobile transfer to cloud of **all generated data** during the same example project: 4G and towards pure 5G

2017 IN FINLAND

2017 mobile data transfer in Finland (no 5G)

0.3 kWh/GB

1 iteration of all files in the same example project sent over mobile then

0.75 kWh * 100

with emissions

7.2 kg CO_2 eqv.

PURE 5G IN 2025

Pure 5G transfer in 2025

0.03 kWh/GB

1 iteration of all files in the same example project sent over mobile then

0.075 kWh * 100

with emissions

0.40 kg CO_2 eqv.

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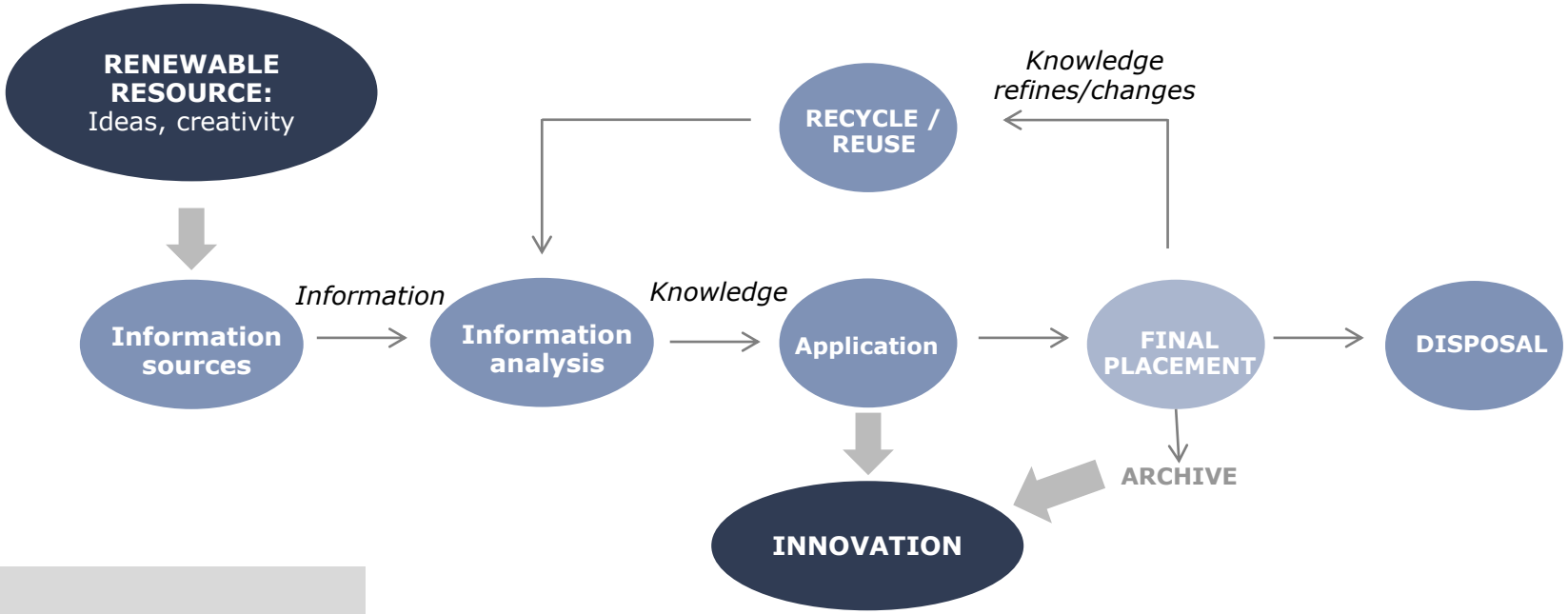
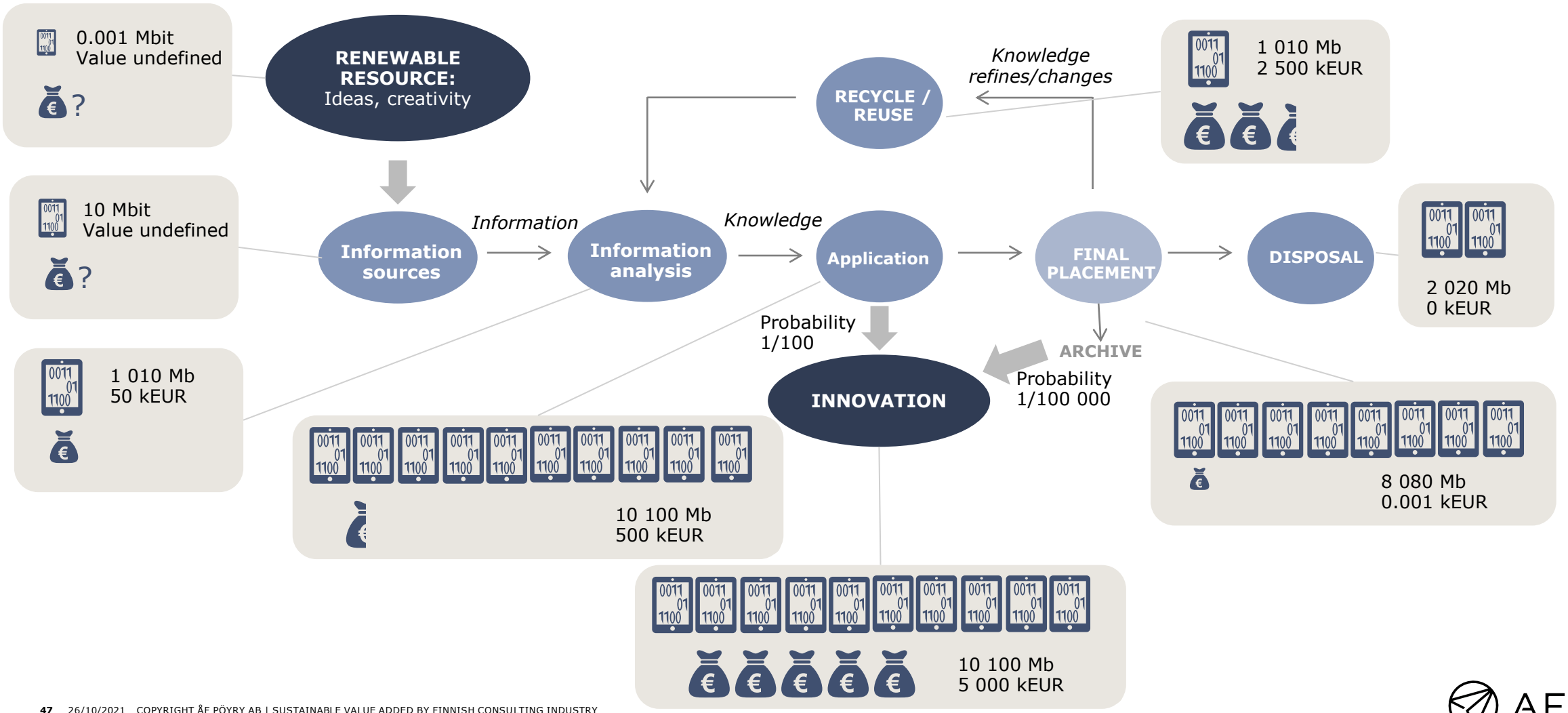
Circular economy of information



Concept created by Pöyry and the authors also present in this current study and published in 2009. Link

Source: AFRY Report

Value of information grows exponentially as it is refined by experts



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”On the move” - Circular information economy in consulting: sustainable value added

THE BASIS

1) Circular information economy as cornerstone for consulting

Meaning: information, from idea through analysis, application, circularity with value added end final disposal, is at the core of all consulting

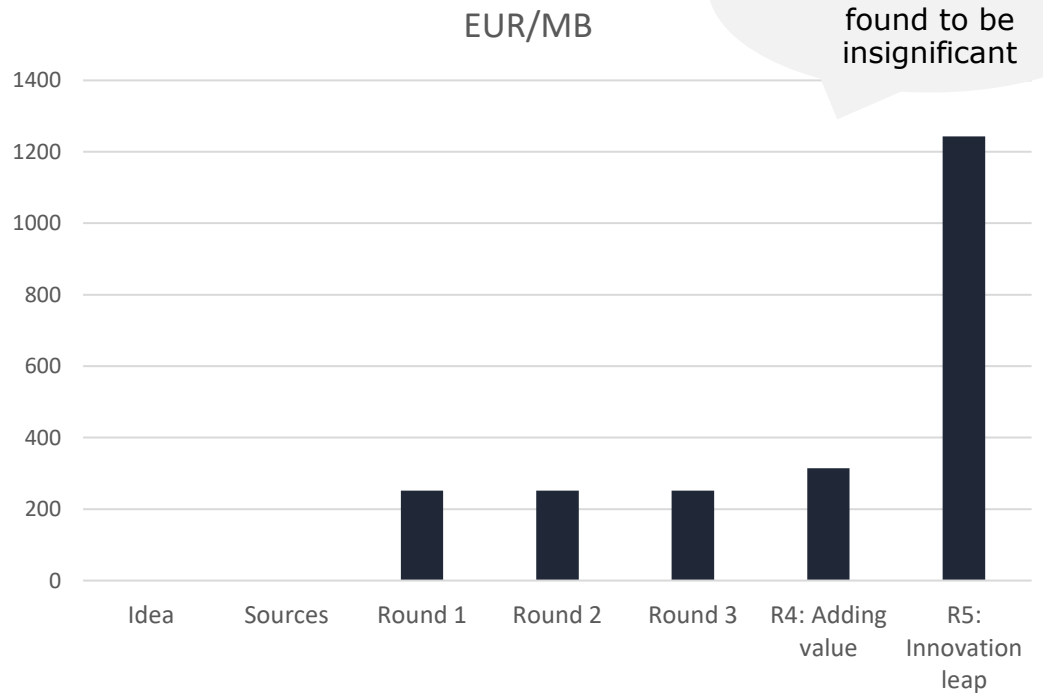
2) Information moves: the greater efficiency emission/bit is counteracted by increasing information

Meaning: we are more efficient transferring information, but there is more of it.

3) Information should gain in value in circularity: occasional innovation loops (”quantum leaps”) occur
Meaning: we get the most out of what was created in circularity – and more value per bit is created in information loops

THE INCREASE IN VALUE ADDED

Emissions from data transfer were calculated and were found to be insignificant



Rounds refer to the information rounds in the circular information loop (one loop = analysis, application, recycling)

What is consulting’s role in footprint and handprint?

How should we think about consulting, footprint and handprint?

AFRY

How do consulting and design services create a handprint impact with a footprint?

EARLY HUMANS TO CONSULTANTS (PROGRESS, OR NOT)

a) Ancient human "handprint art" on cave walls

Sustainable value added = presumably hunting luck and wellbeing. There was an idea on how to generate this through handprint art. This produced a footprint, too – on the floor, literally, but also as an impact of effort to produce the handprint art.

b) Consulting producing handprint with a footprint, in Finland and globally

Sustainable value added = defined earlier. All actions to reduce CO2 start with an idea. Through many stages viewed as a consulting project a handprint (CO2 savings, other impacts) is created. This produces a footprint for consulting.

AN IMPORTANT CONNECTION FROM THE EARLY BEGINNING OF HANDPRINT ART

Nothing new under the sun

Fundamentally, creating sustainable value added and wellness (**handprint**) with an effort (**footprint**), starting from **idea** and ending with implementation, with a **"guru"** involved in the process, is ancient. Consulting just has grown more complex.

How to in the simplest way think about consulting's footprint and handprint

The footprint of only consulting:
CO2 emissions from scope 1, scope 2 and scope 3. All, 100 %, allocated to consulting.

Consulting as necessary part of a handprint:
Consulting has different roles in different projects – many forms of consulting often combined. However, trying to allocate a percentage to consulting is nearly impossible and definitely controversial. Consulting is a necessary part of a handprint – what part belongs to which actor is not essential.

”The consulting equation”

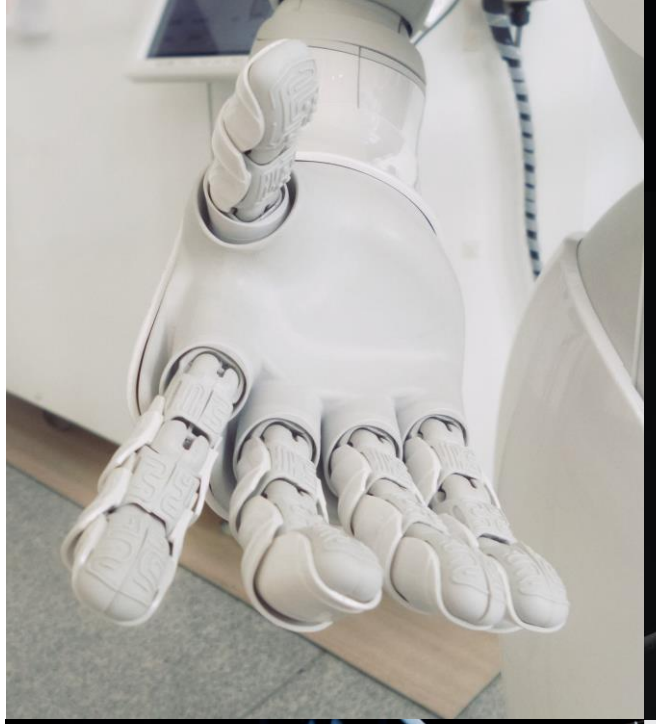
IF ANY OF THE CONSULTANT INPUTS ARE MISSING, THE TOTAL HANDPRINT IS 0. IN THIS CASE, ZERO IS NOT A GOOD THING.

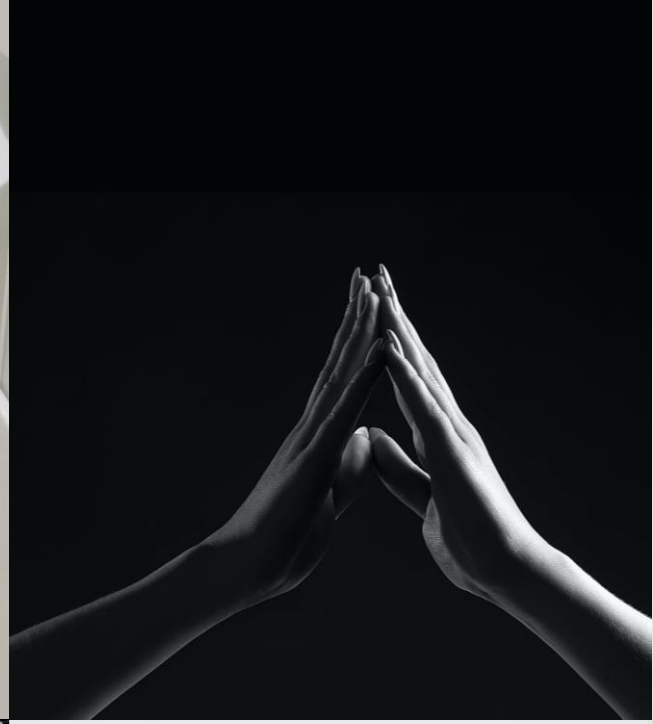
If all actors in the chain do their task, we achieve the full handprint – all contribute their necessary part to the full handprint

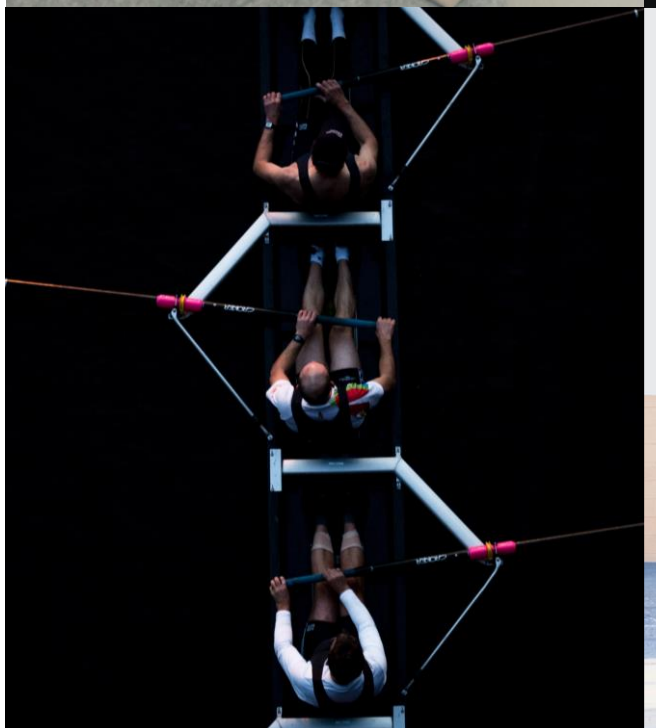
Idea * Concept * Design * Project plan * Implementation * Running = **Handprint**

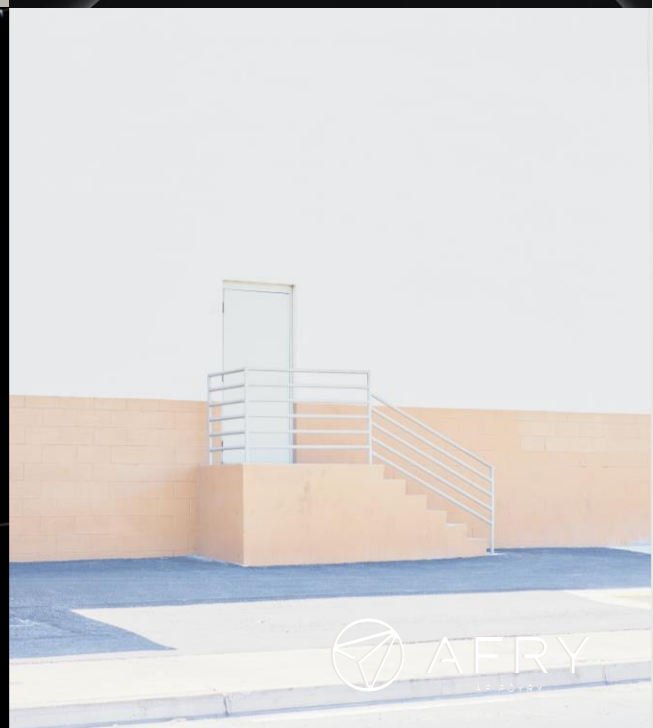
Consulting footprint

Agenda









The SKOL footprint

How light or heavy is our step?

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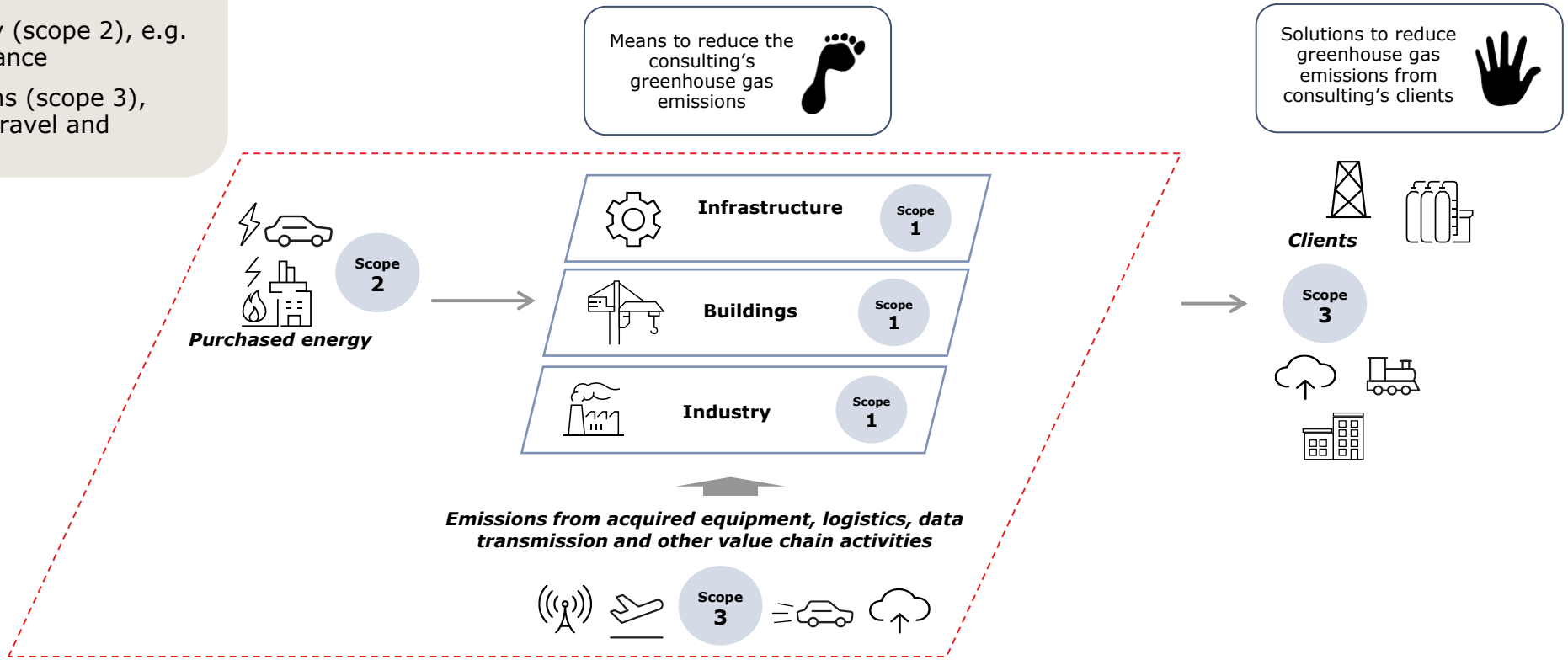
Carbon footprint for consulting and design services

Focus on

- Direct emissions (scope 1), e.g. company car use
- Purchased energy (scope 2), e.g. premise maintenance
- Indirect emissions (scope 3), mainly business travel and commuting



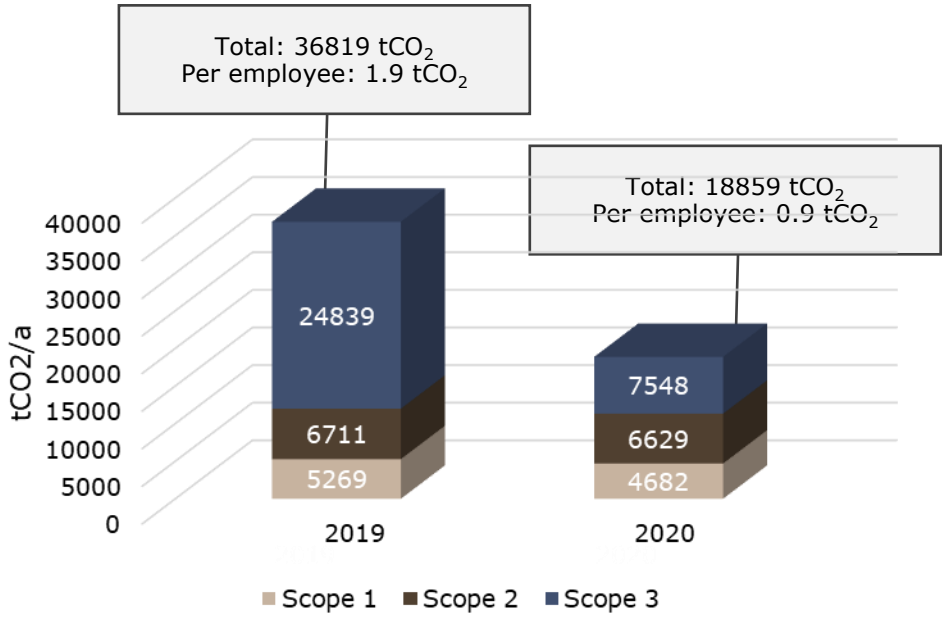
Scope 3 emissions are a major contributor to SKOL's total emissions

KEY FINDINGS SUGGEST…

- Consulting and design companies' major source of emissions is business travel (mainly scope 3), which was significantly reduced in 2020 due to the global COVID-19 pandemic
  - This induced a significant drop also in the emissions per employee
- Scope 1 and 2 emissions remained relatively stable during 2019 and 2020
- Scope 3 emissions are typically one of the hardest ones to reduce unless the companies along the value chain commit in reducing emissions, thus, SKOL ability to influence is limited but meaningful

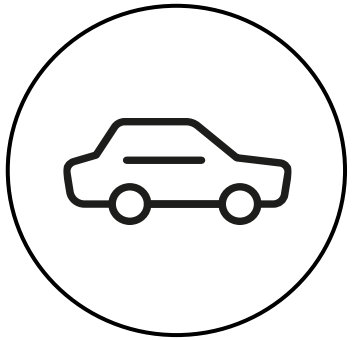
→ The 2019 carbon footprint is more representative to describe SKOL companies average emissions since it is not impacted by the COVID-19 pandemic

ESTIMATED SKOL COMPANIES CO2 EMISSIONS, THE YEAR 2019 GIVES A MORE REALISTIC REFERENCE WITHOUT COVID-19 IMPACTS

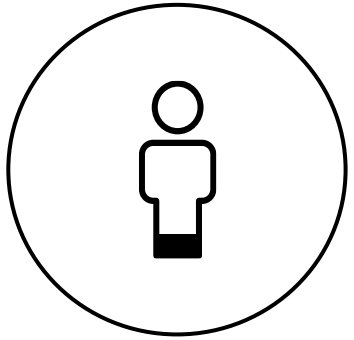


Scope 1 Direct emissions	**Scope 2** Emissions from purchased energy	**Scope 3** Other emissions / value chain emissions
– Sources controlled by the SKOL companies themselves, e.g. business travel with company cars operated by employees, heat boilers if controlled by the company	– Purchased and consumed electricity, heating and cooling purchased by the SKOL companies	– Purchased or rented goods and services, business travel, upstream transportation and distribution, waste, employee commuting, fixed assets investments, other *(reported sources may differ depending on a company)*

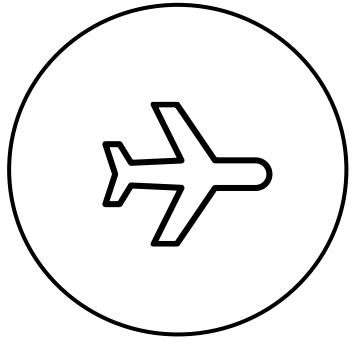
How much is 1 ton of CO2?



Driving a passenger car for half a year*



10% of annual carbon footprint of Finnish citizen

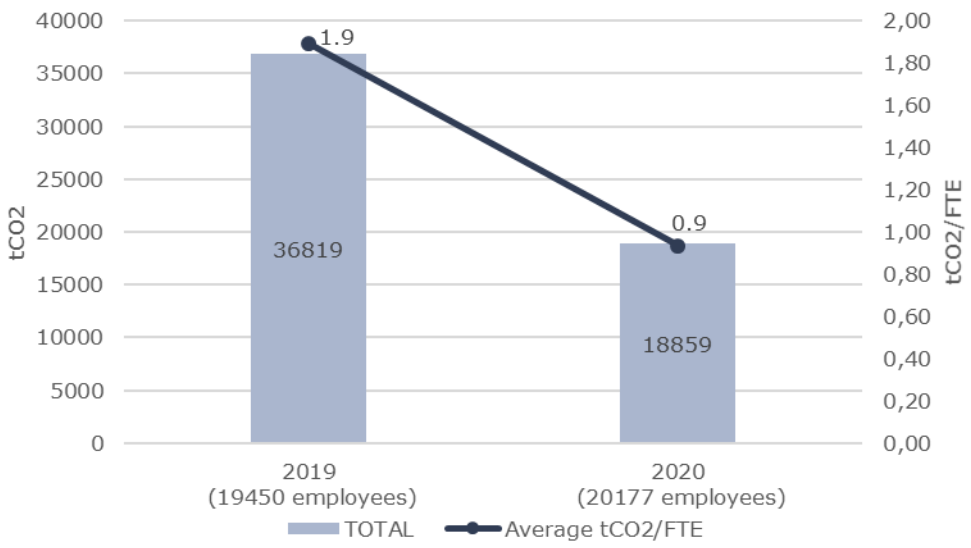


Flying Helsinki – Málaga - Helsinki

Requires 50 trees to grow for a year in order to capture it

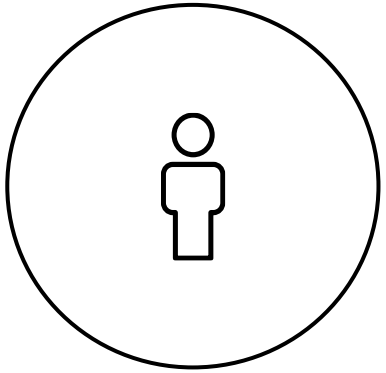
*Average km's per year with passenger car, gasoline: 9994km
Sources: Statista

SKOL's carbon footprint was heavily impacted by the global pandemic



1.9 tCO2
SKOL EMPLOYEE
AT WORK

10.3 tCO2
FINNISH CITIZEN



SKOL annual contributions	Total emissions (tCO2)	SKOL sales (M€)	tCO2/M€ (Total emissions)	tCO2/M€ (Scopes 1 +2)	Emissions per employee	SKOL employees	€ Per employee
2019	36819	2120	17.4	5.7	1.9	19450	109000
2020	18859	2188	8.6	5.2	0.9	20117	108780

Source: Sitra (2019)

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How heavy is the SKOL impact?

SKOL COMPANIES TOTAL EMISSIONS

37 $ktCO_2/a$

FINNISH MUNICIPALITY WITH A POPULATION OF 5800 (size of Mäntyharju municipality)

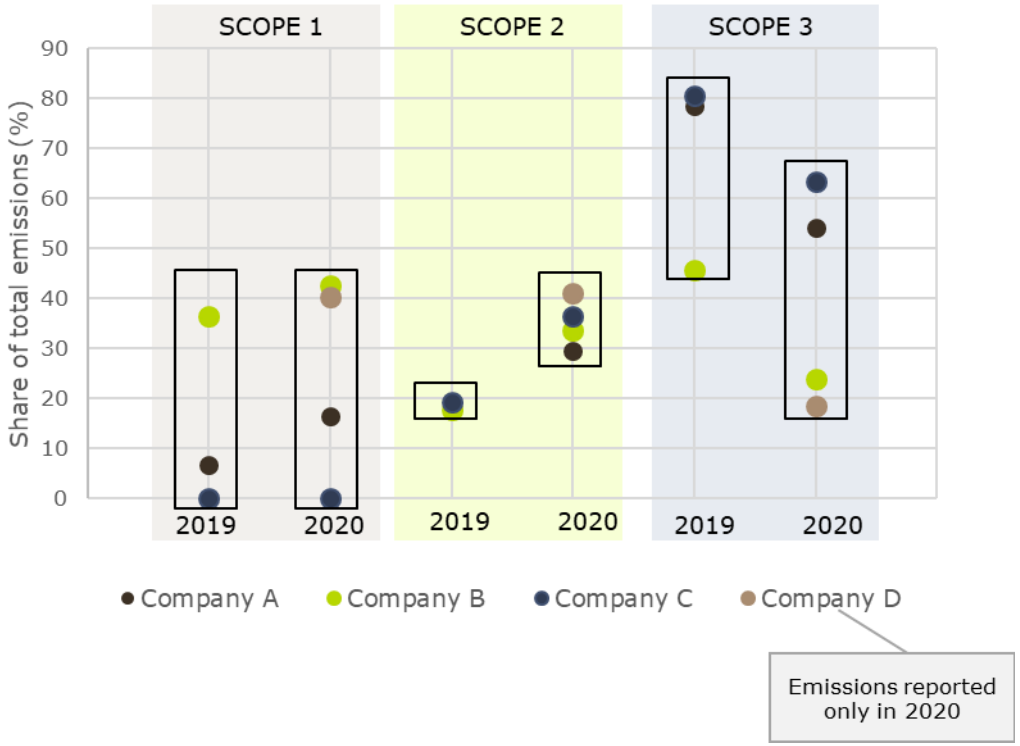
37 $ktCO_2/a$

Most listed companies disclosed their emissions, however, assumingly their accounting methodologies vary

METHODOLOGY DESCRIPTION

- Estimated SKOL companies' emissions are calculated using companies' self reported emissions in their annual reports
- Companies are not entitled to report their emissions but it is voluntary, and therefore the used data coverage is limited.
  - Company coverage used in emission estimation of total SKOL employees was 34% in 2019 and 50% in 2020
- Emission accounting methodologies may differ between companies
  - Figure in the right illustrates how the share of reported emissions per scope is rather varied between companies, which is not self-explanatory

SHARE OF REPORTED SCOPE (1-3) OF TOTAL EMISSIONS



What is included in scope 3 emissions? Accounting methodologies may vary between companies, and thus, results shall be interpreted as indicative

QUESTION OF EMPLOYEE TRNSPORTATION – SCOPE 1 OR SCOPE 3?
Guidance of GHG Protocol

Scope 1
- Emissions from transportation in fuel vehicles owned or controlled by the reporting company

Scope 2
- Emissions from transportation in electric vehicles owned or controlled by the reporting company

Scope 3
- Business travel in vehicles owned or operated by third parties
- Employee commuting, transportation of employees to and from work
- Leased vehicles operated by the reporting company not included in scope 1 or scope 2

SCOPE 3 EMISSIONS' COVERAGE OF EXAMPLE SKOL COMPANIES

	Employee commuting (private cars)	Business travel (taxis, public transport, air travel, ferry)	Waste	Food	Fuel and energy related sources not included in scope 1 or 2	Investments	Transportation and distribution activity in the value chain	Other purchased or rented goods and services	Other
Company A	x	x							
Company B		x							x
Company C	x	x	x		x			x	
Company D	x	x	x	x	x	X	X	X	x

Companies have not necessarily separated the share of indicated emissions but announce that they are included in the scope of 'scope 3 emission sources'

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Examples of how SKOL companies can reduce their carbon footprint

	Company cars with combustion engine Scope 1	***Purchased energy and electric cars*** Scope 2	***Acquired equipment, logistics, data transmission and other value chain activities*** Scope 3
LOW HANGING FRUITS	– Switching company cars to electric cars	- Selecting a clean/renewable energy plan - Reducing energy use with electricity-efficient and smart equipment and practices - Incentives for office premises and activities, e.g. LEED Certification, WWF Green Office - Changing lighting to less-energy consuming options - Adjusting office needs with hybrid working	- Deploying digital tools to replace part of travelling - Selecting cloud service and mobile provider that uses clean electricity - Reducing food waste and promoting of plant-based options - Applying green criteria for procurement of goods and services - Encouraging carpooling and cycling in employee commuting - Minimising waste and enhancing recycling
ADVANCED	*Sometimes an improvement in scope 1 is actually transferred to scope 2 or 3*	– Installing solar panels on office roof area – Energy and environmental design of office premises and green retrofits (incl. insulation, lighting, HVAC)	– Preferring less GHG-intensive means of travelling – Purchasing second hand or sustainably sourced office furniture – Increase employee engagement to make them feel connected to reducing company carbon footprint

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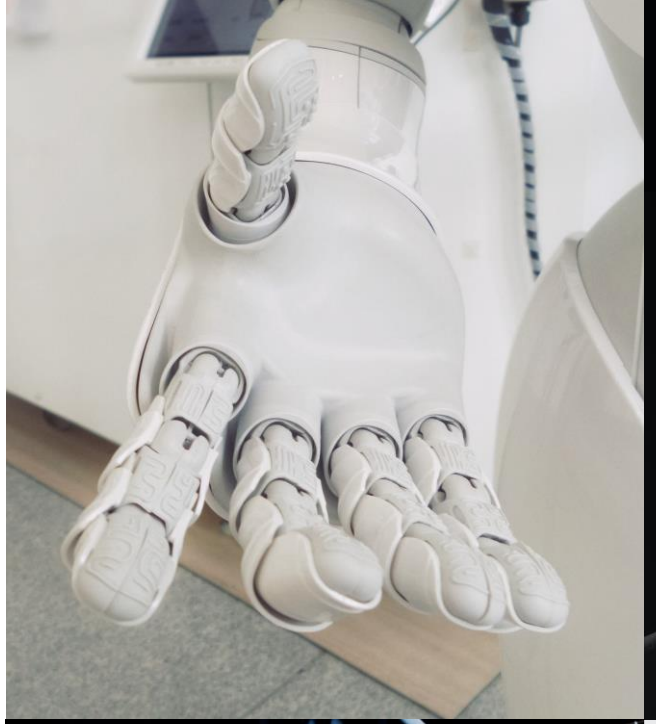
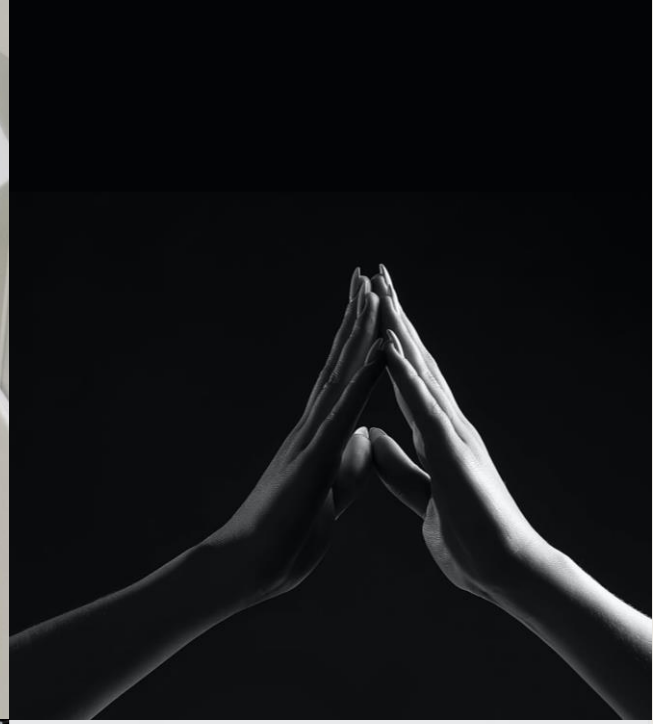
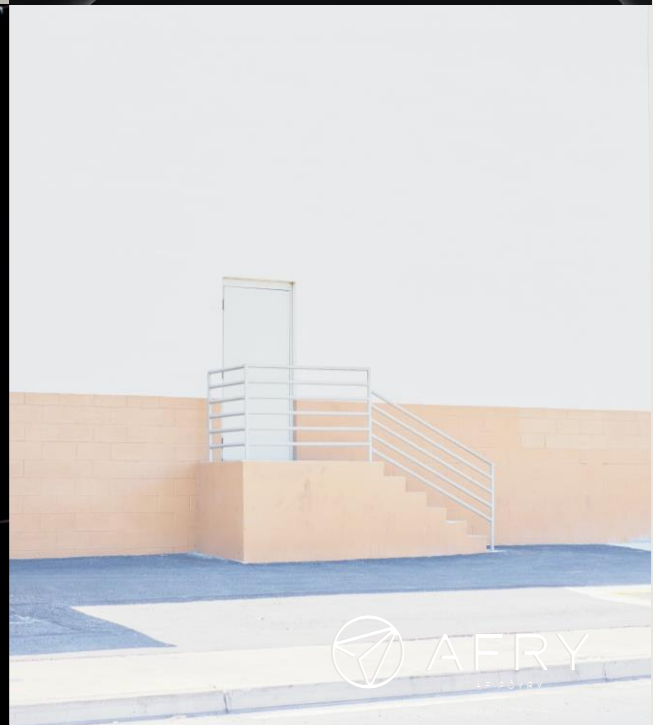
Agenda







Handprint methodology

Getting a representative set

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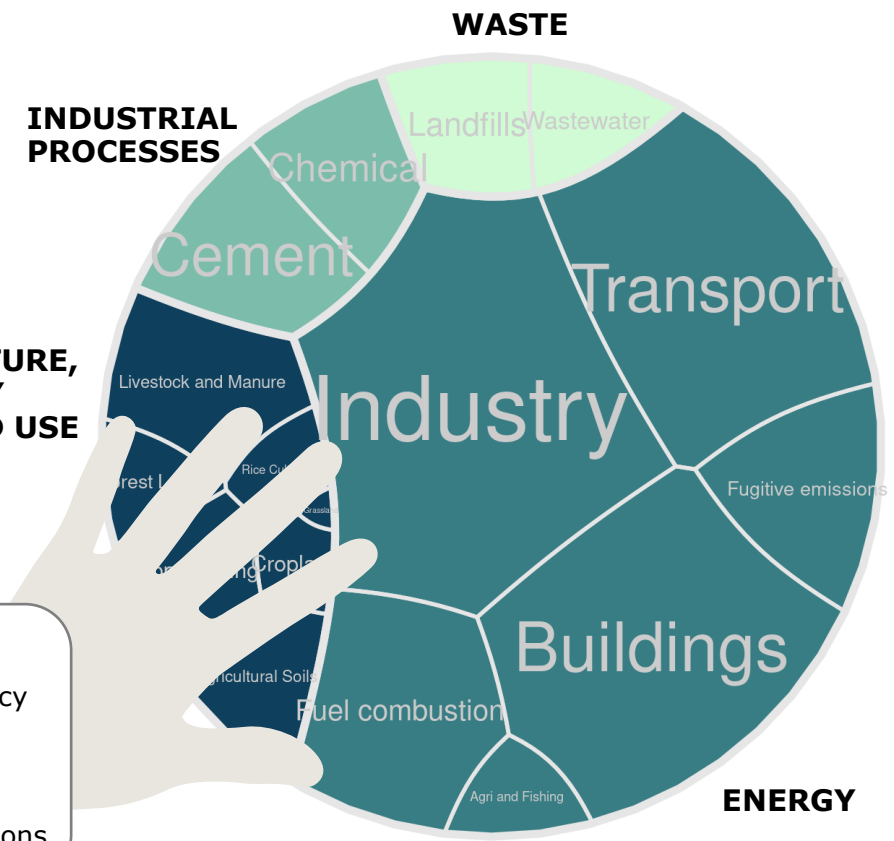
Getting a grip on emissions: Potential to reduce clients' GHG impacts demonstrated with cases

IMPACT OF SKOL COMPANIES

SKOL companies operate in emission-intensive sectors, and thereby, are solving the most crucial sustainability problems



Palette of solutions, e.g.

- Improving energy and material efficiency
- Preparing for risks
- Enabling smart society and circularity
- Sustainable design and lifetime extensions

CASE STUDIES COVER SKOL OPERATIONS AND IMPACTS

- Improving energy efficiency of existing facility
- Digital twin for a production plant
- Preparation for the risk of cyber attack on electricity grid
- Material-efficient construction
- Smart city water system
- Urban planning for smart city

Note

GHG impact is quantified in the cases, but other sustainability impacts may not be compromised.

Source: Our world in data/WRI (2020)

YES/NO ADVICE

The Yes and No of interpreting the handprint

YES, SAY IT

BE AN IMPORTANT PART OF A LARGE HANDPRINT where consulting is an absolutely necessary part

TELL REPRESENTATIVE CASES which provide a suitable coverage of SKOL's current and coming offerings

SCALE UP THE CASES FOR AN ESTIMATE OF THE HANDPRINT SKOL IS AN INTEGRAL PART OF by assuming a certain proportion of spearheads,
mainstream and "laggard" cases (as to handprint) and using the cases to provide an estimate that fits the projected SKOL turnover.

NO, AVOID IT

NO: THE HANDPRINT DOES NOT 100 % BELONG TO CONSULTING. Consulting has an absolutely necessary role in the handprint; without consulting the handprint cannot happen – but all is definitely not consulting.

NO: The cases are **NOT A FULL CATALOGUE OF ALL CONSULTING DONE** and cannot be. Just imagine 10 000 different projects in different conditions with different impacts. That is not doable.

NO: DON'T TAKE THE HANDPRINT ESTIMATE AS A PRECISE "TRUTH". It is a realistic estimate giving a size for where SKOL is involved. It also helps in guiding thinking of where SKOL should be headed.

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The handprint logic: how to estimate how much SKOL is part of accomplishing in handprints

1

The Boundaries
Business as an integral part of the handprint - if nothing is done, there is no handprint

The main boundary:
- turnover (numbers now/forecast) for SKOL divided into the three categories of SKOL work
- the handprint is scaled up from cases to match this turnover

2

The Cases
Representative cases covering different areas of SKOL consulting

Output:
- showing that SKOL services are being covered by the cases (representativity)
- CO2 reduction and consulting cost/unit of consulting (study, project) – key calculation numbers for handprint
- abatement cost
- proportion of SKOL categories (industry, infra, building) in each case

3

The Scaling Up
Calculating SKOL estimate using cases

Scaling needs:
- average reduction/consulting cost/category, weighted calculation from case percentages
- division of studies/projects assumption (spearheads/mainstream/laggards)
- average reduction/cons.cost by project type
- scaling up to full turnover by multiplying project type volume with reduction/cost

4

Reality Check and Conclusion
Checking spearhead volume vs. market assumptions
Concluding from ressults

Final check and conclusion
- assuming sales projections as reasonable: does it make sense to assume the resulting volume of spearheads sold? Is the global market big enough for reasonable market entry being enough? Do we need to assume more spearheads?
- conclusions which of course depend on results

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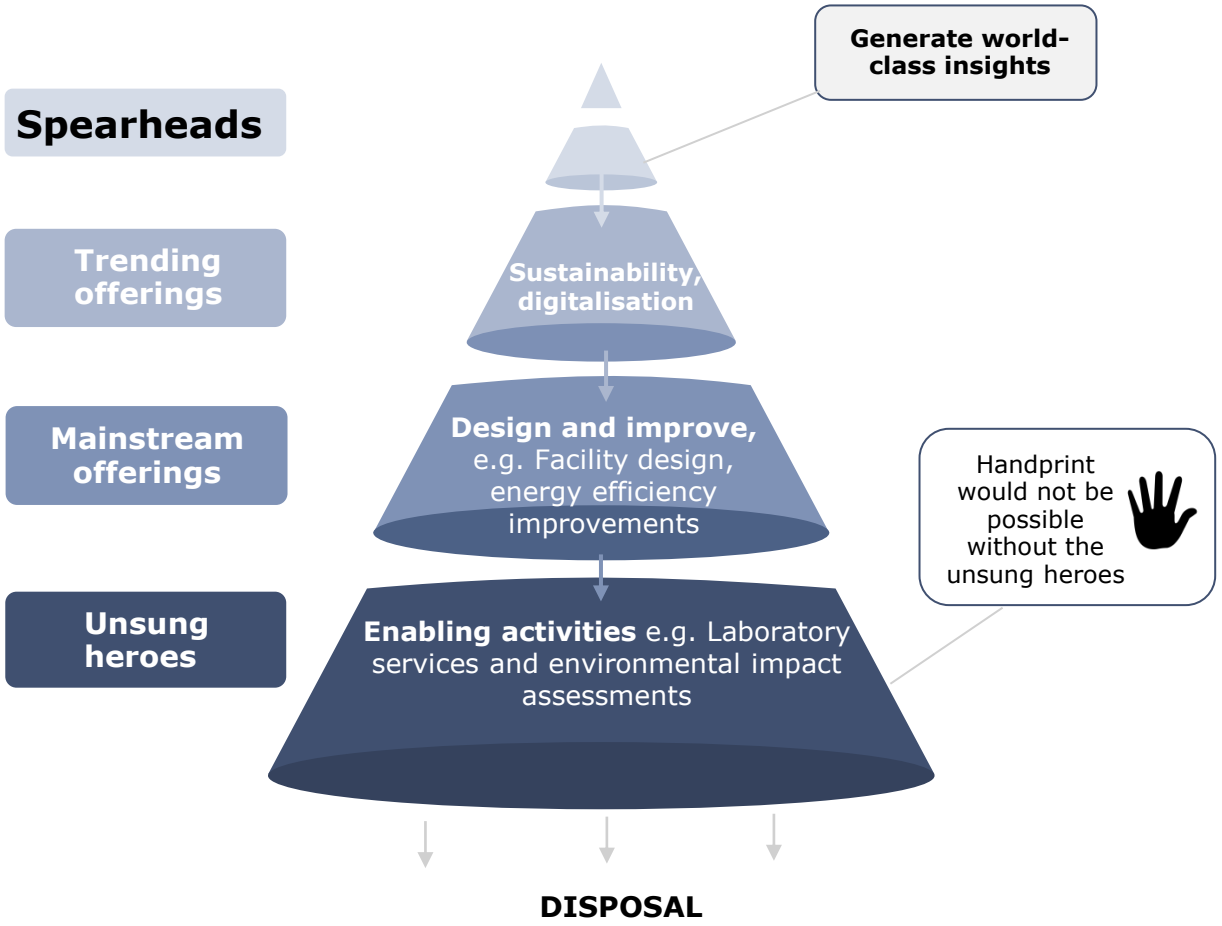
What are spearhead offerings?

STORY OF SPEARHEADS: WHY, WHAT AND HOW?

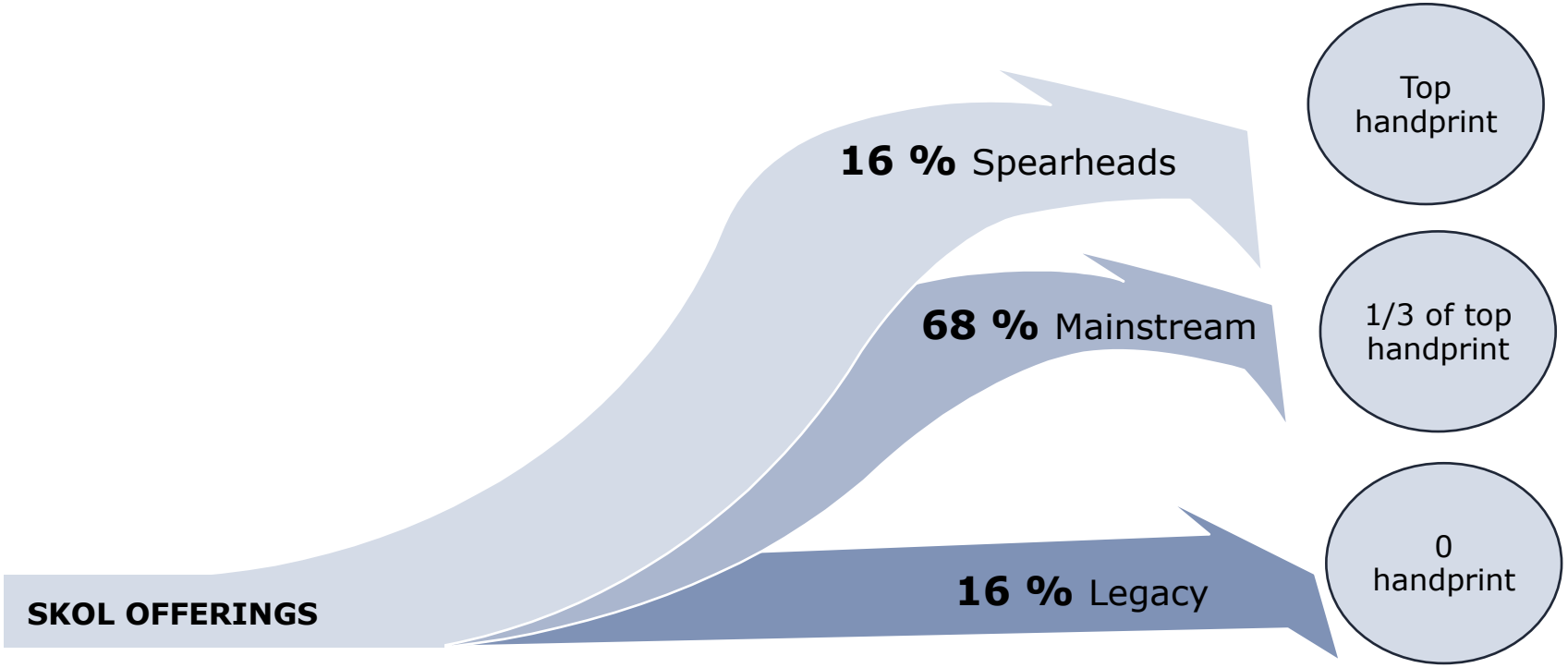
- New solutions are constantly needed by clients as the surrounding world develops and reshapes – developing spearheads is a natural part consulting work's organic learning to a certain extent.
- However, a company can gain a competitive edge by consciously putting efforts on internal research and development in order to deliver expectational and distinctive solutions.
- On the other hand, companies have an inherent incentive to develop spearheads because over time the spearheads become trending offerings and after a while even mainstream offerings. To put it differently, state-of-art offering slowly become mainstream leaving white space for new innovations to thrive and occupy the space. Thereby, there's always space for widening the offering.
- Spearhead solutions also tend to attract attention of young, ambitious and creative experts, which in turn, increases the overall attractiveness of the industry



Spearheads move towards unsung heroes little by little once new spearheads enter the market

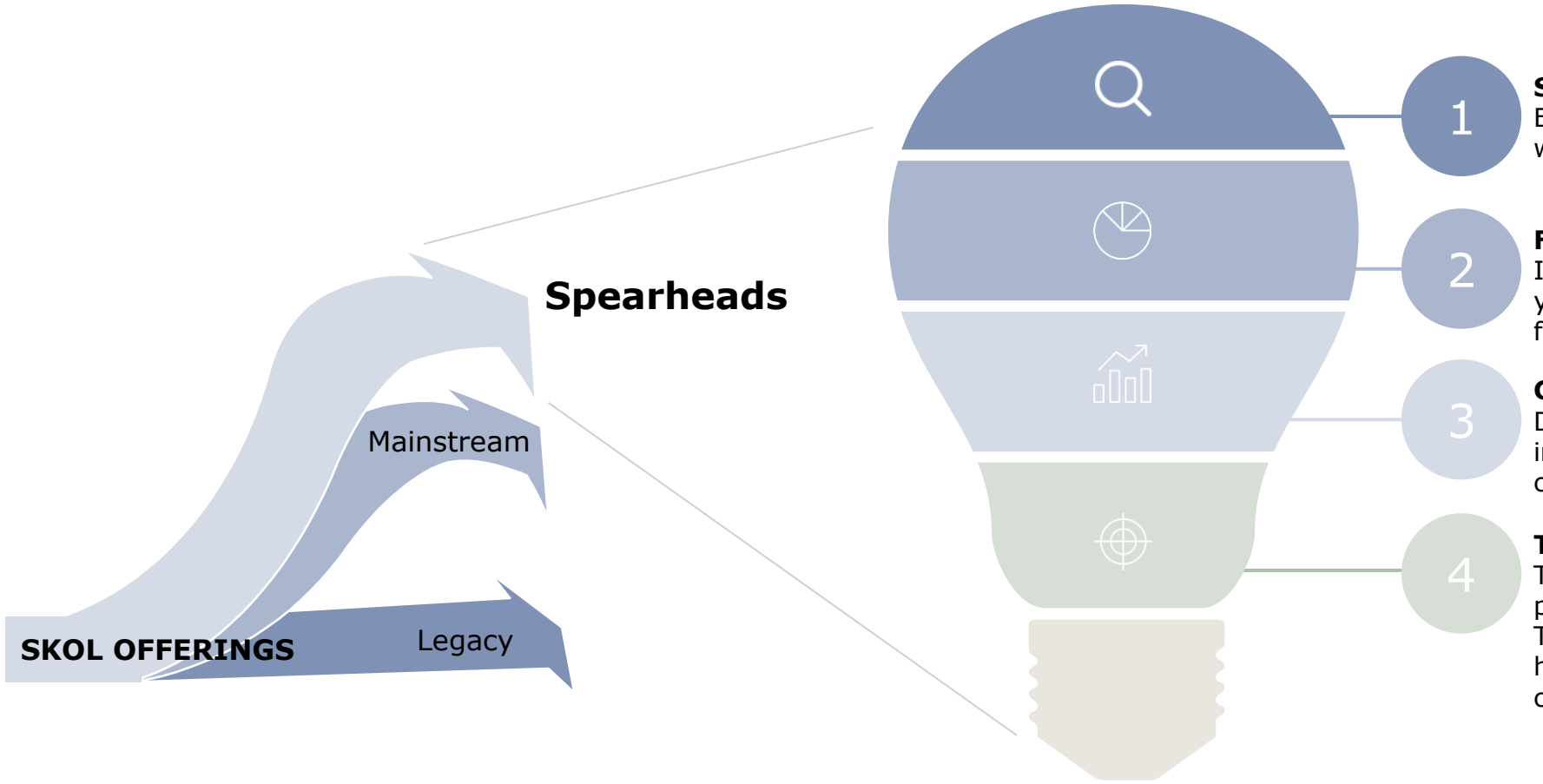
DISTRIBUTION OF OFFERINGS

Spearhead solutions tend to have the highest handprint potential



= neither improve nor worsen. If SKOL work worsens the situation, it should not be done.

Why do spearheads?



SEARCH FOR PIPELINE
Every mainstream offering was once a spearhead

FULL SPECTRUM
If you're not a niche expert, you need the fullest spectrum, from vision to dirty fingernails

GROWTH BETS
Dramatic growth occurs rarely in mainstream, but with a certain probability in spearheads

TARGETED SOLUTIONS
Today we have enough problems without solutions. Target problems exist, spear-heads bring offerings ever closer to solutions

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EXAMPLE

How to get from cases to a handprint consulting is a necessary part of?

1	**Boundaries**	Consulting turnover e.g. 450 MEUR/a, divided into two categories: e.g. 200 and e.g. 250 MEUR/a
2	**Cases:** creation	From mainstream and emerging offerings, form a group of cases covering main consulting types (e.g. 6 cases)
3	**Cases: calculation**	Create/pick existing/ emerging case; describe; calculate savings compared to starting state and estimate consulting cost, divide by consulting type
4	**Scaling up**: proportions	Examine area and research: what is a typical division between spearhead/ mainstream/ laggard projects?
5	**Scaling up**: performance	From cases and their proportions, calculate avg. CO2/EUR for consulting type. Assume 1/3 efficiency for mainstream, 0 handprint for laggard.*)
6	**Reality check:** full handprint, is it sellable?	Take volumes of spear/main/ laggard by type, multiply by avg handprint = full handprint as sum total. Is the spearhead volume realistic?
7	**Conclusions**	Insights!

**) If our studies have a negative handprint, we should eliminate them from our services*

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Spearheads and mainstream offerings of consulting and design services are shortlisted to define a representative handprint

Longlist of cases

SKOL offering: current and emerging

"Sieve"

Current volume

GHG impact

Significance

SKOL strengths

Growth potential

Wild card

Future potential

Shortlist of cases

Representative set of spearheads and mainstreams

- SKOL main competence coverage
- SDG coverage
- Knowledge and education needs

Handprint analysis

Handprint of representative set with market assumption

Extrapolated handprint = representative set expanded with export volume

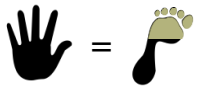
How do consulting and design services create a handprint impact

PRINCIPLES OF HANDPRINT

- The handprint refers to an emission reduction in carbon dioxide equivalents (tCO_2e) or positive climate impact enabled by a product or a service provided by another actor
- Consulting and design services may enable avoided emissions or positive climate impact as follows

a) Decrease existing carbon footprint with a better solution

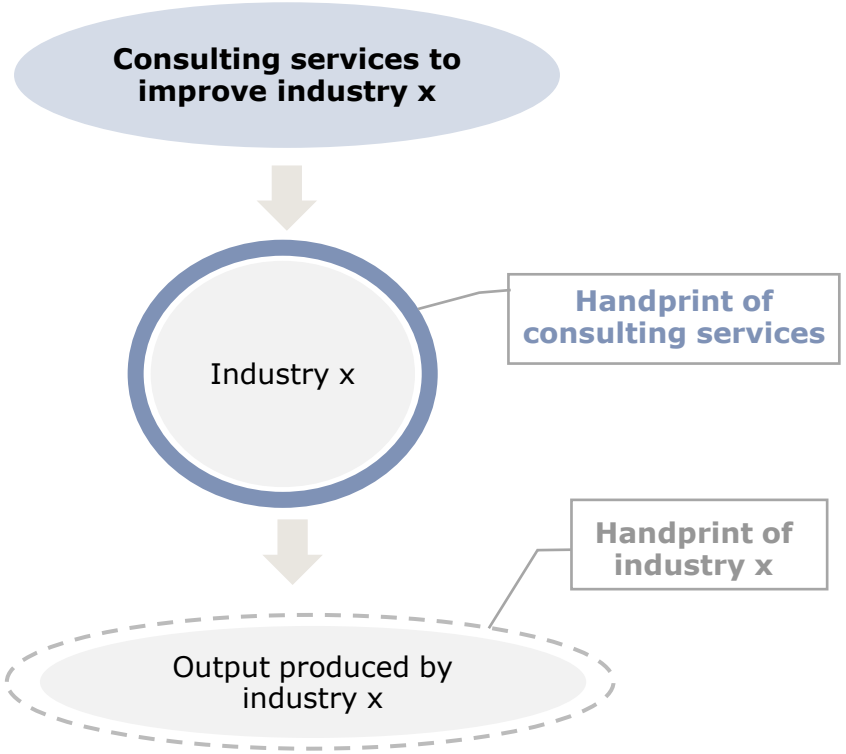
Using a product or service avoids a footprint that otherwise would happen



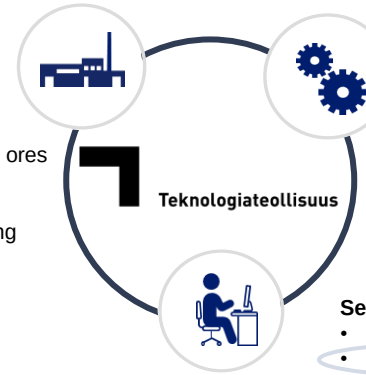
b) Create a new way to produce a positive impact

A product or service generates a positive climate impact that otherwise would not happen

LIMITS OF MY TERMS OF REFERENCE ARE THE LIMITS OF MY HANDPRINT



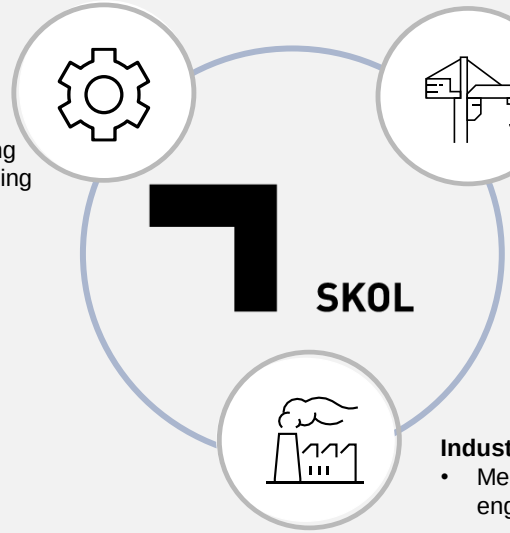
Who are the SKOL members and how do they contribute to society?



Metal processing
- Mining of metal ores and industrial minerals
- Metal processing

Manufacturing industry
- Machinery and metal products industry and vehicle manufacturing
- Electronics and electrical industry

Services
- Information technology
- Design and consulting

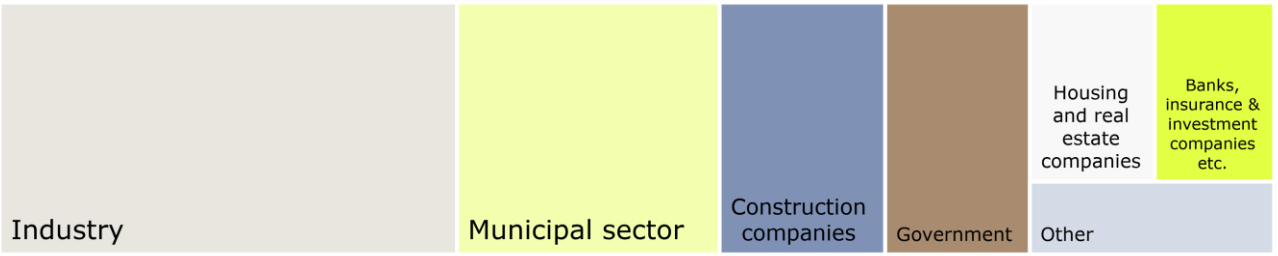


Infrastructure
- Heating, plumbing and air-conditioning design
- Town and city planning
- Civil engineering activities

Buildings
- Electrical engineering design
- Structural engineering activities
- Architectural activities
- Other construction activities

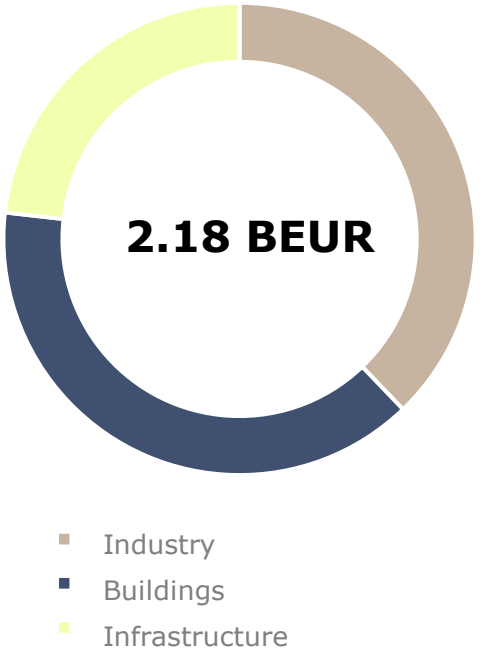
Industry
- Mechanical and process engineering design

CLIENTS OF SKOL MEMBERS

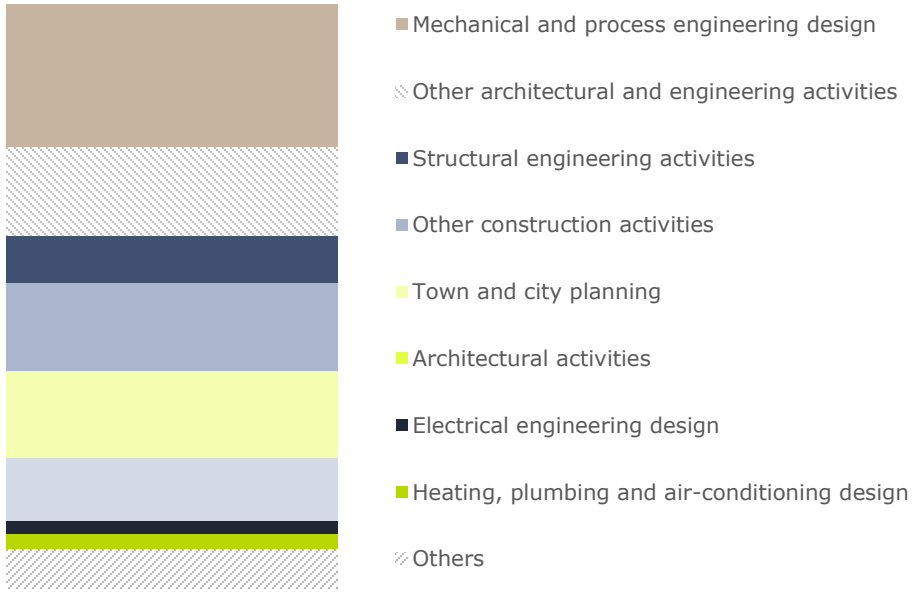


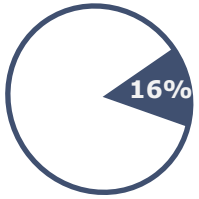
What are the key sub-sectors influenced by SKOL members?

TURNOVER OF SKOL MEMBERS



TURNOVER DIVIDED INTO SUB-SECTORS (2017)





Share of **exported services** by SKOL members

There is a spectrum of typical offerings provided by consulting and design services that enable emission reductions in other sectors

Domain consulting

Infrastructure

- Traffic and mobility
- Telecommunications
- Community planning

Buildings

- Structural construction
- Buildings
- Earthworks

Industry

- Industrial installations

Common ground

Expert, design and product development

- Digital
  - Digital twins
  - Cloud services
  - ICT
- Project related
  - Project management
  - EPC/EPCM – project delivery
- Procedural services
  - Contract administration
  - Contractor and supplier procurement
  - EIA

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SKOL Competence and SDG Coverage – getting a representative set

	Infrastructure	KEY SDGs	Buildings	KEY SDGs	Industry	KEY SDGs
1	Roads and Area Design	11 9	Structural Engineering	11 9	Process design	7 12 13
2	Traffic Engineering	11 15	Heating, Ventilating, Air Conditioning	11 13	Plant Engineering	7 12 14
3	Environmental Consulting	13 14 15	Construction management	11 9	Electrical and telecommunications engineering	7 13

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Handprint case pondering…

Cross-cutting

Case	Group 1: Energy + climate	Group 2: Construction	Group 3: Sustainable living (Industry + cities = Infra)	Group 4: Industry + consumption
Improving energy efficiency of existing facility				Energy efficiency improvements in a European pulp and paper mill
Digital twin for a production plant				Building a production plant with a digital twin → simulations, optimal solutions, possibility to adapt/make changes
Preparation for the risk of cyber attack on electricity grid	Preventing cyber attack on electricity grid with vast impacts			
Material-efficient construction		Reduction and circular use of construction materials, utilising BIM		
Smart city water system			Smart city water system including advanced wastewater treatment and flooding safety	
Urban planning for smart city		Energy savings in a smart building connected to a smart district		

Two terms to note: ”baseline” and ”reduction *per annum*”

”BASELINE”

- In a handprint, one needs to compare what is accomplished with what otherwise would have happened. So, the baseline is:
  - BAU, business-as-usual, as in ”outcome if work done in one way instead of the consultant’s way
  - BAU as in ”no disruptive event such as a succesful cyberattack occurs”

  The delta, the change achieved, is the point – in the overwhelming majority of cases, it is not even necessary to know details about the baseline, only about the changes to the baseline that happen

”SAVINGS/TURNOVER/ETC PER ANNUM”

- Most handprints are calculated using achieved changes per annum. This is motivated in most types of cases, e.g.

  - when consulting is part of achieving for instance a permanent change in operations, which results in a handprint of X $ktCO_2/a$ of reduced emissions

  - when consulting is part of avoiding a disruptive event, e.g. a cyberattack, which is a one-off *per se.* However, unfortunately, having suffered a cyberattack does not give immunity against upcoming ones – the attackers and defenders are in a constant war of skills upgrading. Here, there is a market/probability per year of becoming a victim of cyberattacks, and that probability is never zero – there is always a ”market”

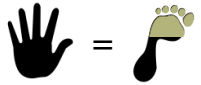
There’s a fourth wave of consulting coming and the SKOL handprint is a key element of it

- Following handprint cases present handprint potential in the field where there’s still space for major improvements – the cases are spearhead cases and are not currently largely implemented
- On top of the CO2 emissions, handprints shall describe industry impacts to biodiversity, social justice and transition towards circular economy to leverage the potential of the 4th wave of consultancy *”Reshaping consultancy for change in a changing world”*

HOW THE HANDPRINT IS GENERATED?

a) Decrease existing carbon footprint with a better solution

Using a product or service avoids a footprint that otherwise would happen



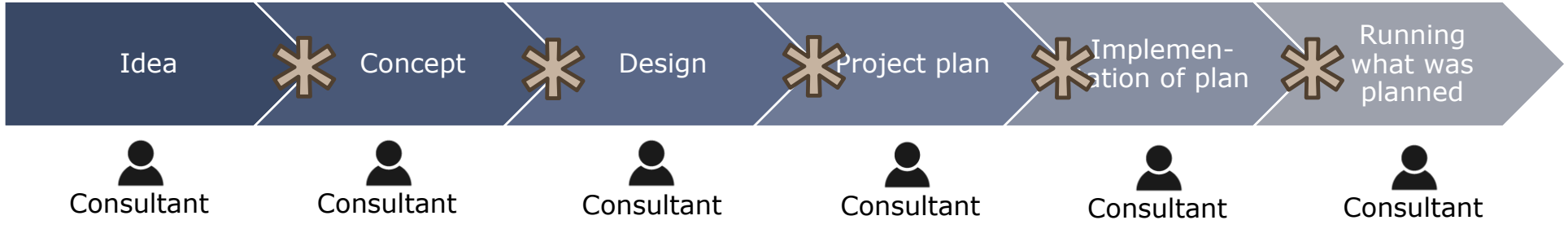
b) Create a new way to produce a positive impact

A product or service generates a positive climate impact that otherwise would not happen

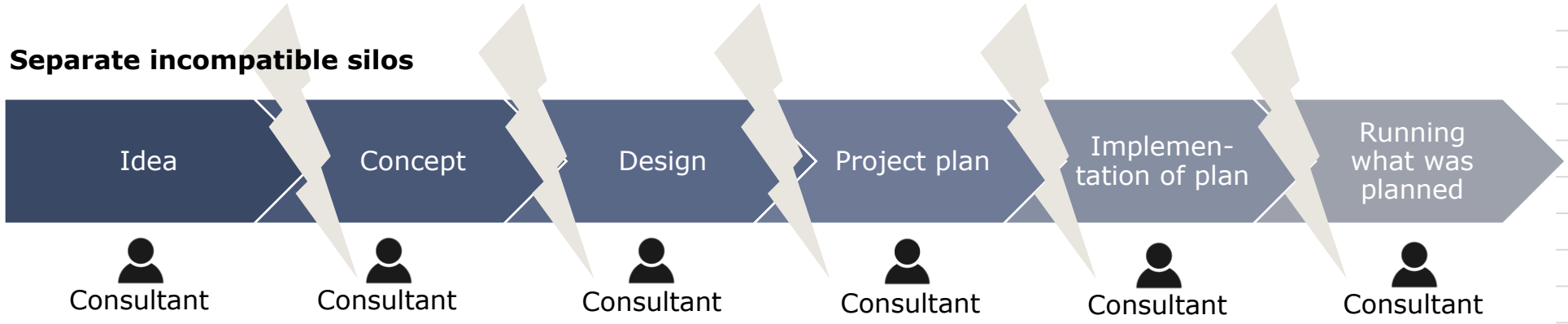
The Handprint "Golden Collaboration Effect"

For e.g. an initial emission total in CO2/a of 100 kt, any single stage reaches a max handprint of 25 kt/a. However, collaboration and cumulative savings bring the handprint to 65.5 kt/a

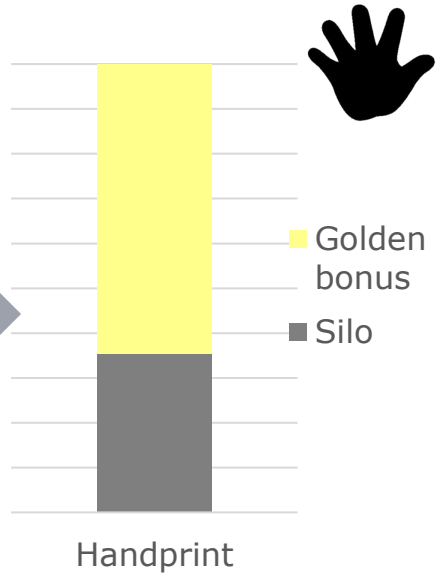
Building on others' work together



Separate incompatible silos



Overall handprint



Handprint results

Scaling up from cases as described

Improving energy efficiency of existing facility

Background
Production of energy needed by industry causes one fourth of the global CO2 emissions. Energy use of energy-intensive industrial processes can be reduced by applying a menu of solutions to have a remarkable impact.

Case
The process-specific menu includes elements such as technical improvements, heat recovery, process optimisation and adoption of new technologies. A suitable combination for an industry facility is prepared by the consultant.

Consulting handprint
In the case of European process industry facilities, the action plan and implementation support by the consultant could lead to an energy efficiency improvement of 10%. At an average European facility with the European average energy mix, the reductions in produced energy and purchased electricity would bring savings of 4,4 ktCO2/a, or approximately 0,0088 tCO2/EUR consulting.

Other impacts
Savings in energy use are also savings in costs, thus economic viability is also improved. Emissions other that greenhouse gases are also reduced.

CO2 handprint

Energy efficiency actions at a facility save

4,4 kton of CO_2 eqv. per year

compared to a facility with business-as-usual improvements. This translates to approximately

0,0088 ton of CO2 eqv. Per EUR of consulting

as a consulting unit handprint.

Handprints can also be seen on

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Digital twin for a production plant with AI analytics

Background
A digital twin is a digital model that in real-time duplicates its real-world counterpart. Added sensors, data collection, connections and computing power have made digital twins possible. It can be used as a simulation tool, a monitor, a diagnostics tool, a smart maintenance system … most uses remain to be invented. If an AI-based analytics system is based on top of the digital twin, the effect is manifold.

Case
A digital twin is built for a process industry plant. The plant is pre-existing, so the digital twin did not help in the startup or engineering phase. However, it is built by the consultant and the consultant also is part of an initial diagnostic over the first months.

Consulting handprint
With digital twin construction and consulting, a realistic estimate is 2-3 % energy efficiency improvement. With AI on top, this goes up to about 20 %. For our example plant, this translates to savings of 7000 MWh of purchased energy/year. Using Nordic standards, we arrive at savings of 520 tCO_2/a, or about 0,0052 tCO_2/EUR consulting.

Other impacts
A digital twin also helps in reducing accidents, to improve equipment effectiveness, to reduce maintenance costs and materials and bring in circular materials, and also to reduce downtime. The health and wellness aspects come in, mostly for the plant workers.

CO2 handprint

Preventing a cyberattack as described on the right avoids

520 ton of CO_2 eqv. per year

compared to avoiding an attack. This translates to approximately

0,0052 ton of CO_2 eqv. per EUR of consulting

as a consulting unit handprint.

Handprints can also be seen on

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Preparation for the risk of cyberattack on electricity grid

Background
Cyberattacks have been a plague for decades, and they increase in frequency, sophistication and impact. The COVID period has among other things witnessed a rise also in malware. The impacts of cyberattacks on CO2-emissions can be surprisingly significant.

Case
A malware attack strikes out two low-carbon 200 MW powerplants. The return to normal production and distribution takes two weeks. During that time, electricity production is lost, and has to be replaced by back-up coal power. The change in emissions between the stricken plants and the back-up coal plants amounts to 32 ktCO_2 due to the high coefficient of coal.

Consulting handprint
With a cyberconsulting assignment, which members of SKOL provide, this cyberattack could have been prevented. Thus, the handprint of the unit assignment is 32 ktCO_2 and an estimate for the cyberconsulting unit handprint is 0.32 tCO_2/a (assumed: this one event during the year)

Other impacts
A power blackout can cause severe disturbances in heating, goods distribution, also e.g. medical emergencies. The social SDG dimension of a cyberattack is one of its great dangers.

CO2 handprint

Preventing a cyberattack as described on the right avoids

32 kton of CO_2 eqv. per event/year

compared to avoiding an attack. This translates to approximately

0,32 ton of CO_2 eqv. per EUR of consulting
as a consulting unit handprint.

Handprints can also be seen on

Material-efficient construction

Background
Environmental impacts of construction materials production can be reduced remarkably in the construction planning phase. Concrete, steel and aluminium have the highest impact, cement production alone causes 3% of the global CO2 emissions.

Their use can be reduced by improving materials management to avoid waste in construction. In addition, materials efficiency can be made better by design. Design for disassembly promotes reuse and recycling of building components at the demolition phase.

Case
The consultant develops a plan targeting to waste reduction in the construction phase and to increased reuse of building materials. Building information modelling (BIM) is utilised to facilitate the more efficient use of construction materials and components.

Consulting handprint
The impact of the actions is estimated to be 15% reduction in the production of new construction materials. In the case of new Finnish average-sized block of flats this means savings of 3,6 tCO2/a.

Other impacts
The use of natural resources and the amount of waste are reduced, while circular economy is taken forward.

CO2 handprint

Reduced waste in construction of a block of flats and improved reusability of building components save

3,6 ton of CO_2 eqv. per year

compared to a traditional construction site, per one year of the block of flat's lifetime of 50 years. This translates to approximately

0,00014 tons of CO_2 eqv. per EUR of consulting
as a consulting unit handprint.

Handprints can also be seen on

Smart city water system

Background
Wastewater treatment plants typically consume 30 to 60% of municipal energy demand. Therefore, significant emission reduction potential relies in increasing the energy efficiency of such plants by improving the optimisation of technological processes in smart cities.

Case
Smart water grid, smart sewage system and smart (network) management characterise future cities that enable solving problems of optimal control. Predictive diagnostics, validation and reconstruction of data together with soft sensors allow precise system calibration real time, which enhances the overall energy efficiency of waste water treatment plants.

Consulting handprint
Approximately 45% of the electricity consumed by the biological waster water treatment plants is used in the aeration process to drive blowers. Hence, with spearhead computational solutions implemented as a result of engineering consulting emission reductions of 427 tCO2/a can be achieved at a wastewater treatment plant of an average size.

Other impacts
Smart city water system secures affordable and safe water for citizens and improves the quality of natural waters nearby. Smart system is also designed for advanced flood handling, which is of a growing importance.

CO2 handprint

Predictive diagnostics and smart computational process optimisation in an average size wastewater treatment plant reduces

427 ton of CO_2 eqv. per year

compared to a traditional biological waste water treatment plant. This translates to approximately

0,0085 ton of CO_2 eqv. per EUR of consulting

as a consulting unit handprint.

Handprints can also be seen on

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Urban planning for smart city

Background
Smart cities aim at sustainable societies, and technological means can among others bring many environmental benefits. Production of energy used in buildings covers almost one fifth of global CO2 emissions, and smart buildings can reduce those in various ways.

Case
A smart building is designed to have advanced control of heat and electricity flows. Energy and also water can be saved with real-time monitoring and control systems, and thermostats with machine learning capabilities bring comfort and savings in heat. This also supports matching the use better with the supply, advancing demand response. In addition, the buildings could be connected to a district-wide intelligent energy system that allows the building to both use and produce energy, and enhances reliability of energy distribution.

Consulting handprint
A new average-sized Finnish block of flats could reach at least 10% electricity and heat savings with smart solutions. By also utilising local electricity network and storage for cleaner power, the impacts together correspond 11,2 ton of CO2 eqv.

Other impacts
A district can be 3D-modelled to assist smart city planning and development. The district digital twin can be used for life cycle observation, e.g. simulating impacts of changing weather conditions, or for smart city design, testing, service development and stakeholder collaboration.

CO2 handprint

Advanced control of energy flows in a block of flats reduces

11,2 ton of CO_2 eqv. per year

compared to a traditional block of flat built in 2010s. This translates to approximately

0,00048 ton of CO_2 eqv. per EUR of consulting

as a consulting unit handprint.

Handprints can also be seen on

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A POSSIBILITY FOR WEIGHTING

Using network analysis to quantify consultants' roles

NETWORKS

1) Players, among them the consultant(s), form a network

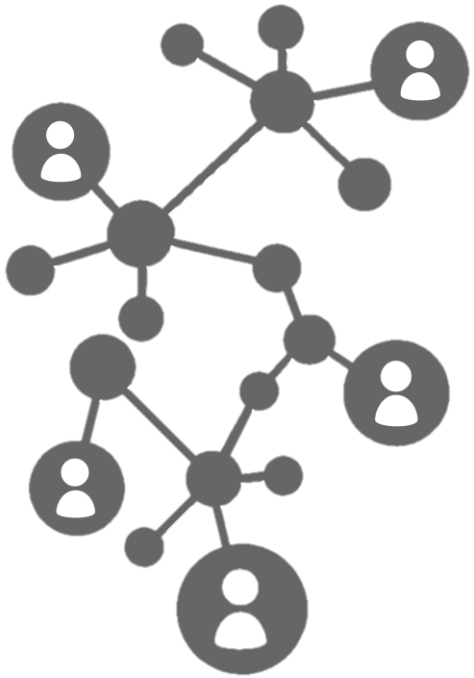
Meaning: There are usually more partners and and stakeholders involved – things do not go linearly, instead the players are connected in various ways across the project

2) It is possible to quantify different aspects of the network
Meaning: using SNA (Social Network Analysis) methods, it is possible to quantify a surprising amount of dimensions in the network itself and for the individual players

3) Among the quantifiable dimensions: how central? How far-reaching? How much of a broker position?

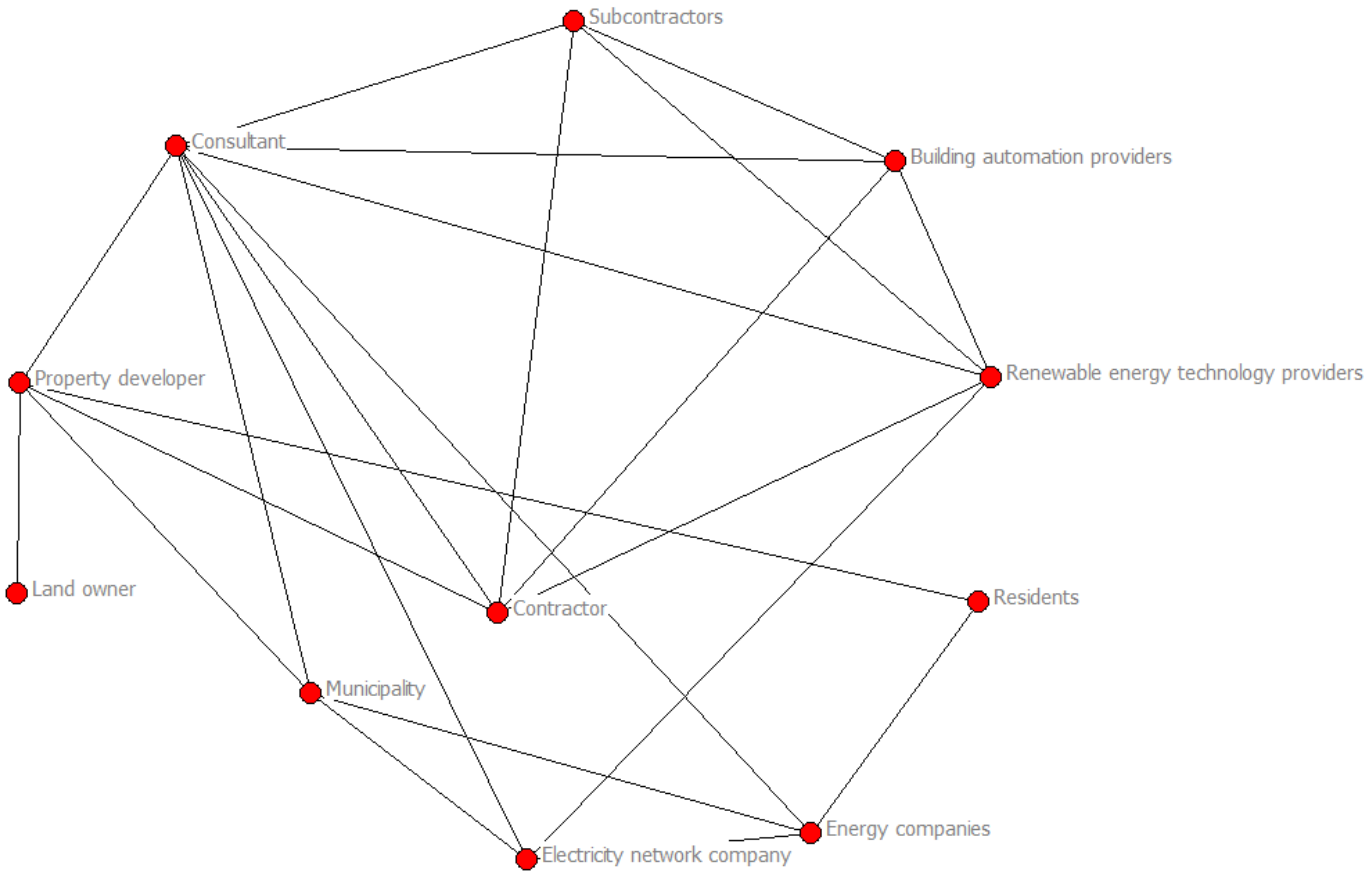
Meaning: the different aspects of a network and its players help to quantify and shape into "proportional power" e.g. the reach inside the network and the broker role (= how much passes through one player), which could be used to weigh the role of the players in a project.

INTERACTIONS AS A NETWORK – MANY PLAYERS AND TYPES



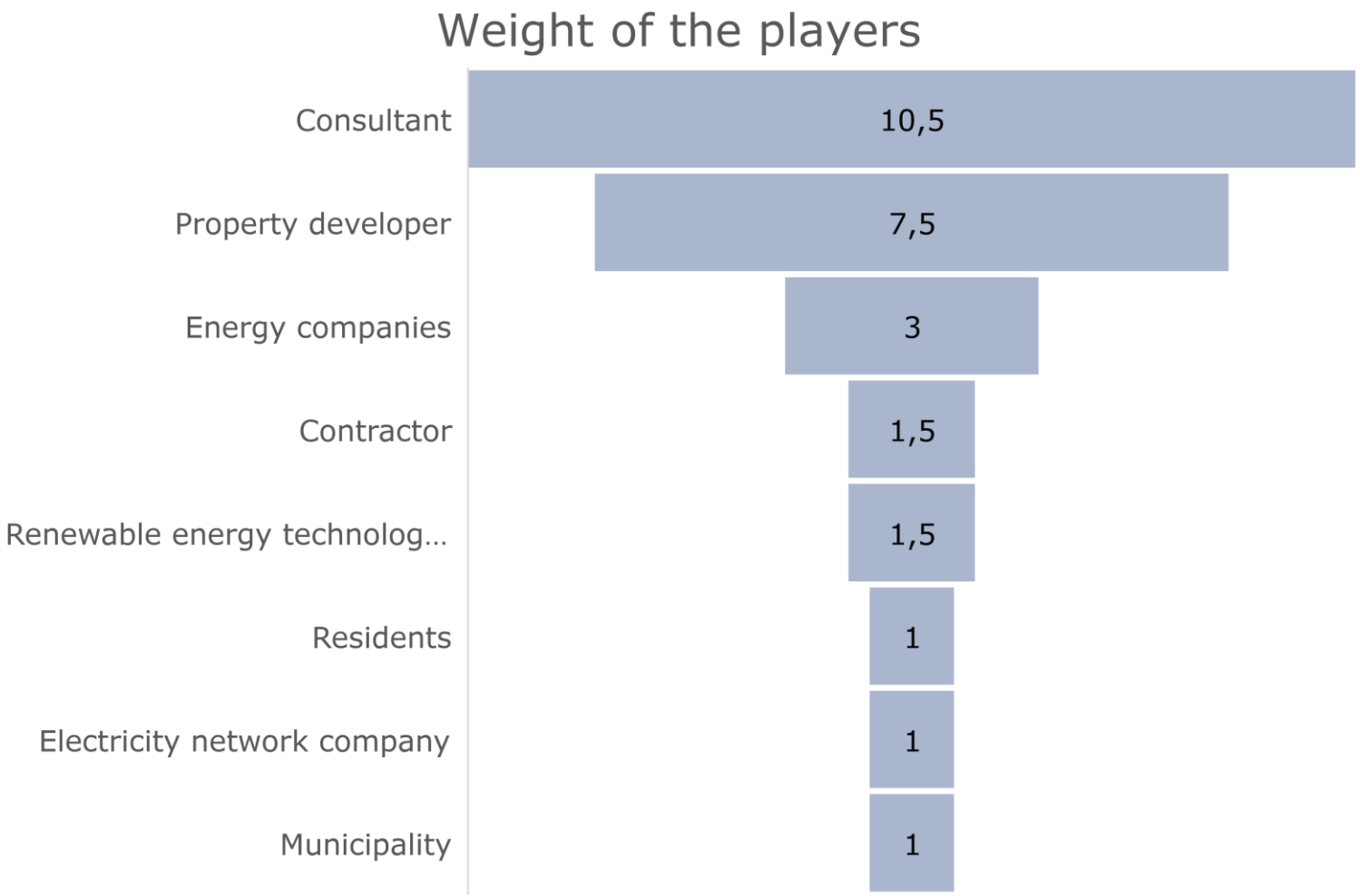
Example case network - interactions

- The network describes the interactions between players in the case of smart building with advanced control of heat and electricity flows, connected to a district-wide intelligent energy system
- Without analysis, what can be seen is a fairly complex web
- With analysis, many things about
  - the network itself
  - the players roles and power
  become clearer



Example case network - influence

- The “weight” of the players in the network can be calculated in many ways
- The weight of consultant in the smart building case is 10,5 times higher than e.g. residents, when measured by the interactions
- It should be noted that the property developer sets the main specifications and requirements for the consultant
- Subcontractors have no weight because of their straightforward role in the project



Handprint results

THE SCALES OF CONSULTING

When things are weighed, where does the consultant working in a SKOL member company stand?

1.9 tCO_2/ employee-year

2500 tCO_2/ employee-year

Proportion handprint/ footprint per employee:

1300: 1

AFRY ÅF PÖYRY