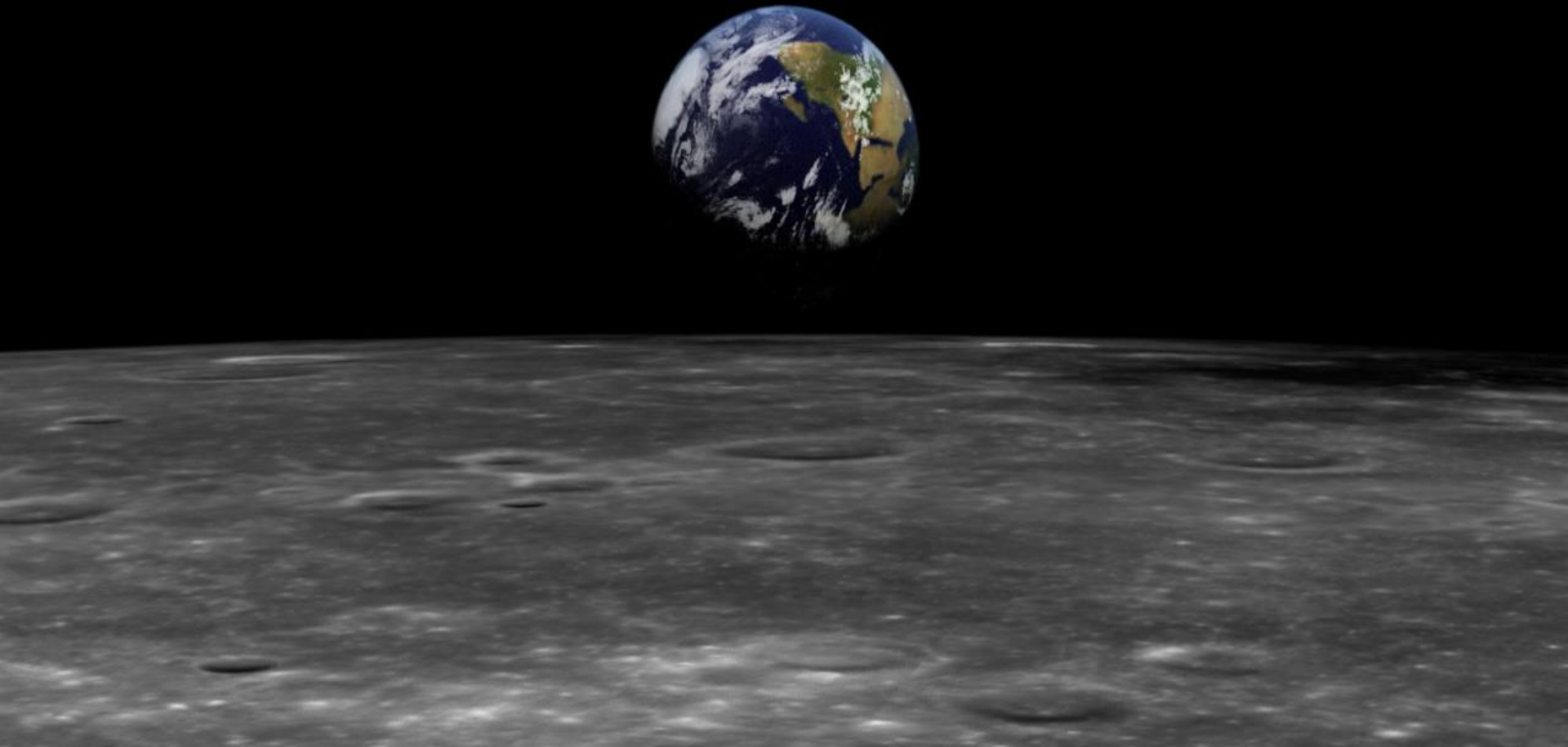


Framtidens utmaning — transportförsörjning i det hållbara samhället. Vad menas då med hållbart?

Resultatkonferens trafiksäkerhet, Stockholm, 27 April 2016

John Holmberg

Professor i fysisk resursteori och vicerektor vid Chalmers





SUSTAINABLE DEVELOPMENT GOALS



PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11



Hög intensitet
Hög effektivitet
Låg materiell tillväxt



Hög intensitet
Låg effektivitet
Hög materiell tillväxt



Låg intensitet
Låg effektivitet
Låg materiell tillväxt





Polytech' Nantes, France: ___ ? km/l



Polytech' Nantes, France: 4896 km/l !!!!!!!!



Photo: CR-S, Panoramio



Push



Idé-driven innovation



“Tänka utanför lådan?”



Behovs-driven innovation Designprocess



Pull



Kultur, normer

Kunskap



Policy

Teknik

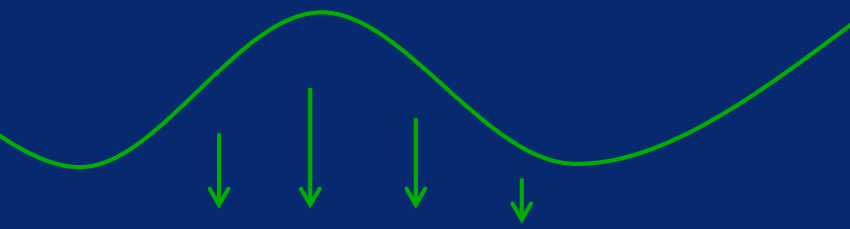
Lagstiftning

Marknad



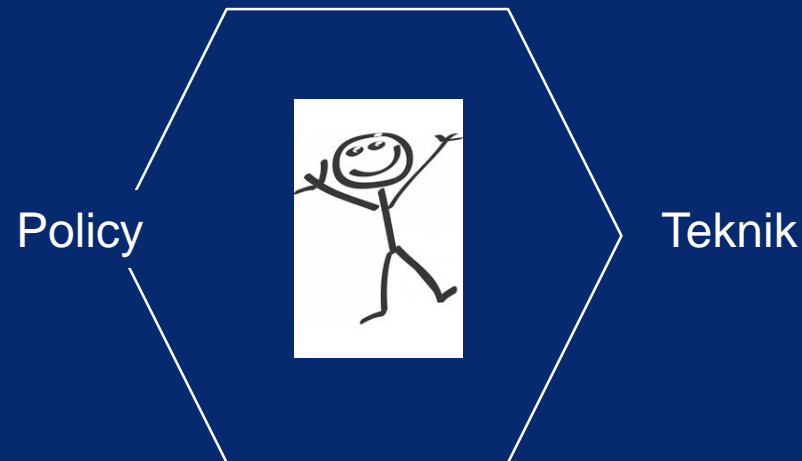
Vi sitter fast i
socio-tekniska system

Förändringar på landskapsnivå
kan utmana rådande regim
och ge en nisch ett möjlighetsfönster



Kultur, normer

Kunskap



Lagstiftning

Marknad



Tesla Gigafactory

Gigafactory Projected Figures	
2020 Tesla Vehicle Volume	≈500,000/yr
2020 Gigafactory Cell Output	35 GWh/yr
2020 Gigafactory Pack Output	50 GWh/yr
Space Requirement	Up to 10M ft ² w/ 1-2 levels
Total Land Area (acres)	500-1000
Employees	≈6,500

New Local
Renewables
Solar and Wind



The Gigafactory is designed to reduce cell costs much faster than the status quo and, by 2020, produce more lithium ion batteries annually than were produced worldwide in 2013. By the end of the first year of volume production of our mass market vehicle, we expect the Gigafactory will have driven down the per kWh cost of our battery pack by more than 30 percent. The project aims to disrupt battery costs enough to impact the distributed storage industry.

Krav på en hållbar framtid



Kultur, normer

Kunskap

Policy



Teknik

Lagstiftning

Marknad



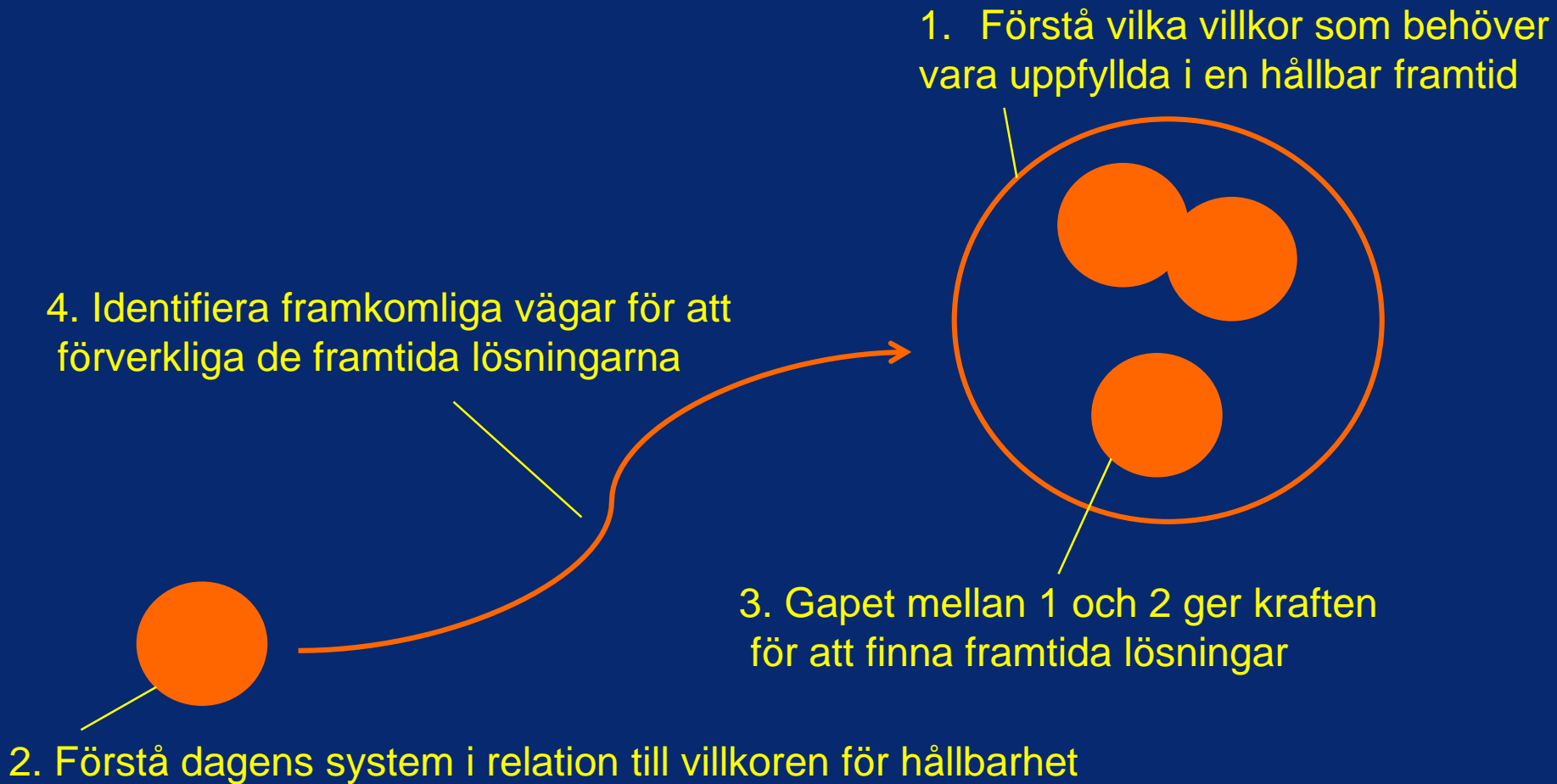
HÅLLBARHETSDRIVEN OMSTÄLLNING

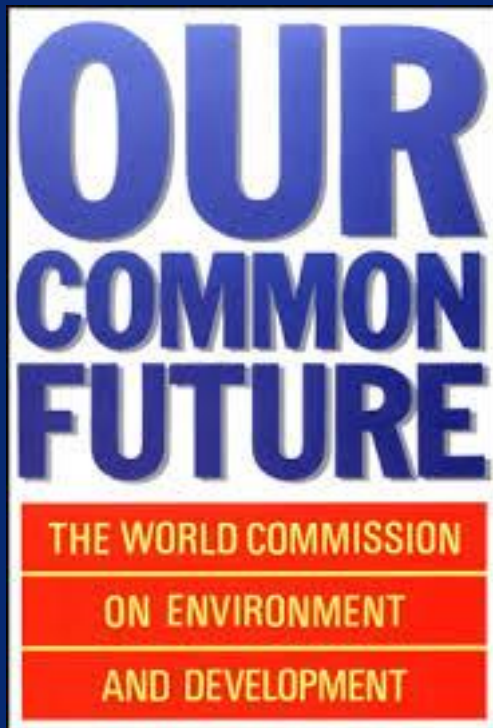


“Hur behöver lådan ändras?”



Hållbarhetsdriven innovation -> Backcasting





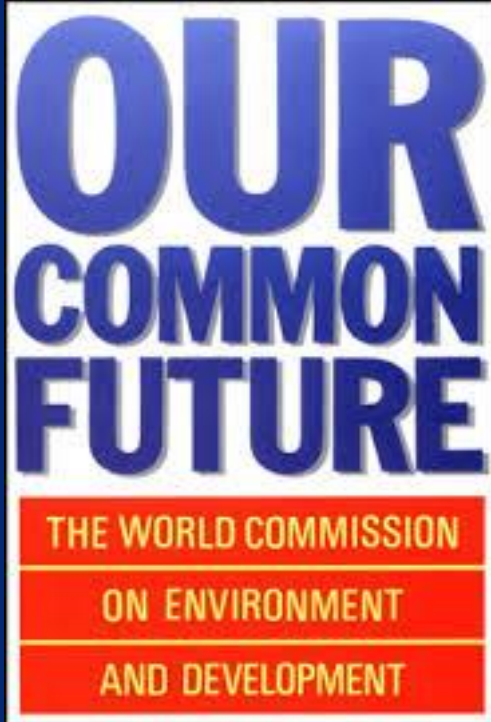
Hållbar Utveckling

"En hållbar utveckling tillfredsställer dagens behov utan att äventyra kommande generationers möjligheter att tillfredsställa sina behov.."

World Commission on Environment and Development's (the Brundtland Commission) Our Common Future, 1987.

Välbefinnande i framtiden

Välbefinnande idag

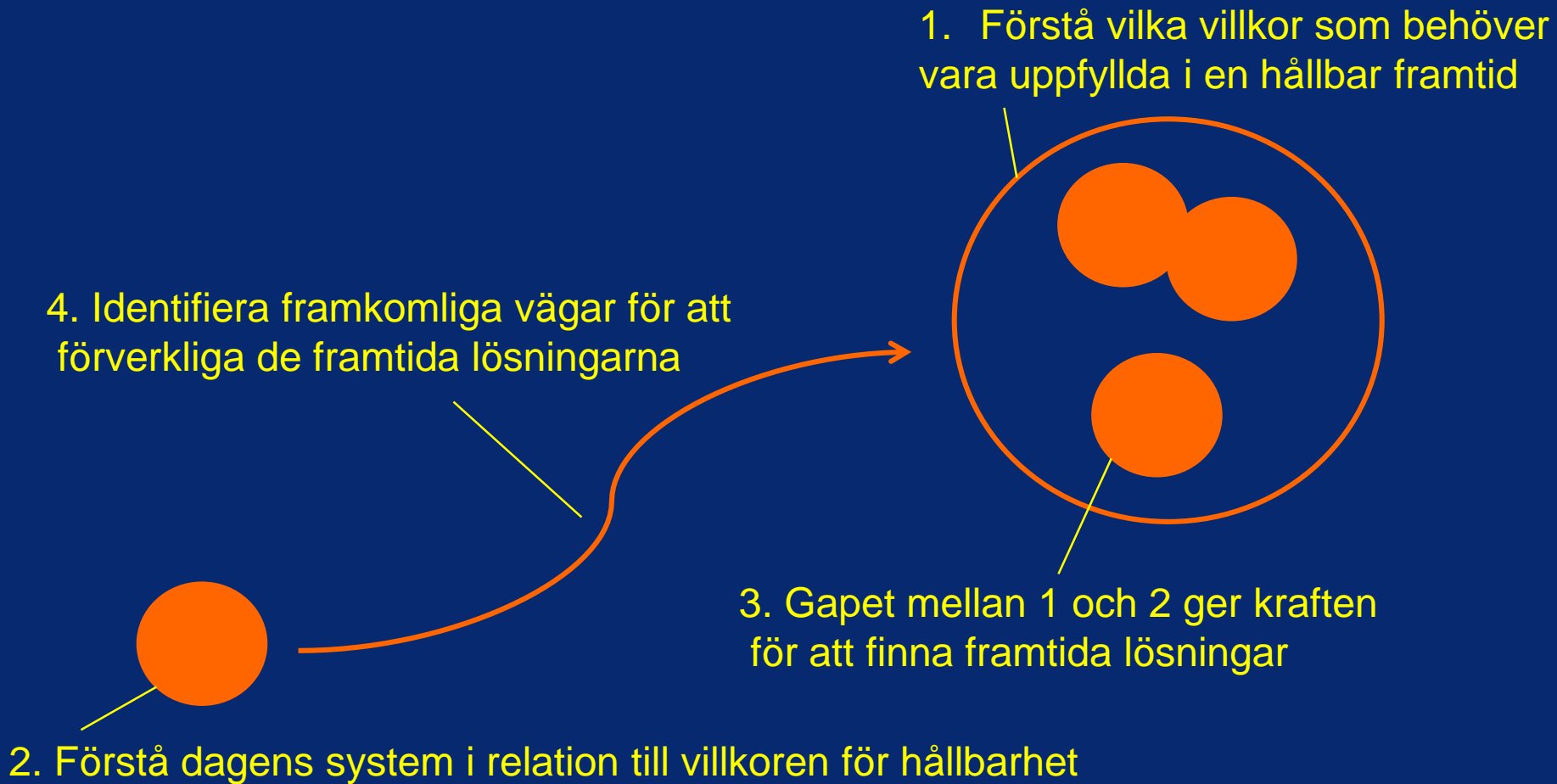


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World Commission on Environment and Development's (the Brundtland Commission) Our Common Future, 1987.

Hållbarhetsdriven innovation -> Backcasting





Systemperspektiv

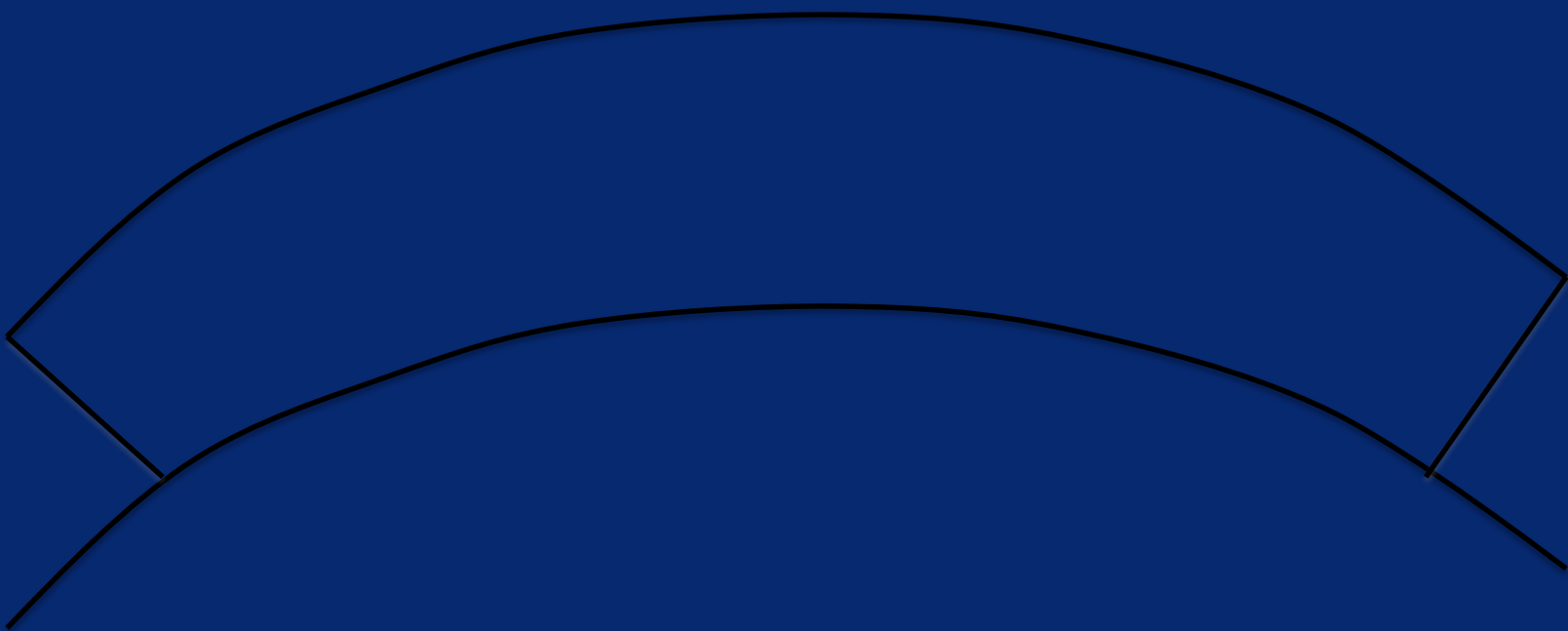
Stam och grenar

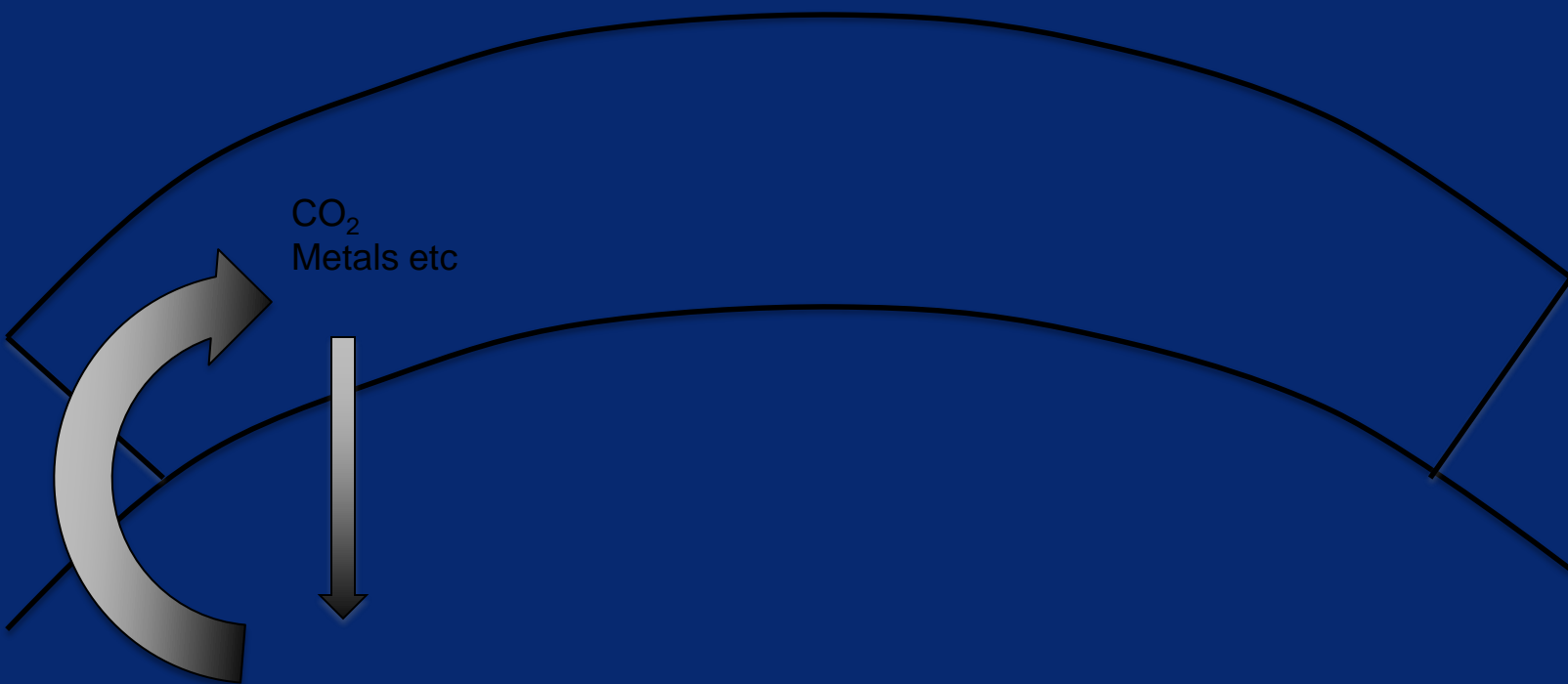
— Grundläggande principles

Bladverk

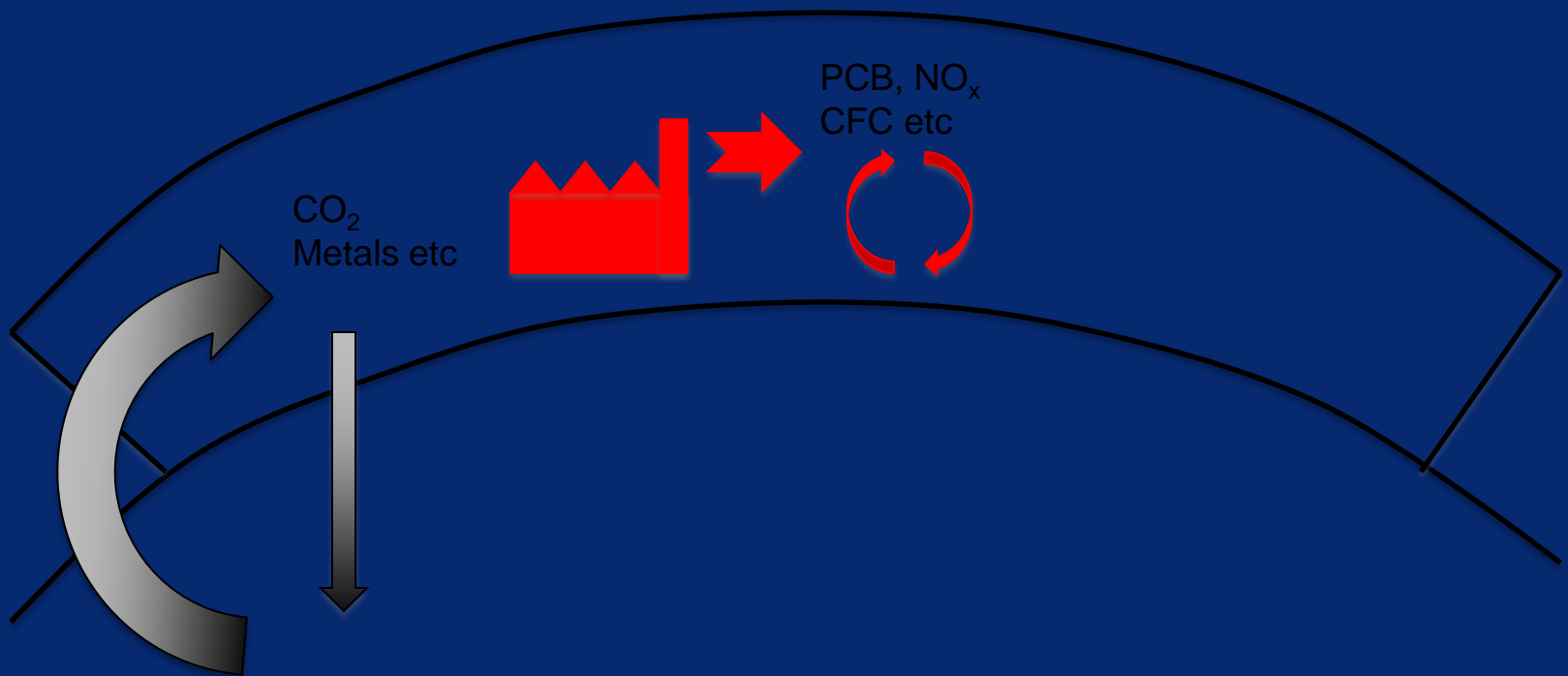
— Detaljer

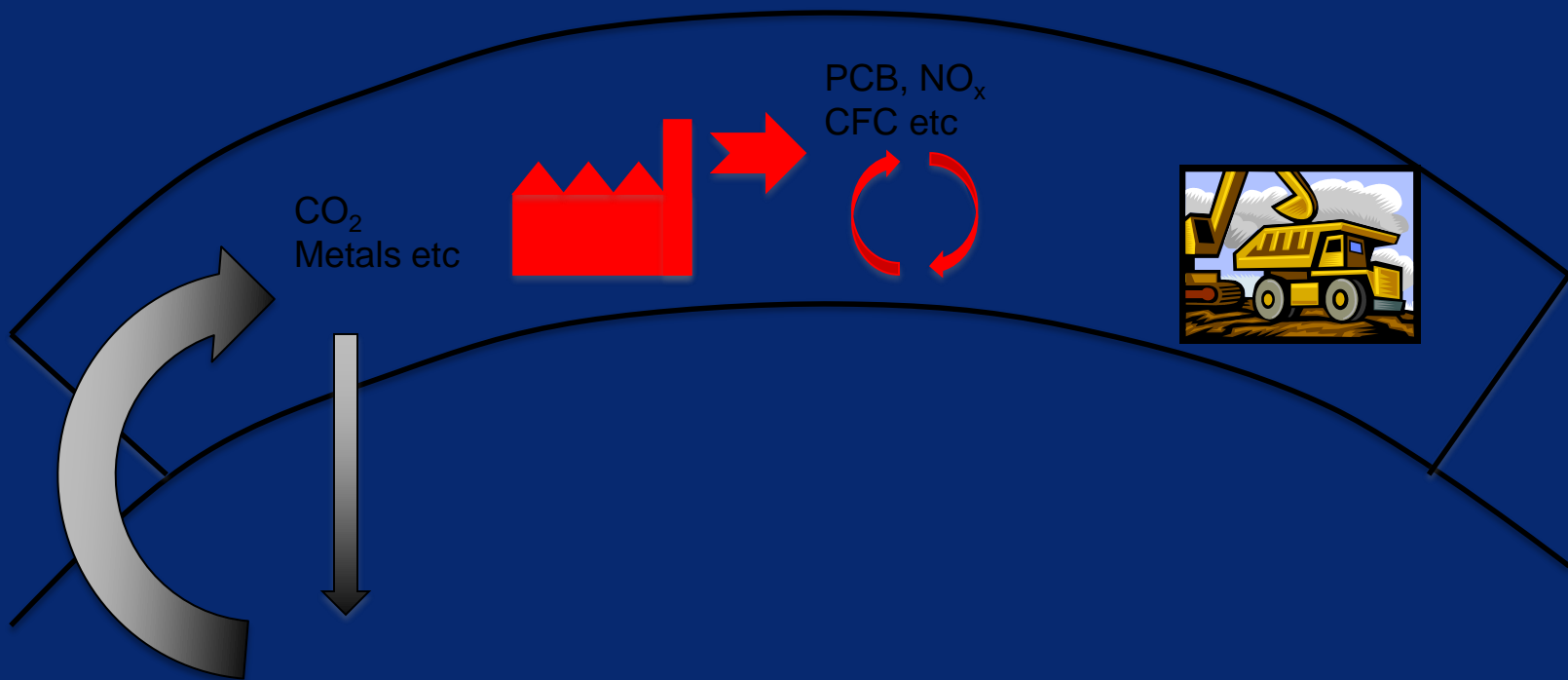


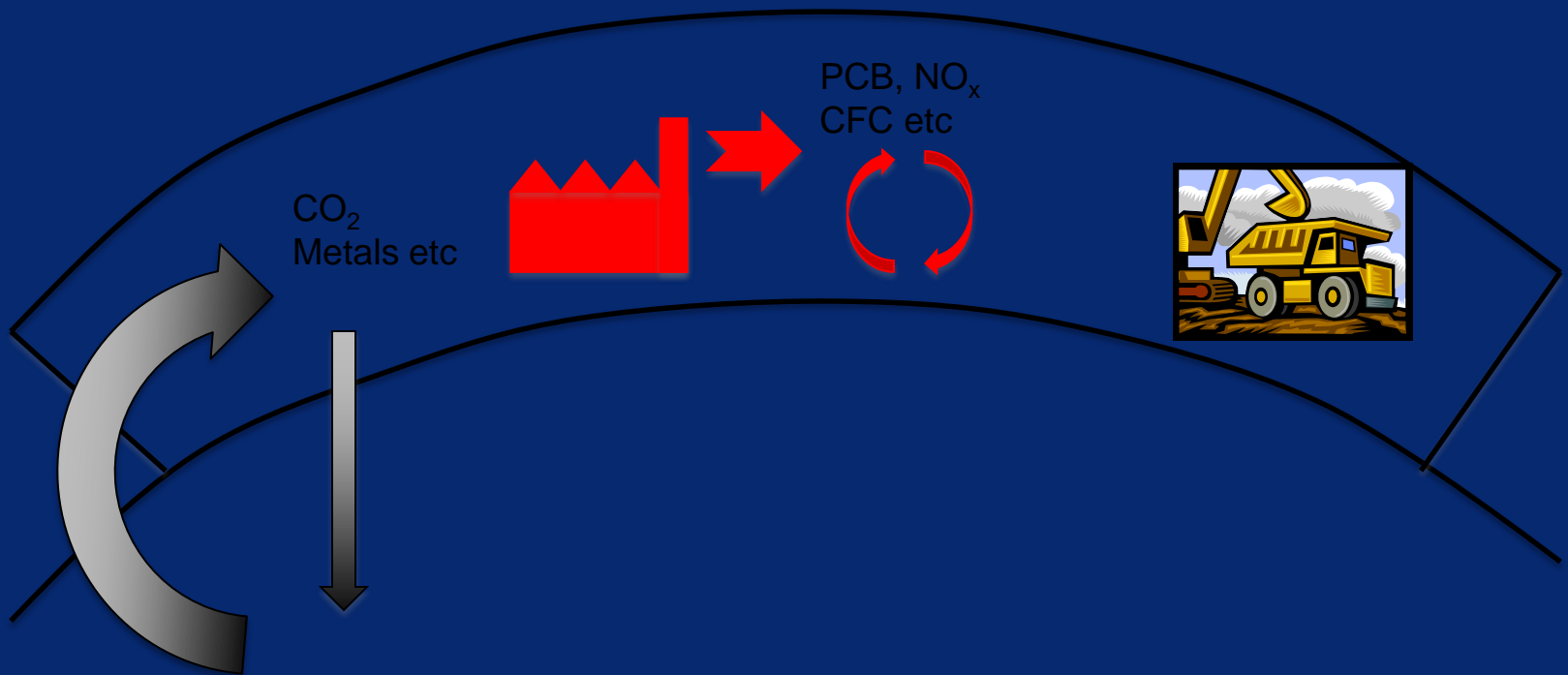




CO₂
Metals etc

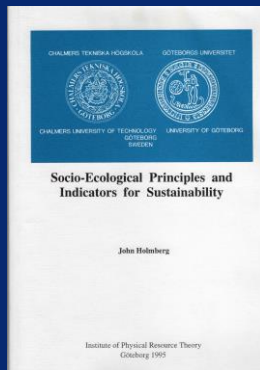






Välbefinnande i framtiden

Välbefinnande idag



...people are not subject to conditions that systematically undermine their capacity to meet their needs.

Naturen (Ekologisk)



...concentrations of substances extracted from the Earth's crust,



...concentrations of substances produced by society,



...degradation by physical means,



Interface®

Electrolux



Swedish Eco-municipalities

An eco-municipality aspires to develop an ecologically, economically, and socially healthy community for the long term, using **The Natural Step Framework** for sustainability as a guide, and a democratic, highly participative development process as the method.



vancouver 2010



Nationell kraftsamling **TRANSPORT 2050**

Fossiloberoende Västra Götaland

#mitt2030



LÄNSSTYRELSEN
VÄSTRA GÖTALANDS LÄN

Välbehinnande i framtiden

Vad karakteriserar det goda livet och det goda samhället?

Välbehinnande idag

Hur klarar vi att leva ihop?

Bevara tillit

Fördela och kontrollera makt

Garanterade mänskliga rättigheter

Bevara viktiga institutioner

Social

Ekonomisk

Att hushålla med resurser

Användningen av energi och material

Underhålla tekniskt kapital

Investering eller kostnad?

Förmögenhetsfördelning

Naturen (Ekologisk)



...concentrations of substances extracted from the Earth's crust,



...concentrations of substances produced by society,



...degradation by physical means,

Well-being in the future



Well-being today



Social

Economical



Nature (Ecological)

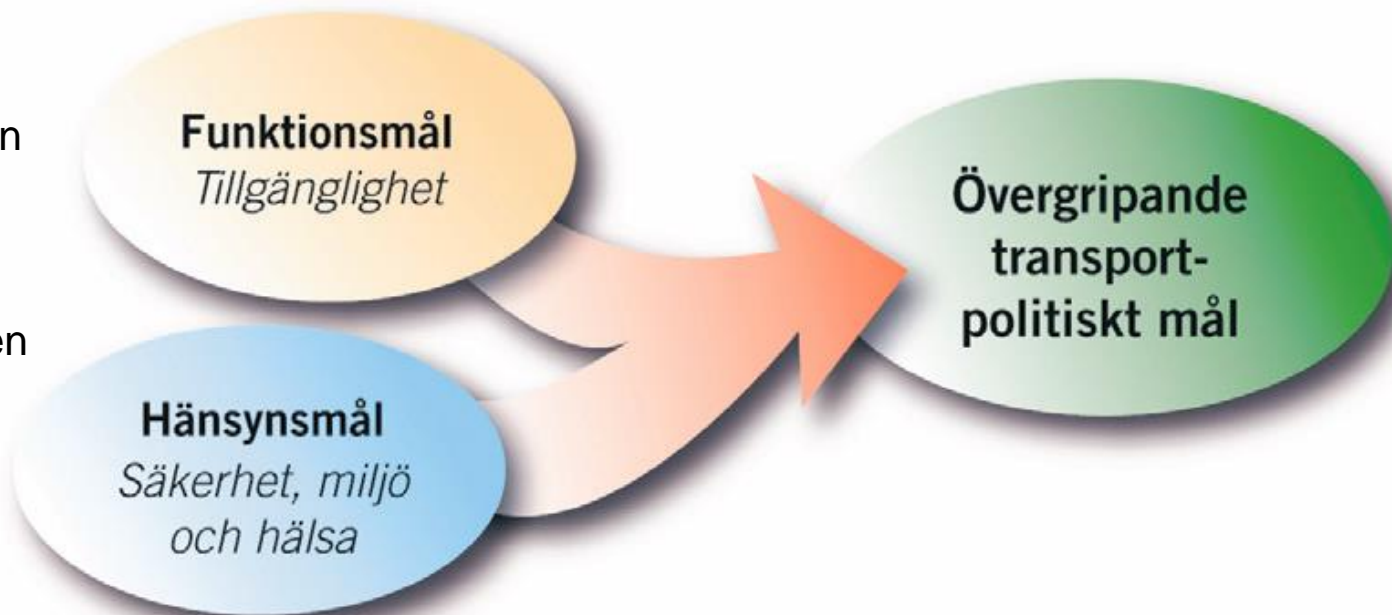


Regeringens proposition 2008/09:93 Mål för framtidens resor och transporter

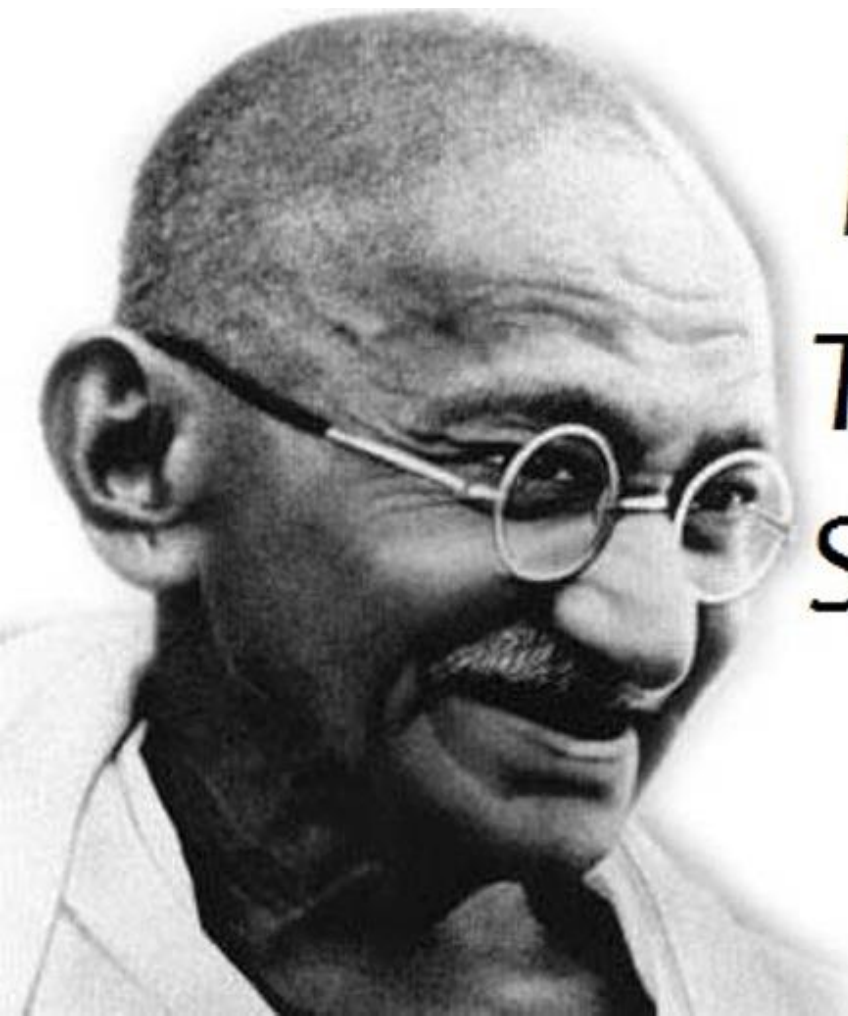
Transportsystemets utformning, funktion och användning ska medverka till att **ge alla en grundläggande tillgänglighet** med god kvalitet och användbarhet samt bidra till utvecklingskraft **i hela landet**.
Transportsystemet ska vara **jämställt**, dvs. likvärdigt svara mot kvinnors respektive mäns transportbehov.

En **stegvis ökad energieffektivitet** i Transportsystemet
År 2030 bör Sverige ha en fordonsflotta som är **oberoende av fossila bränslen**.

Transportsektorn ska även bidra till att **övriga miljö kvalitetsmål** nås och till **minskad ohälsa**.

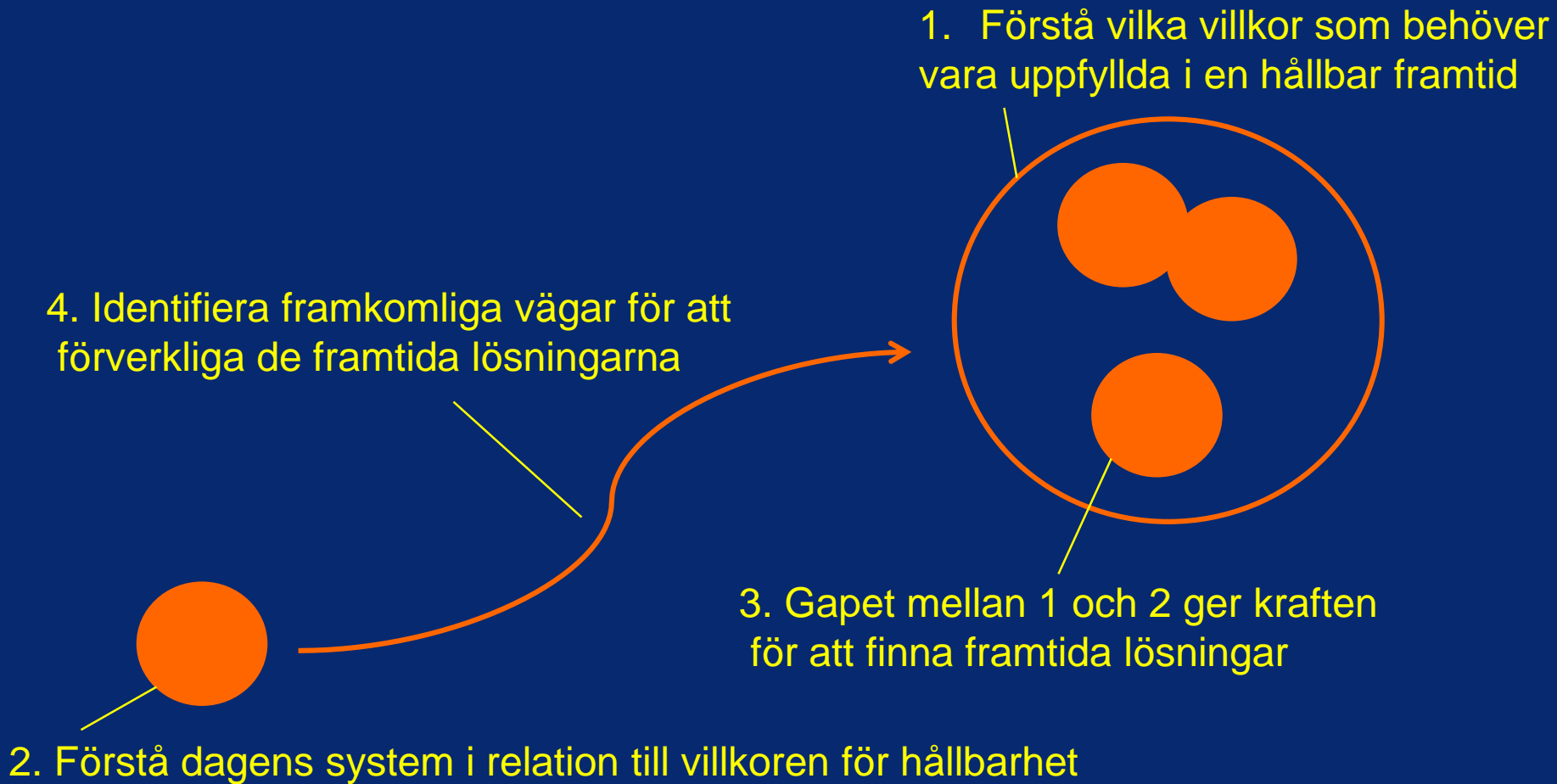


Antalet **dödade och allvarligt skadade** till följd av trafikolyckor inom de olika trafikslagen ska fortsatt minska. Exempelvis bör inom vägtransportsystemet antalet omkomna halveras och antalet allvarligt skadade minskas med en fjärdedel mellan 2007 och 2020.



*Be The **Change**
That You Want to
See In The World.*

Hållbarhetsdriven innovation -> Backcasting



Why start from guiding principles?



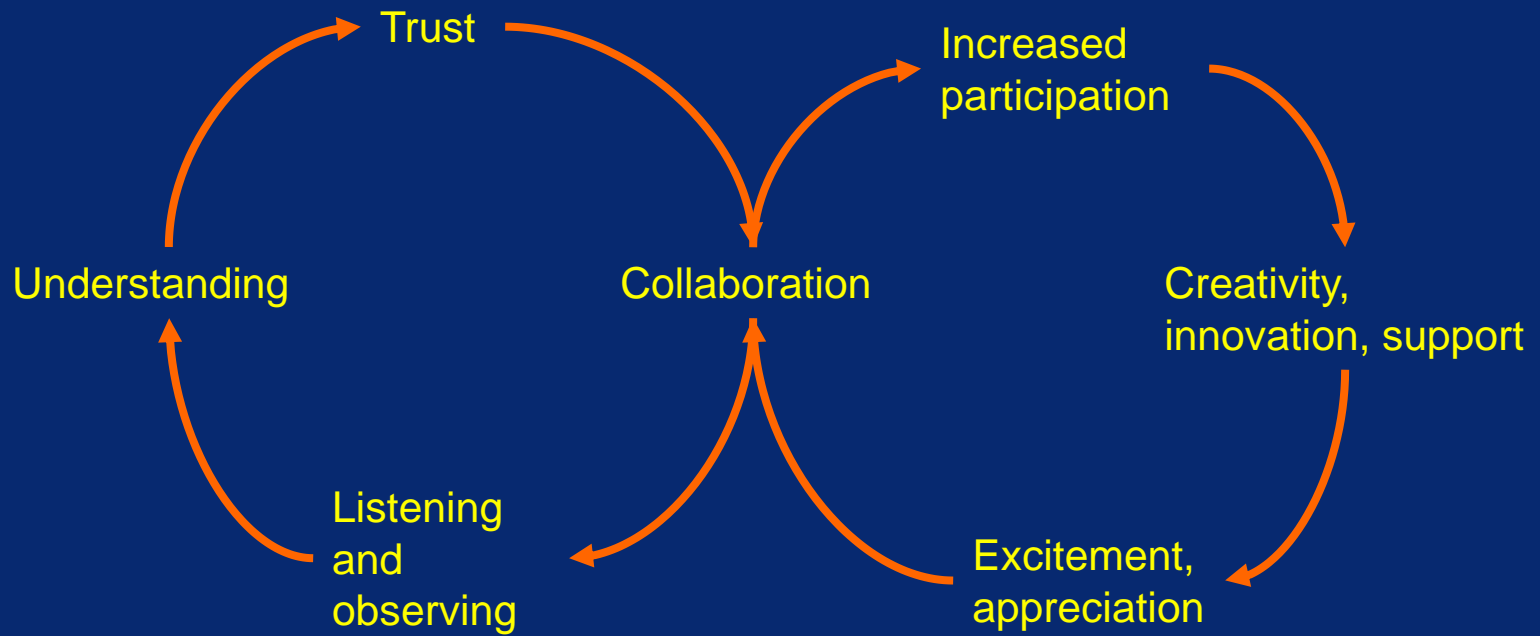
Hur löser man ett stort problem?

Man gör det **STÖRRE!**

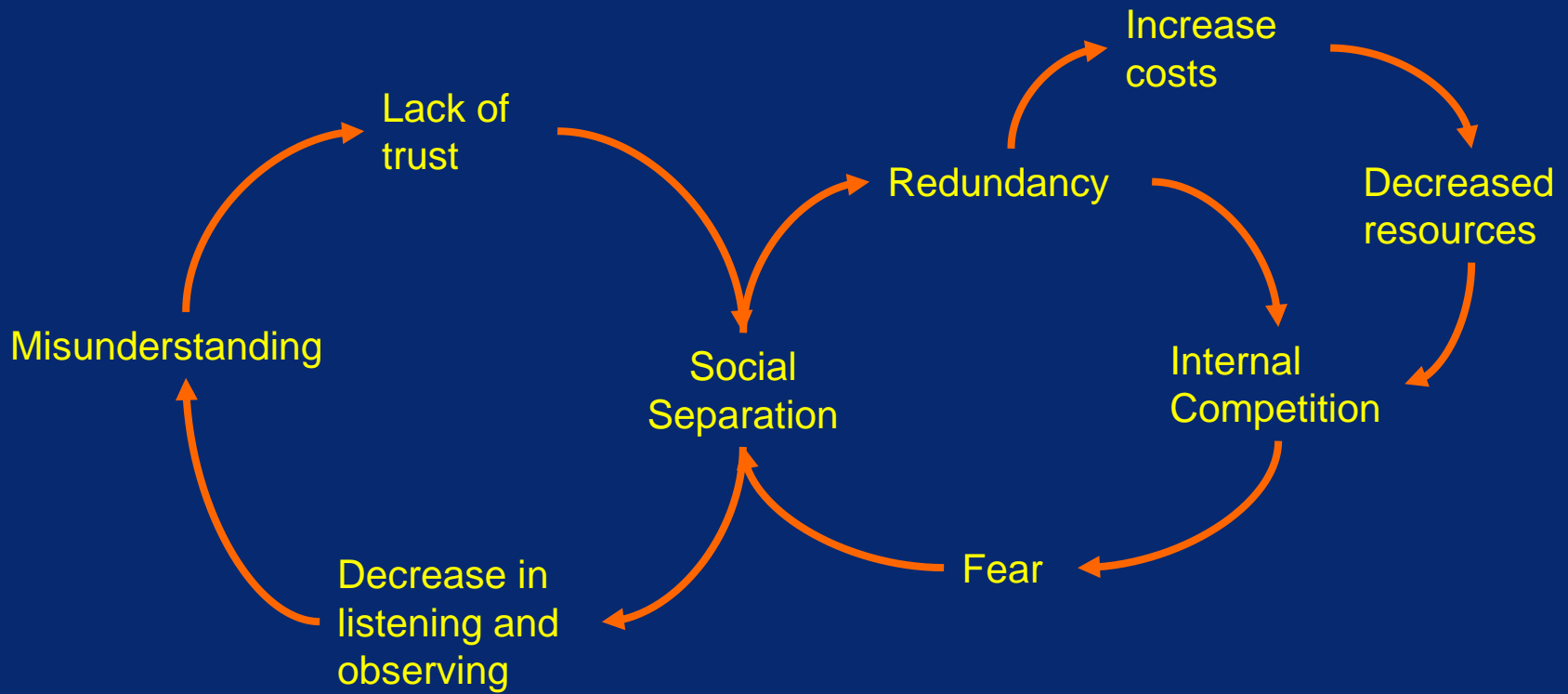
Think big, start small, act now!

+

Double loop learning



Collaboration begins with listening



The cost of not listening

Att skapa utrymme för förändring,
— att ge rätt förutsättningar och sedan kliva
undan skapar ett helt annat engagemang än
att försöka styra och kontrollera.

Challenge Lab



Martin Luther King said

“I have a Dream”

not

“I have a nightmare!”

The Politics of Happiness

The name Bogota conjures images of kidnapping, murder, and drug wars. But today's Bogota is safer than Washington, D.C., or Baltimore. A visionary mayor discovered the secret to making his city safe. Enrique Penalosa tells Susan Ives the story.

by Enrique Peñalosa, Susan Ives

posted May 20, 2004

We really have to admit that over the past 100 years we have been building cities much more for mobility than for people's well-being. Every year thousands of children are killed by cars. Isn't it time we build cities that are more child-friendly? Over the last 30 years, we've been able to magnify environmental consciousness all over the world. As a result, we know a lot about the ideal environment for a happy whale or a happy mountain gorilla. We're far less clear about what constitutes an ideal environment for a happy human being. One common measure of how clean a mountain stream is is to look for trout. If you find the trout, the habitat is healthy. It's the same way with children in a city. Children are a kind of indicator species. If we can build a successful city for children, we will have a successful city for all people.

When I was elected mayor of Bogotá and got to city hall, I was handed a transportation study that said the most important thing the city could do was to build an elevated highway at a cost of \$600 million. Instead, we installed a bus system that carries 700,000 people a day at a cost of \$300 million. We created hundreds of pedestrian-only streets, parks, plazas, and bike paths, planted trees, and got rid of cluttering commercial signs. We constructed the longest pedestrian-only street in the world. It may seem crazy, because this street goes through some of the poorest neighborhoods in Bogotá, and many of the surrounding streets aren't even paved. But we chose not to improve the streets for the sake of cars, but instead to have wonderful spaces for pedestrians. All this pedestrian infrastructure shows respect for human dignity. We're telling people, "You are important—not because you're rich or because you have a Ph.D., but because you are human." If people are treated as special, as sacred even, they behave that way. This creates a different kind of society.



Enrique Penalosa, mayor of Bogota, Colombia, 1995-1998. photo by Susan Ives

Bogota, Columbia



Enrique Penalosa, mayor 1995-1998, 2016 -

Det är den andra musen som får osten



A world map where the landmasses are filled with a dense pattern of small, glowing yellow and white dots, representing city lights or population density. The background is a dark, deep blue color.

john.holmberg@chalmers.se