

Elfordonens roll på väg mot en hållbar framtid?



Sven Borén doktorand (Lic) @ BTH



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File:Electric_car_charging_Amsterdam.jpg](https://commons.wikimedia.org/wiki/File:Electric_car_charging_Amsterdam.jpg)

Author: Ludovic Hirlimann



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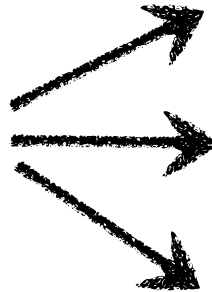


Photo by Sven Borén 2016



[http://www.nissan.se/SE/sv/vehicle/electric-vehicles/
leaf/design/photos.html](http://www.nissan.se/SE/sv/vehicle/electric-vehicles/leaf/design/photos.html)



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File:Tesla_Model_S_P85D.jpg](https://commons.wikimedia.org/wiki/File:Tesla_Model_S_P85D.jpg) Author: Martino Castelli



https://upload.wikimedia.org/wikipedia/commons/7/78/Oil_well_in_Tsaidam.jpg



https://upload.wikimedia.org/wikipedia/commons/3/35/Front_tire_and_wheel_of_NISSAN_FUGA.jpg

W2W: bränsleförbrukning, CO₂

LCA : Energianvändning, miljöpåverkan



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https://upload.wikimedia.org/wikipedia/commons/3/35/Front_tire_and_wheel_of_NISSAN_FUGA.jpg

W2W: bränsleförbrukning, CO₂

FSSD: Full hållbarhet



LCA : Energianvändning, miljöpåverkan



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W2W: bränsleförbrukning, CO₂

SLCA (alla vägfordon)

Table 1: Strategic Life Cycle Assessment comparing current vehicle systems.

Life cycle phase	SP effects by ICEV powered by fossil fuels	SP effects by BEV powered by wind-generated electricity	SP effects by HFCEV powered by hydrogen produced from renewable fuels and wind-generated electricity	Sustainability Principle
Extraction				SP1 
Production				
Distribution				
Use				
Waste				

	Legend:	Negative	Slightly negative	Neutral
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Extraction				SP1
Production				
Distribution				
Use				
Waste				
Extraction				SP2
Production				
Distribution				
Use				
Waste				

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Extraction	Negative	Negative	Negative	SP1 
Production	Negative	Negative	Slightly negative	
Distribution	Slightly negative	Slightly negative	Slightly negative	
Use	Negative	Slightly negative	Slightly negative	
Waste	Slightly negative	Slightly negative	Slightly negative	
Extraction	Negative	Negative	Negative	SP2 
Production	Negative	Negative	Negative	
Distribution	Slightly negative	Slightly negative	Slightly negative	
Use	Negative	Slightly negative	Slightly negative	
Waste	Slightly negative	Slightly negative	Slightly negative	
Extraction	Negative	Negative	Negative	SP3 
Production	Slightly negative	Neutral	Neutral	
Distribution	Slightly negative	Slightly negative	Slightly negative	
Use	Slightly negative	Slightly negative	Slightly negative	
Waste	Slightly negative	Slightly negative	Slightly negative	

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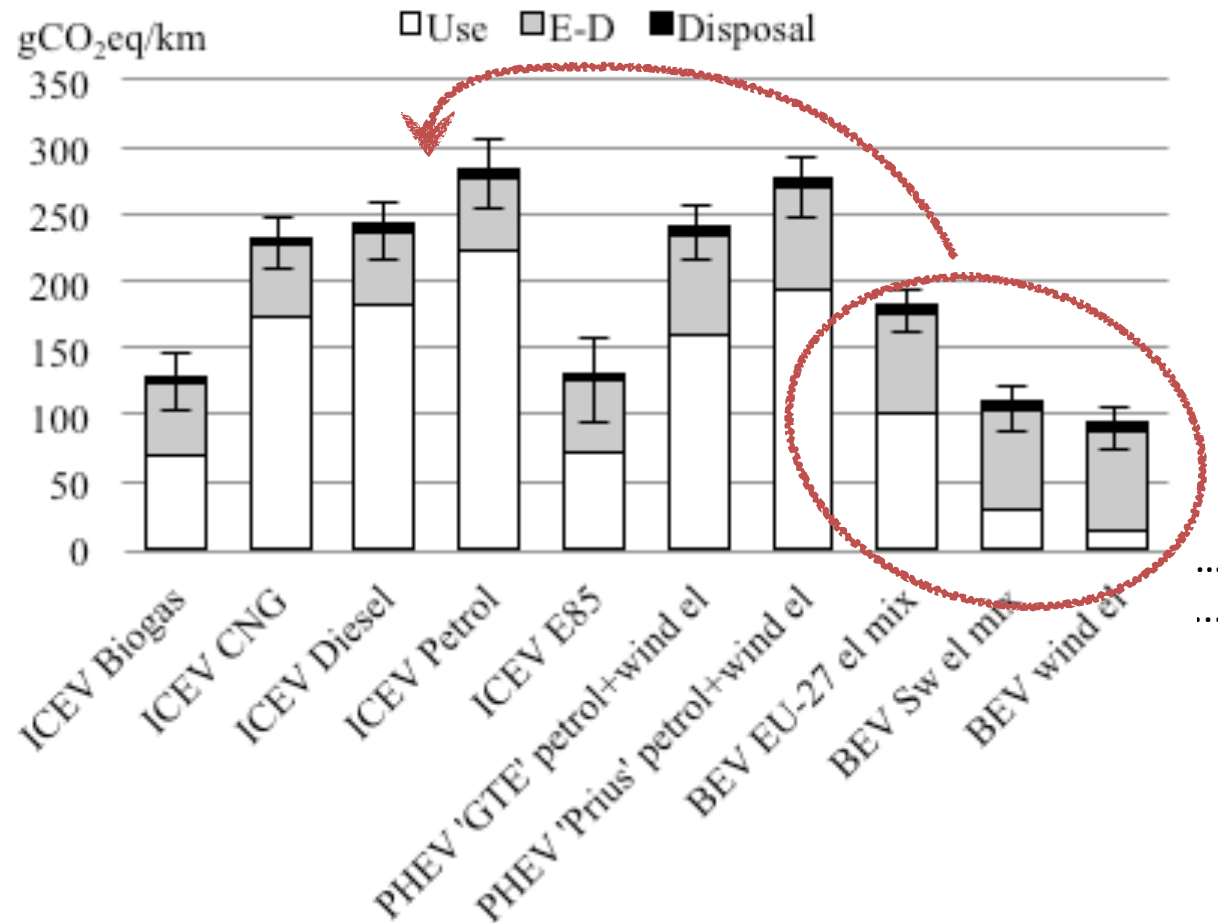
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Use	Negative	Slightly negative	Slightly negative	
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Production	Negative	Negative	Negative	
Distribution	Slightly negative	Slightly negative	Slightly negative	
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Extraction	Negative	Negative	Negative	SP3 
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Distribution	Slightly negative	Slightly negative	Slightly negative	
Use	Slightly negative	Slightly negative	Slightly negative	
Waste	Slightly negative	Slightly negative	Slightly negative	
Extraction	Negative	Negative	Negative	SP4 
Production	Slightly negative	Slightly negative	Slightly negative	
Distribution	Slightly negative	Slightly negative	Slightly negative	
Use	Negative	Slightly negative	Slightly negative	
Waste	Slightly negative	Slightly negative	Slightly negative	

Legend: Negative Slightly negative Neutral

LCA Klimatpåverkan (vw Golf)

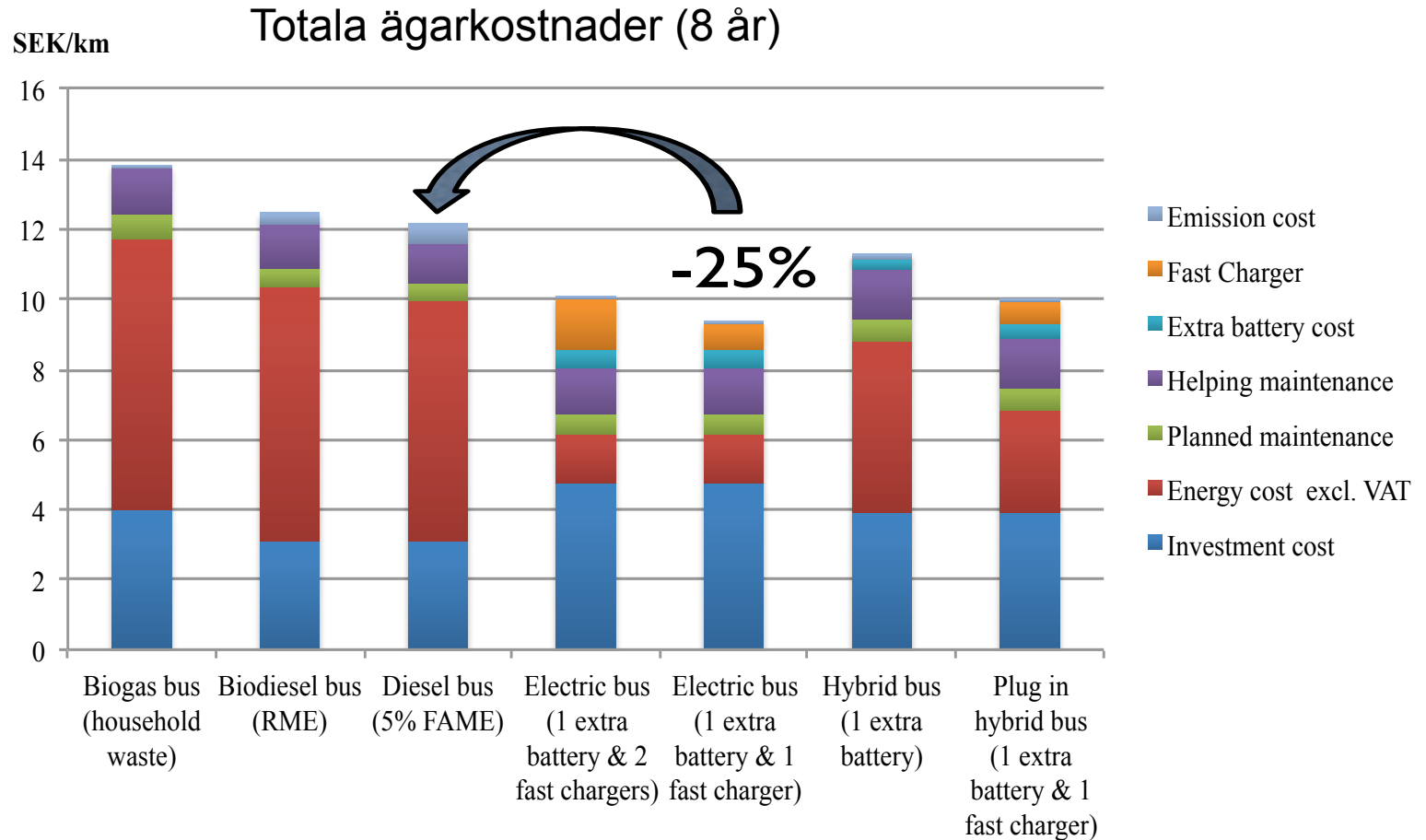


within the 95% confidence interval, according to ReCiPe midpoint (H) v1.12

Källa: Borén S, Ny H, 2016



Busstudie 1: TCO?



Källa: Nurhadi L, Borén S, Ny H, 2014



Busstudie 2: Möjligheter & Barriärer

- 0,96 kWh/km
- > -25% TCO
- -6 dB
- Goda möjligheter till snabbbladdning
- Förnybar el

Busstudie 2: Möjligheter & Barriärer

- 0,96 kWh/km
 - > -25% TCO
 - -6 dB
 - Goda möjligheter till snabbladdning
 - Förnybar el
-
- Potentiella kostnadsrisker
 - Detaljstudier (linje)

PTAs, Bus operators



Busstudie 3: elbussar i trafikupphandling



Busstudie 3: elbussar i trafikupphandling



- Trafikupphandling
- Kostnader
- Tillgänglighet
- Acc.buller
- Batterier vs laddning



Summering

i. Tungmetaller

ii. Gruvdrift



<http://publicdomainvectors.org/de/kostenlose-vektorgrafiken/Elektroauto-Vektor-ClipArt/5487.html>

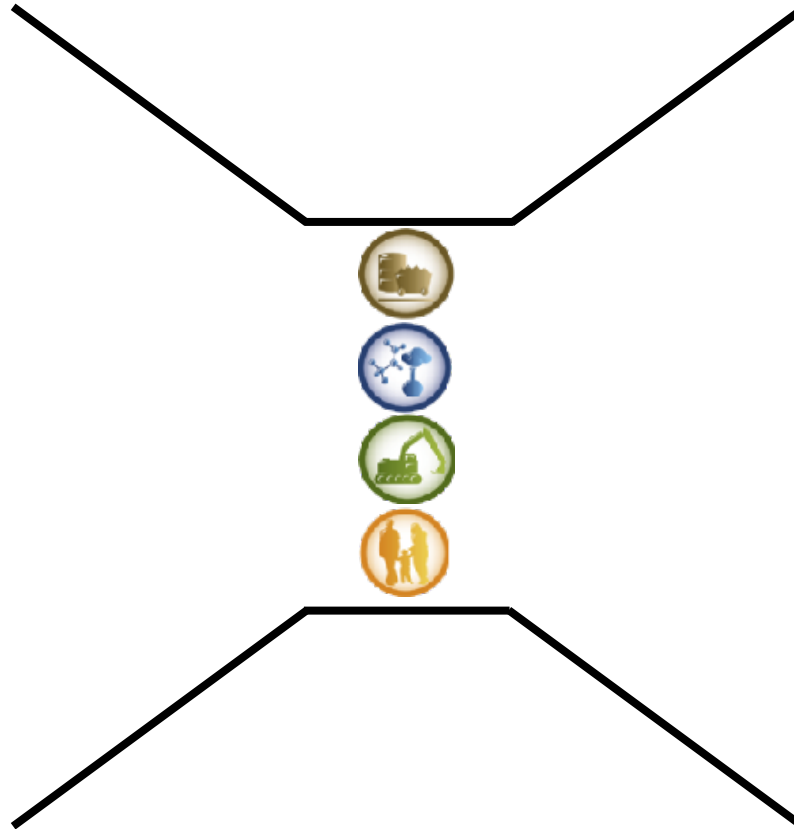
iii. Fossila bränslen

iv. Högt inköpspris



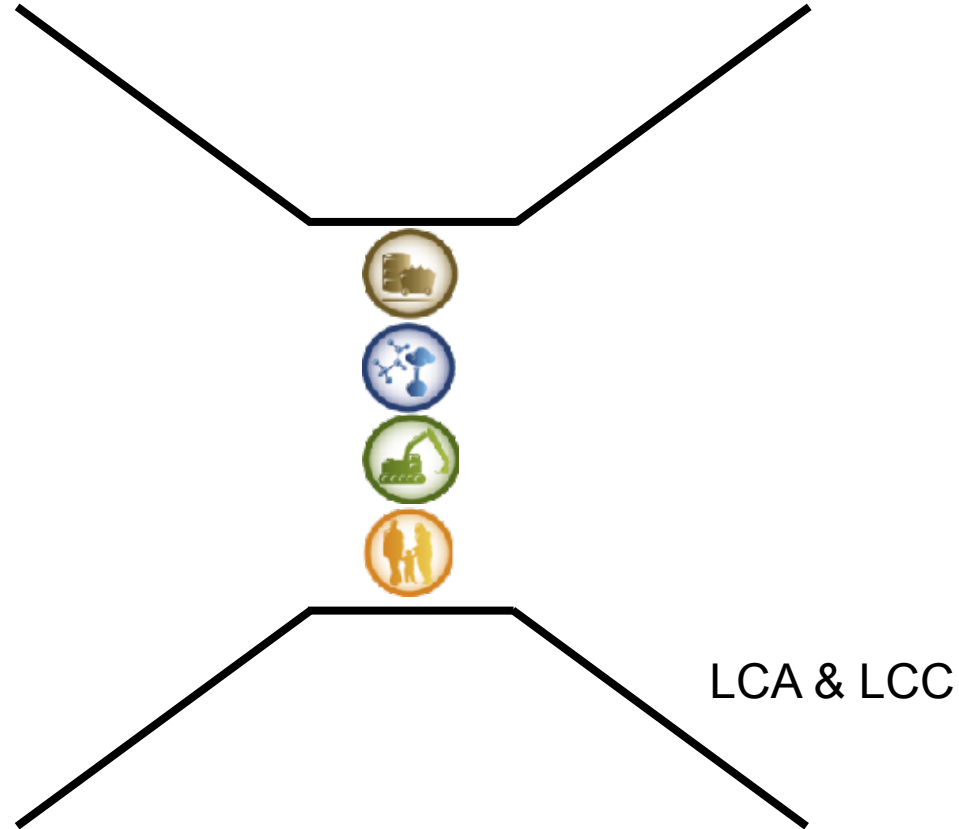


Summering



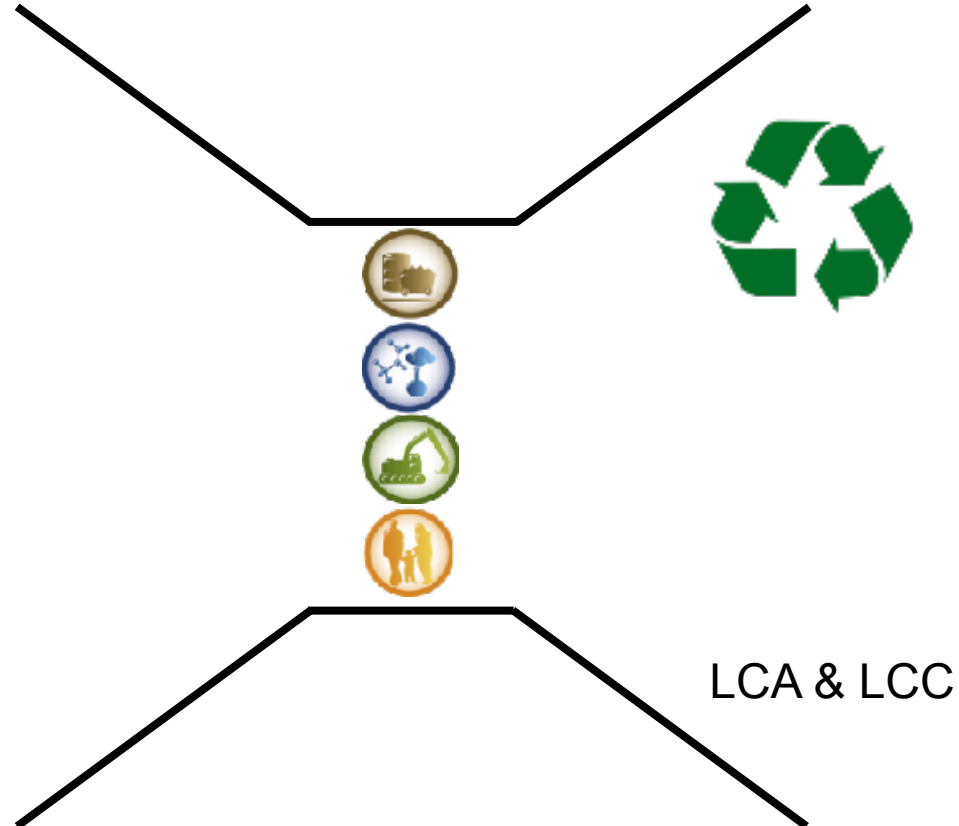


Summering



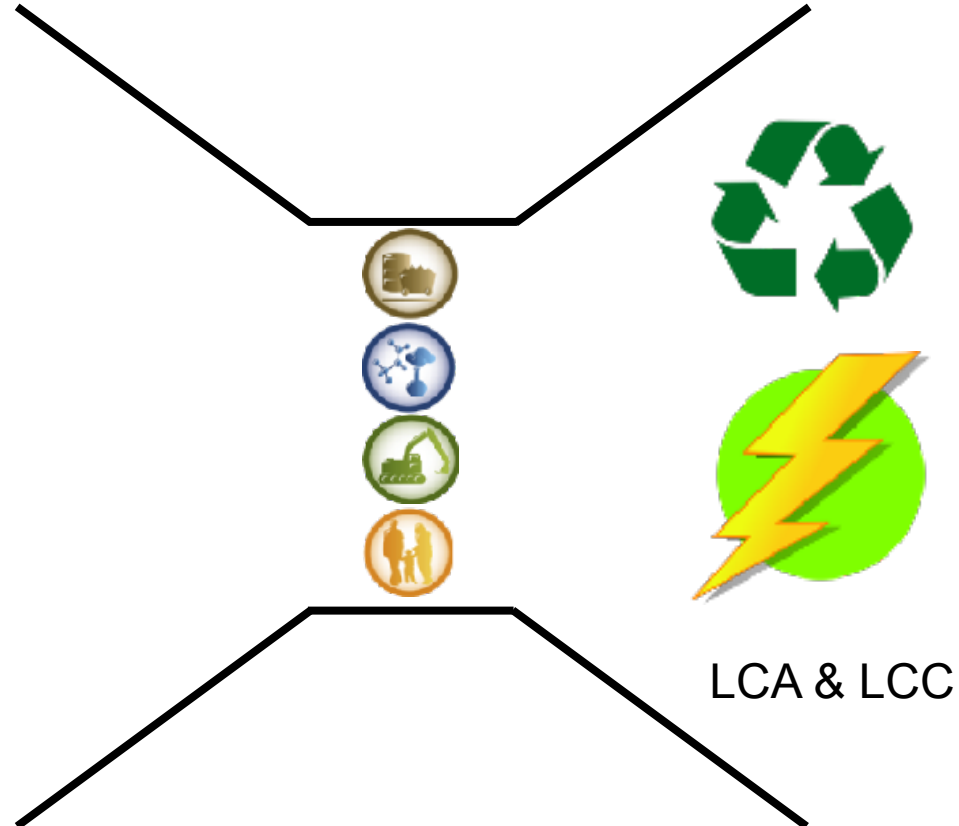


Summering





Summering



Summering





спасибо 谢谢
GRACIAS 谢谢
THANK YOU
ありがとうございました MERCI
DANKE धन्यवाद
شُكراً OBRIGADO

<https://pixabay.com/sv/tack-tacksamhet-uppskattning-490607/>



FSSD^a

^a Broman and Robèrt (2015)

^b Missimer (2015)

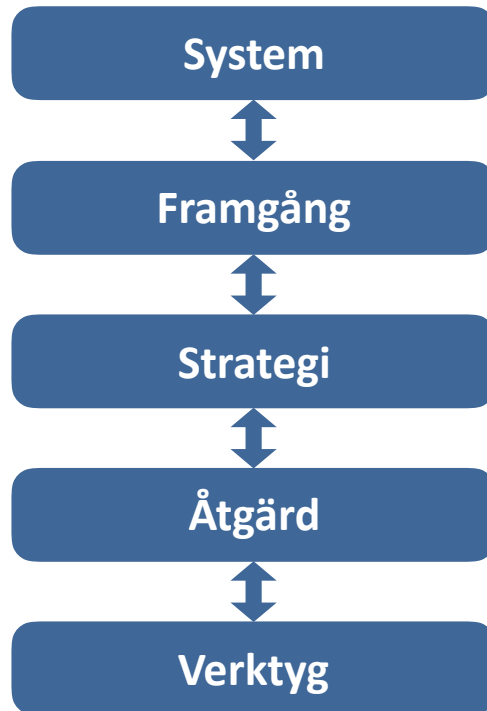
^c Gunnarsson (2010); Ny et al. (2006)

^d ISO (2006)

^e ISO (2008)



FSSD^a



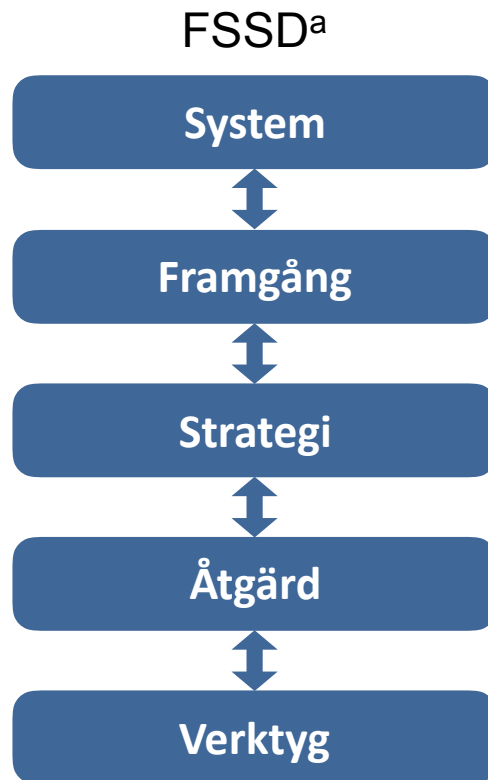
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I det hållbara samhället utsätts inte naturen för systematisk ökning...



...av koncentration av ämnen från berggrunden

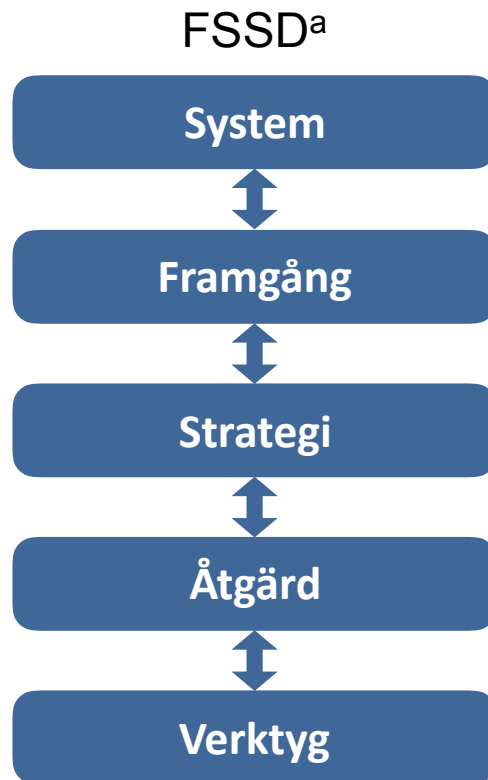
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...av koncentration av ämnen från samhällets produktion

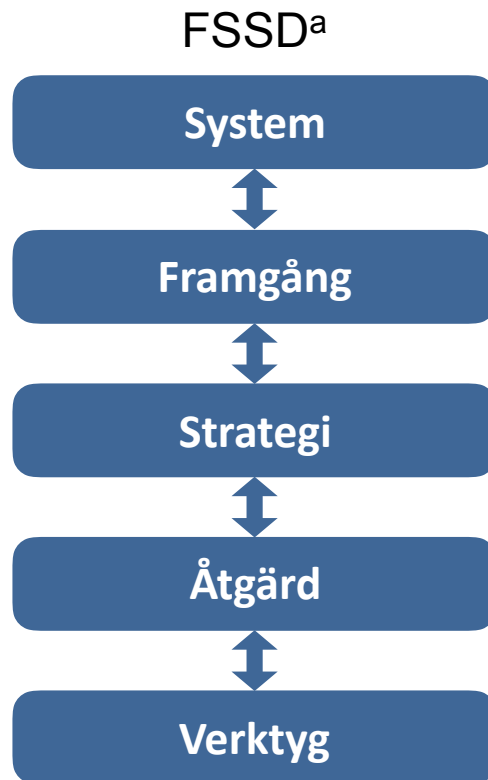
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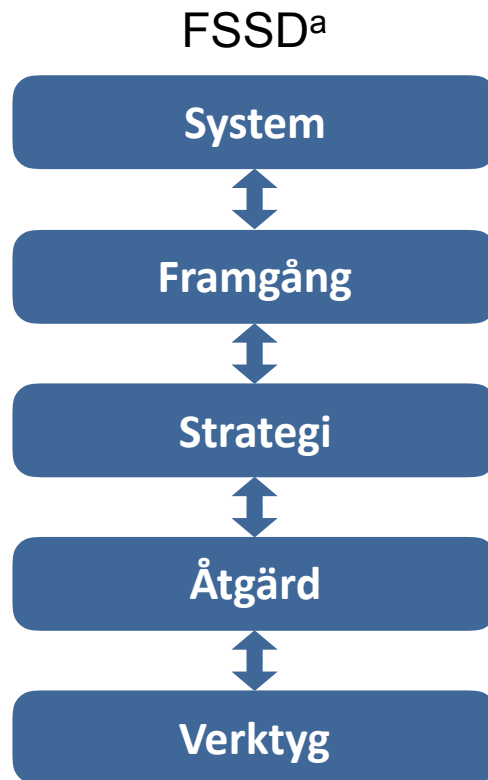
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...strukturella hinder för människors hälsa, inflytande, kompetens, opartiskhet och mening ^b

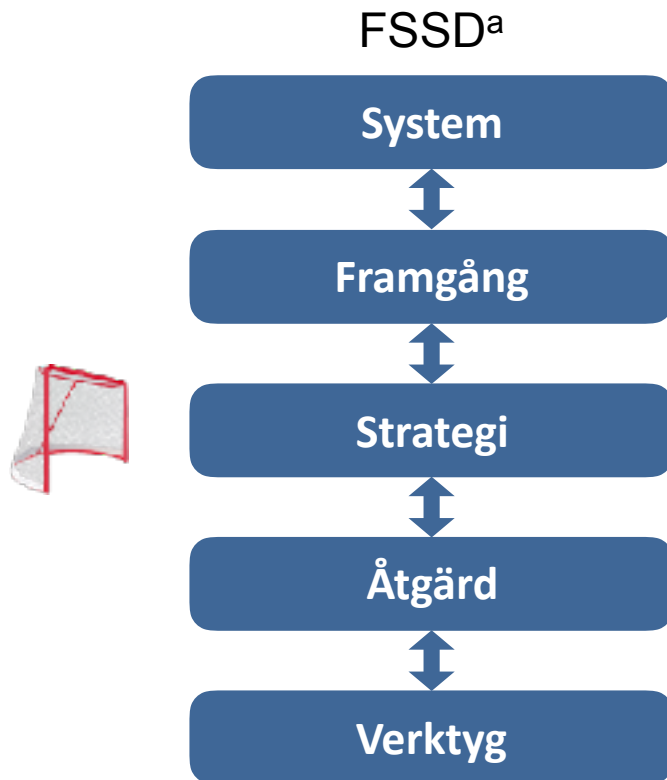
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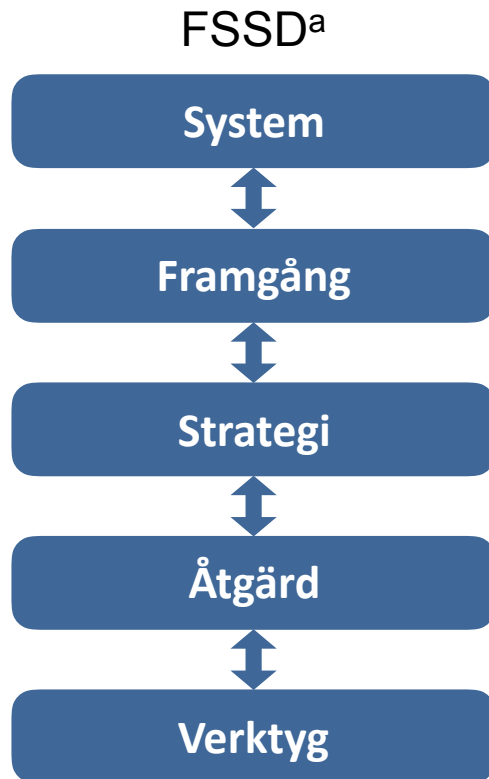
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SLCA^c,
LCA^d,
LCC^e



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