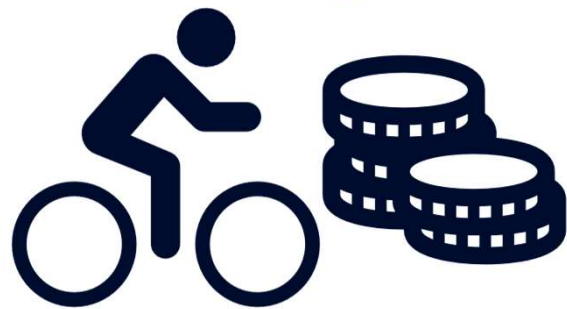


Interreg webinar Sep 23 2021

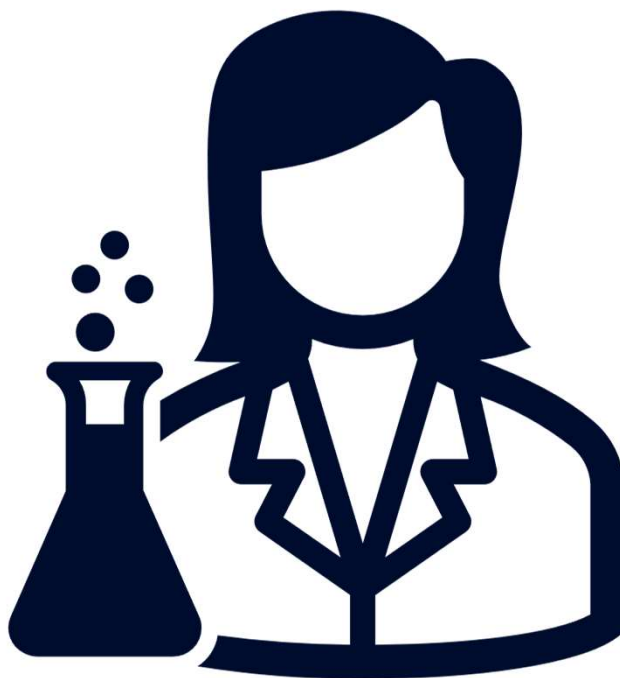


Cost-benefit of bicycles vs cars

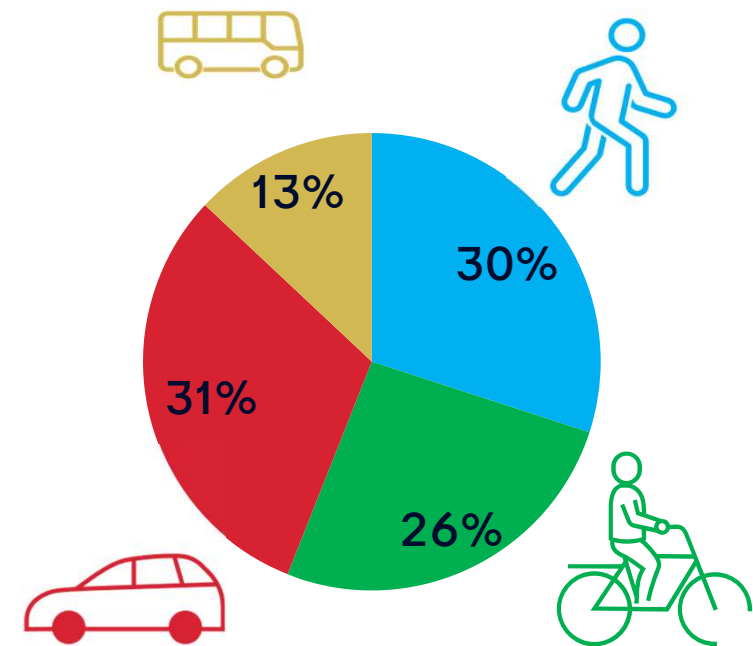


Marie Kåstrup
Head of Bicycle Program
City of Copenhagen





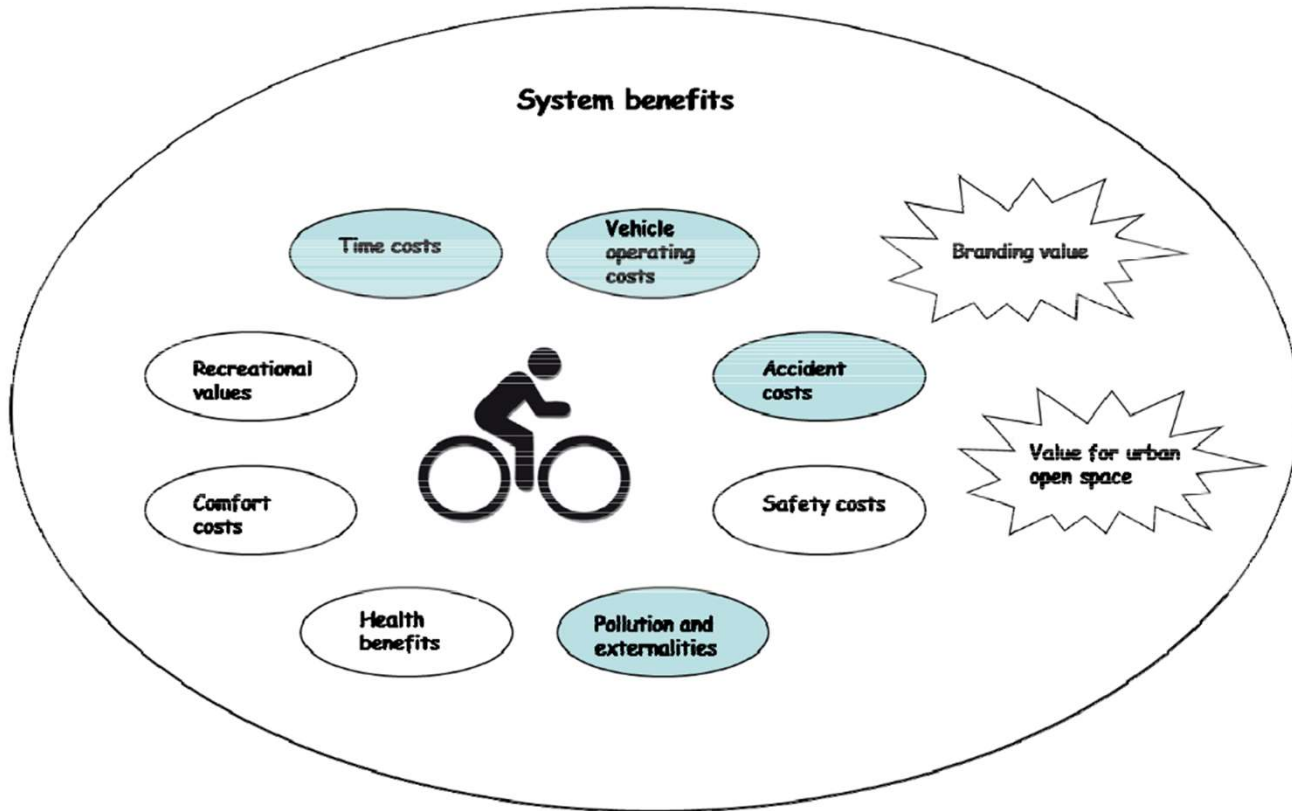
Copenhagen - city of cyclists



Normalising cycling



New method in 2009 - TERESA



COWI

City of Copenhagen

Economic evaluation of cycle projects - methodology and unit prices

Summary

COWI A/S
 Paralelsvej 2
 DK-2800 Kongens Lyngby
 Denmark
 Tel +45 45 97 22 11
 Fax +45 45 97 22 12
 www.cowi.com

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1 Introduction

This note comprises a combined English summary of the report "Samfundskonomiske analyser af cykeltrafik - metode og cases" and the accompanying note "Embedsværdier for cykeltrafik", prepared by COWI for the City of Copenhagen (www.kk.dk/cykeltrafik).

For further information please contact Andreas Rohl, City of Copenhagen, aroh@mf.kk.dk, phone: +45 33 66 31 66 or Jonas Herby, COWI, johr@cowi.dk, phone: +45 45 97 22 07.

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 Date of issue 09 December 2009
 Prepared JCHR
 Checked EBN
 Approved EBN

Purpose

What can you use a SCBA for?

DECISIO
ECONOMIC RESEARCH

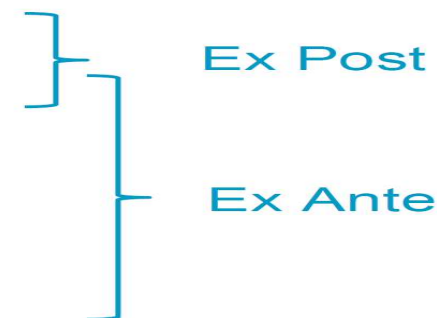
- Evaluating decisions and/or helping future decisions about improving society
- Making sure tax money is spent well
- Choosing the best alternative (even if alternative is investment in different mode)
- Getting support for a project
- Optimising the investment for the project
- Making it clear who benefits from the project
- Getting a sense of the uncertainties of the project



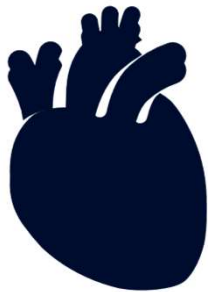
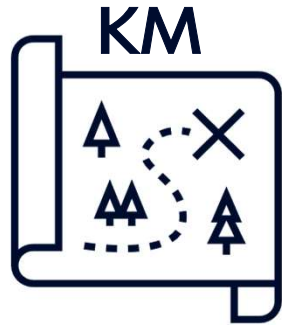
What can you use a SCBA for?

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How do we measure the economic effects?



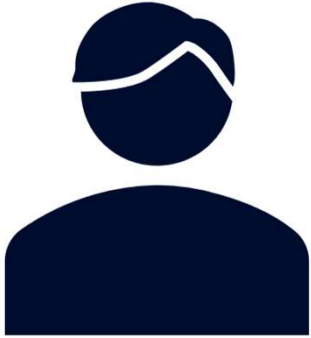
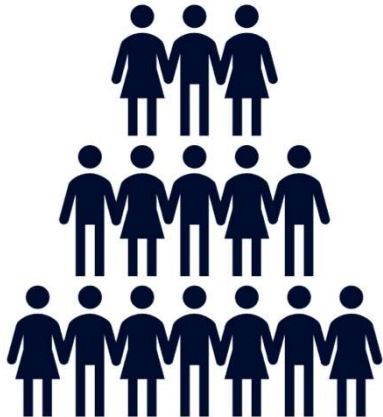


Table 2.2 Average costs per kilometre for cycling, DKK, 2008 prices

	Cycling (16 km/h)			For reference: Car (50 km/h) in city			
	Internalized	External	Total	Internalized	External	Duties	Total
Time costs (travel time, non-work)	5.00	0	5.00	1.60	0	0	1.60
Vehicle operating costs	0.33	0	0.33	2.20	0	-1.18	1.02
Prolonged life	-2.66	0.06	-2.59	0	0	0	0
Health	-1.11	-1.80	-2.91	0	0	0	0
Accidents	0.25	0.54	0.78	0	0.22	0	0.22
Perceived safety	+ (?)	0	+ (?)	?	?	0	?
Discomfort	?	0	?	?	?	0	?
Branding/tourism	0	-0.02	-0.02	?	?	0	?
Air pollution	0	0	0	0	0.03	0	0.03
Climate changes	0	0	0	0	0.04	0	0.04
Noise	0	0	0	0	0.36	0	0.36
Road deterioration	0	0	0	0	0.01	0	0.01
Congestion	0	0	0	0	0.46	0	0.46
Total	1.81	-1.22	0.60	3.80	1.13	-1.18	3.74



Values per km by bicycle / car

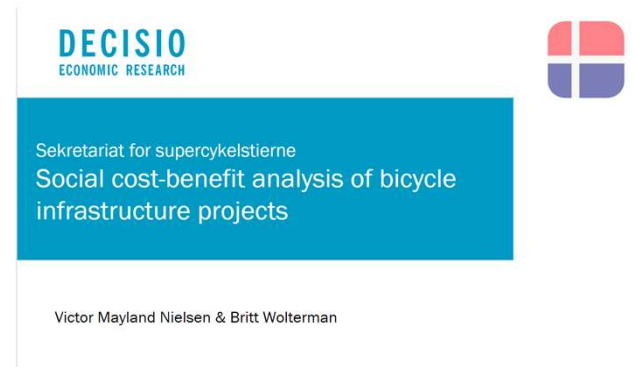
DK Teresa model 2020 external costs

- Bicycle: € 0.85 gain
- E-bike: € 0.51 gain
- Car: € 0.15 cost
- E-car: € 0.14 cost

Marginal external costs for the year		2020		2020 prices						
		Capacity	Total	Air pollution	Climate change	Noise	Accidents	Congestion	Infrastructure	Health
Bicycle		1 pers	-6,35	0,00	0,00	0,00	1,49	0,00	0,00	-7,84
E-bicycle		1 pers	-3,76	0,00	0,00	0,00	2,51	0,00	0,00	-6,27
Passenger car	Petrol	4 pers	1,12	0,04	0,04	0,08	0,32	0,63	0,01	
	Diesel	4 pers	1,18	0,11	0,04	0,08	0,32	0,63	0,01	
	Electricity	4 pers	1,01	0,01	0,01	0,03	0,32	0,63	0,01	
	Average	4 pers	1,15	0,07	0,04	0,08	0,32	0,63	0,01	

Values differ in time and place

- Comparison of NL and DK methods through EU Horizon 2020 Handshake Project
- NL higher value of climate and congestion
- DK higher value of health and noise



The Ps:
Marginal external costs (benefits)



MEC in EUR/1000km in 2018 euros	European Commission 2014	Cowi & CPH 2010 (vkm)	CE Delft & VU 2014 (pkm)	MKBA Decisio 2017 (pkm)
Air pollution	1-32 (dep on vehicle)	2.9	3.9	10.5 (pollution and climate change together)
Climate change	14-39 (dep on vehicle)	1.4	12.9	
Noise (city)	8.8-21.4 (dep on traffic density)	21.2	12.8	10.4
Accidents (car / biking)	1-19 (dep on vehicle and type of road)	43.5 / 150.9	41.9 / 88.3	33.2 / 88.1
Congestion	0-2426 (dep on time and type of road)	53.3	67.9	(case based)
Infrastructure	5	1.5	2.5	(uses CE Delft & VU)
Health biking	(not included)	- 475.9	- 181.1 (average)	- 134.8-165.9

Health costs and benefits 2020

- Report by Cowi for DK Min of Transport
- € 1.35 per extra km cycled
- € 0.2 cost of accidents
- € 1.55 gain of physical activity
- 7:1 ratio of positive health effects

COWI

TRANSPORTMINISTERIET
TRANSPORTØKONOMISKE
ENHEDSPRISER FOR CYKLING

COWI A/S
Parkerings 2
2800 Kongens Lyngby
T: +45 56 40 00 00
F: +45 56 40 99 99
www.cowi.dk

INDHOLD

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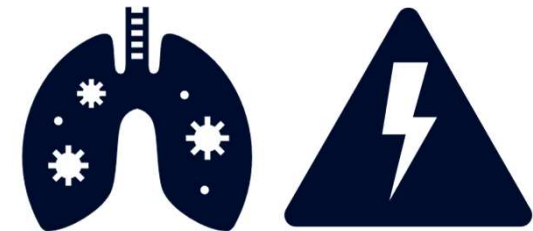
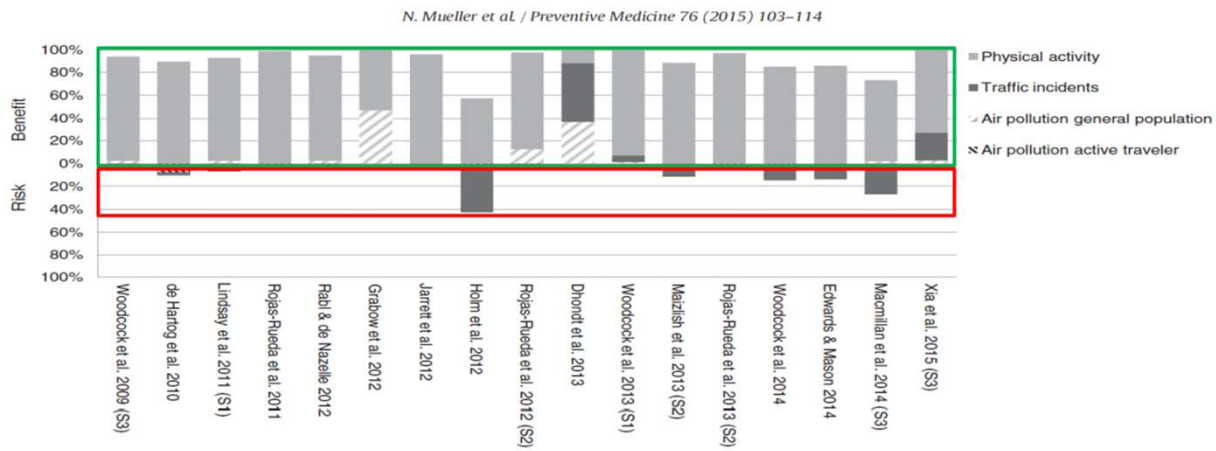
1 Forord og indledning
Transport-, Bygnings- og Bolgministeriet har iværksat en opdatering af de transportøkonomiske enhedspriser for cykling, og COWI er valgt som konsulent til at gennemføre opdateringen.
Opdateringen omfatter

PROJEKT	DOCUMENTAL				
A122240	02				
VERSION	UDGIVELSESDATO	REVISOR	FORBEREDET	KONTROLLERET	UDGIVET
6	14-9-2020	BRUNNEN	STJ, nan, bj	olek	olek



Risks vs benefits

Health Benefits of Active Travel Outweigh Risks



Source: meta study presented by Goetschi / Castro, 2018, Zürich University, for ITF OECD EU Pasta project+ WHO's HEAT model

Added value for employers

- Report by Danish Industry Association 2018
- 10% more km cycled in CPH Capital region
 - 227,000 fewer annual sick days
 - 112,000 fewer annual sick workdays
 - Private enterprise savings € 8 million
 - Public sector savings € 3.8 million
- Total health gain € 63 million
- Congestion savings € 25 million



TILBUD AF CYKLING

DI TRANSPORT • ANALYSER

Effekter af cykling

Baggrundsnotat udarbejdet af Daniel Sloth Olesen og Thomas Odgaard 27. maj 2018

1 Indledning og baggrund

Cykling spiller en stor og stigende rolle i samfundet. Øget cyklisme vil bl.a. reducere antallet af sygedage blandt medarbejdere og generne ved trængsel på vejene. DI har derfor en naturlig interesse i cyklisme, og de ønsker at få kvantificeret nogle af de effekter, der er ved et ændret omfang af cykling.

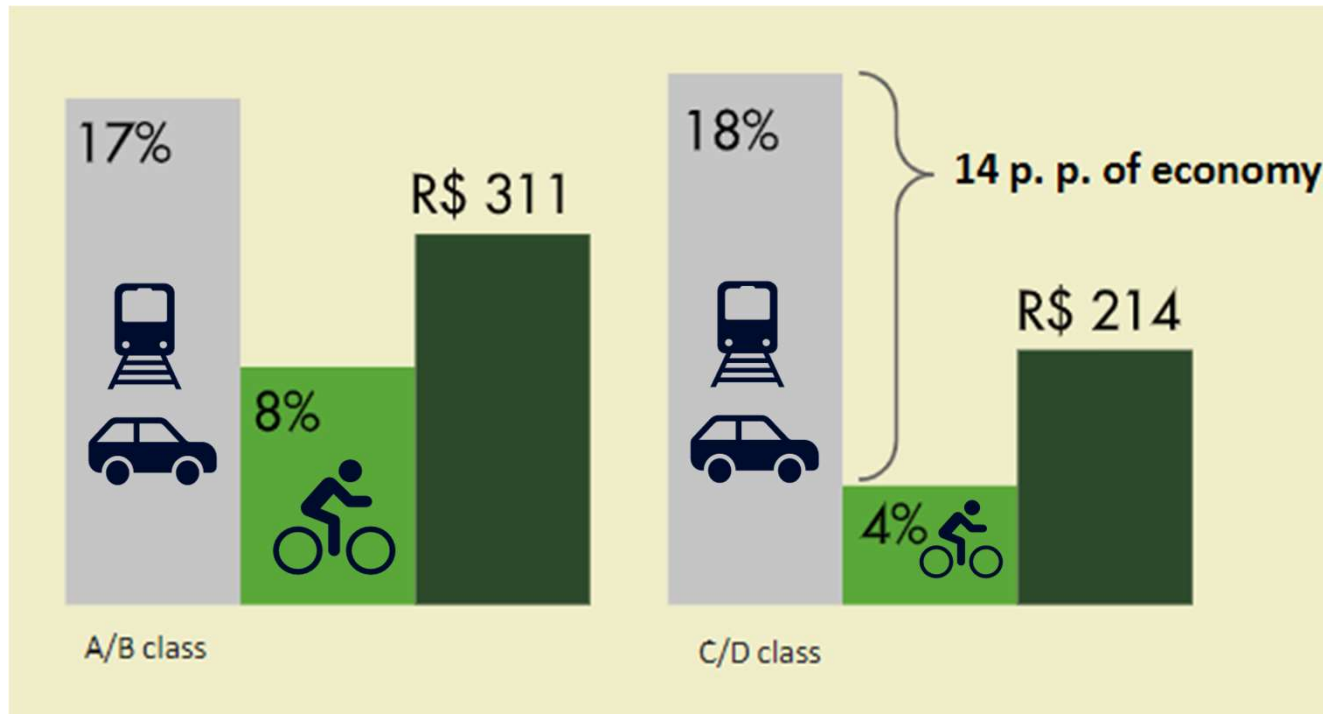
I dette notat opgør vi udvalgte effekter af henholdsvis en stigning og et fald i cyklisme på 10%.

Mere konkret har vi set på følgende effekter:

- Trængsel på vejene
- Sygedage for medarbejdere i den offentlige og private sektor
- Lønomkostninger relateret til ændret sygefravær
- Den samfundsekonomiske sundhedsgevinst

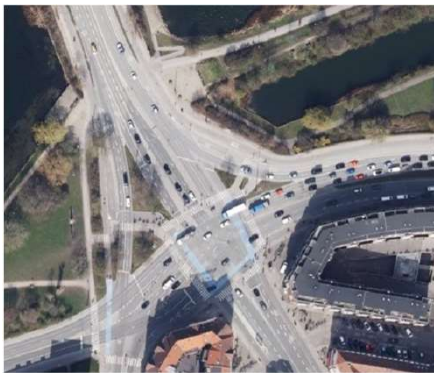
Vi ser både på effekterne i Region Hovedstaden og for Danmark som helhed.

Personal economic benefits



Source: The social impact of bicycle in Sao Paulo, report by Cebrap 2018

Case studies

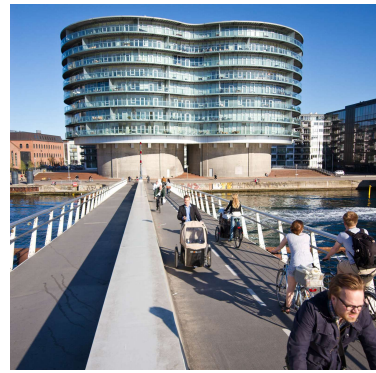


Gyldenløvegade intersection

3 fewer accidents p/y

Cost € 1.2 million
Net value € 4.4 million

Internal rate 33%
(ex post)



Brygge Bridge (Car free)

3,400 → 5,500 06-08

Cost € 10 million
Net value € 5 million

22,100 cyclists in 2019

Internal rate 7.7%
(ex post)



Cycle Serpent Bridge

+66% cyclists 14-19
17,500 daily in 2019
380 h time savings
1,400 fewer car trips

Internal rate 9%
(ex post)



Cycle Superhighways

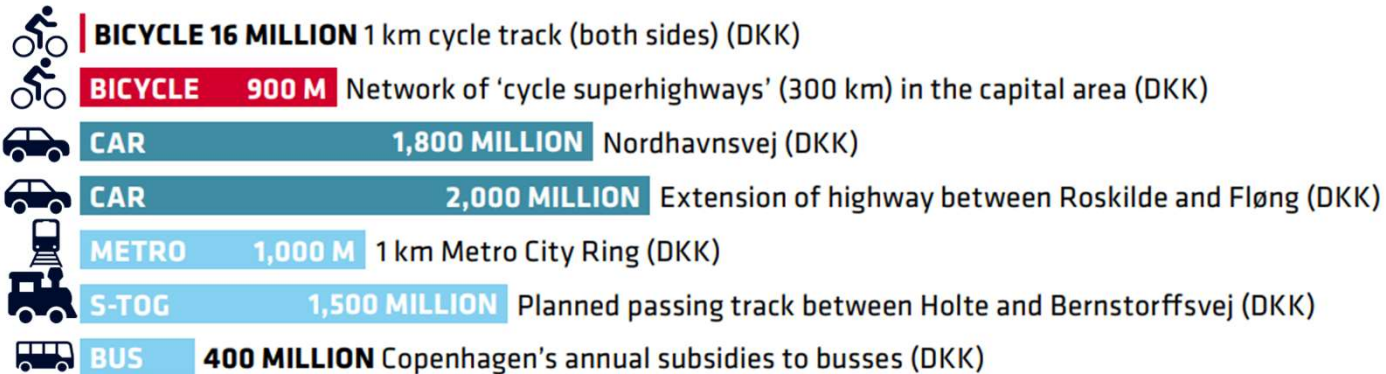
+23% cyclists on 9 regional routes

14% new cyclists former car users

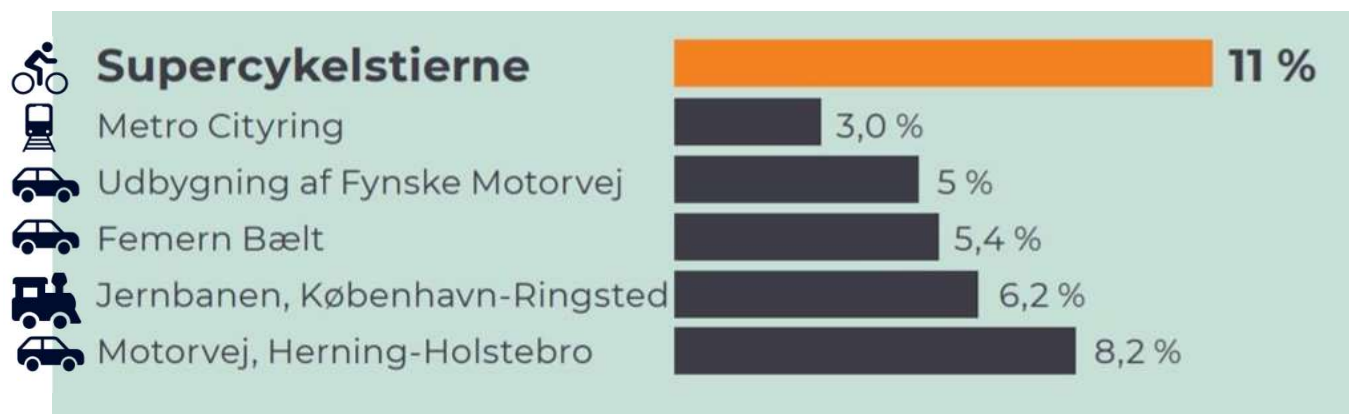
Internal rate 11%
(ex ante)

Comparable costs

INFRASTRUCTURE COST ESTIMATES



Comparable internal rates



Local vs. national benefits

Cost-benefit of bicycle infrastructure with e-bikes and cycle superhighways

Jeppe Rich^{*}, Anders Fjendbo Jensen, Ninette Pilegaard, Martin Hallberg

^{*}Corresponding author for this work

Transport, Transport Demand, Department of Technology, Management and Economics, Transport Economics

Research output: Contribution to journal › Journal article › Research › peer-review

- Full network of 746 km of regional cycle routes
- Internal rate 6%-23%
- "Benefits are non-local and suggest an increased state involvement in bicycle infrastructure investments in the future."

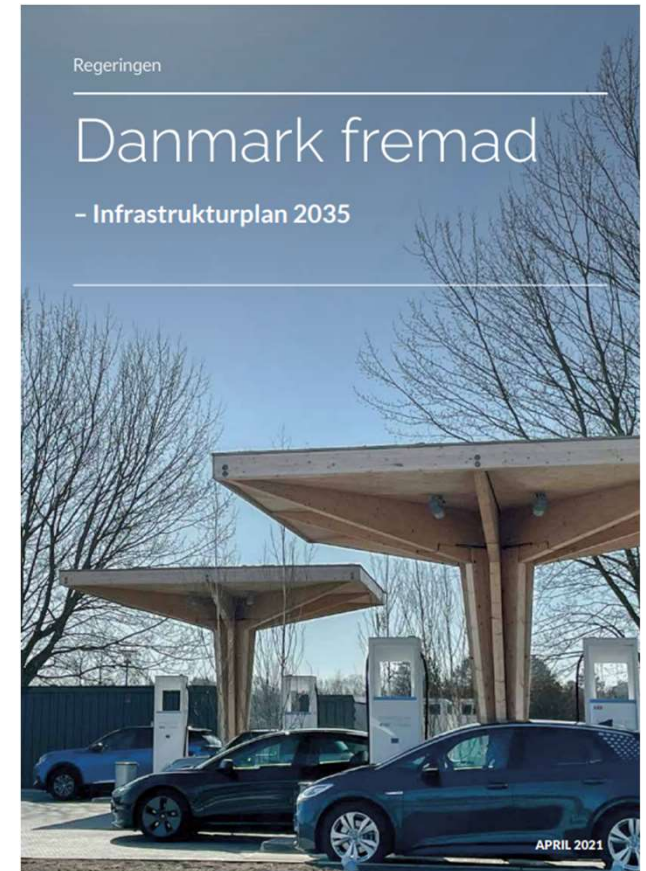
National investment plan 2035

€ 21,5 b. in total

€ 8,4 b. roads

€ 11,5 b. railroads

€ 0,4 b. bicycles = 2%



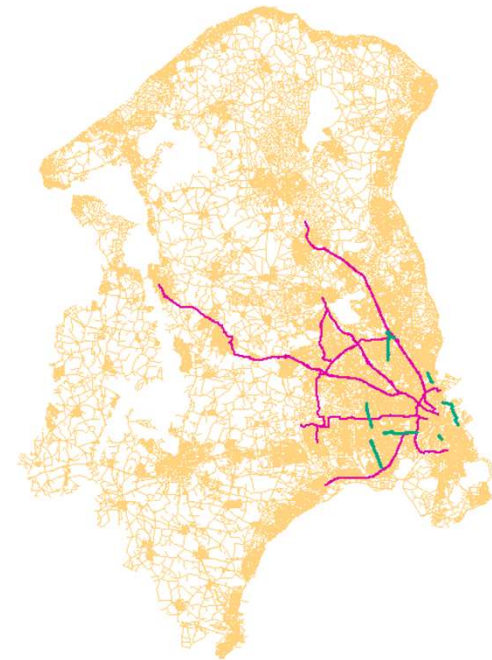
Work in progress

**Mads Paulsen, Jeppe Rich, Anders Fjendbo Jensen,
Otto Anker Nielsen**

*Division of Transport, Department of Technology, Management and
Economics*

Technical University of Denmark

**Optimal investment strategy
of long-term bicycle
investments**



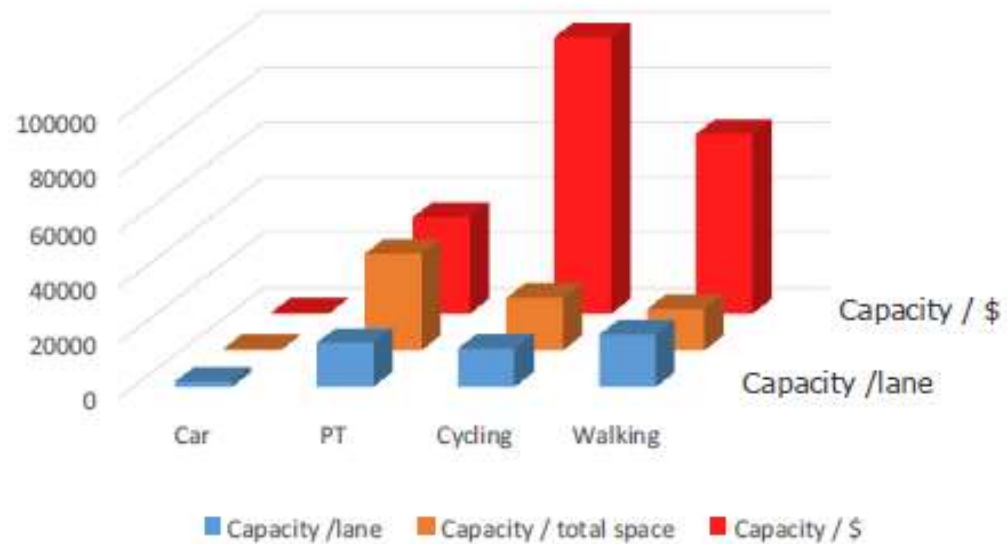
To consider: "Economies" of limited resources

- Money
- Time
- Health
- Weather
- Justice
- Space



The value of space

Bikenomics to Accessanomics:



Source: Mark Major, Velo-city 2016

Thank you!

Marie Kåstrup

Head of Bicycle Program
City of Copenhagen

Vice Chair

Cycling Embassy of Denmark

0045 26770757

mariek@tmf.kk.dk

#cykelmama

www.kk.dk/cityofcyclists

www.cycling-embassy.dk



**Cycling Embassy
of Denmark**