Copenhagen as Cycling City

Lecture, 4th April 2013

Thomas Krag Mobility Advice

Copenhagen as Cycling City

Contents

- Facts
- Bicycle Super Highways
- Green Cycle Routes
- Bridges
- Politics and Planning

Townhall Square ~ 1979

Townhall Square ~ 1979

Self Presentation

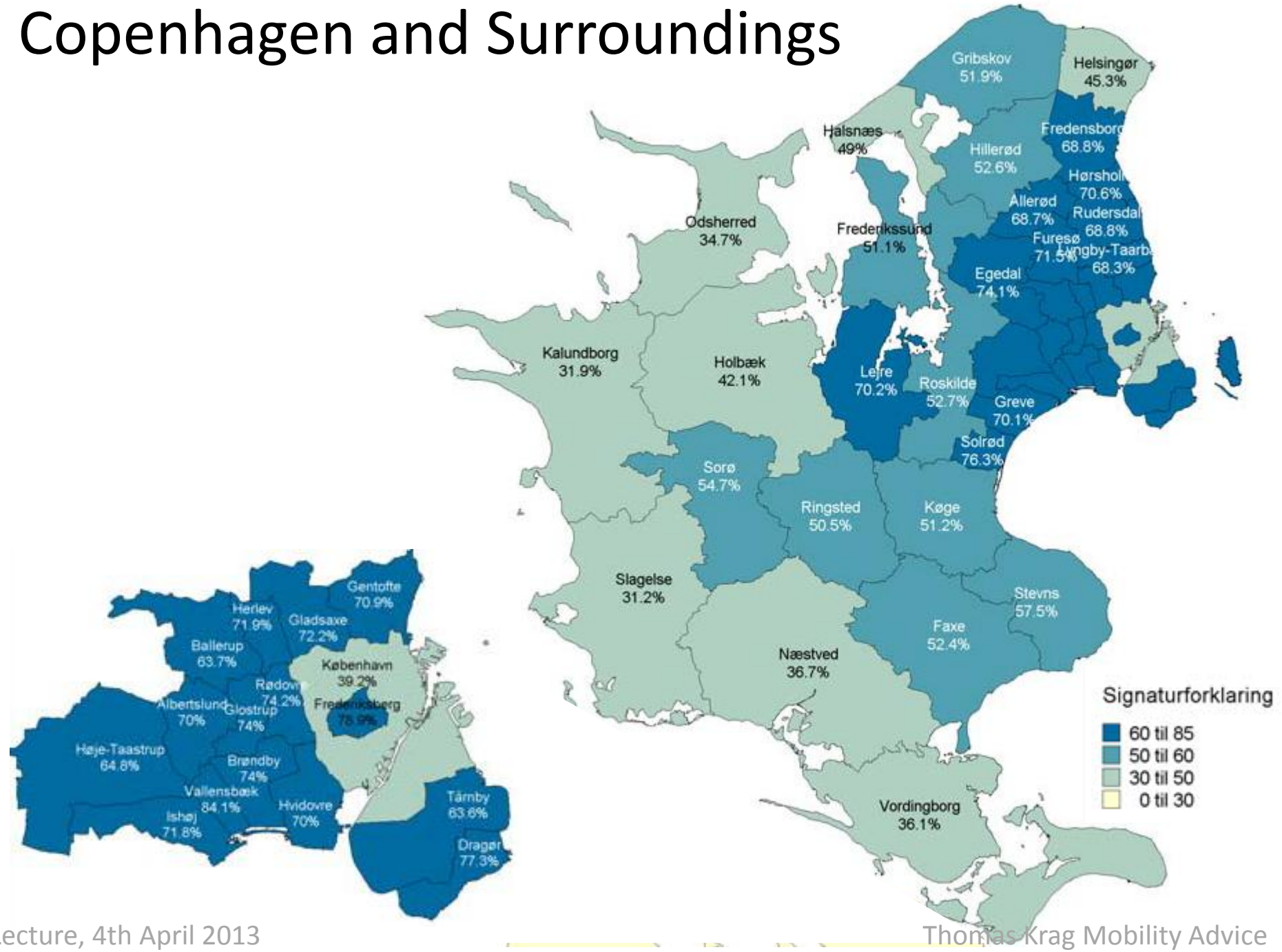
1972 Member of Danish Cyclists Federation
1976 Volunteer at Danish Cyclists Federation
1986 Director of Danish Cyclists Federation
2000 Consultant (Transport behaviour, Cycling, …)
Thomas Krag Mobility Advice

(Education: Master of Science, 1979)

Copenhagen and Surroundings

Copenhagen and Surroundings

Copenhagen and Surroundings



Facts

Population

City of Copenhagen	**0,55 Million**
(Greater Copenhagen Area	1,71 Million)
(Denmark	5,58 Million)

Area

City of Copenhagen	**89,6 km²**
(Denmark	5.600/km²)

Population density: 61 inhabitants per hektare

Climate and topography

Windy, but rarely extreme temperatures.

Risk of rain: Less than 5%

Maximum Height ~ 30 Meter

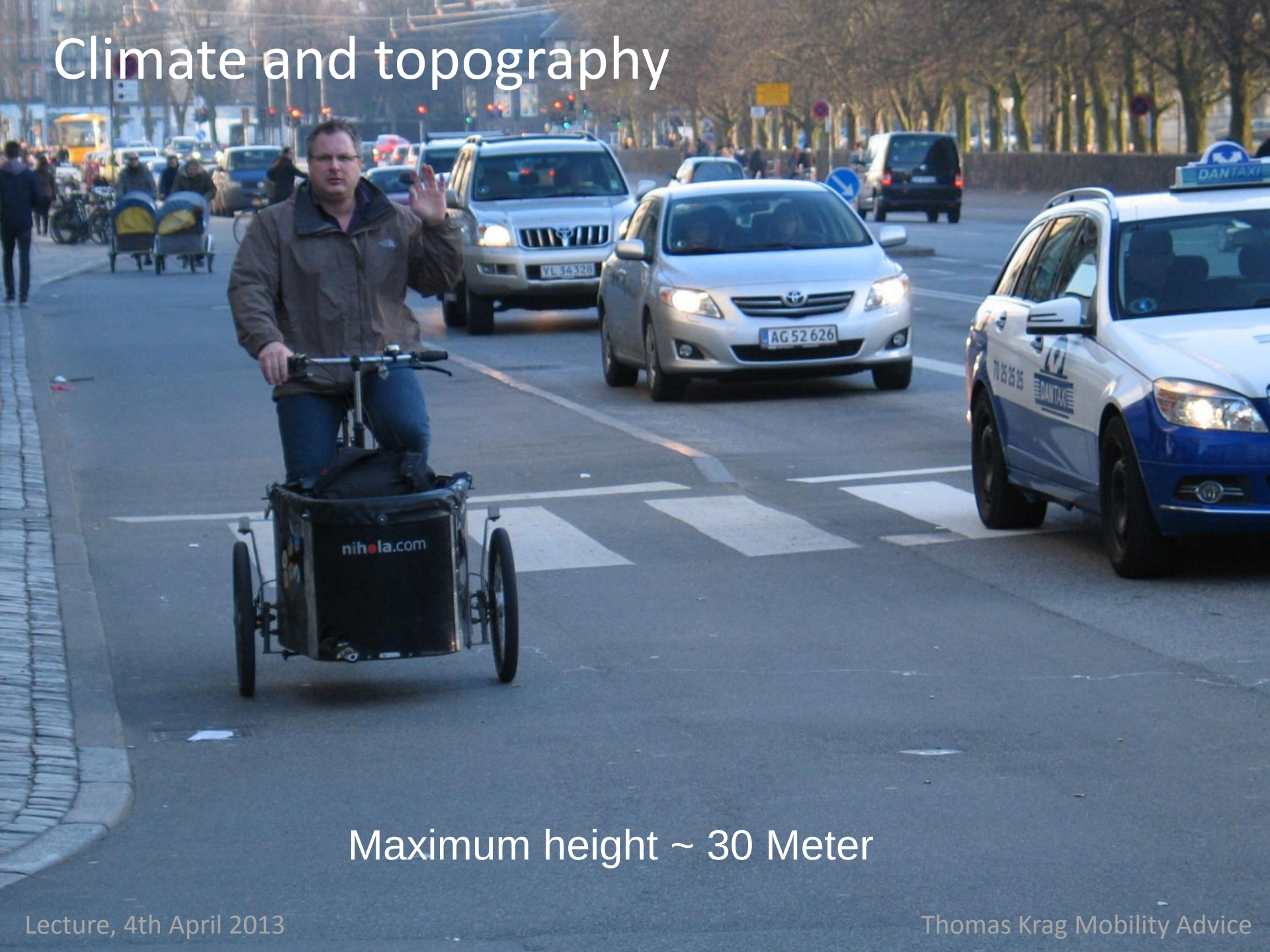
Climate and topography

Windy, but rarely
extreme temperatures.
Snowy winters ~ 1:5

Climate and topography

Climate and topography

Climate and topography



Maximum height ~ 30 Meter

Cargo Bikes

Cargo Bikes

Cargo Bikes

Facts on cargo bikes in Copenhagen

6% of all households in Copenhagen has a cargo bike

- this corresponds to more than 15,000 cargo bikes in the city

25% of two-children families in Copenhagen has a cargo bike

50% of those, who own a cargo bike, use it to transport children

Only 2% of Copenhagen cyclists feel particularly bothered by cargo bikes

22% of the cargo bike owners have a bike as a replacement for a car

24% of the owners have a cargo bike as a complement to the car

The number and use of cargo bikes is increasing - the share is 0.8-1.3%.

Planning guidelines say 1 per 1.000 bicycle parking spaces should be for cargo bikes – will have to be increased.

Source: City of Copenhagen, 2009 and 2013

Bicycle Track Concept

The koncept was described in 1938. The first bicycle track was built in 1892.

In Danish: ”Cykelsti”.

Bicycle Track Concept

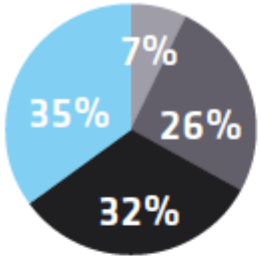
Bicycle Track Concept

Bicycle Track Concept

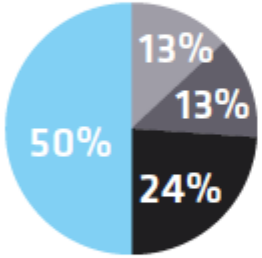
Cycle Tracks

Today: 346 km
Cycle Tracks
(> 173 km Street)

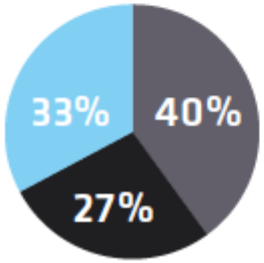
Modal Split in Copenhagen



All trips to work or education in the City of Copenhagen



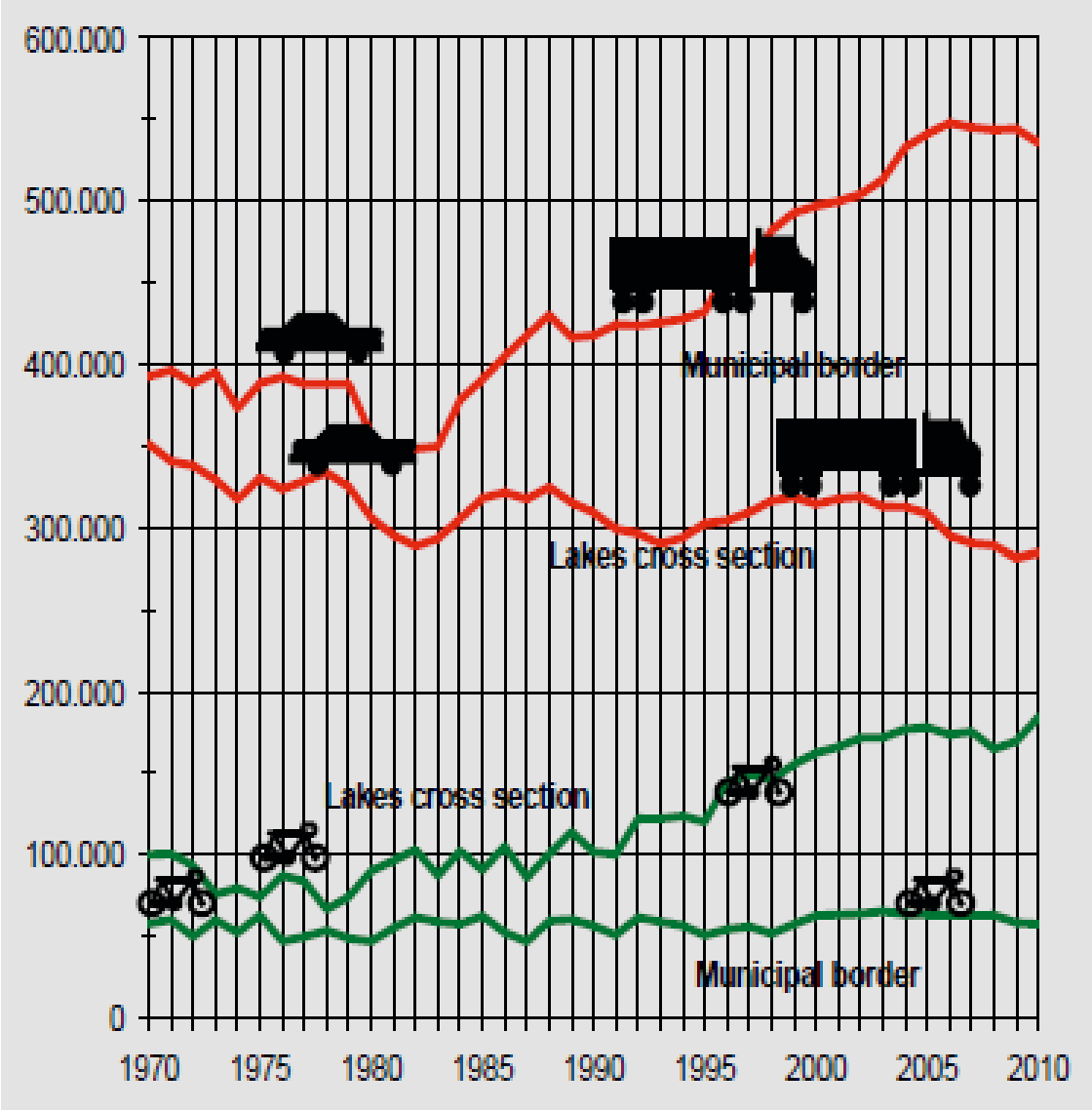
Trips to work or education in the City of Copenhagen, only Copenhagen residents

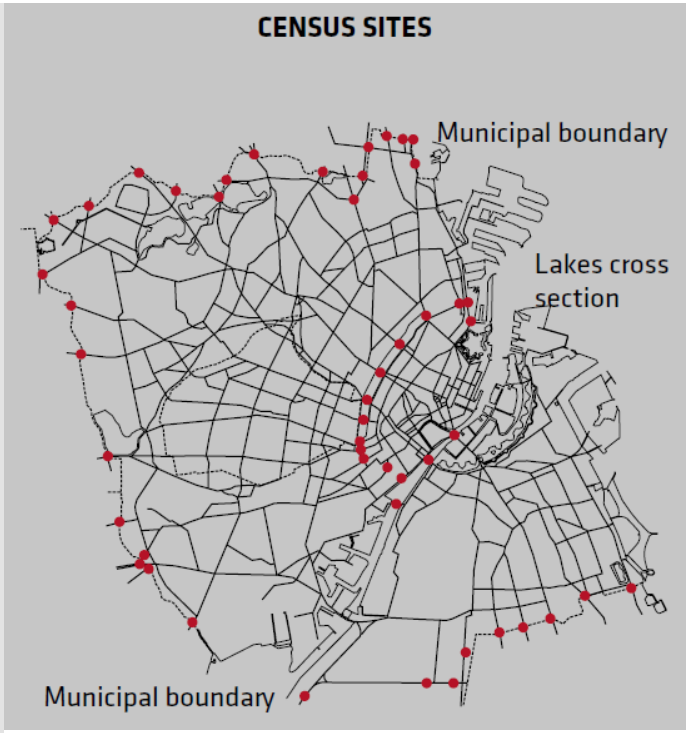


All trips starting and/or terminating in the in the City of Copenhagen

Walk* / *Car* / *bus, train and Metro* / *Bicycle

Traffic Counts





Goal: 60.000 more Cyclists

Copenhagen goal: 50% cycling to work and education

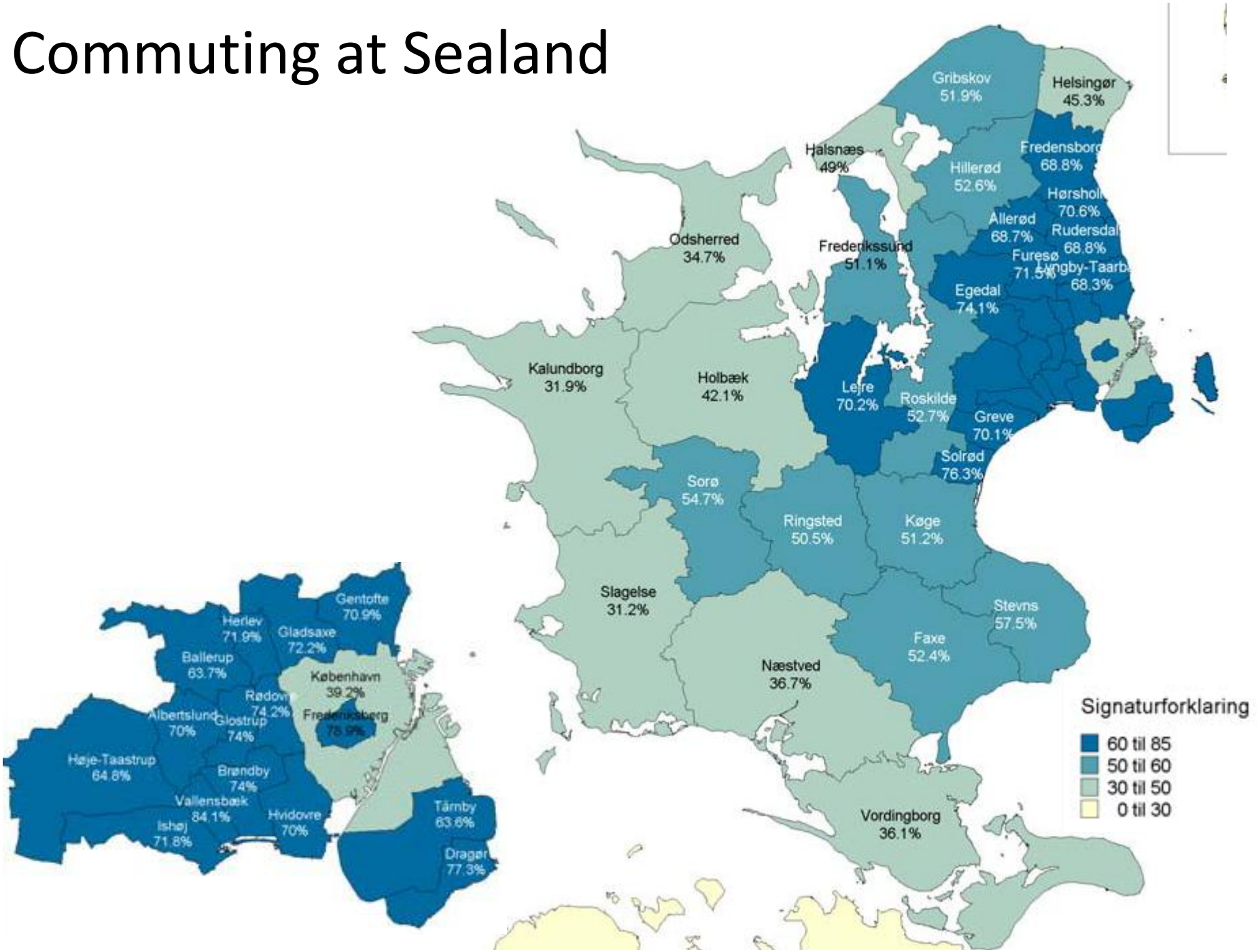
Present: 35%

PERSONS GOING TO WORK OR EDUCATION IN COPENHAGEN DISTRIBUTED ACCORDING TO TRANSPORT DISTANCE AND TRANSPORT MODE *ROUND NUMBERS*

	< 2 km	2-4,9 km	5-9,9 km	10-14,9 km	>15,0 km	Total
Walk	30,000	6,000	0	0	0	36,000
Bicycle	35,000	67,000	43,000	9,000	1,000	155,000
Car	3,000	18,000	27,000	23,000	67,000	138,000
Bus	1,000	9,000	14,000	3,000	1,000	28,000
Train	1,000	4,000	13,000	13,000	43,000	74,000
Other	0	0	1,000	1,000	4,000	6,000
Total	70,000	104,000	98,000	49,000	116,000	437,000

How? By faster and more pleasant cycling.

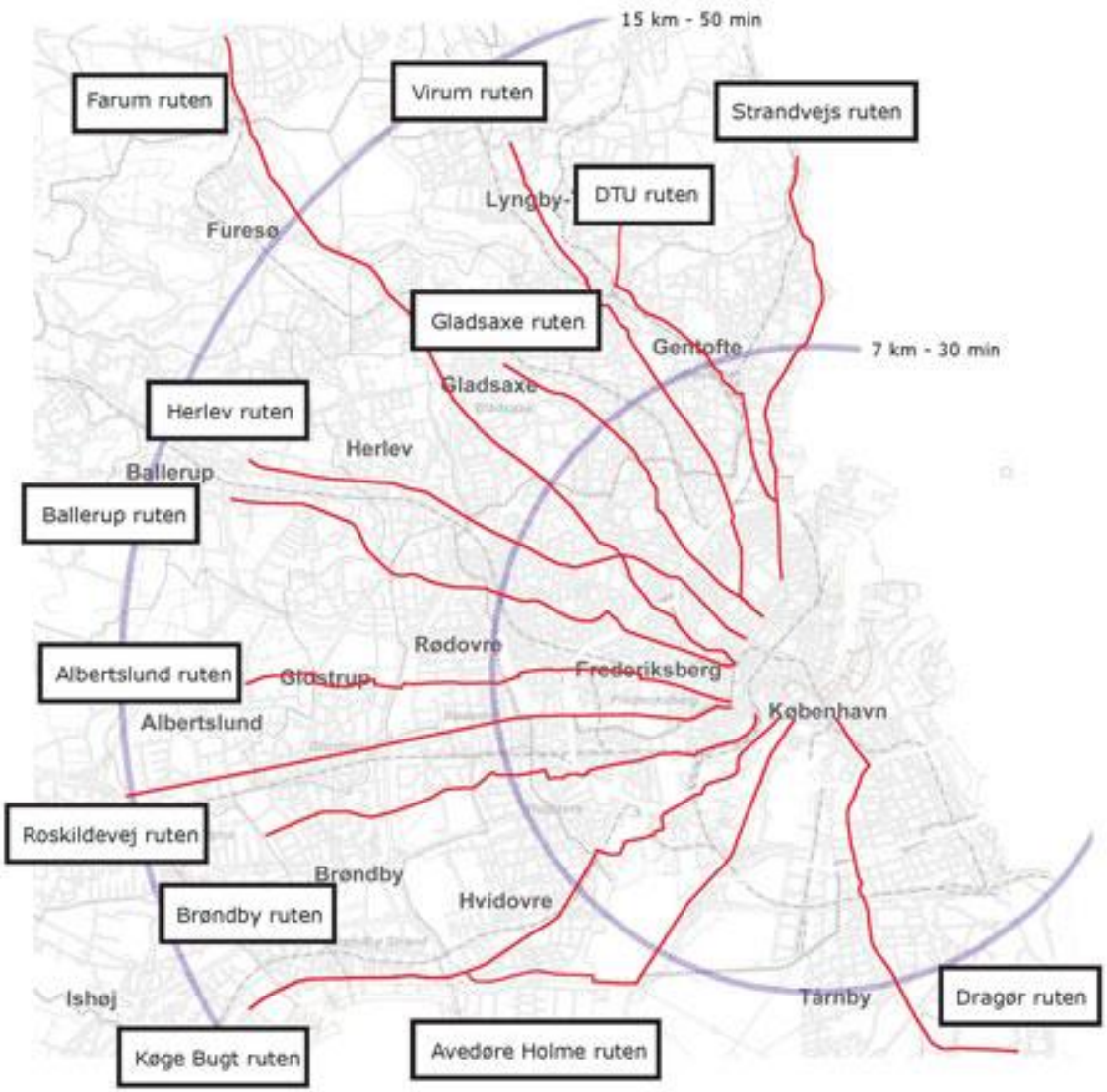
Commuting at Sealand



Bicycle Super Highways

Report, 2008

Bicycle Super Highways



Bicycle Super Highways

Report, 2008
(Example)

STRANDVEJS RUTEN

FORSLAG TIL FORBEDRINGER

TRIANGLEN: BUSUDSTIGNINGSPERRON OG OMBYGNING AF SIGNALER
Fremkommeligheden på Trianglen kan blive bedre, hvis der etableres udstigningsperron ved busstoppestederne. Desuden kan det øge trygheden at gøre signalerne mere overskuelige for cyklister.

ØSTERBROGADE: GRØN CYKELBØLGE
På Østerbrogade kan fremkommeligheden blive bedre ved at etablere en grøn bølge for cyklister.

ØSTERBROGADE: SKILLERABAT
Ved at anlægge fortovsareal eller skillerabat mellem de parkerede biler og cykelstien, vil der være mindre risiko for, at cyklister bliver ramt af åbne bildøre. Forbedringen kræver formentligt, at strækningens vejprofil lægges om.

STRANDVEJEN NORD FOR TUBORGVEJ: UDVIDET CYKELSTI
På strækningen nord for Tuborgvej, hvor der er butikker, vil en udvidelse af cykelstien gøre det nemmere for cyklisterne at komme frem.

SIGNALER
Det er nødvendigt at ombygge to signaler for at gøre det tryggere og nemmere for cyklisterne at færdes på ruten. Desuden er der behov for at forbedrede afmærkningen i enkelte signaler.

VIGEPLIGTSKRYDS
Trygheden kan blive forbedret ved at omlægge 10 vigepligtskryds. For at gøre opmærksom på cykeltrafikken, er der desuden behov for at ændre afmærkningen.

ULYKKESTÆTHED
På Østerbrogade er ulykkestætheden større end 3 ulykker pr. km. En ombygning af dele af strækningen kan øge trafiksikkerheden for de cyklende.

ALTERNATIV TIL RUTEN
Den sydlige del af Strandvejen løber parallelt med en del af DTU ruten. DTU ruten kan være et alternativ for pendlere, der vil undgå den inderste del af Strandvejen.

I relation til de grønne cykelruter kan strækningen fra Svanemøllen Station og helt ind til Østerport Station erstattes af den planlagte grønne rute "Svanemølleruten". Dette vil dog være en mindre omvej. Se eventuelt kortet i bilaget.

Bicycle Super Highways

Report, 2008
(Example)

STRANDVEJS RUTEN

STRANDVEJEN – ØSTERBROGADE

FAKTA

Længde	10 km
Antal signaler	20
Antal signaler pr. km	2
Antal sideveje	80
Antal ulykker pr. km pr. år	< 3
Antal cyklister på Østerbrogade	13.200
Antal cyklister på Strandvejen	7.200

FORSLAG TIL ÆNDRINGER

Ny cykelsti, stiudvidelse eller asfaltering	18 mio. kr.
Signalforbedringer	1 mio. kr.
Forbedringer af vigepligtskryds	3 mio. kr.
Afmærkning af rute	1 mio. kr.
Andet	1 mio. kr.

TOTAL: 24 millioner kr.

Opretning af belægning, tilretning af riste osv. er ikke inkluderet i overslaget
Omprofilering af vejen er ikke inkluderet i overslaget

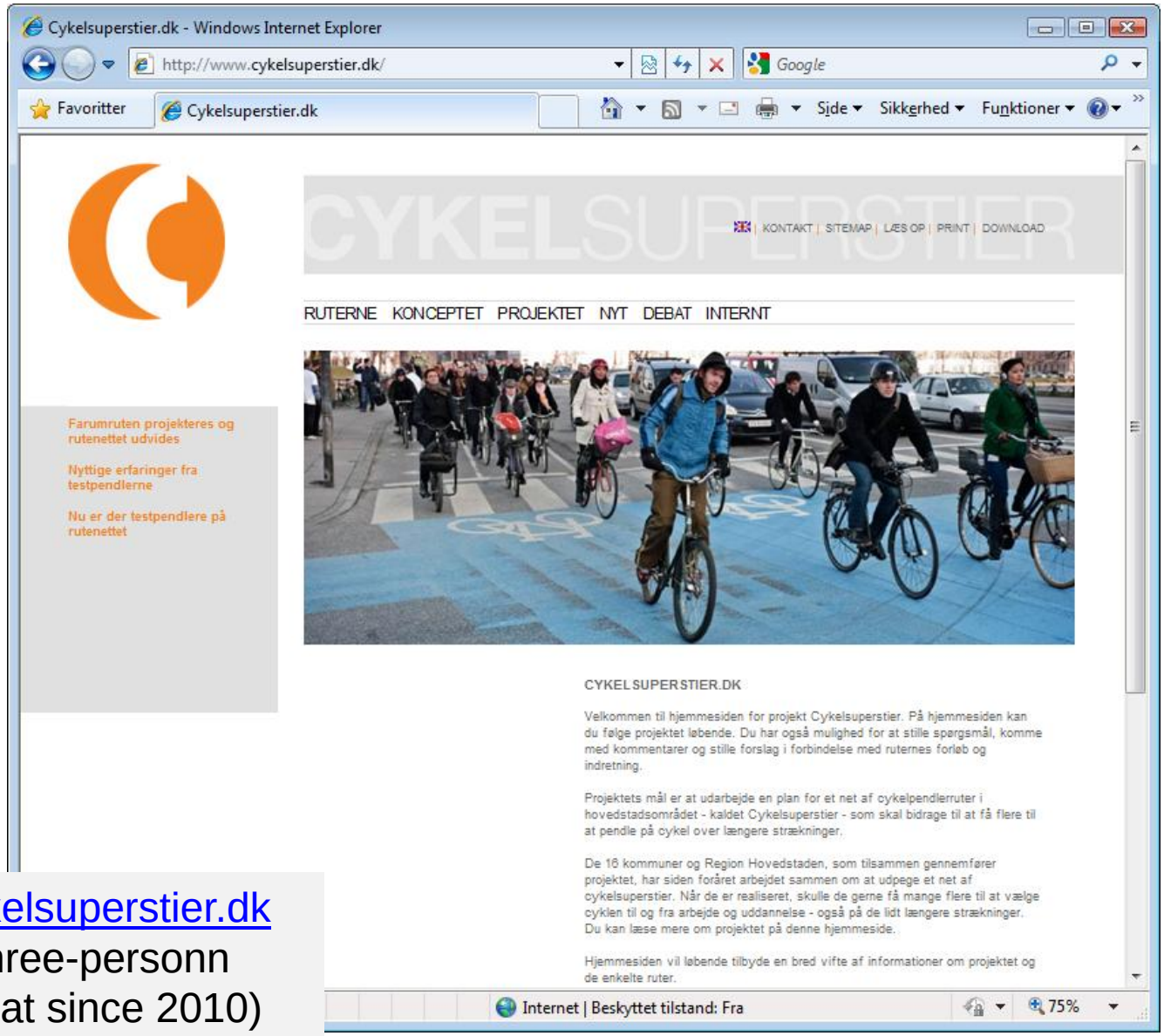
Bicycle Super Highways

Report, 2008 (Totals)

Cykelpendlerrute	Længde [km]	Skønnede anlægsomkostninger [millioner kr.]	Skønnede anlægsomkostninger [millioner kr. pr. km]
Strandvejs ruten	10	24	2,4
DTU ruten	8	5	0,6
Virum ruten	17	23	1,4
Gladsaxe ruten	9	18	2,0
Farumruten	19	24	1,3
Herlev ruten	8	9	1,1
Ballerup ruten	13	9	0,7
Albertslund ruten	12	32	2,7
Roskildevej ruten	15	9	0,6
Brøndby ruten	15	15	1,0
Køge Bugt ruten	15	22	1,5
Avedøre Holme ruten	13	28	2,2
Dragør ruten	11	16	1,5
Overslag i alt	165	234	1,4

Number of Routes	13
Total length	165 km
Construction costs	31 M €

Bicycle Super Highways



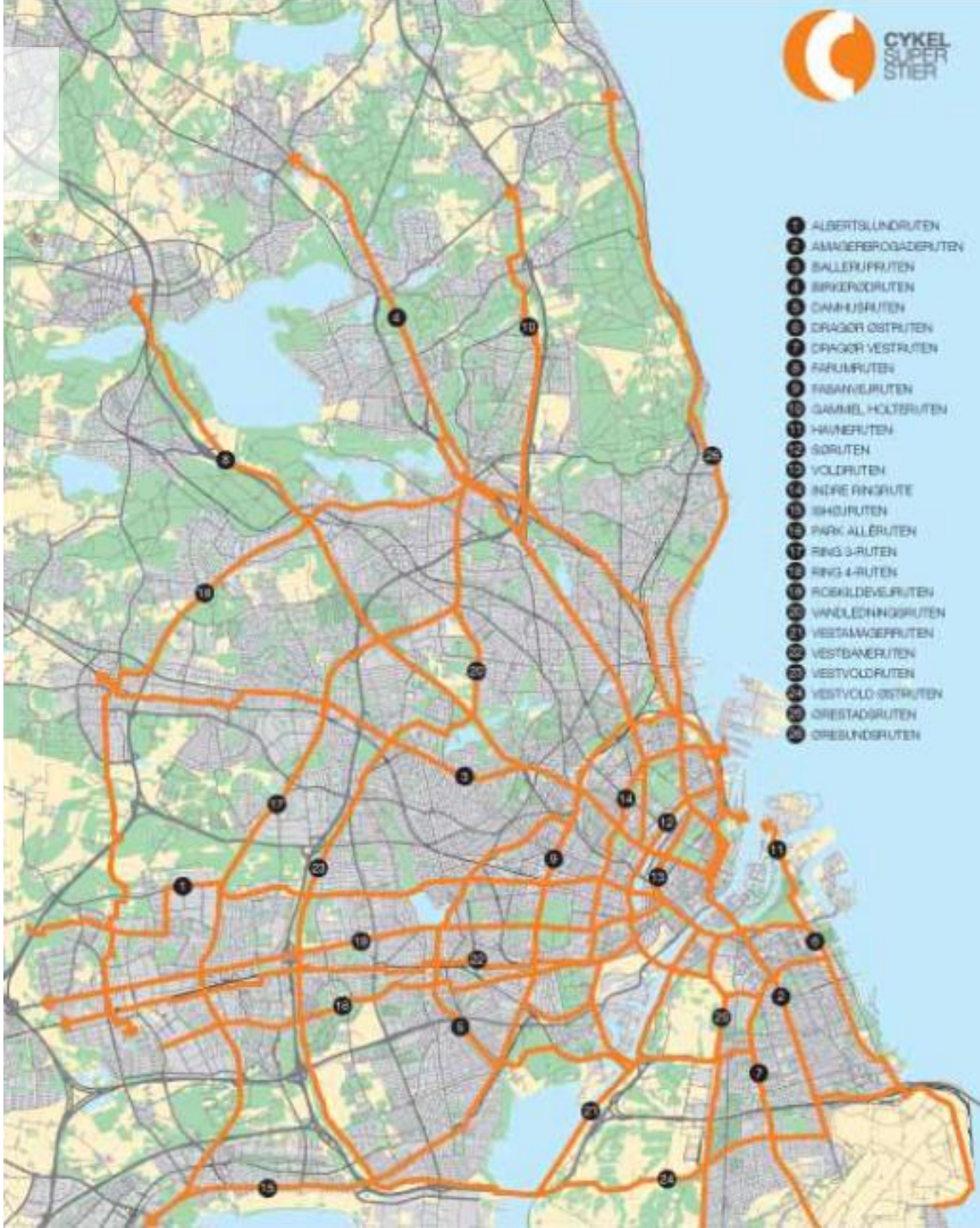
www.cykelsuperstier.dk
(and a three-personn sekretariat since 2010)

Bicycle Super Highways

Danish: ”Cykelsuperstier”

Bicycle Super Highways

Now: 26 routes planned.



Bicycle Super Highways

VESTBANERUTEN

Vestbaneruten forbinder Albertslund, Brøndby, Glostrup, Hvidovre og Københavns kommuner og er 15,8 km. Fra Albertslund vil det evt. være muligt at forlænge ruten mod Høje-Taastrup Kommune.

POTENTIALE
I dag er der i alt ca. 28.500 pendlere inden for Vestbanerutens opland med pendlerafstande på 4-20 kilometer - heraf cirka 3.600 cykelpendlere. Cirka 1.900 pendlere kan i teorien flyttes fra andre transportmidler til cykel. Det svarer til en vækst i antallet af cykelpendlere på cirka 52 procent.
Forslaget til det samlede rutenet lægger op til en løsning med enten Park Alléruten og Roskildevejruten eller Vestbaneruten, idet Vestbaneruten dækker samme opland som de to andre ruter til sammen.

52 procent flere cyklister på denne rute, kan årligt spare samfundet for:
- 6.992.000 kilometer i bil
- 874 ton CO_2
- 38,5 mio. kroner i sundhedsomkostninger

ØKONOMI
Det samlede anlægsoverslag for forbedringer pr. kommune til en basis eller ideel løsning:

Kommune	Længde	Anlægsoverslag *basis løsning*	Anlægsoverslag *ideel løsning*
Albertslund	2,5 km	kr 7.040.000	kr 9.020.000
Brøndby	4,4 km	kr 15.000.000	kr 15.660.000
Glostrup	2,0 km	kr 6.310.000	kr 6.400.000
Hvidovre	1,8 km	kr 3.680.000	kr 5.060.000
København	5,1 km	kr 9.370.000	kr 22.190.000
Total	15,8 km	kr 41.400.000	kr 58.330.000

Tallene i opslaget er baserede på rutebeskrivelser og beregninger fra projektsekretariatet for Cykelsuperstierne, Center for Trafik, Københavns Kommune og Cowi.

HASTIGHEDSDÆMPNING
På 4,7 km af strækningen kan etablering af fartdæmpende foranstaltninger for biler øge trygheden for cyklisterne - blandt andet ved Hæderdalsvej i Hvidovre.

NY TUNNEL OG BRO
På ruten foreslås en ny stitunnel ved Vallensbæk Torvevej i Albertslund og en ny stibro på Nakskovvej i København.

NYE CYKELSTIER
Der etableres 5,7 km ny cykelsti på ruten. Blandt andet på Lyshøjsgårdsvej i København.

Eksemplerne bygger på det ideelle løsningsforslag.

”CYKELSUPERSTIER – de 26 ruter” (Example)

Bicycle Super Highways

Total length: 298,7 km

Total costs:
410,6 – 872,6 M DKK
(55 – 117 M €)

Bike commuters: +30%

CO_2-reduction: 6.974 t/year

Health gain:
307 M DKK/year
(41 M €/year)

Bicycle Super Highways

Capitol area and 22 municipalities.
Not only Copenhagen-commuters, but commuting in general.
The region of Sealand also drawn in.

Green Wave

Green Wave (Analysis, Nørrebrogade)

		Saved stops	Speed increase
To centre in the morning	Green wave	5-6	21%
From centre in the morning		0-1	-1%
From centre in the afternoon	Green wave	2-3	-1%
To centre in the afternoon		0-1	9%

Bikes

		Saved stops	Speed increase
To centre in the morning	Green wave	0	0%
From centre in the morning		0	11%
From centre in the afternoon	Green wave	1-2	21%
To centre in the afternoon		0-1	-4%

Cars

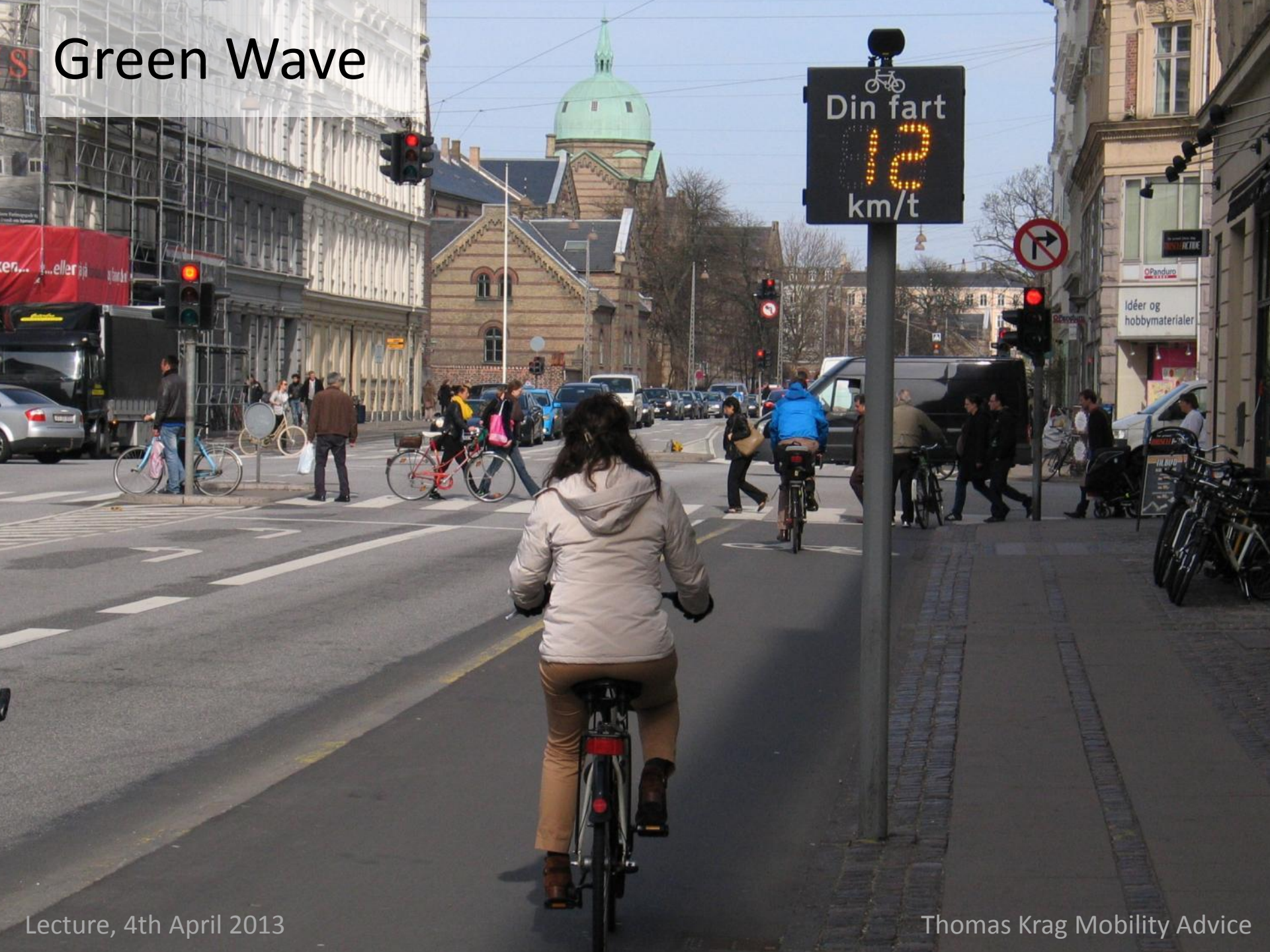
		Speed increase
To centre in the morning	Green wave	-1%
From centre in the morning		-4%
From centre in the afternoon	Green wave	2%
To centre in the afternoon		-12%

Buses

Green Wave


Grøn bølge
Mandag-fredag
Kl. 6.00-10.00
20 km/t
BURGER
RESTAURANT

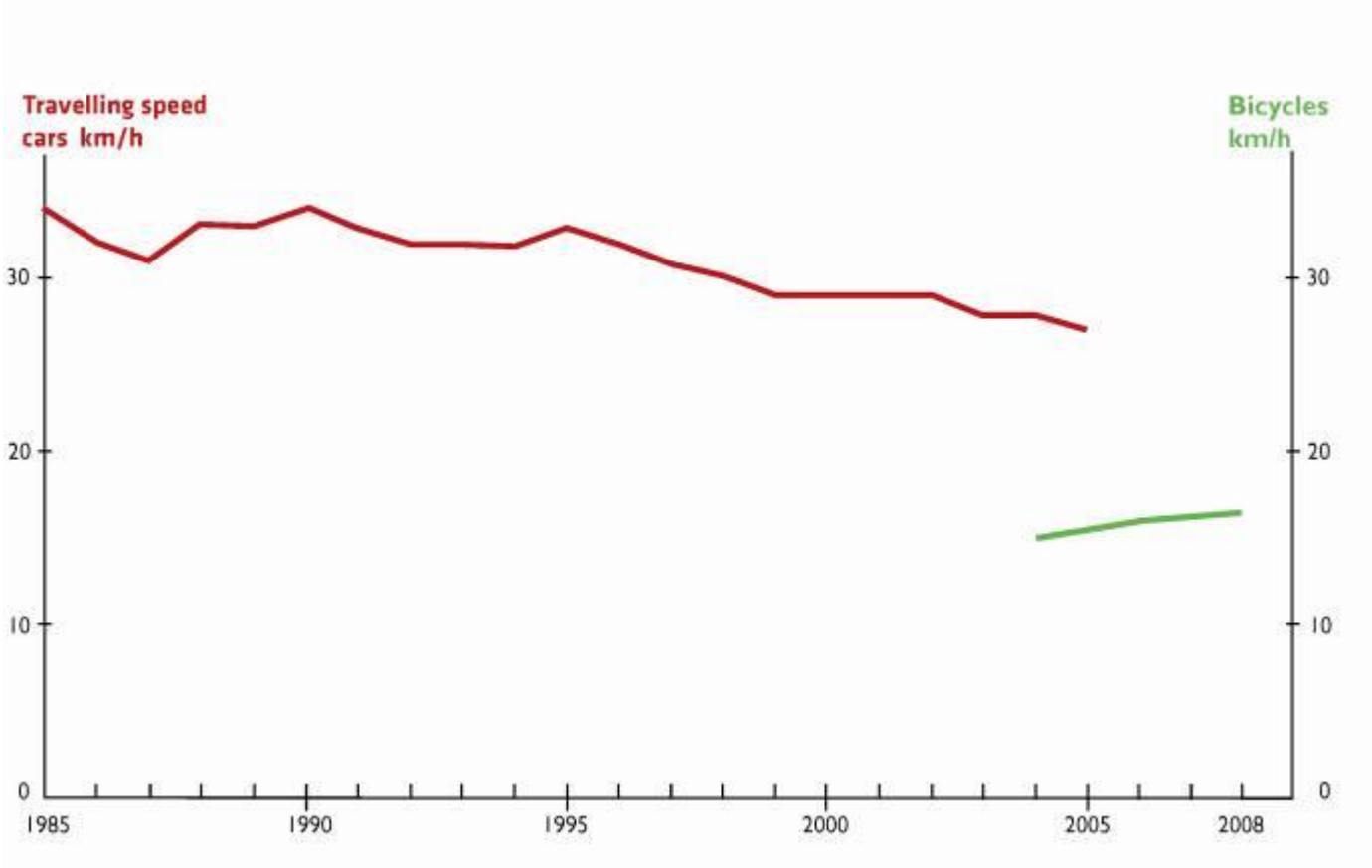
Green Wave



Green Wave

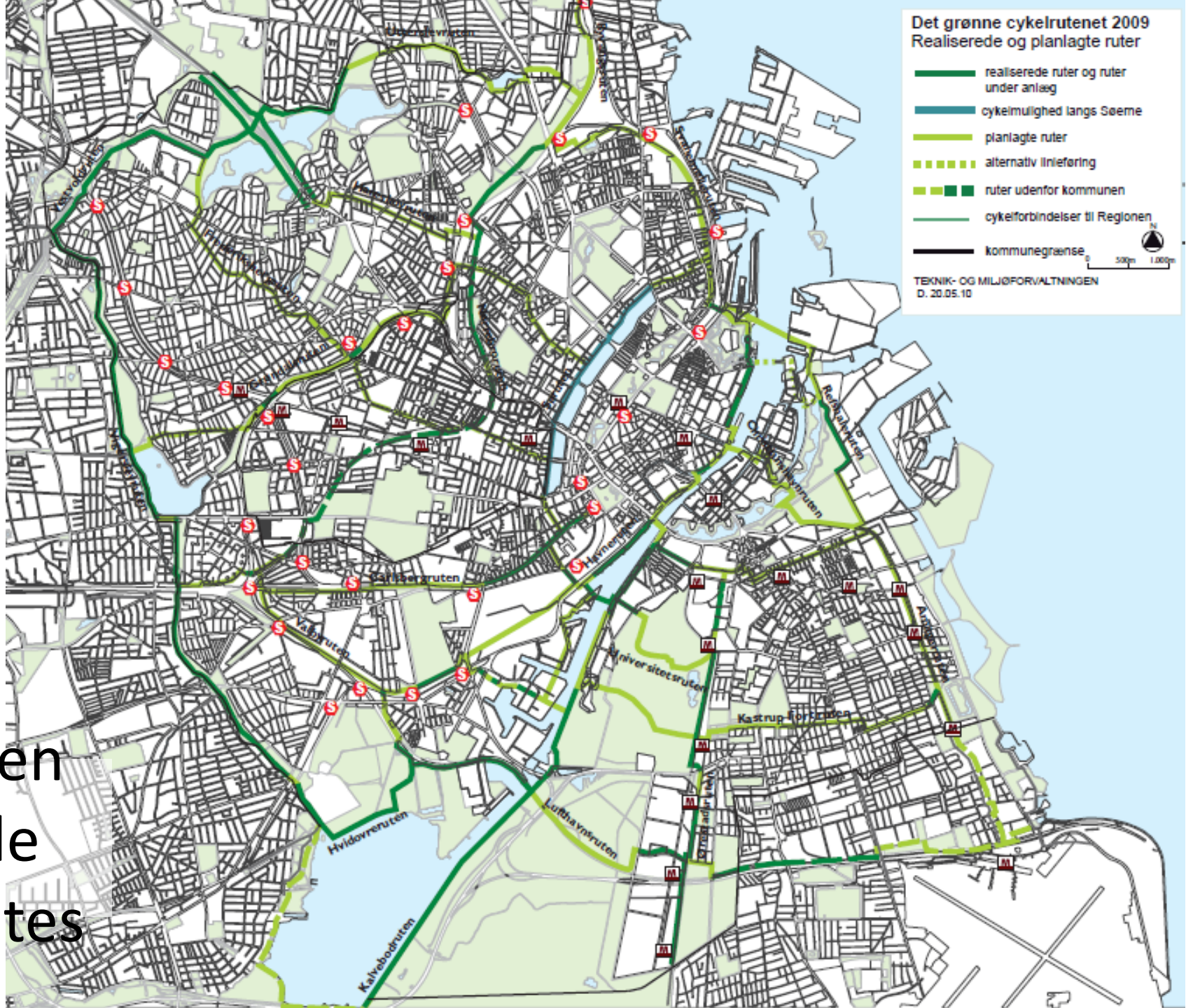
Green Wave

Green Wave



Car speed
34 km/h (1985)
33 km/h (1995)
27 km/h (2005)

Bicycle speed
15.3 km/h (2004)
16.0 km/h (2006)
16.2 km/h (2008)
15.8 km/h (2010)



Green Cycle Routes

Green Cycle Routes



City ofCopenhagen (and Frederiksberg).

Planned since 1989 (Velo-city Copenhagen), total network 109 km.

”We may not have any money, but we spend a lot of money. If we have plans, we can often realise them with no extra costs, by integrating them into other projects.”

Green Cycle Routes

Green Cycle Routes

Lecture, 4th April 2013

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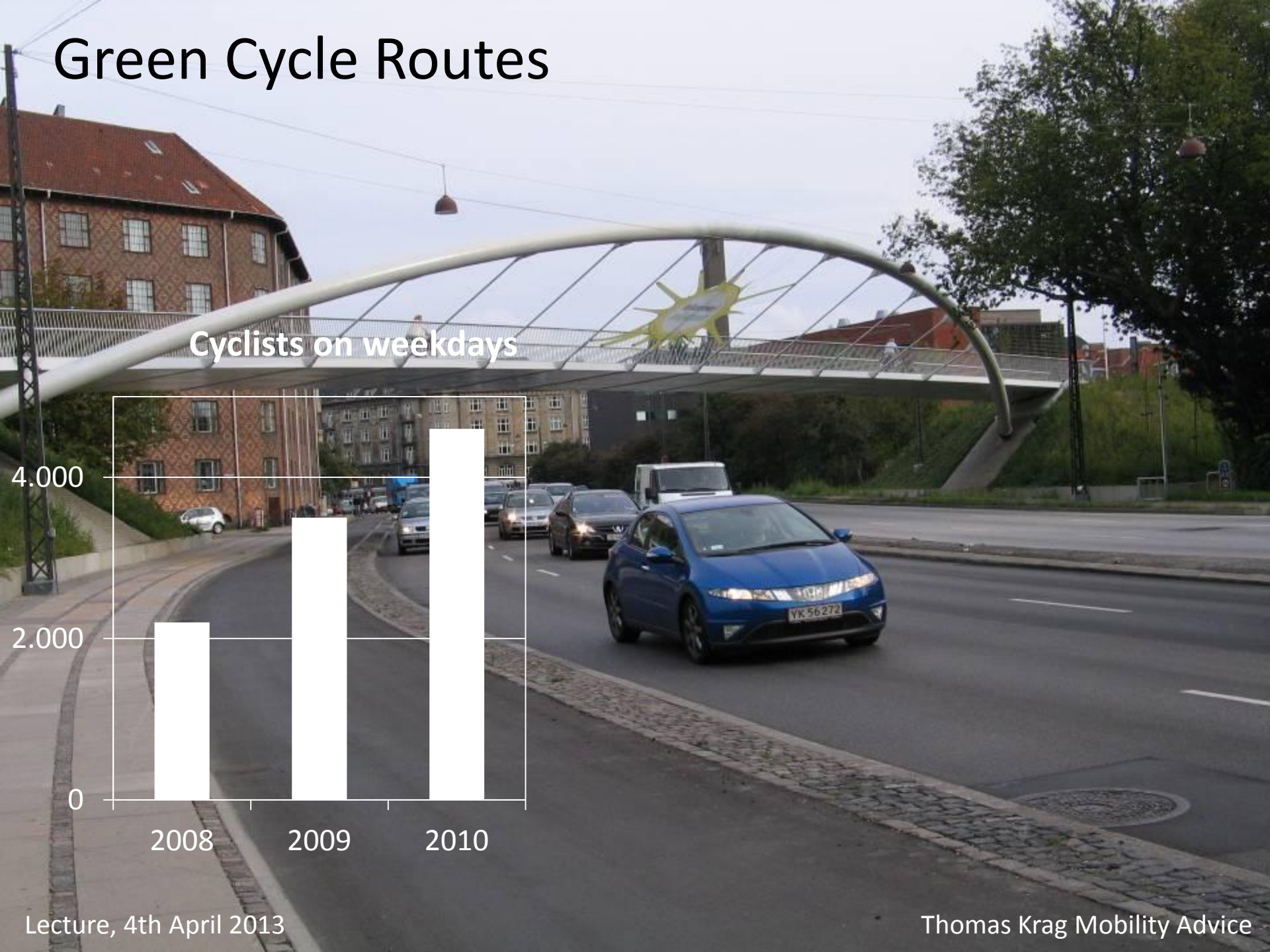
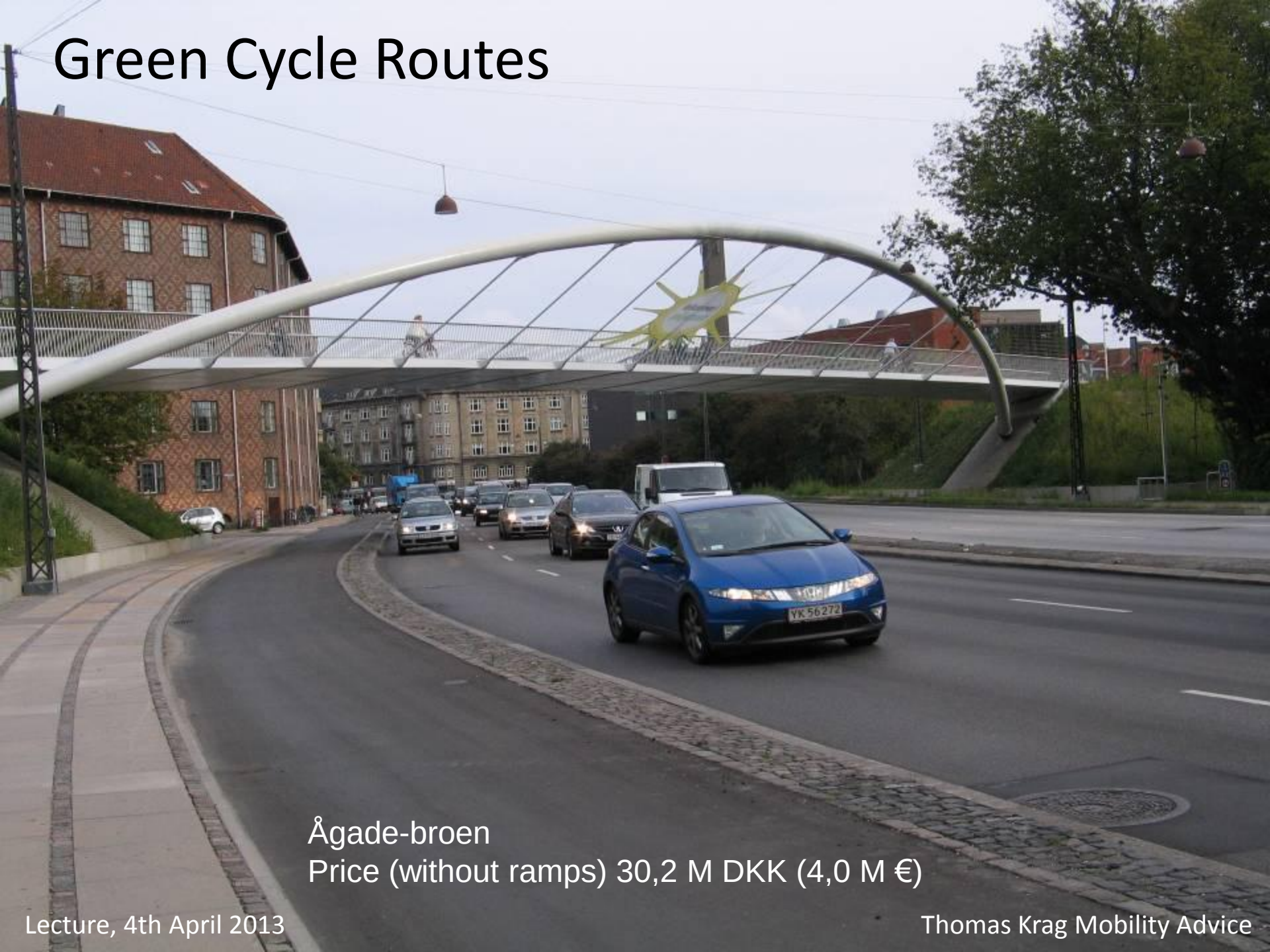
Green Cycle Routes

Green Cycle Routes

Green Cycle Routes



Green Cycle Routes



Ågade-broen
Price (without ramps) 30,2 M DKK (4,0 M €)

Shortcut

Lecture, 4th April 2013

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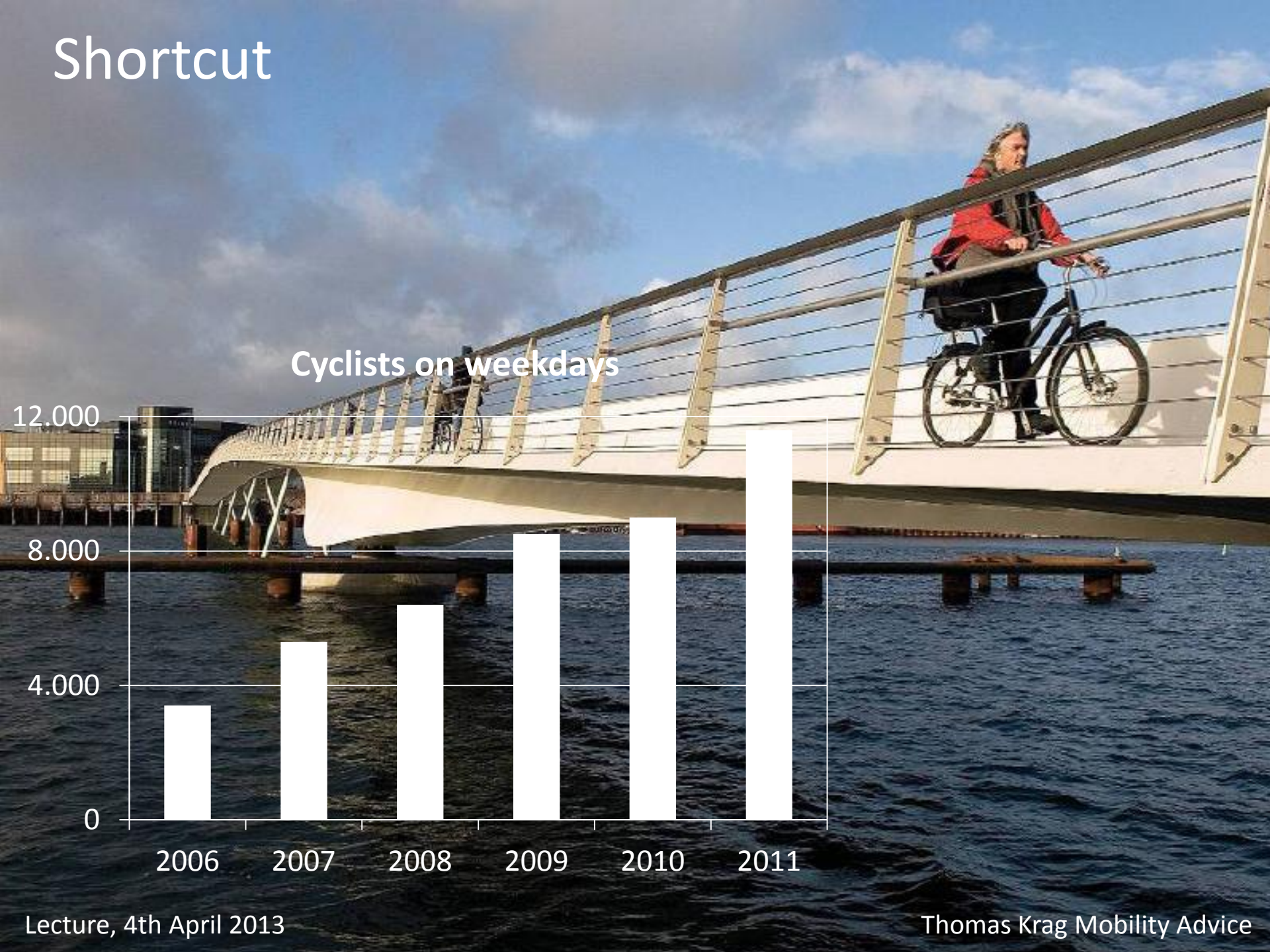
Shortcut

Shortcut


Cyclists on weekdays
12.000
8.000
4.000
0
2006
2007
2008
2009
2010
2011

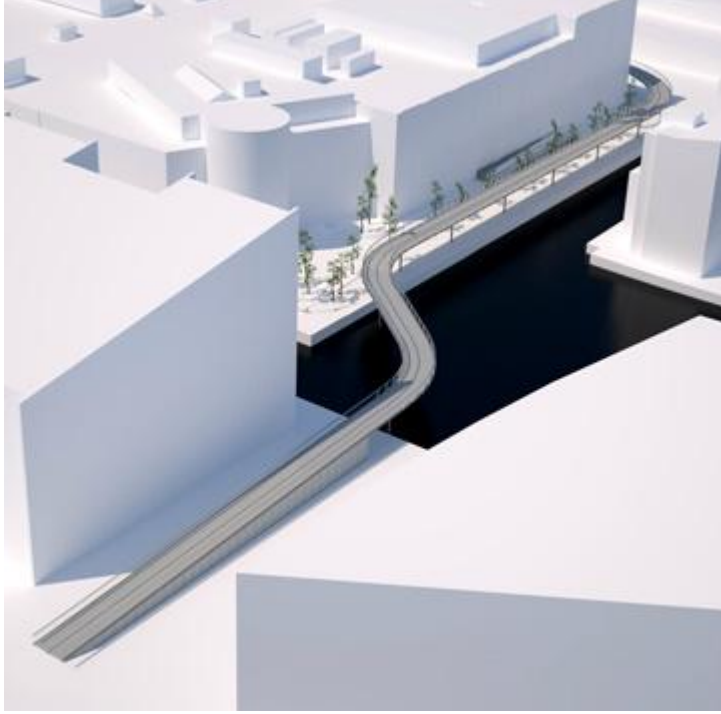
Shortcut

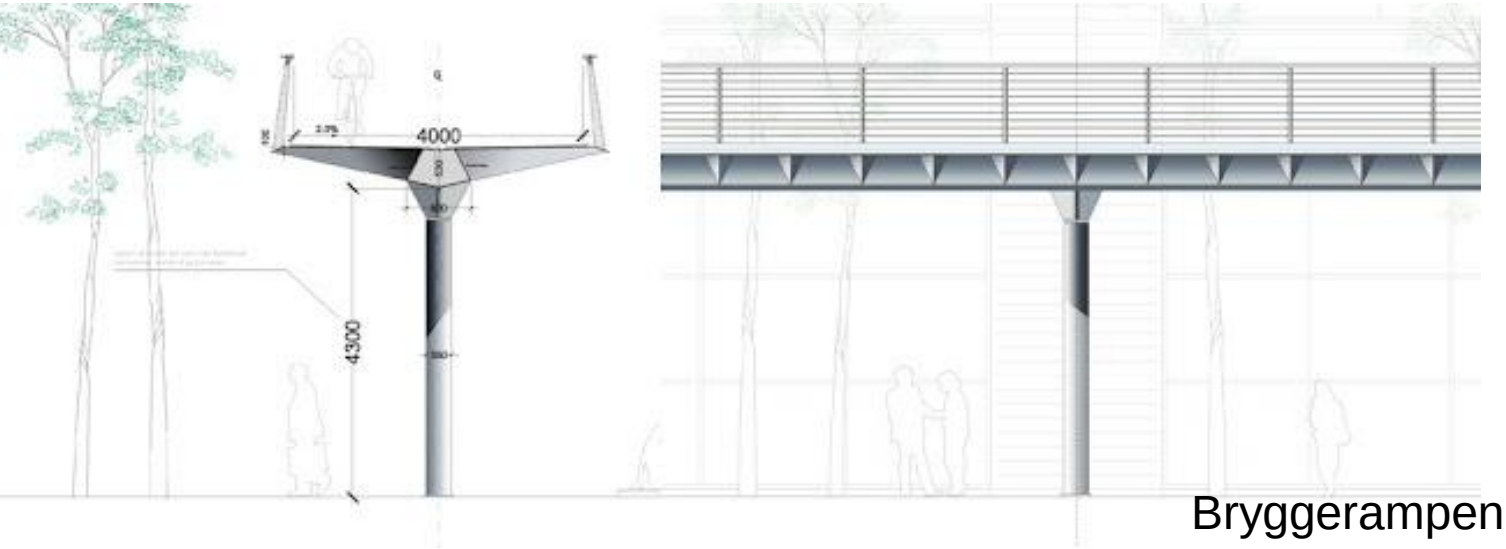
Bryggebroen
Price (without ramps) 55 M DKK (7,4 M €)

Shortcut

Bryggerampen
- Connection to Bryggebroen

Shortcut





Bryggerampen
Price 38 M DKK (5,1 M €)

Shortcut

Cirkelbroen
(Nordea-fonden)

Shortcut

Shortcut

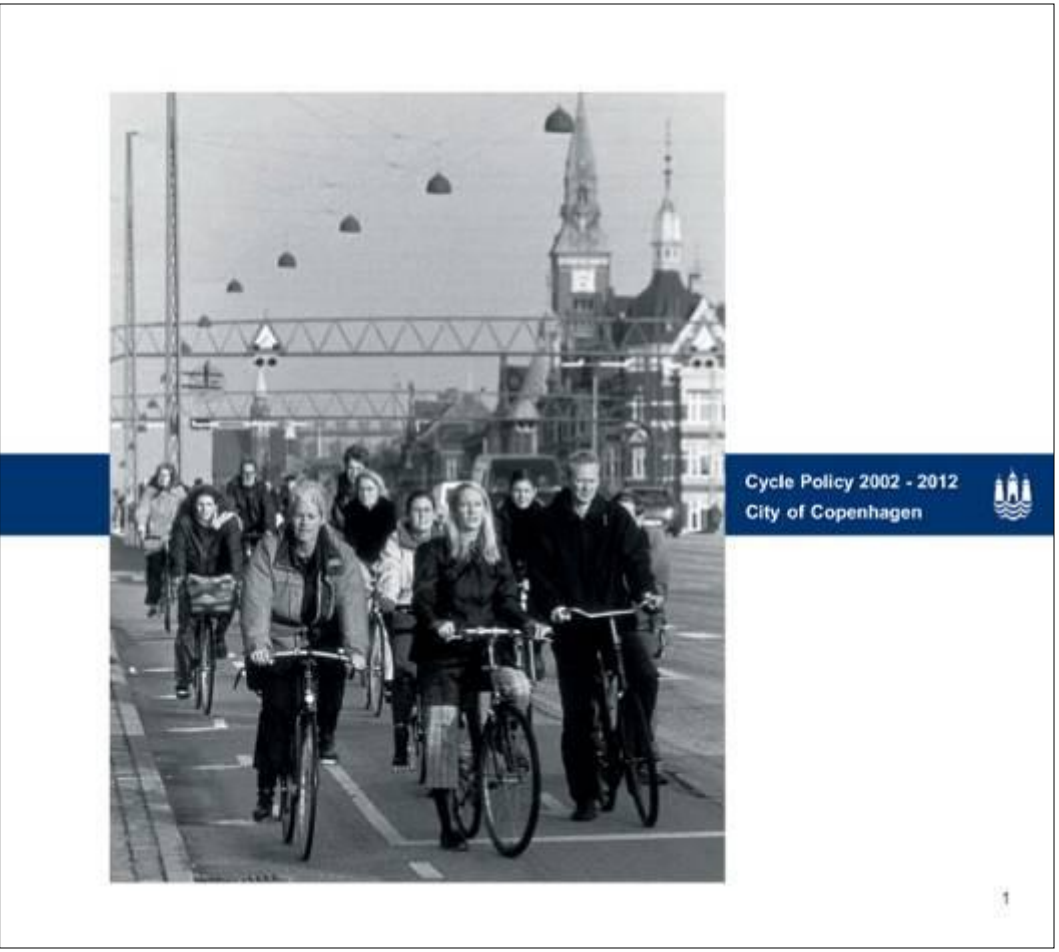
Inderhavnsbroen

Shortcut

Indehavnsbroen
165 M DKK
(22,1 M €)
A P Møller
+ 37,2 M DKK
(5,0 M €) City of Copenhagen

Thomas Krag Mobility Advice

Bicycle Policy 2002-2012



- Transport quality
- 5 goals
- 9 focus areas
- Assessment

Bicycle Policy

- **Goals in Cycling Policy 2002-2012**

⇨ **Increase** the proportion of people cycling to workplaces in Copenhagen **from 34% to 40%**

⇨ **Decrease** cyclist risk of serious injury or death **by 50%**

⇨ **Increase** the proportion of Copenhagen cyclists who feel safe cycling **from 57% to 80%**

⇨ **Increase** cyclist travelling speed **by 10%**

⇨ **Improve** cyclist comfort so that **95%** of cycle track surfaces are satisfactory

Bicycle Policy

- **Politicians set new goals in spring 2007**

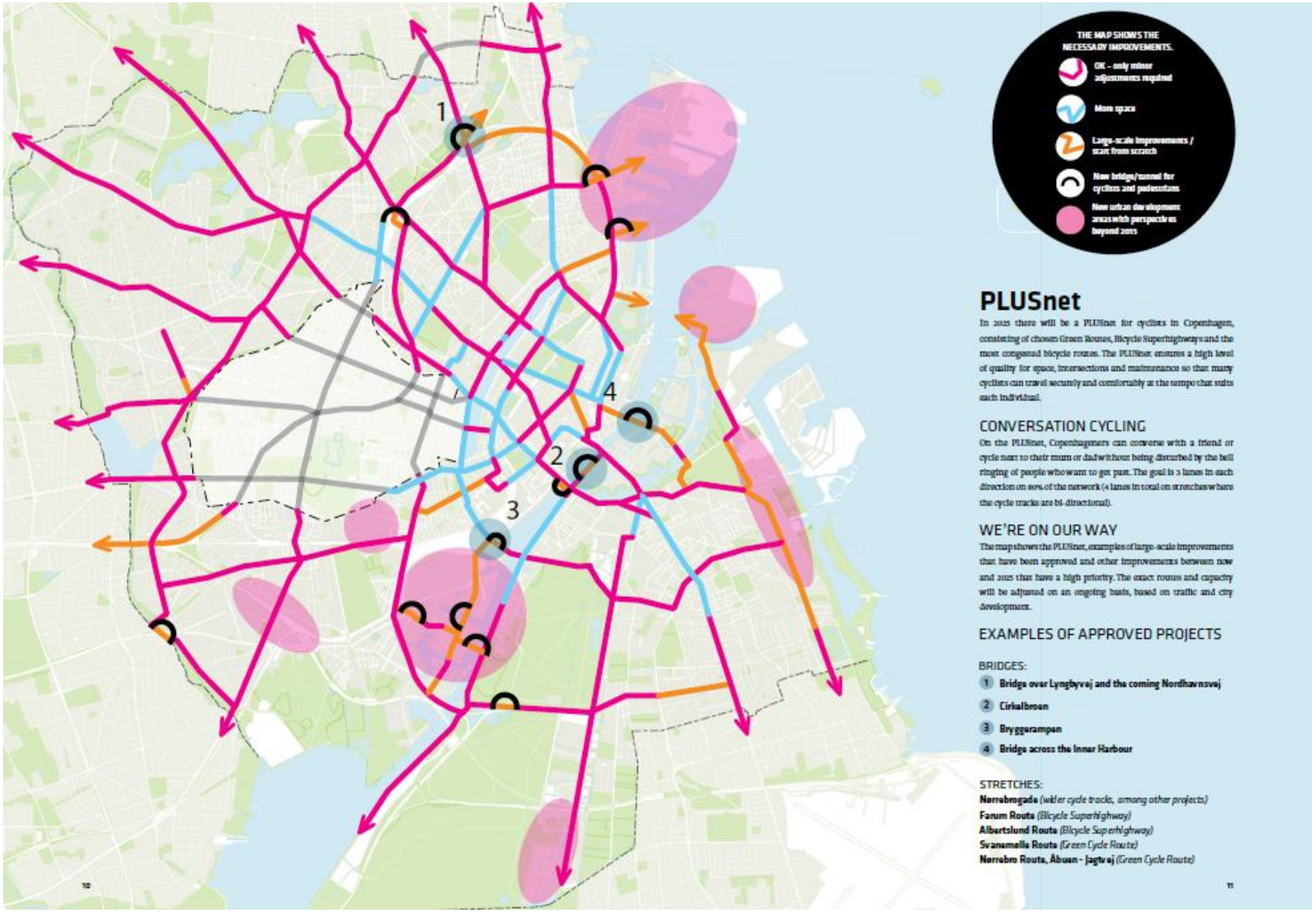
⇨ **Increase** the proportion of people cycling to work and education in Copenhagen **to 50%** in 2015

⇨ **Decrease** cyclist KSI **by 50%** in 2015

⇨ **Increase** the proportion of Copenhagen cyclists who feel safe cycling to **80%** in 2015

Bicycle Policy 2011-2025

Bicycle Policy 2011-2025



Bicycle Account

Bicycle Account

	96	98	00	02	04	06	08	10	15
ECO-METROPOLIS – TARGET GOALS									
Percentage that cycle to work or education (%)	30	30	34	32	36	36	37	35	50
Seriously injured cyclists (number per year)	252	173	146	152	125	97	121	92	59
Percentage of cyclists that feel safe (%)	60	58	57	56	58	53	51	67	80
OTHER KEY FIGURES									
Cycled kilometers (mil. km per weekday)	0.93	0.92	1.05	1.11	1.13	1.15	1.17	1.21	
Cycled km between serious casualties (mil. km)	1.2	1.8	2.4	2.4	3.0	4.0	3.2	4.4	
Cycling speed (km/h)					15.3	16.0	16.2	15.8	
Cycle tracks (km)	294	302	307	323	329	332	338	346	
Cycle lanes (km)		6	10	12	14	17	18	23	
Green cycle routes (km)	29	30	31	32	37	39	41	42	
Cycle parking spaces on roads and pavements (1000 pcs)*						42	47	48	

* New method of calculation, which is why the figures have been adjusted in relation to the Bicycle Accounts of 2006 and 2008.

Bicycle Account

WHAT WOULD MAKE COPENHAGENERS FEEL SAFER AND PERSUADE THEM TO CYCLE MORE?

	Non-cyclists	Cyclists
More space on cycle tracks	33 %	37 %
Better cyclist road manners	55 %	35 %
Better motorist road manners	29 %	34 %
More cycle tracks (rather than cycle lanes)	29 %	31 %
Better segregation between cyclists and motor traffic	21 %	29 %
More bicycle-friendly signal intersections	14 %	26 %
Fewer potholes on cycle tracks and roads	10 %	19 %

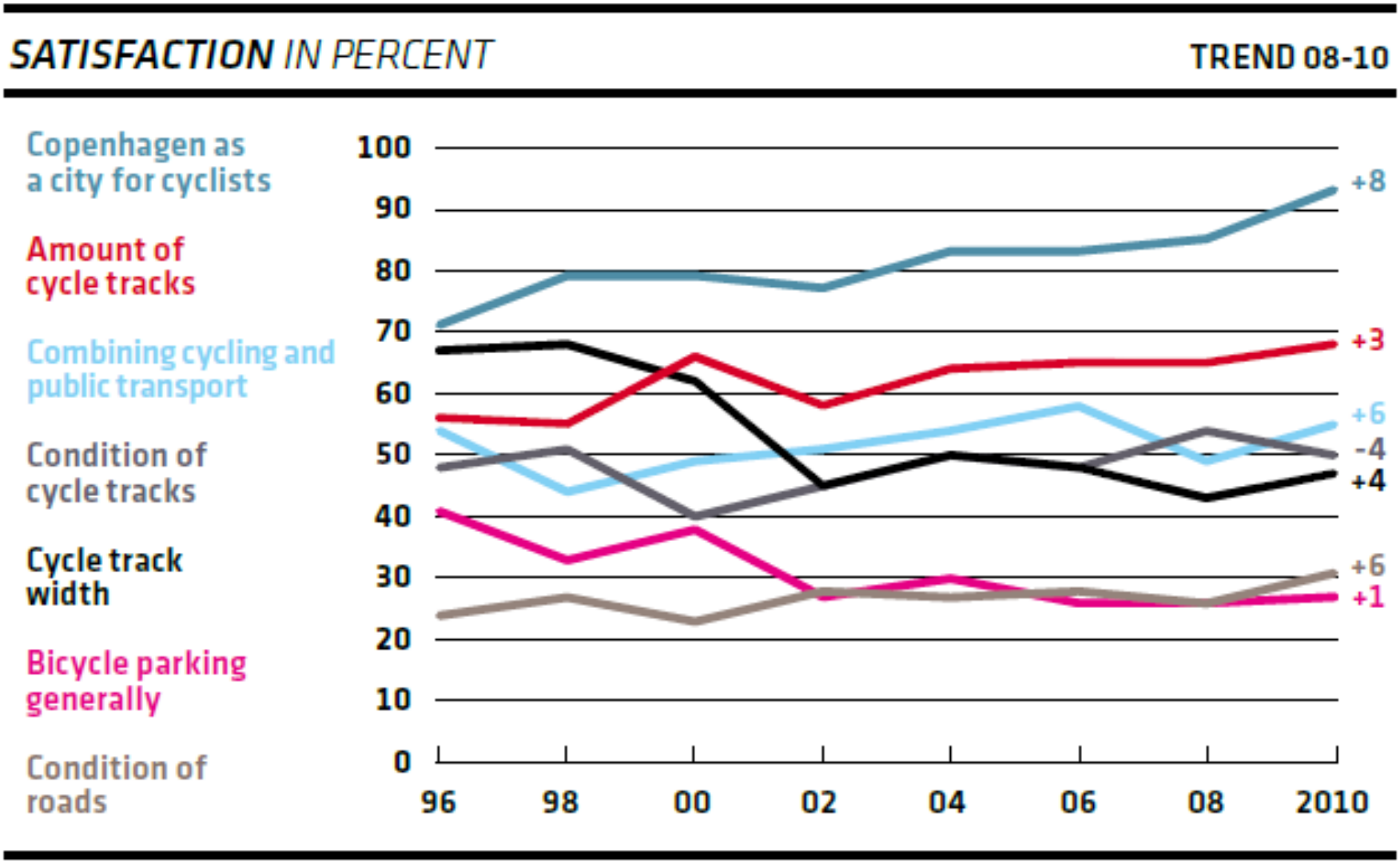
WHAT CAN OTHER CYCLISTS DO TO BE LESS ANNOYING?

Use hand signals	40 %
Keep to the right	32 %
Respect the red light	24 %
Don't use their cell phone	23 %
Keep on the cycle track	21 %
Use their bicycle bell	21 %
Stay on their side of the road	20 %

NEW CYCLISTS' REASONS FOR STARTING TO CYCLE

It's faster	51 %
It's more convenient	32 %
It's healthy	31 %
It's cheap	30 %
It feels good/ good way to start the day	20 %

Bicycle Account



Wider Cycle Tracks

Lecture, 4th April 2013

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WiderCycle Tracks

Lecture, 4th April 2013

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WiderCycle Tracks

Bicycle Account and Bicycle Policy

Evaluation

Adjustment

Copenhagen as Cycling City

More Info:
http://kk.dk/Borger/ByOgTrafik/CyklernesBy.aspx
http://kk.dk/sitecore/content/Subsites/CityOfCopenhagen/SubsiteFrontpage/LivingInCopenhagen/CityAndTraffic/CityOfCyclists.aspx

www.thomaskrag.com / tk@thomaskrag.com