

Gröna Tåget [grø:na 'tø:gæt] to make train travel more attractive

Oskar Fröidh

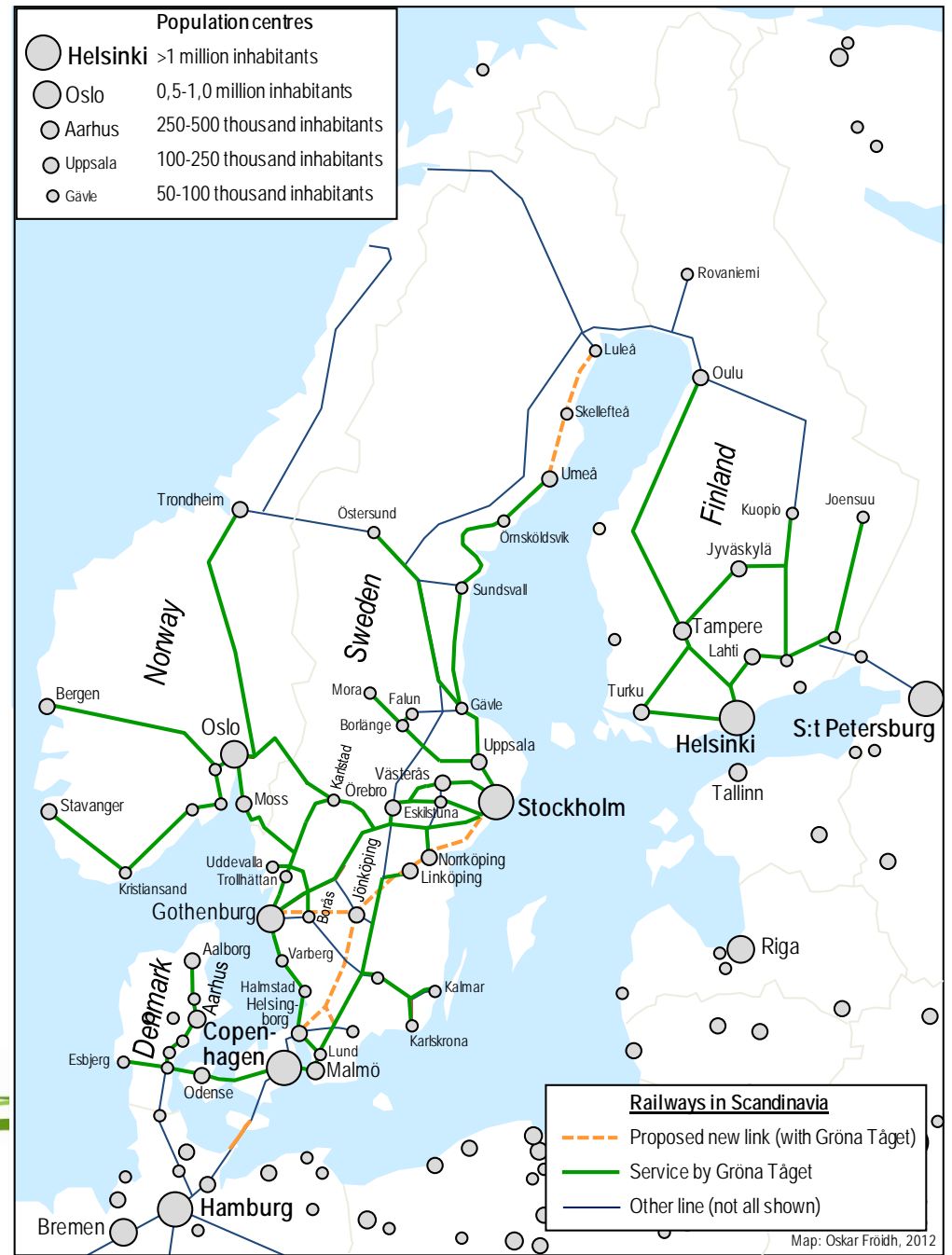
Royal Institute of Technology (KTH)

Stockholm, January 25, 2012

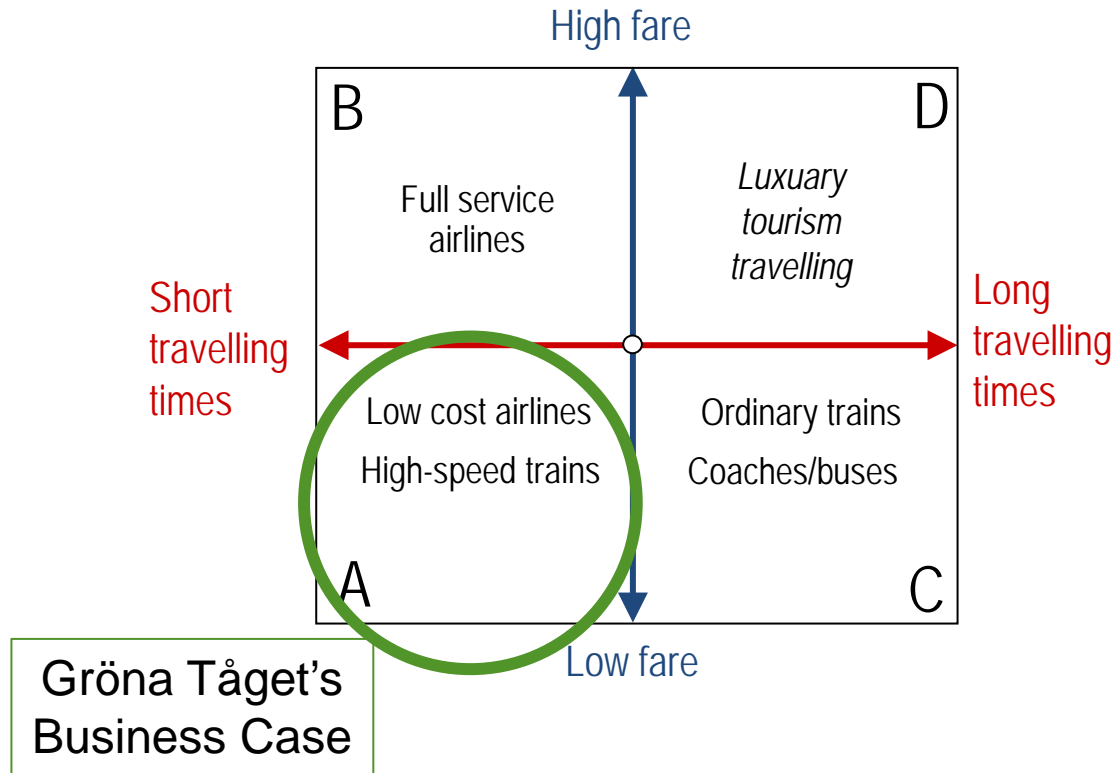


What are specific Nordic conditions?

- Harsh winters
- Elks and deers on track
- Conventional lines incl. new links up to 250 km/h, but many sinuous slower lines
- Mixed heavy freight and passenger traffic
- Varying travel demand



Market segments for long-distance journeys



Most important factors for economic train operations

- **High occupancy**

Flexibility of train concept, services, sales (yield management)

- **Effective space utilisation**

Furnituring and seats, more seats in each car

- **High commercial speed**

A modern infrastructure a prerequisite

High top speed and curving speed, acceleration, short station stops

Attractive services

Long train set and low frequency during the day



Short train sets, multiplied in peak hours, and low frequency



Short train sets and high frequency in peak hours



Results
Revenues-
Costs=Index
 $100-100=0$

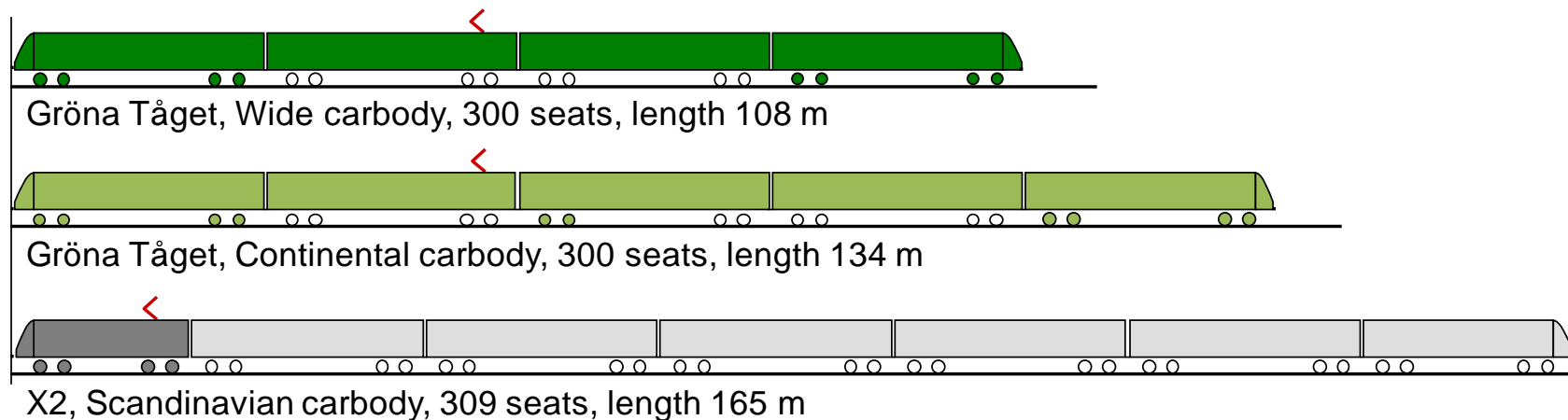
$100-96=4$

$115-105=10$

Short units = increased flexibility, higher occupancy
Increased travel as a result of a more attractive supply is
often more important than possible cost savings

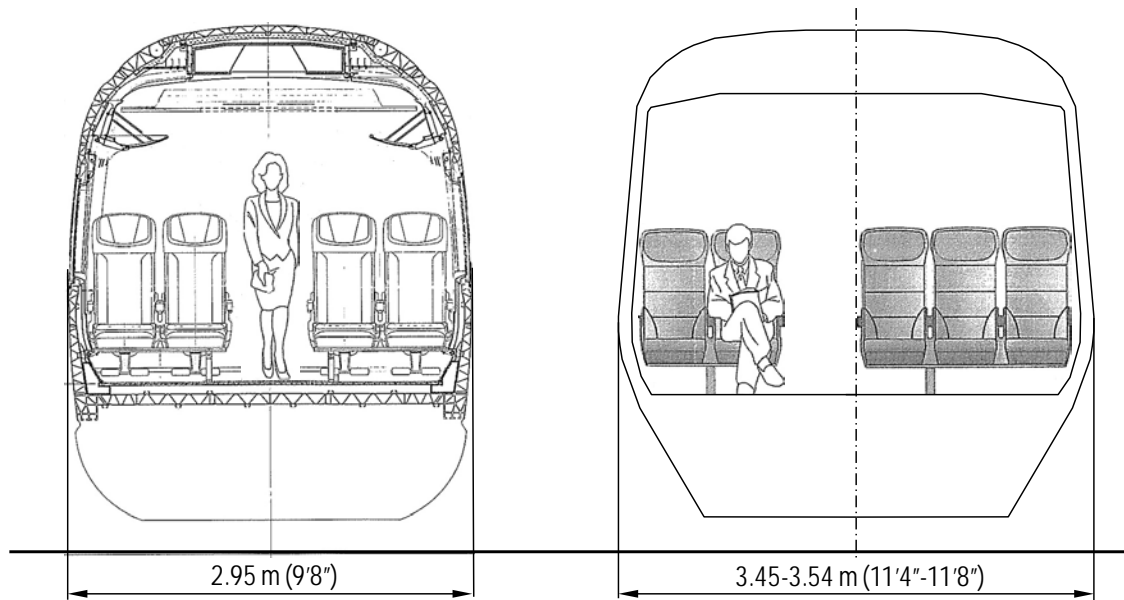
Space efficiency and costs

- Wide-body trains have 25% more seats than Continental carbody
- Space efficient seats and train layout
- An EMU is lacking a locomotive/power unit (cf. the X2/SJ 2000)



**Wide-body trains have 15% lower total costs than narrower trains
(and 20-25% lower than the X2)**

Effective space utilisation



ICE3

European continental profile

Gröna Tåget

Wide body

Norway, Sweden, Denmark

Wide body includes 9 cm of increased width made possible by Active Lateral Suspension (ALS)

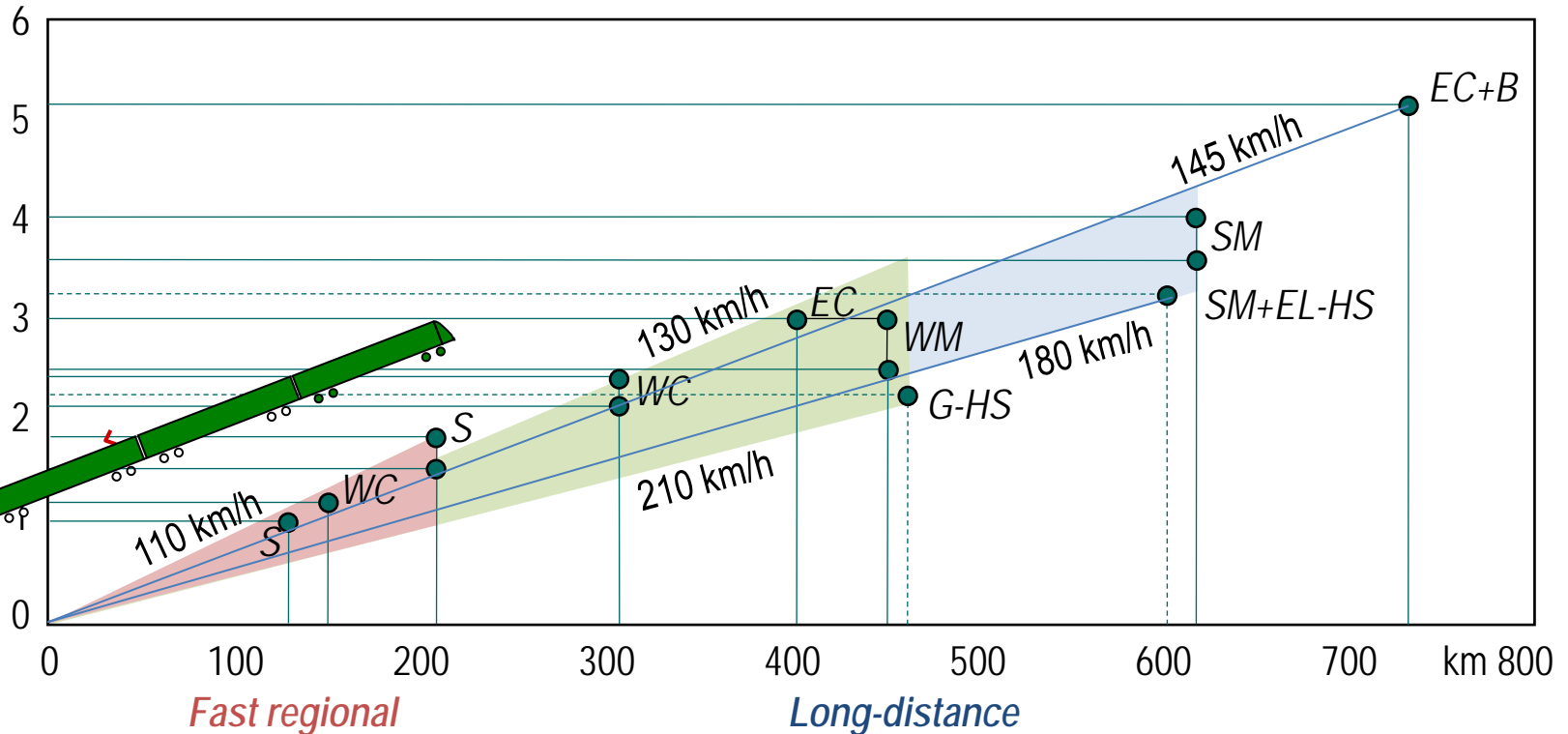
Effective seats

- Individual armrests on each seat
- Space-efficient seats – thin seatbacks and legroom

Gröna Tåget's operational range

Examples from different lines in Sweden, 1 to 5 hrs travelling time

Travelling time (h)



What should the Gröna Tåget characteristics be?

- More attractive to passengers (travelling time, price etc.)
- Better economy of operations
- Interoperable in Scandinavia in fast regional and long-distance services
- Flexibility for variations in demand and services
- Short and punctual station stops, also at peak load
- Improved environmental "green" performance
- Made for Nordic climate conditions

Infrastructure upgrading

for speeds up to 250 km/h (Swedish examples)

Examples of measures

- Grade separated road crossings
- Bridges and geotechnical stability
- Track and catenary
- Signalling (ERTMS >200 km/h)
- Strengthen capacity

Very profitable on recently rebuilt lines

- *West Coast Line* Gothenburg–Malmö–Copenhagen, 305+41 km)
- *East Coast Line and Bothnia Line* Stockholm–Umeå, 737 km
- Stockholm-Mälars region

Profitable to upgrade, but capacity constraints

- *Western Main Line* Stockholm–Gothenburg, 455 km
- *Southern Main Line* Stockholm–Malmö–Copenhagen, 614+41 km

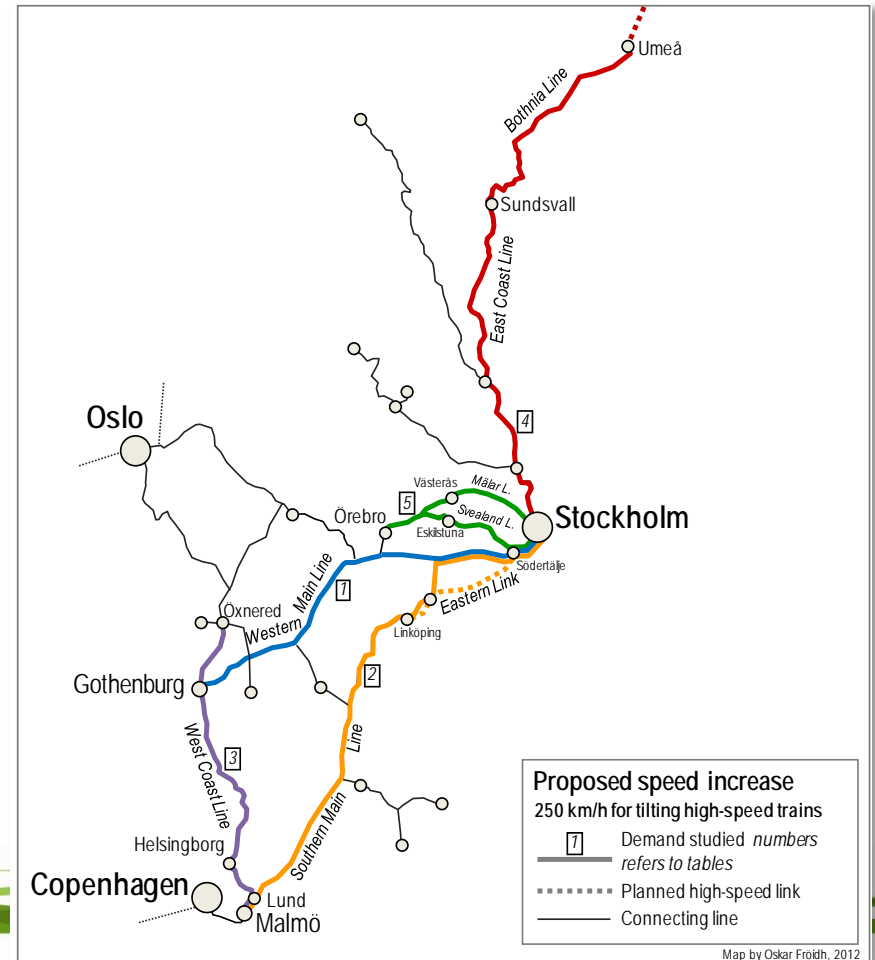
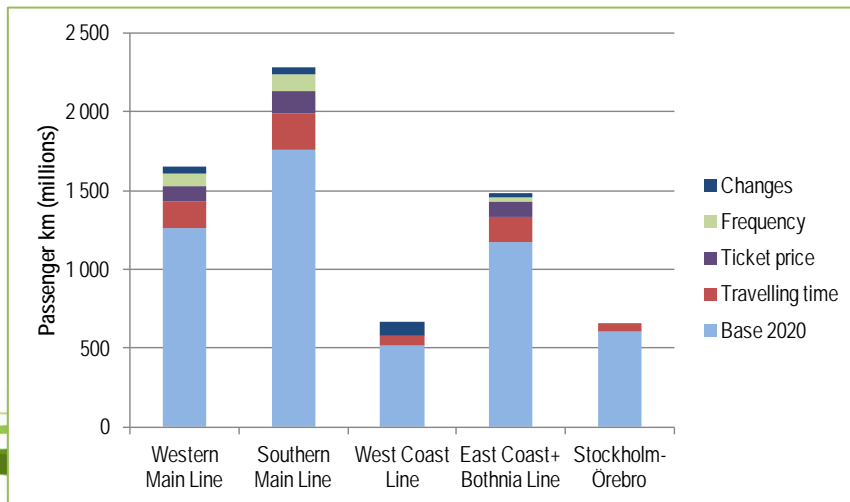
Gröna Tåget's effects on the supply

	<i>Shorter travel times</i>	<i>Increased frequency</i>	<i>Lower fares</i>	<i>More environment friendly</i>
Higher top speed (250+ km/h)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Tilting capability	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Wide body (2+3 seating in Economy)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Shorter trainsets, flexible train length	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Travel demand with 250 km/h on the conventional network compared to 200 km/h in Sweden (base year 2020)

Up to 30% increased travelling,
due to

- 10% shorter travelling times,
- 10% lower fares,
- A few more departures, some direct without change



Map by Oskar Frösth, 2012

Market effects of Gröna Tåget

- Increased travel demand
- Improved economy of operation
- Less car travel

*Especially for **fast regional** (commuting, leisure, business)*

- Counterbalance deficits in housing and labour markets

*Especially for **long-distance** (leisure, business)*

- Less air travel – sustainable environment, airport capacity
- Better accessibility to regions could spark regional growth



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