ELECTRIFIED ROADS

e-mobility NSR conference

Gothenburg, Sweden october 25th 2012

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Sponsored by:

TRAFIKVERKET
SWEDISH TRANSPORT ADMINISTRATION

Swedish Energy Agency

Prepared by:

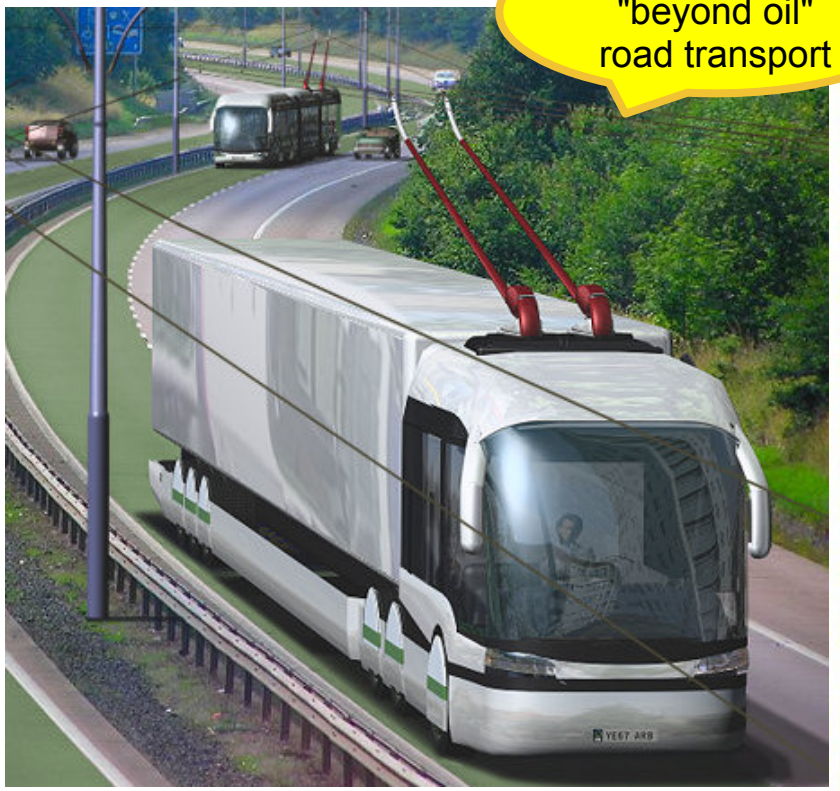
Svenska Elvägar AB

projekt engagemang

WHAT IS IT?

Todays trolleybus

Yesterdays trolley lorry



Tomorrows "beyond oil" road transport

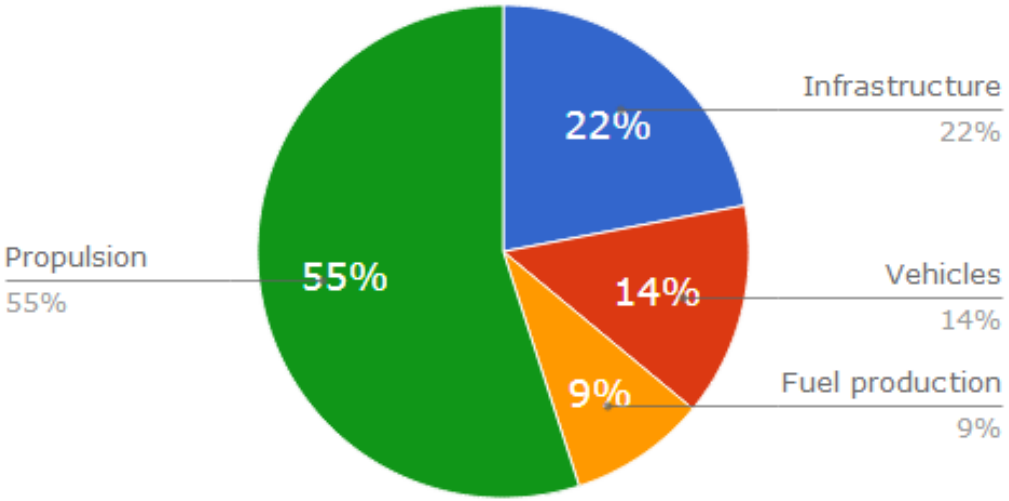
WHY?

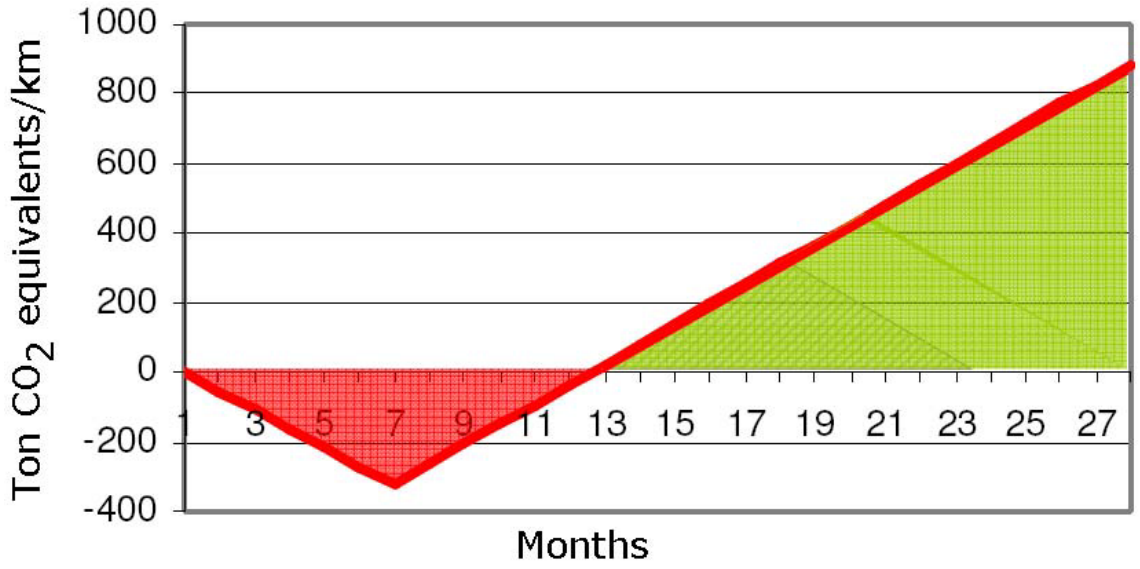
- Energy efficiency
- Wide variety of energy sources like renewables
- Zero emissions of local exhausts
- Reduced greenhouse gas and noise emissions
- Independency from imported fuel

Also:

- Great opportunity for the industry
- Powerful tool for tax models

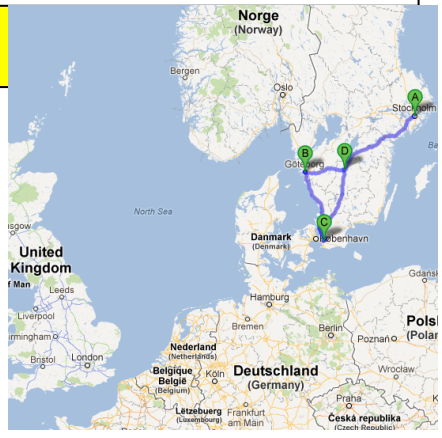
QUICK CO2 PAYBACK





COST COMPARISON

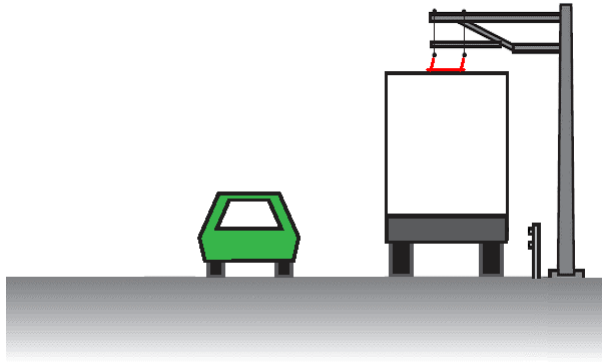
WHAT	WHERE	MEUR/km	Reference
Railway	Up North	13	Botniabanan
Highway	Outside Stockholm	7	Nynäshamn
Tram	Suburban Stockholm	45	Tvärbanan
Tram	Central Stockholm	100	Spårväg City
Railway partly in tunnel	Malmö	50	Citybanan
Railway in tunnel	Malmö-Gothenburg	122	Hallandsås
Railway in tunnel	Stockholm	266	Citybanan
Highway in tunnel	Stockholm	131	Förbifart Stockholm
Road electrification	Malmö-Gothenburg-Stockholm	2	

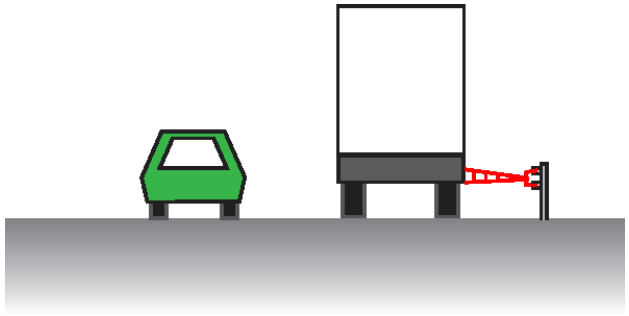


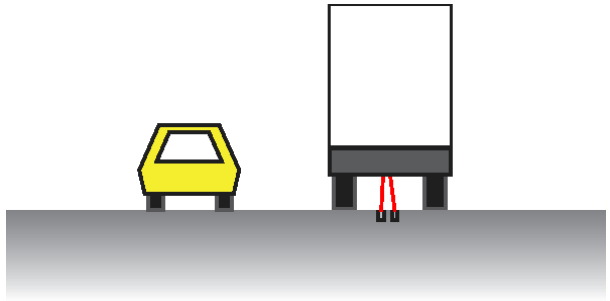
PROJECT BACKGROUND

Three possible ways to feed energy continuously:

- above
- side
- below







We focused on above / overhead due to:

- well proven
- existing open standard
- cost efficient
- ready to implement

MILESTONES

OP-ED
2009

eHighway
2012

Pre-
Study
2010

Tech
Study
2011

SCANIA
eTruck
2012

WHAT'S UP NOW?

2010: Pre-study of societal benefits

2011: In depth study of showstoppers

2011: Non-public test track verifying studies

2012-
2014: Public pilot project showcasing system

2014-
2019: Implementation of large scale project(s)

2020: Start of nationwide electrification

WHY NOT PERSONAL CARS?

Most travels with passenger cars can be powered by batteries:

...the average daily commute for **75%** of the Americans are less than **40 miles** (64 km)...

...the daily commute of **75%** of Americans, which averages around **33 miles** (53 km)...

...**97%** of all car travels are less than **150 km**...

...**75%** of all car travels are less than **20 km**...

PILOT PROJECT FOCUS

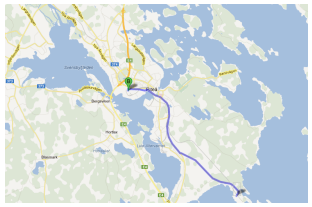
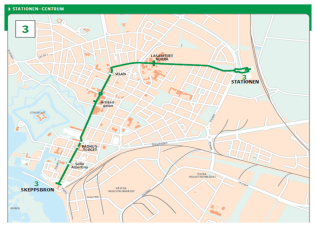
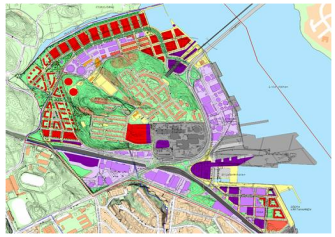
- **Legal** obstacles handling
  - Short term - exemptions
  - Long term - adaptation of laws & regulations
- **Financing & business** models incl. ownership
- **Energy supply** and transfer
- **Safety** of infrastructure
- **Customers** satisfaction
- **Local** authorities involvment

Estimated: 10 - 15 !!!!!!

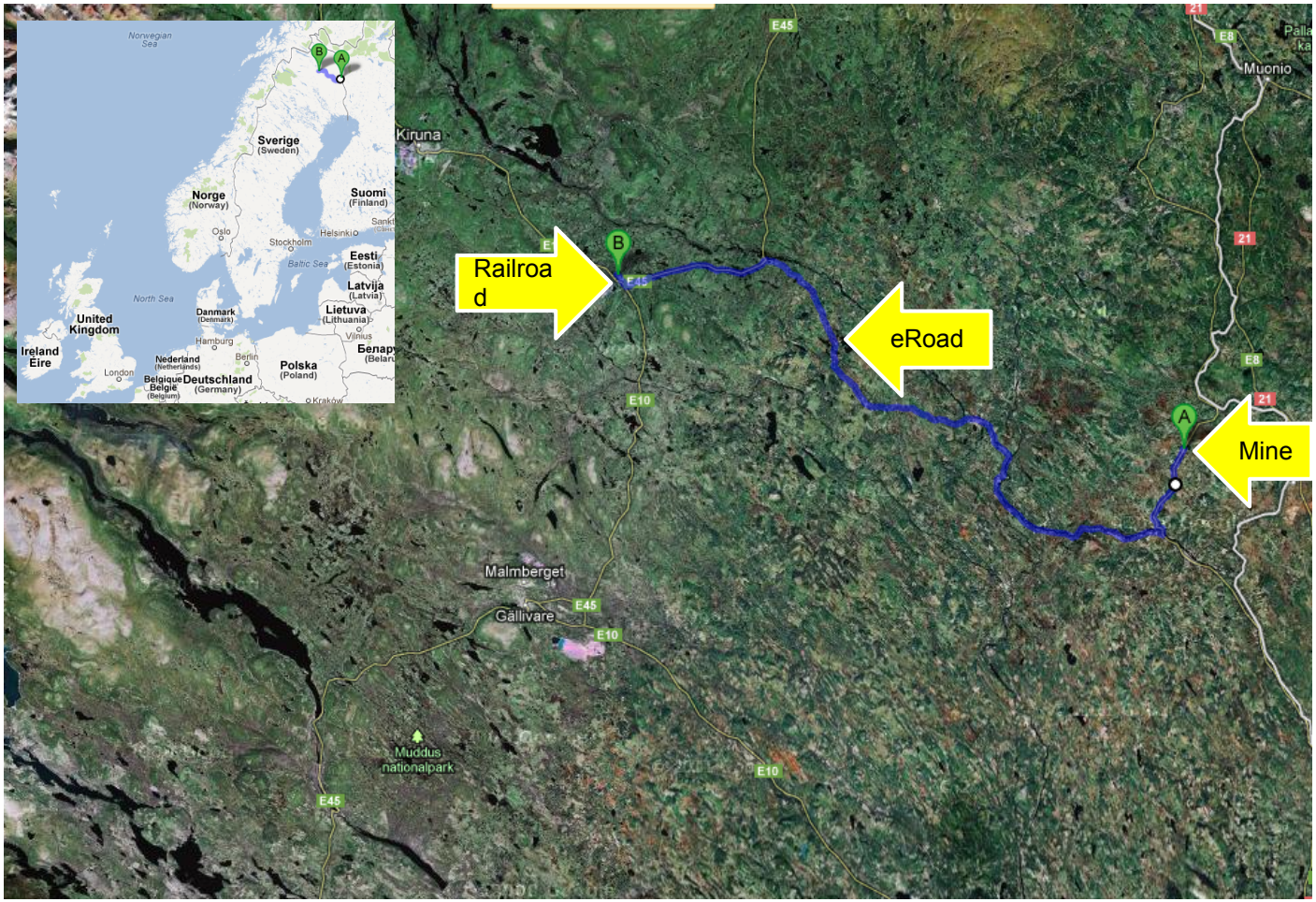
PILOT PROJECT STATUS

- **~ 30** demo sites have been identified
- **~ 10** stakeholders have been interviewed
- **~ 5** sites have been evaluated further
- **~ 3** have been selected

LOCALISATION EXAMPLES

Road / Site	Type	Place	Description
	**Harbour & Industries**	Piteå	Production plant <-> harbour
	**Cities**	Landskrona	Distribution trucks sharing trolley-bus network for emission free urban deliveries
	**Large Building Project**	Stockholm	Material handling in large scale urban development area
	**Large Building project**	Stockholm	Material handling in tunnel project for lowering ventilation needs and improving workplace conditions

PAJALA

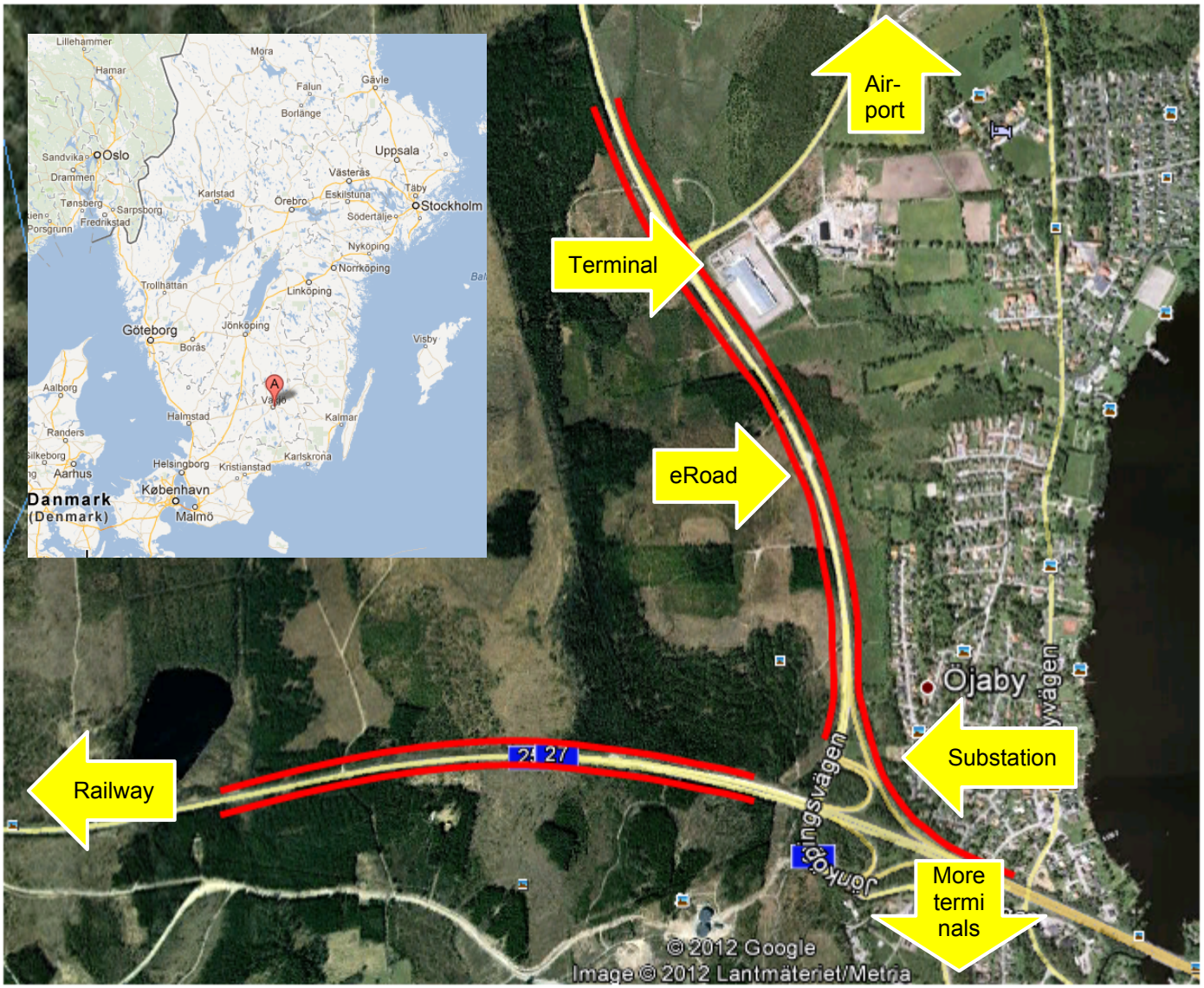


Transport of iron ore from mine to railroad

Trucks are 90 tons 3+4 axles, 360-380 hp, with trailer.

480 passages daily

VÄXJÖ



Transport of parcels from and to railroad, airport and terminal

Trucks are 18 tons 2+2 axles, 360-380 hp, w/o trailer.

20-40 passages daily

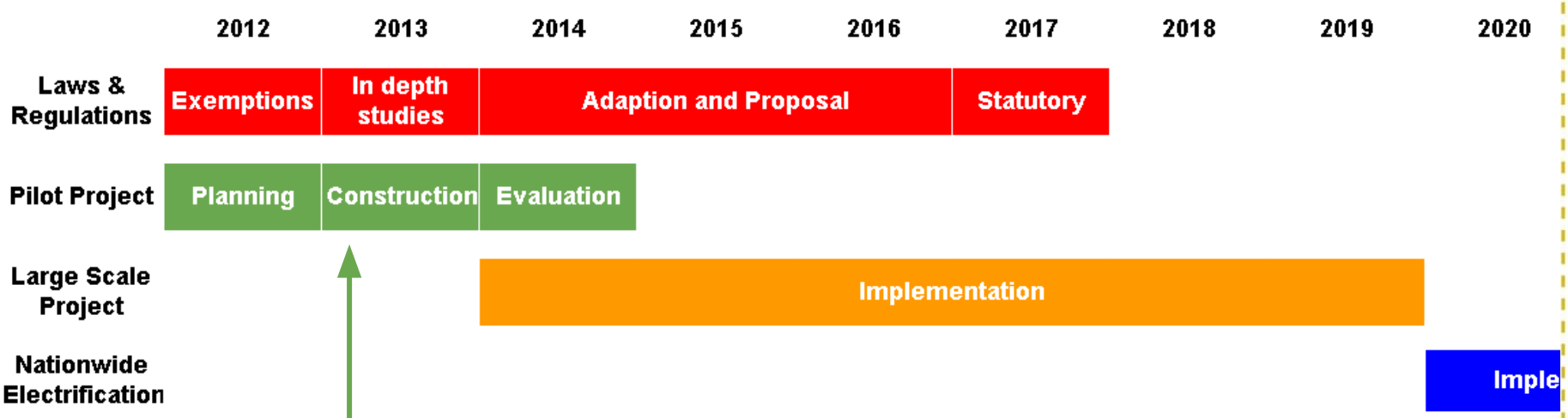
KEY ADVANTAGES

- Swedens largest haulage contractor is committed
- Can be started now
- Showcases the transport system railway, air & truck
- Perfect "startup" for handling the legal aspects
- Visual for the general public
- Visualizes the future of heavy goods road transports

TRAFIKVERKET ELFORSK SIEMENS SCANIA

Svenska Elvägar AB projekt engagemang Växjö kommun KTH VETENSKAP OCH KONST

TIME PLAN & BUDGET



Pilot Project Budget: ~10 Million EUR

Start: Now

Up & Running: 2014

CONCLUSIONS

- Pre-study indicates Växjö
- Excellent "start-up" project for:
  - legal aspects
  - business models
  - infrastructure
  - energy supply
  - customers satisfaction
- PostNord AB (Denmark & Sweden) is a driving force
- The city of Växjö supports the project
- The Swedish Road Administration is involved in the planning
- Electric industry supports
- Strong visual impact of future national electrification of goods transports

LETS GO!

More information

www.elvag.se
www.projektengagemang.se/projekt/eldrift_for_tunga_fordon/

PREFACE

"given our addiction of moving people, food and products..."

"...electrification of heavy road transports is probably the fastest and most cost efficient way to reduce energy consumption and greenhouse gas emissions"

"changing our lifestyle is a bigger challenge than to electrify a road"

Unknowned - 2012