

# Welcome to Bremen



Free Hanseatic City of Bremen  
550.000 inhabitants

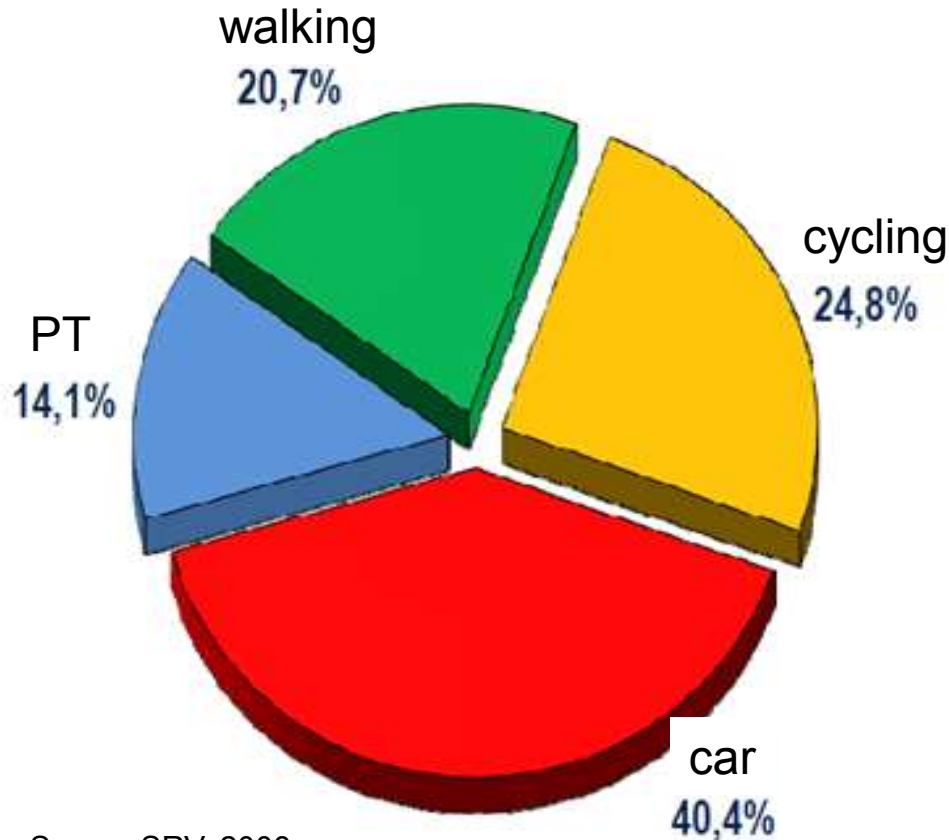


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Free Hanseatic City of Bremen

# Welcome to Bremen



Modal split  
(all trips of Bremen citizens)



Source:SRV, 2008



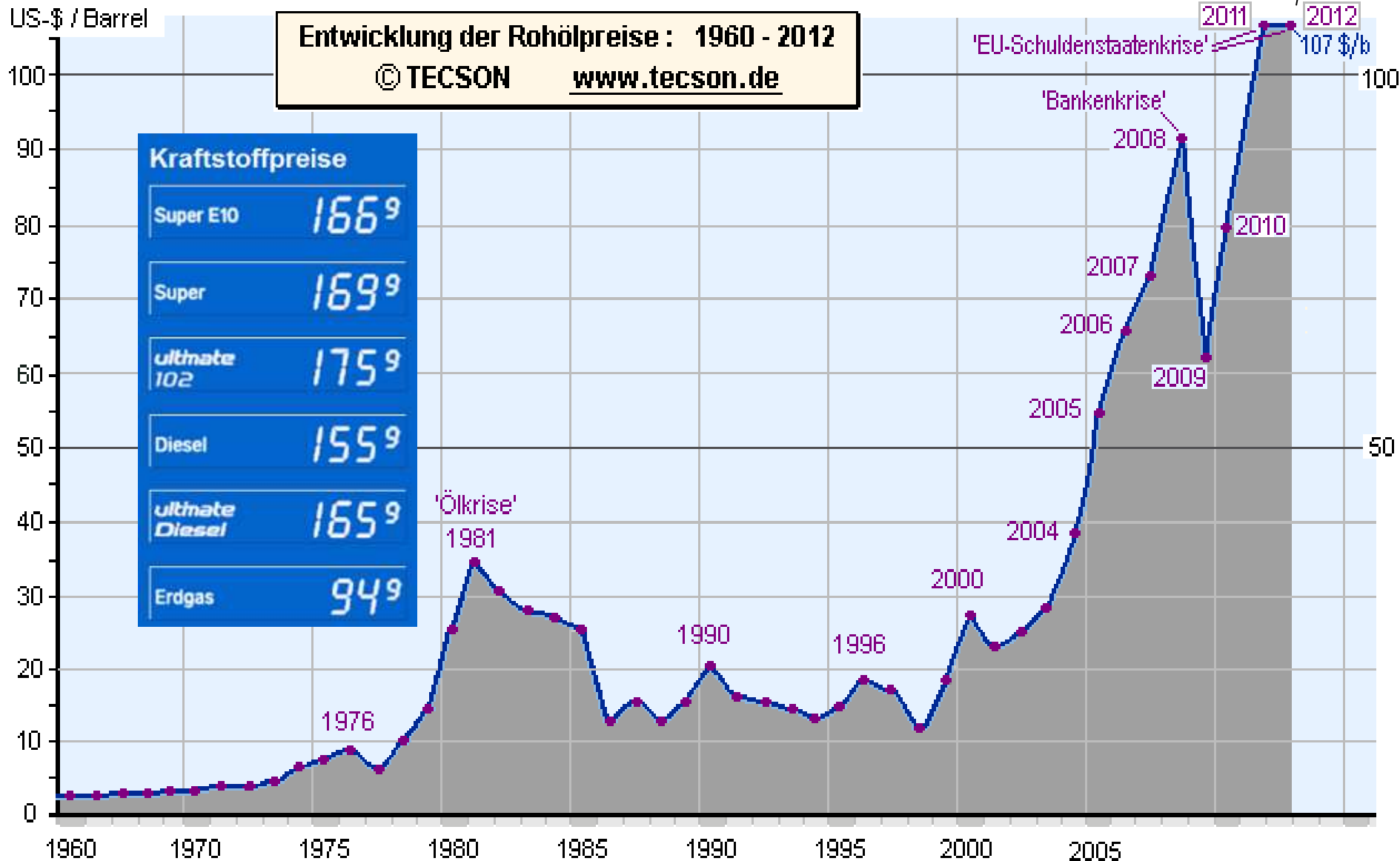
THE CIVITAS INITIATIVE IS CO-FINANCED BY  
THE EUROPEAN UNION

# Oil dependence

109 \$ / barrel  
(25.09.13)



**CIVITAS**  
owner and better transport in cities



# Electric mobility



45 min / day



# Electric mobility



# 15+ hrs / day

Bild: Ingo Teschke



BYD bus / July 2013

# Electric mobility





# Tram city (?)



**Supplementary bus network  
(230 buses)**

**Annual consumption: 8,000,000 litres Diesel**

**CO<sub>2</sub> emission: 22,000 tons CO<sub>2</sub> p.a.**



8 million litres  
22,000 tons CO<sub>2</sub>

# Testing hybrid buses





# Testing electric buses



BYD bus / July 2013

Bild: Ingo Teschke

# CO2 impacts





# Inductive recharging





# Conductive recharging



# Old fashioned – or proven technology ?





Used in ,advanced cities‘





Used in ,advanced cities‘



Used in ,advanced cities‘





Used in ,advanced cities‘



CO<sub>2</sub> neutral – as powered by electricity from hydropower



# Dynamic conductive recharging



# Trolley + battery (APU – for emergency)





# Trolley-battery hybrid (for wireless operation)



# Trolley-battery hybrid





# Trolley-battery hybrid



# Wiring: bus from 1948....





# Wiring: bus from 2010



# De-wiring





# De-wiring





# Semi-automated wiring





# Semi-automated wiring



# Semi-automated wiring





# Semi-automated wiring





# Linie 20

Hauptbahnhof - Überseestadt - Bf Walle - Hohweg und zurück



**Streckencharakteristik O-Bus Linie 20**  
 Kostenschätzung Fahrleitung und Stromversorgung nach Streckenabschnitten

**Variante Teilelektrifizierung**  
**Gesamtsumme: 10.446.687,50 €**

- Grau markierte Abschnitte: Strecken ohne Oberleitung (im Vergleich zu Streckenvollelektrifizierung)
- o.F.: Ohne Kostenschätzung erforderlicher baulicher Folgemaßnahmen (Anpassung Brückenbauwerke)

Stand: 13.04.2013  
 ETC Transport Consultants  
 Kartenhintergrund: BSAG

- 10) Rosenheimer Straße
- 9) Straubinger Straße
- 8) Überseedorf
- 7) Nordstraße
- 6) Emdor Straße
- 5) Cuxhavener Straße
- 4) Eduard-Salling-Straße
- 3) Am Winterhafen
- 2) Eduard-Schopf-Allee
- 1) Bürgermeister-Smidt-Straße

Anpassung Betriebshof 125.070 €





# Cost comparison(s)



**Underground line** ~ 60 mio € / km

**Tram** ~ 10 mio € / km

**Trolleybus infrastr.** ~ 1.5 mio € / km

**BRT track** ~ 5 mio € / km

Diagrammbereich

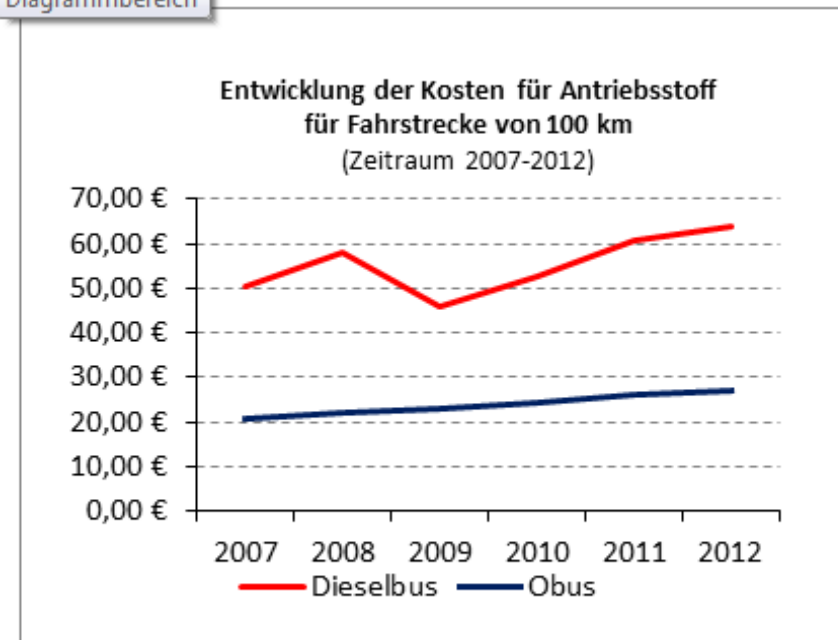


Abbildung 1 – Entwicklung der Energiekosten für 100 km Fahrstrecke<sup>2</sup>

# Conclusions

**Electric mobility – important element for public transport / thus for sustainable mobility**



~ 45 mins



15+ hrs

**Electrification of buses – huge potential – infrastructure can be concentrated**

**~ 165 European cities with trolley buses, ~180 cities with trams**

**Research and Demonstration necessary**



# time frame



10 – 12 years operation  
of urban bus

Research and  
development

50% of cars  
on renewables /  
emission-free

Urban transport  
emission-free

2013

2020

2030

2050

...start now !

# Workshop announcement



## *Electric buses – environmental and operational aspects - Life Cycle Costs analysis –*

**with practical demonstration of electric buses**

**11 – 12 December 2013  
Radisson Blue Hotel Bremen**

**See [www.clean-fleets.eu](http://www.clean-fleets.eu)**

Der Senator für Umwelt,  
Bau und Verkehr







# Thank you for your attention



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