



# **BENCHMARKING OF TRANSPORT INFRASTRUCTURE CONSTRUCTION COSTS**

Workshop on „Good practices and new tools for Financing Transport  
Infrastructure“, WP.5, UNECE

Kalina Thomas, ASFINAG  
8th September 2014



# TOPICS

- ASFINAG in brief
- Financing
- The Austrian Motorway / TEM network
- Benchmarking
- Conclusions

# ASFINAG in brief

## Company overview

- ASFINAG is responsible for 2.178 km motorways
  - Planning, Construction and Maintenance
  - Operation (incl. traffic management & information services)
  - Toll collection & Financing issues
- Stock company – fully owned by the Republic of Austria
- No public grants  
100% user-financed (tolls)

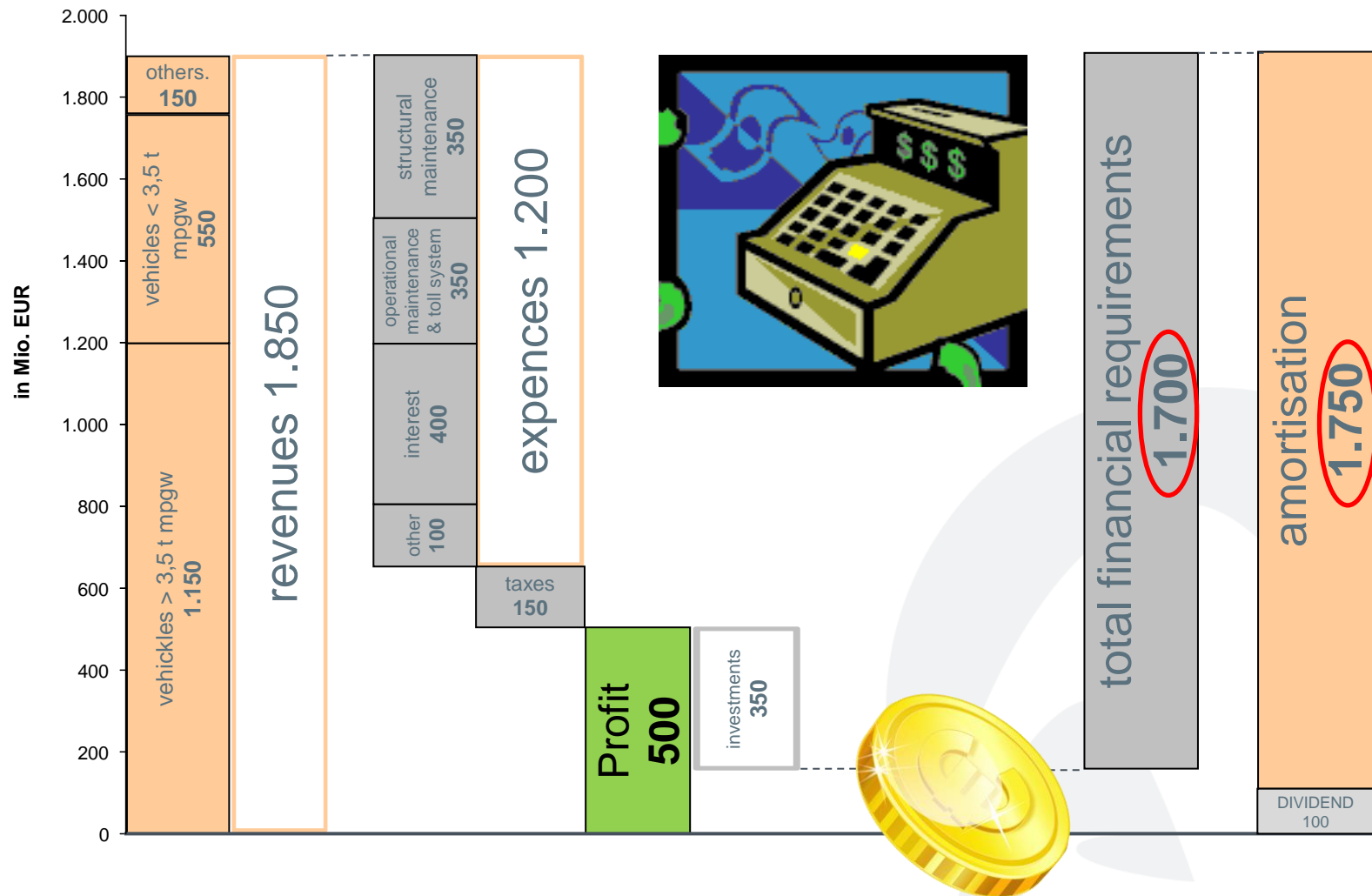


# ASFINAG in brief

## The ASFINAG Vision 2020

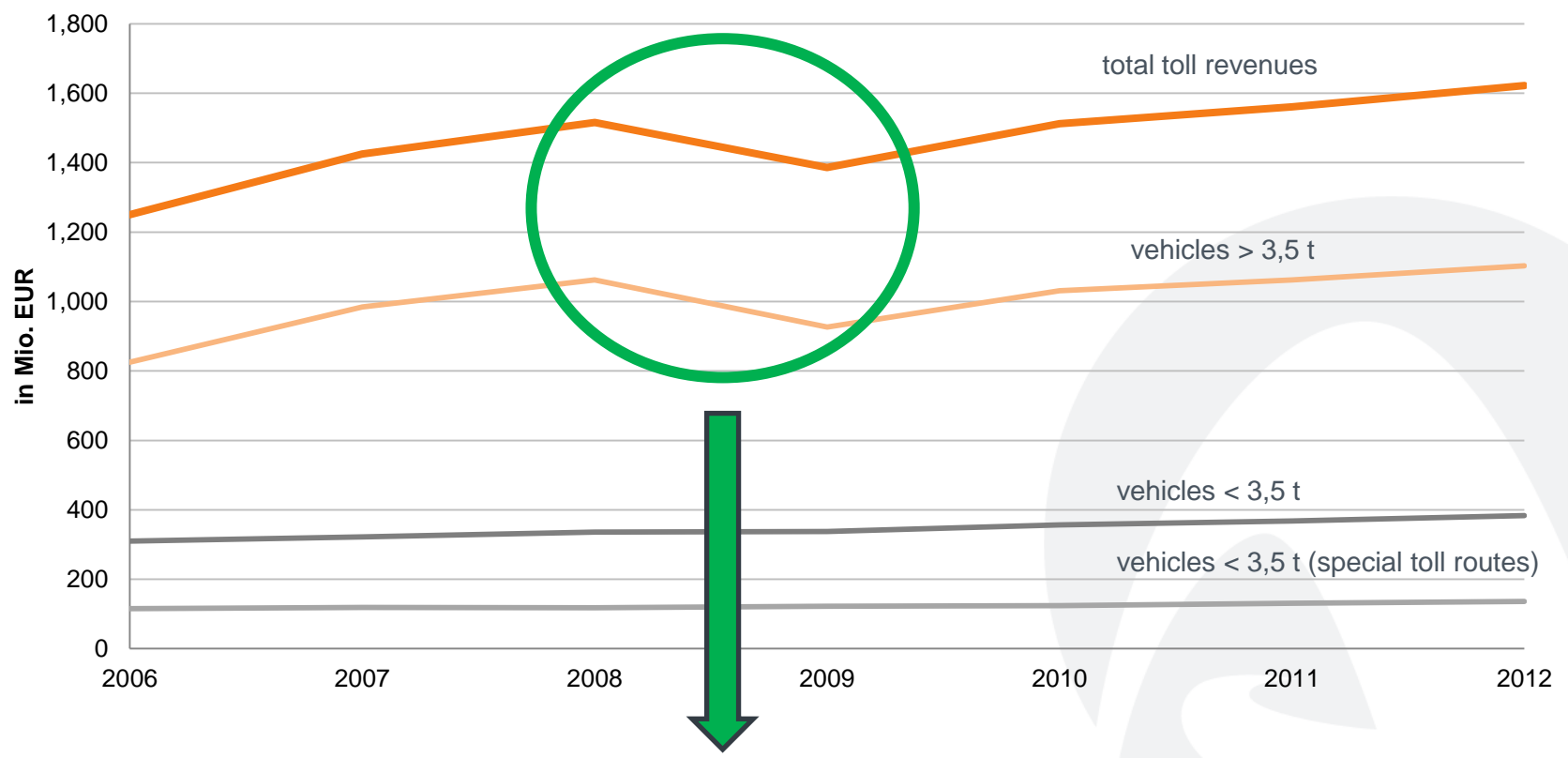
- **ASFINAG** is one of Europe's leading motorway network operators with a special focus on
  - availability
  - traffic management
  - traffic information
  - road safety and
  - technological innovations
- We act internationally and interlink with public transport.

# Financing 2013 (in Mio. EUR)



- Striking a balance between revenues, investments and costs with a focus on ensuring economic independence

# Toll Revenues 2006 – 2012



evaluation of construction projects

# Evaluation of construction projects

## cost-benefit analysis or utility analysis

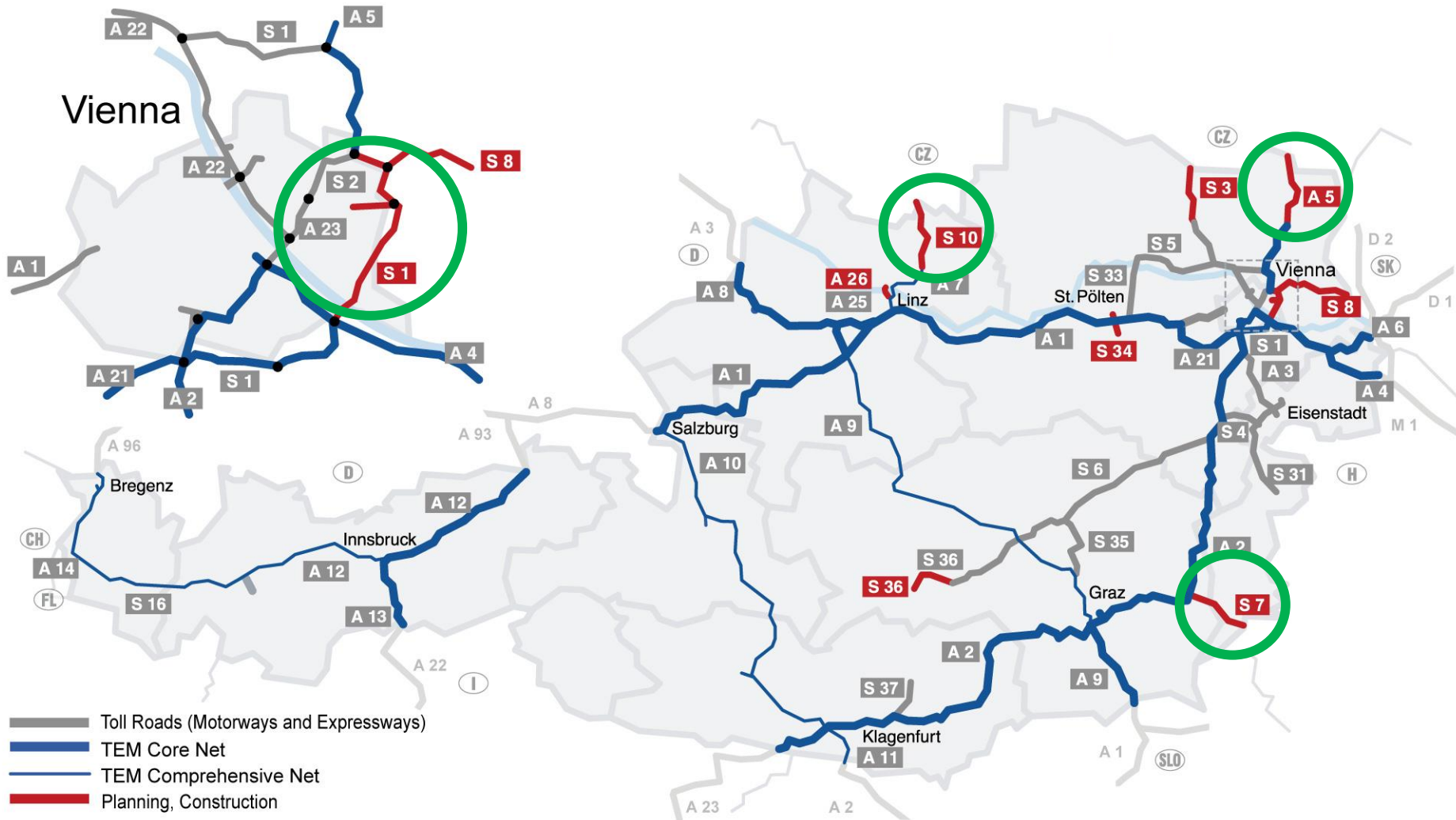
### ➤ parameters

- functional purpose
- cost effectiveness
- road safety



➤ only projects on the TEM-network are in cluster 1

# The Austrian Motorway / TEM network



Version: August 2014; Total length of road network: approx. 2,178 km



# TEM master plan, new constructions

A 5

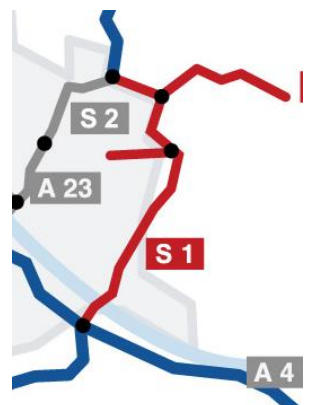
**Schrick –  
Poysbrunn**  
34 km  
costs: € ~320 Mio.  
lane-km: € 2,0 Mio.



2017

S1

**Schwechat -  
Süßenbrunn**  
18,7 km  
costs: € ~1.840 Mio.  
lane-km: € 12,5 Mio.



2025

S7

**Riegersdorf -  
Heiligenkreuz**  
28,5 km  
costs: € ~600 Mio.  
lane-km: € 4,4 Mio.



2019

S 10

**Unterweikersdorf –  
Freistadt Nord**  
22 km  
costs: € ~685 Mio.  
lane-km: € 5,0 Mio.

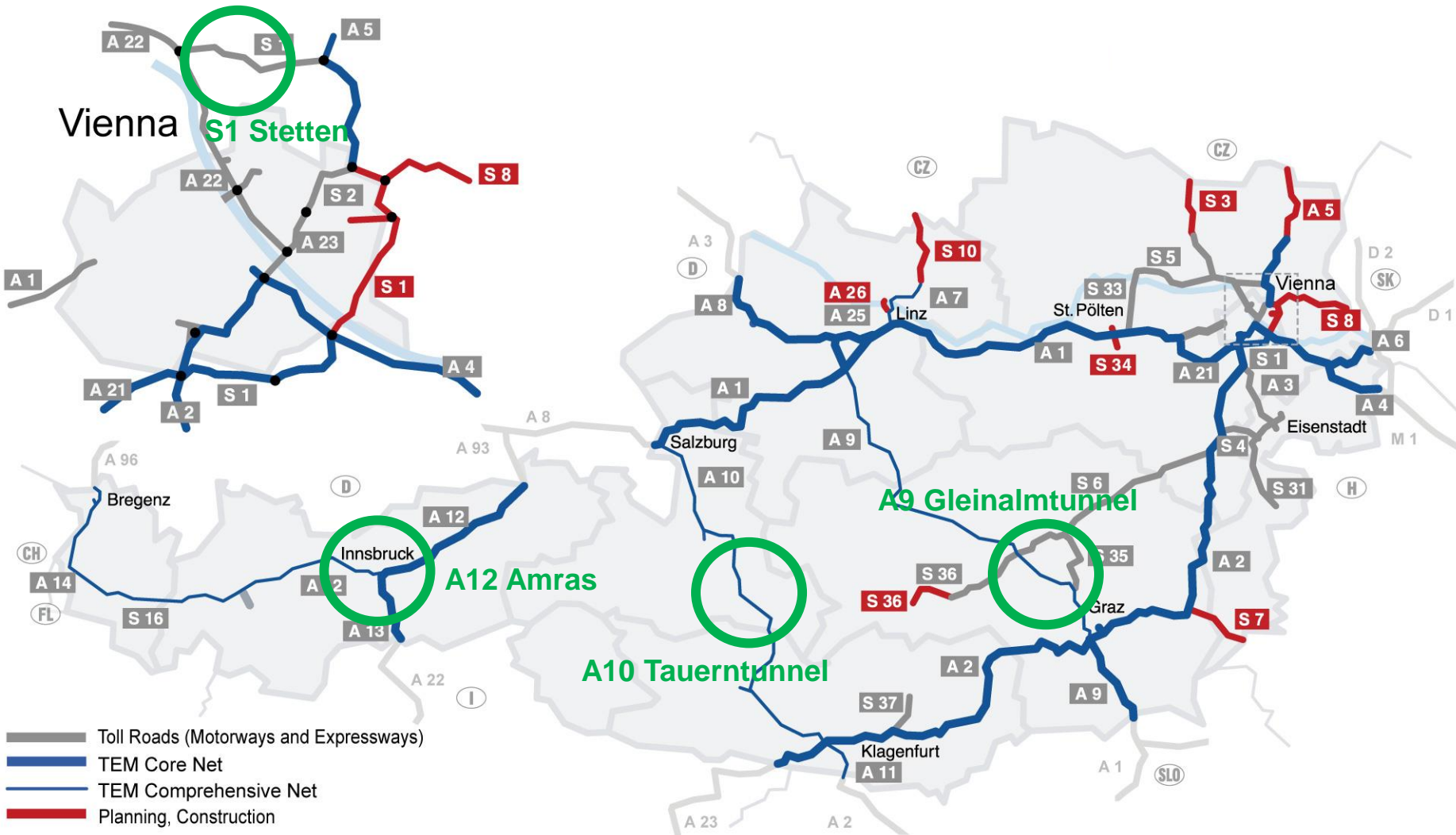


2015

total costs: incl. planing & project management costs, land acquisition costs, construction costs

lane-km: an emergency lane is to be used like a lane

# The Austrian Motorway / TEM Network

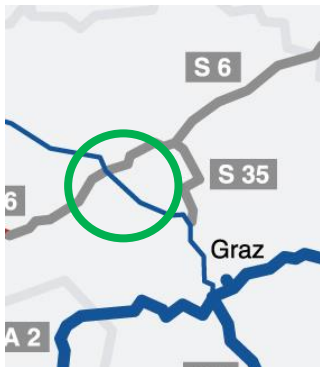


Version: August 2014; Total length of road network: approx. 2,178 km

# Selection of tunnel projects

**A9**

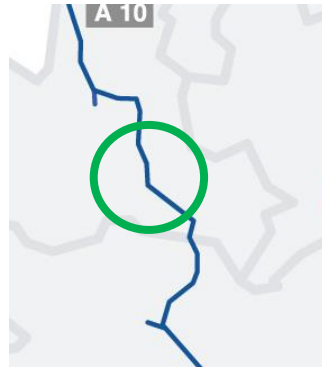
**Gleinalmtunnel**  
8,3 km  
Costs: € ~223 Mio.  
Lane-km: € 12,2 Mio.



2017

**A10**

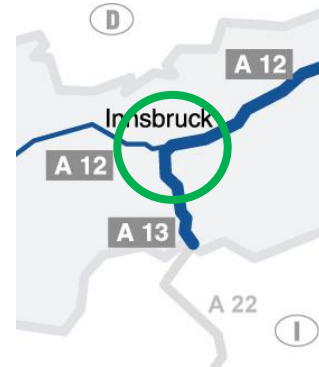
**Tauerntunnel**  
6,5 km  
Costs: € ~156 Mio.  
Lane-km: € 12,8 Mio.



2010

**A12**

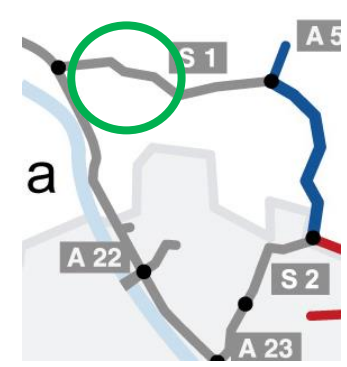
**Amras**  
0,9 km  
Costs: € ~31 Mio.  
Lane-km: € 6,4 Mio.



2011

**S 1**

**Stetten**  
3,0 km / 2,2 km  
Costs: € ~112 Mio.  
Lane-km: € 7,1 Mio.



2010

closed tunneling method

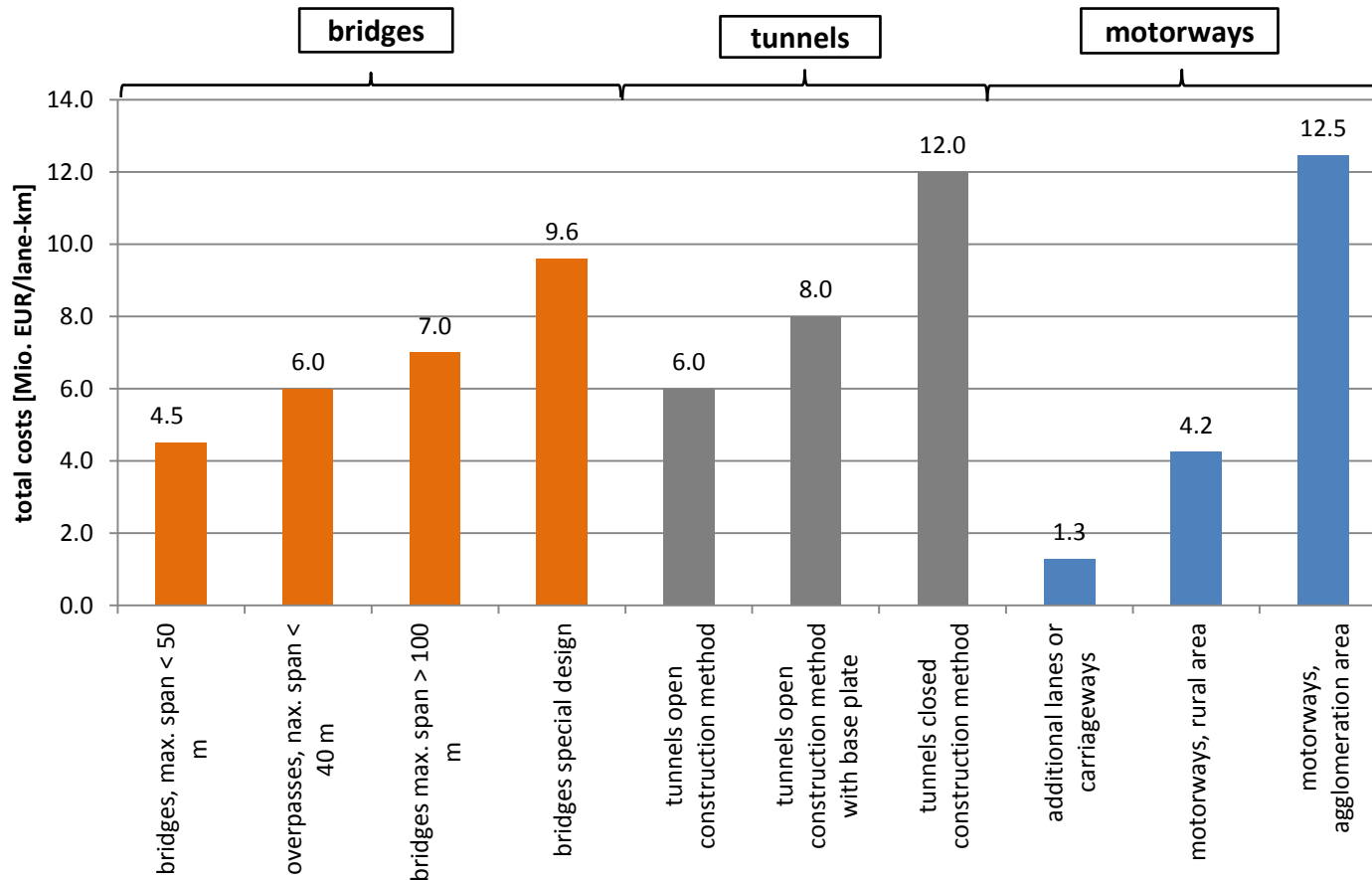
open tunneling method

total costs: incl. planing & project management costs, land acquisition costs, construction cost

# Benchmarking

## Overview of the construction costs of roads, tunnels and bridges

total construction costs of motorways, tunnels and bridges  
in Mio.EUR/lane-km



# Conclusion

- Infrastructure investments are cost-intensive
- Balance between investment, costs and revenues is crucial
- ASFINAG has a stable business case, guarantying long-term economic independency
- Benchmarking is important
  - to have realistic construction costs
  - to have a stable investment program with no cost explosions
- We use benchmarks of construction costs
  - for cost estimates
  - to control cost developments of the projects
- Benchmarking is not a regulatory element!
- We are looking for partners to compare construction costs



# Autobahnen- und Schnellstraßen-Finanzierungs-AG (Motorway and Expressway Financing plc)

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***RELIABILITY ALL THE WAY.***

# Conclusion









## Benchmarking of construction costs - Proposal

		topographical consistence / Population density				
		Rural	Mountain	Suburban	Urban	
Cost components	Land acquisition	14%	1%	18%	23%	
	Planning costs	5%	4%	7%	3%	
	Construction costs	Road	37%	3%	27%	5%
		Bridge	48%	8%	9%	4%
		Tunnel	0%	80%	43%	80%
		overall	15%	9%	21%	11%
	total	78%	91%	71%	71%	
Management costs	3%	4%	4%	3%		
Total costs [Mio.€/lane]						



# Toll System in Austria:

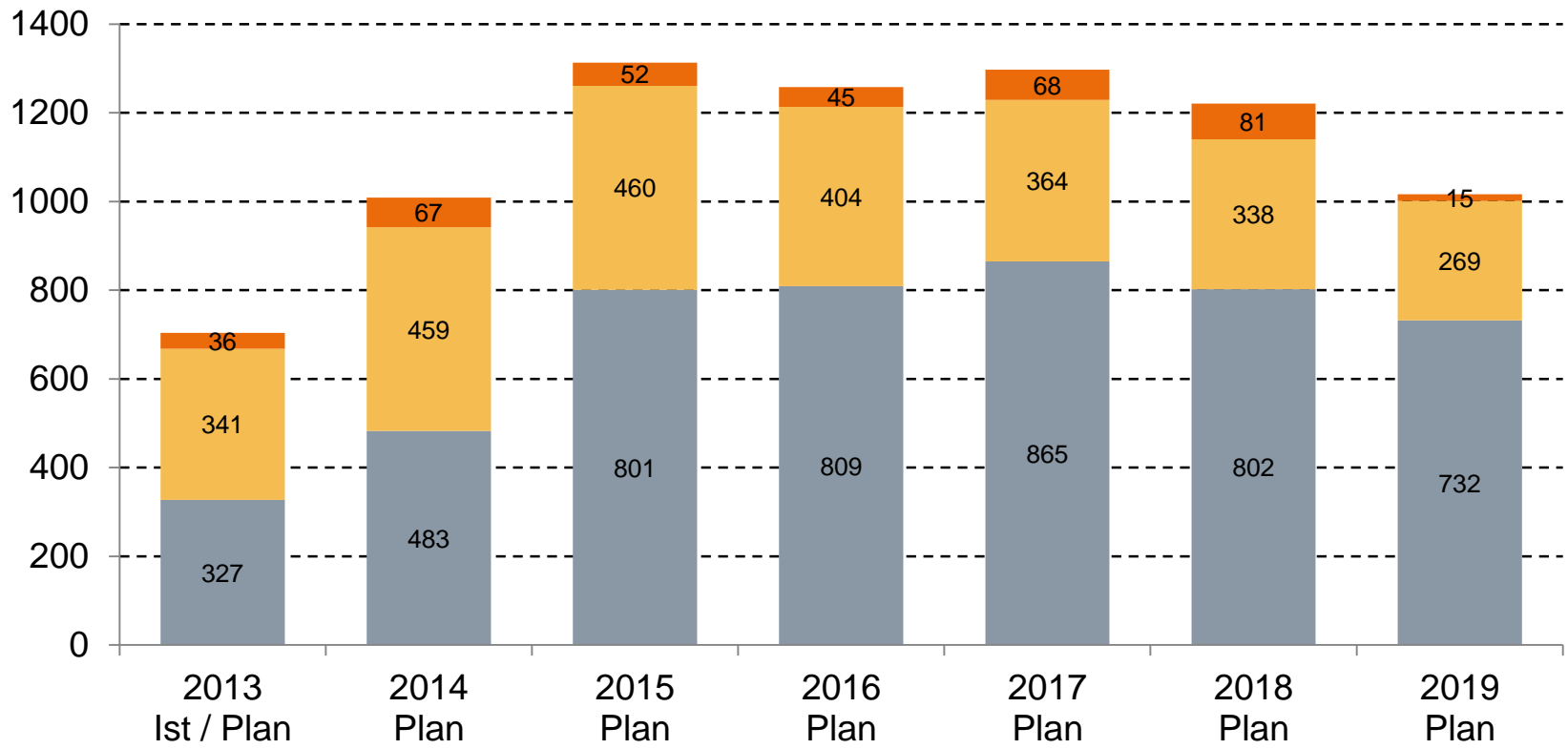
## Overview and Revenue 2013

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Up to 3.5t mpgw</p>	<p style="text-align: center;"><b>Toll sticker</b></p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;"><i>Revenue*) of EUR 406 million</i></p>	<p style="text-align: center;"><b>Special toll</b></p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;"><i>Revenue*) of EUR 147 million</i></p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">More than 3.5t mpgw</p>	<div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 10px;"> <p><b>Fully electronic toll payment by GO-Box</b></p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;">    </div> <p style="text-align: center;"><i>Revenue*) of EUR 1,135 million</i></p>	

\*) net revenue 2013, rounded

# Construction Programme

■ New constructions & expansion   
 ■ Structural maintenance   
 ■ Investment



## Key Financial Data 2013 (in EUR million)

	2013	12 → 13	2012
<b>Net profit for the year</b>	471	+/- 0 %	471
<b>Debt reduction</b>	53	-21.9 %	67
<b>Current and non-current liabilities</b>	11,520	+/- 0 %	11,525

# ASFINAG Overview

- **Tasks:** Planning, construction, maintenance, operation, funding and tolling of motorways and expressways in Austria

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- **Road network:** In operation: 2,178 km

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- **Employees – group:** 2,652

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- **Motorway operation and maintenance facilities:** 43

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- **National traffic management center:** 1

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- **Regional traffic management centres:** 9

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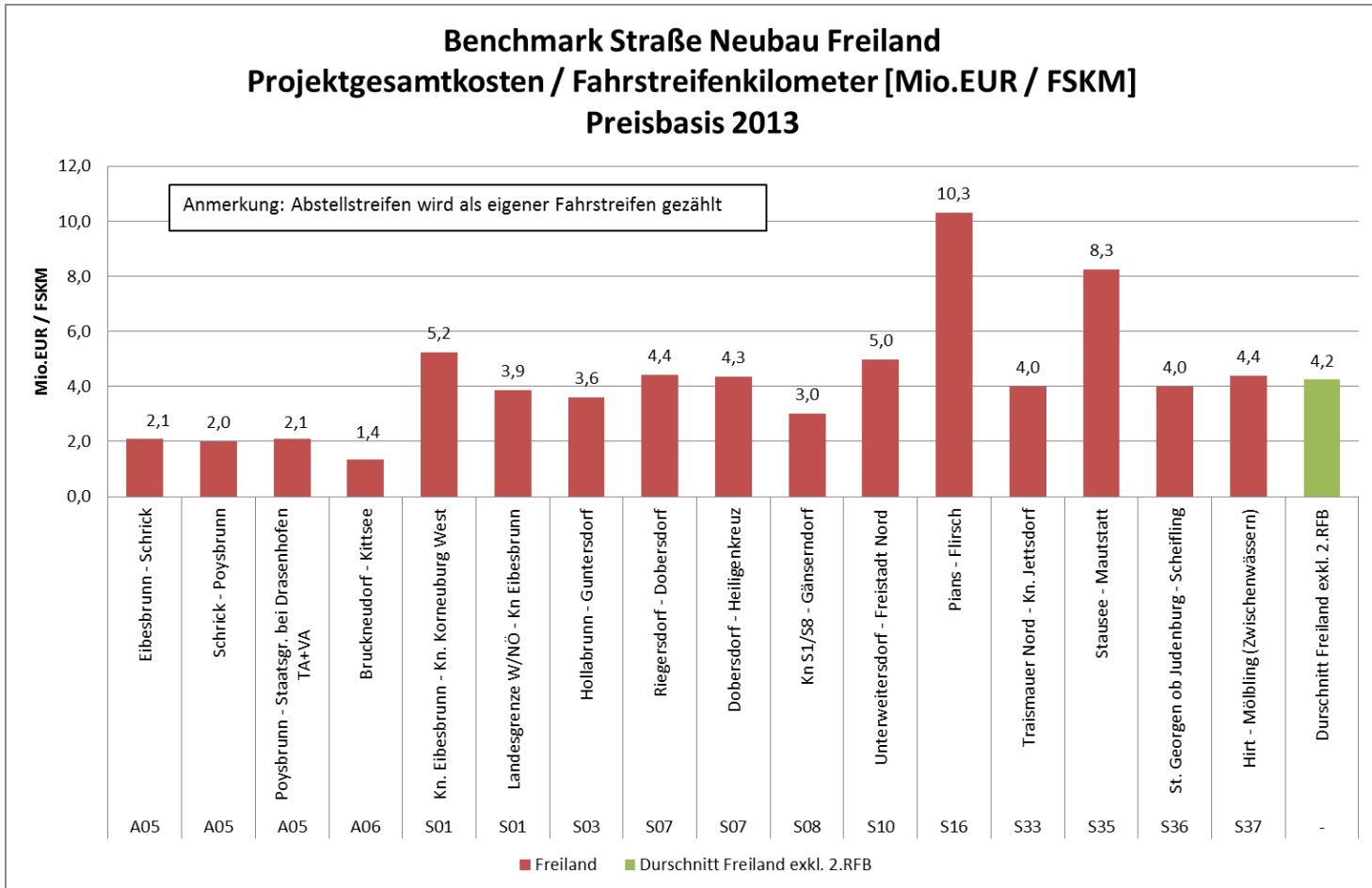
- **Locations:** Wien, Graz, Innsbruck, Salzburg, Ansfelden, Zirl

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- **Financing:** Vehicles < 3.5 t: toll stickers + special tolls  
Trucks > 3.5 t: mileage-dependent toll

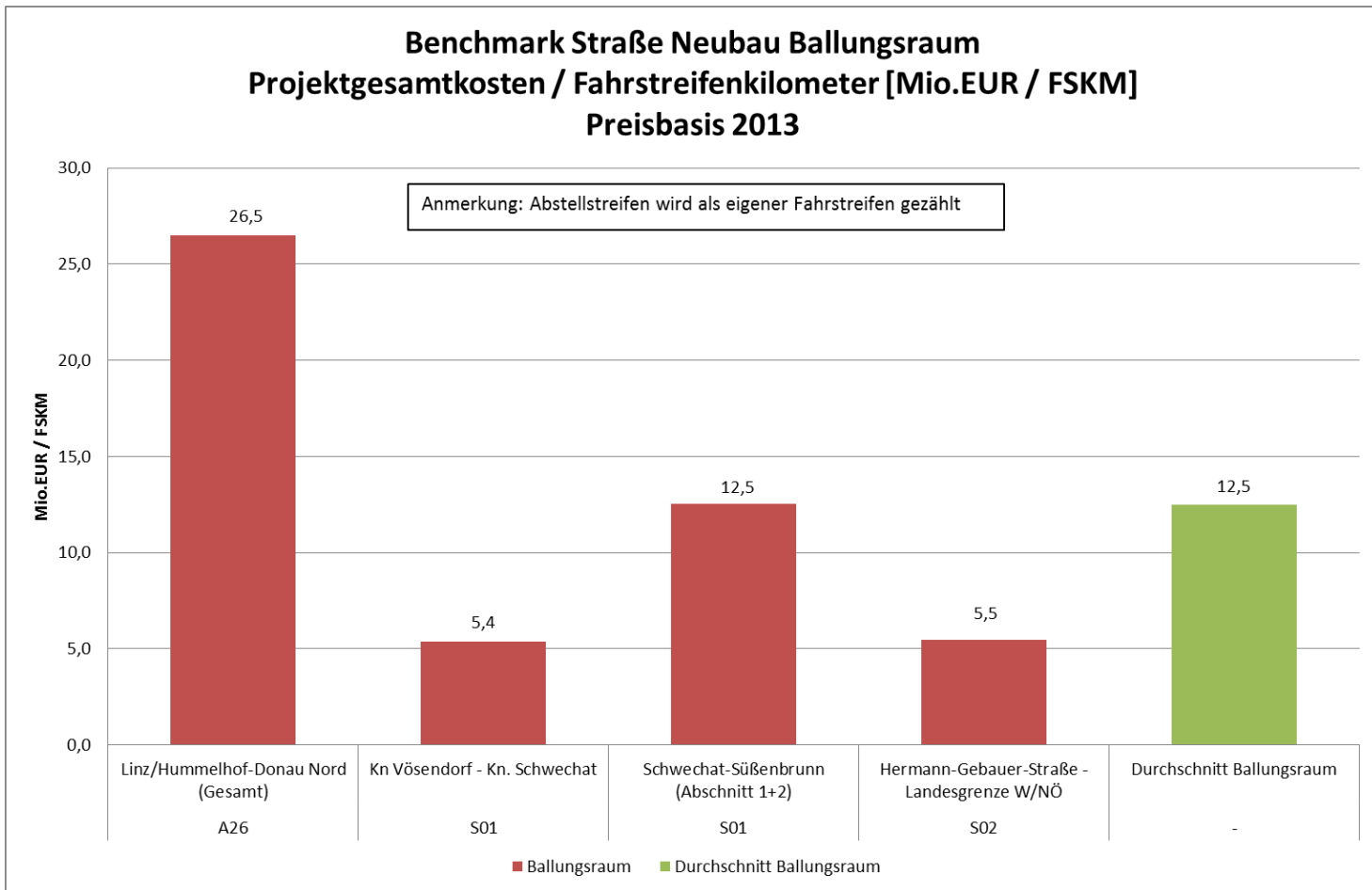
# BENCHMARKING

## Total construction costs of motorways and expressways



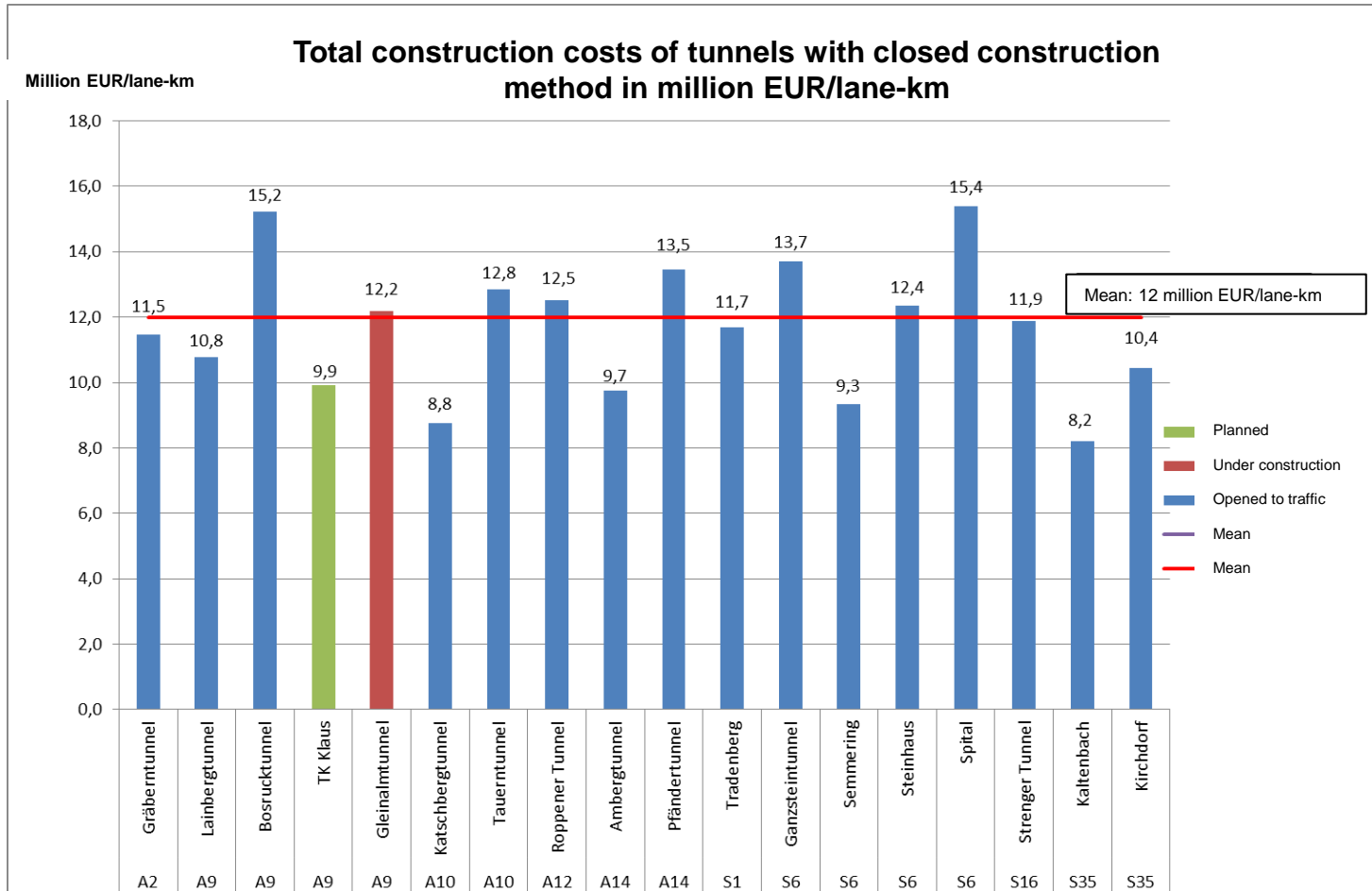
# BENCHMARKING

Total construction costs of motorways and expressways



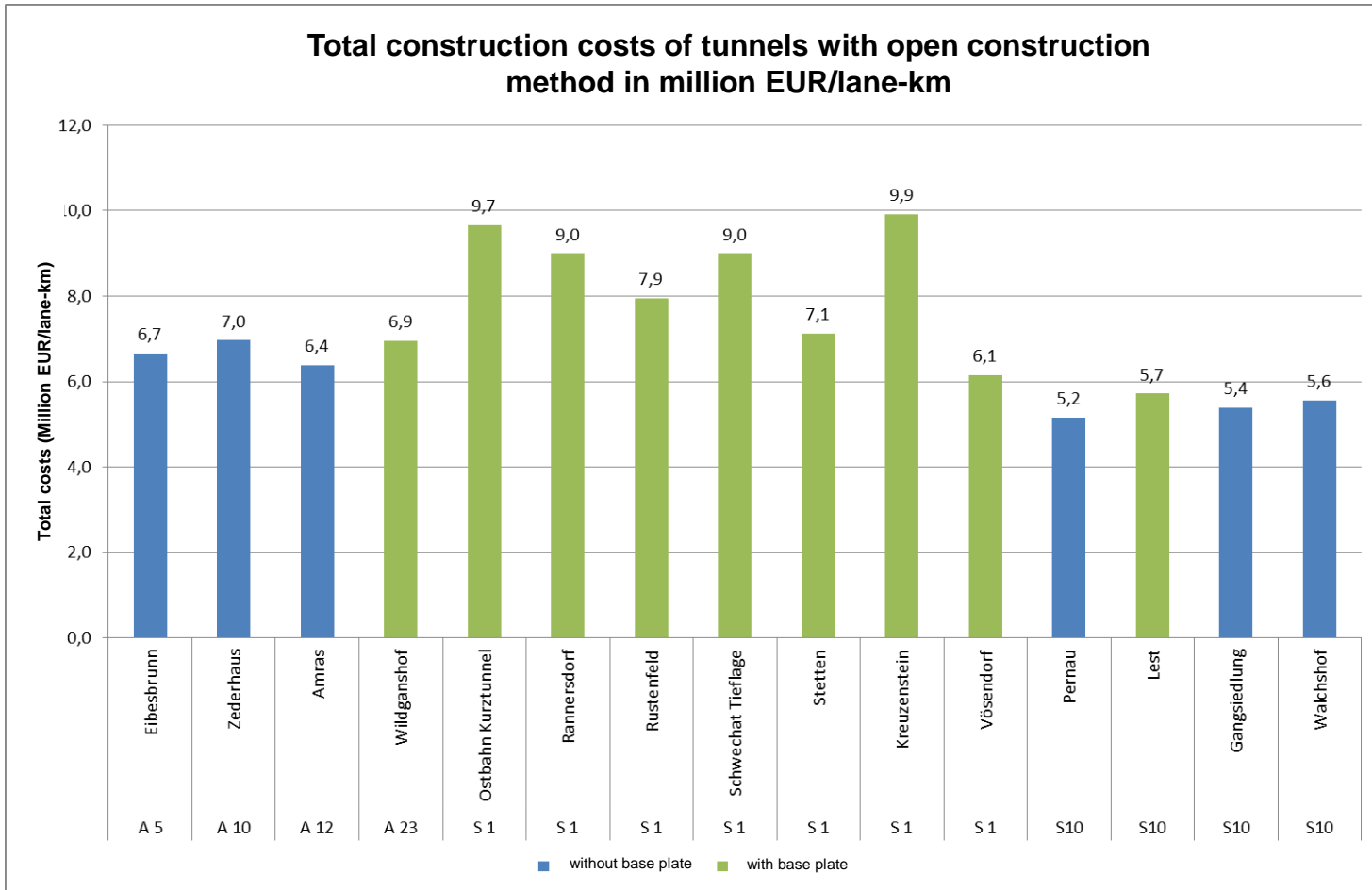
# Benchmarking

## Total construction costs of tunnels with closed construction method



# Benchmarking

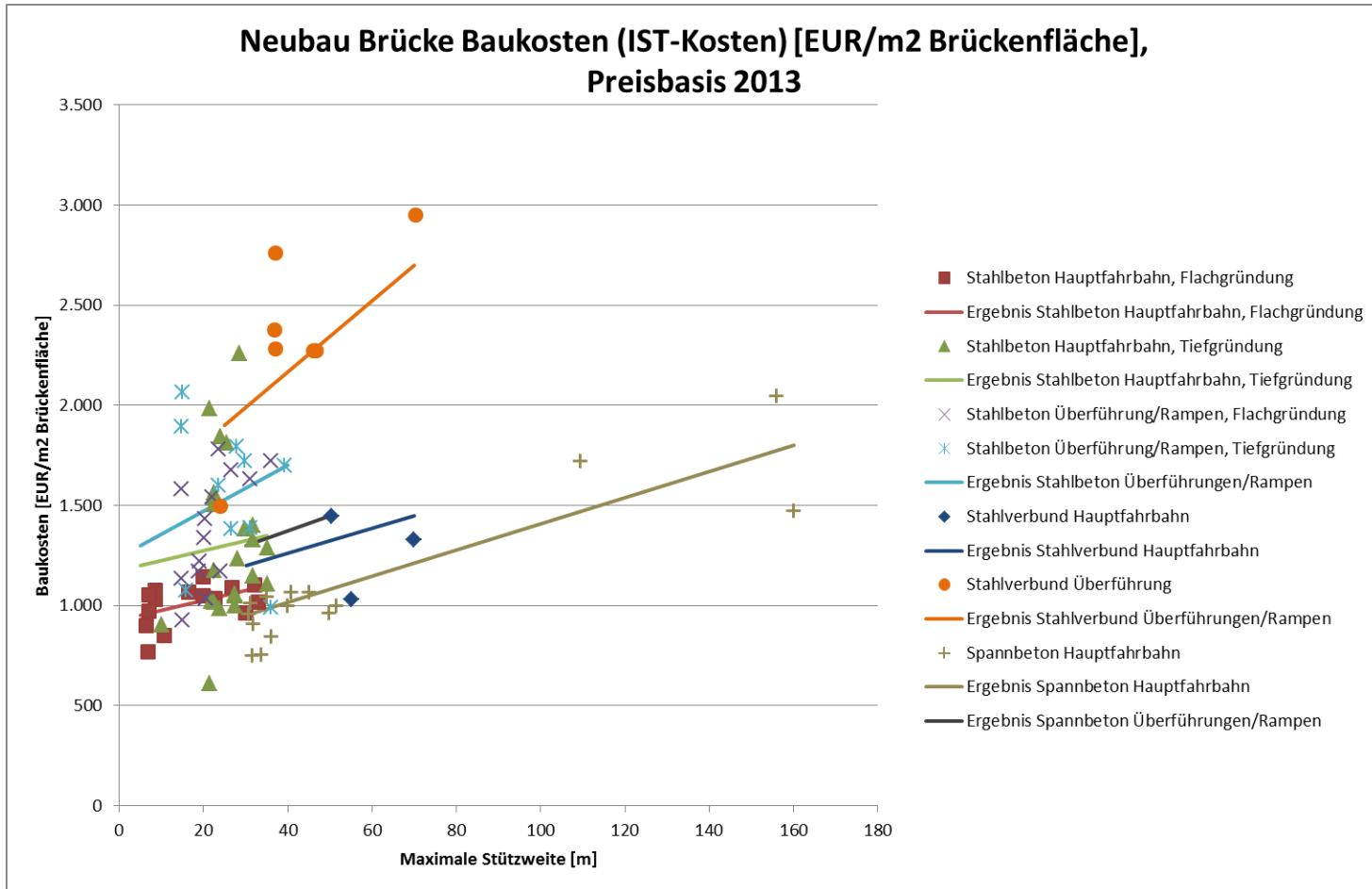
## Total construction costs of tunnels with open construction method





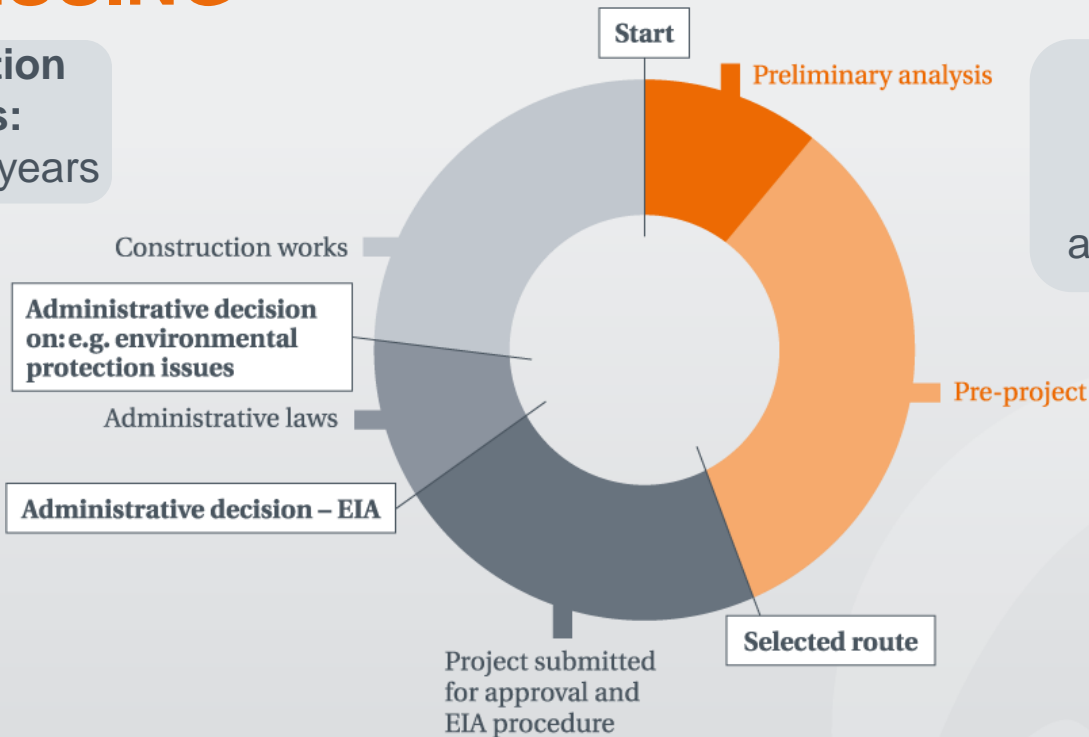
# Benchmarking

## Total construction costs of bridges



# CONSTRUCTION ACTIVITIES – PROJECTS PROCESSING

**Construction process:**  
approx. 3-5 years



**Planning & procedural processes:**  
approx 6-10 years



Documents submitted for project approval of the S 7 expressway

# COSTS OF BUILDING MOTORWAYS AND EXPRESSWAYS



Rural area: **EUR 10-40 million / km**

In and around cities: **EUR 30-100 million / km**

# CONCLUSIONS

## Life-cycle-costs

- Operational maintenance [EUR, EUR/km]
- Structural refurbishment [EUR, EUR/km]



# Benchmarking - Baukosten

## Gesamtkosten Neubau Straße – Gesamtauswertung

### Ergebnisse:

- Gesamtkosten pro Autobahnkilometer:

Straße Neubau, Gesamtkosten / km [Mio.EUR] 2013				
	Min	Mittel	Max	Projekte
2. RFB	1,6	3,9	10,6	9
Freiland	8,2	20,3	41,2	16
Ballungsraum	32,3	61,5	106,0	4

- Gesamtkosten pro Fahrstreifenkilometer (Anm.: Abstellstreifen wird als eigener Fahrstreifen gezählt):

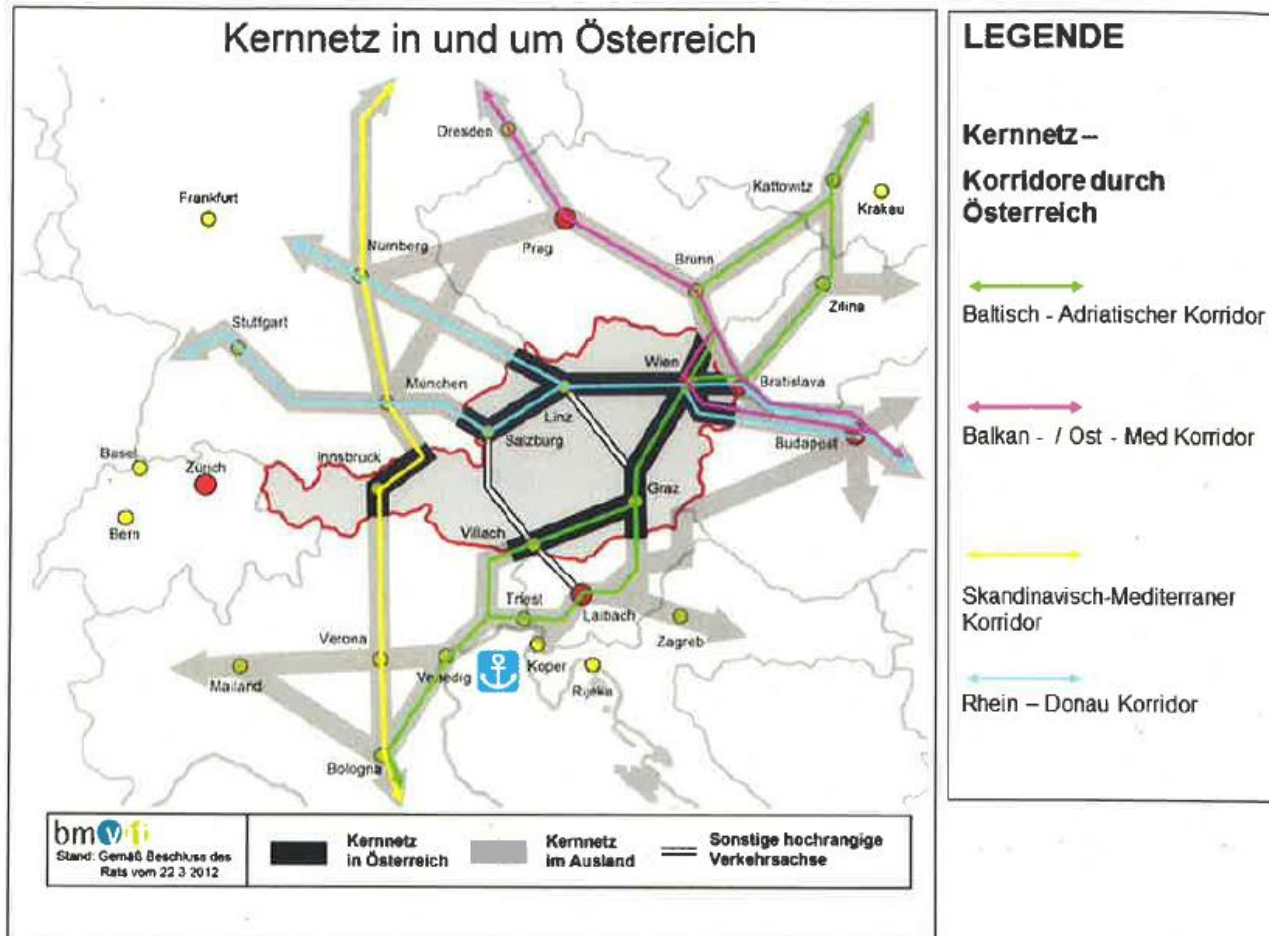
Straße Neubau, Gesamtkosten / FSKM [Mio.EUR] 2013				
	Min	Mittel	Max	Projekte
2. RFB	0,5	1,3	3,5	9
Freiland	1,4	4,2	10,3	16
Ballungsraum	5,4	12,5	26,5	4

# Benchmarking - Baukosten

## Kosten Neubau Brücke

Ergebnis für Benchmarks Neubau Brücken			
Gesamtprojektkosten			
Stahlbeton Hauptfahrbahn, Flachgründung	max. Stützweite [m]	5	35
	Gesamtprojektkosten [EUR / m2]	1.050	1.200
Stahlbeton Hauptfahrbahn, Tiefgründung	max. Stützweite [m]	5	35
	Gesamtprojektkosten [EUR / m2]	1.350	1.500
Stahlbeton Überführung/Rampen	max. Stützweite [m]	5	40
	Gesamtprojektkosten [EUR / m2]	1.450	1.900
Stahlverbund Hauptfahrbahn	max. Stützweite [m]	30	70
	Gesamtprojektkosten [EUR / m2]	1.350	1.600
Stahlverbund Überführung	max. Stützweite [m]	25	70
	Gesamtprojektkosten [EUR / m2]	2.100	3.000
Spannbeton Hauptfahrbahn	max. Stützweite [m]	30	160
	Gesamtprojektkosten [EUR / m2]	1.150	2.000
Spannbeton Überführung	max. Stützweite [m]	30	50
	Gesamtprojektkosten [EUR / m2]	1.450	1.600

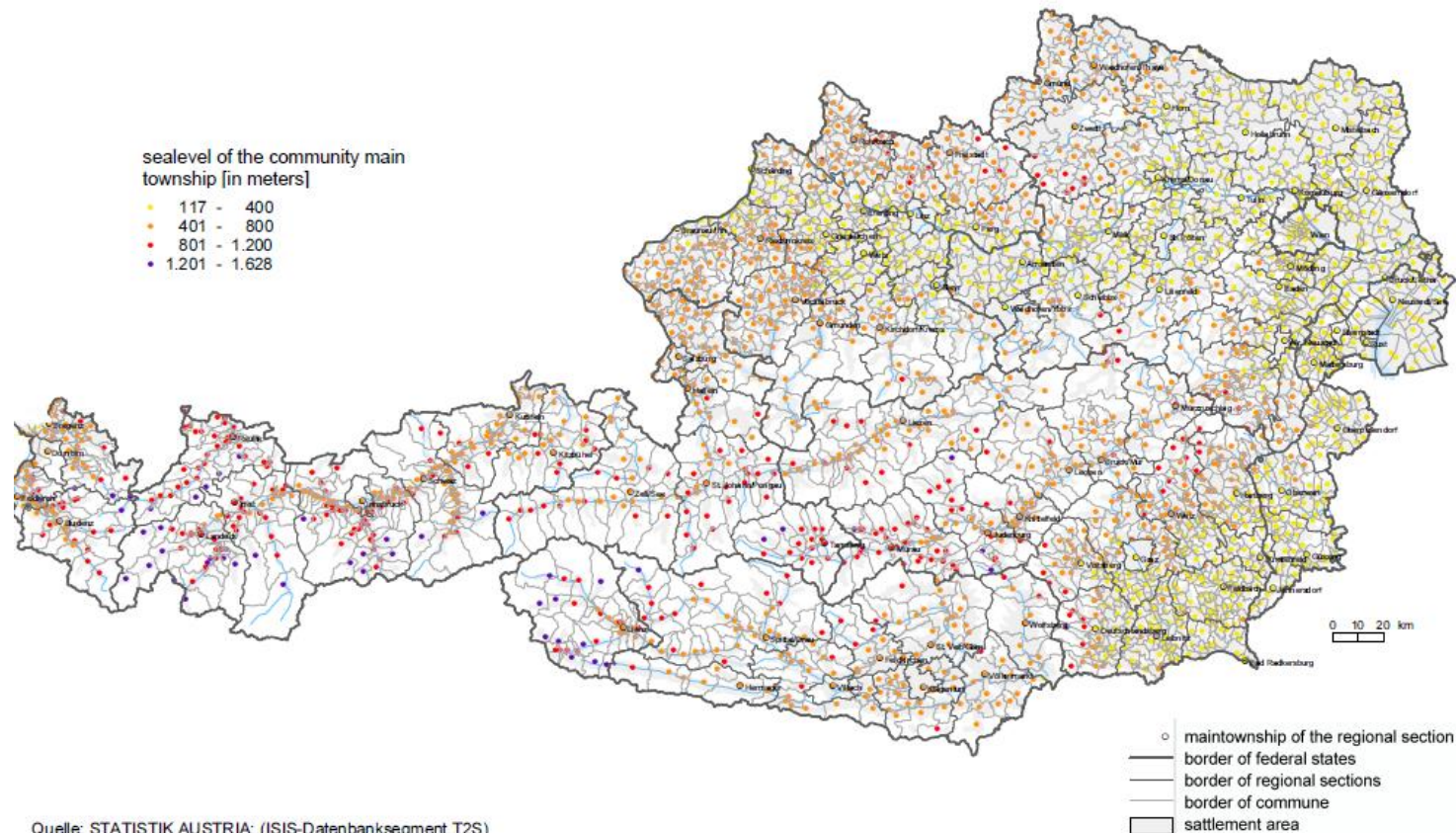
# THE AUSTRIAN MOTORWAY / TEM NETWORK



# Benchmarking - Baukosten

## Zusammenstellung Gesamtkosten Neubau Straße, Brücke und Tunnel

sealevel of the community main township





# Benchmarking - Baukosten

## Zusammenstellung Gesamtkosten Neubau Straße, Brücke und Tunnel

