„e-mobil in niederösterreich“

- Electro mobility strategy of Lower Austria (2014 – 2020)
- Promotion 6 days test use
- Field test in Seitenstetten

Klaus Alberer
25.05.2018

Europäische Union Investitionen in Wachstum & Beschäftigung. Österreich.

Partner von
„e-mobil in niederösterreich“

Companies & Technologies

- ecoplus Clusters
- Internationalization
- Technopols

Business Locations & Services

- Investor Services
- Business Parks

Projects & Initiatives

- Regional Funding
- Support Processing

ecoplus.
The Business Agency
of Lower Austria

Managing Director:
Mag. Helmut Miernicki
Mag. Jochen Danninger

Owner:
Province of Lower Austria
(100%)



About the e-mobility initiative of Lower Austria

The e-mobility initiative of Lower Austria is both first and central point of contact as well as the know-how hub for all matters involving e-mobility in Lower Austria.

At the e-mobility initiative of Lower Austria, we are here to inform and assist innovative companies, entire regions and municipalities, but also all Lower Austrian citizens interested in the topic of electric mobility. We initiate and support regional and communal pilot projects. We aid Lower Austrian companies in their efforts to develop, manufacture and market electric mobility-related products and services in Lower Austria. We are also active in the creation of a suitable framework (grants, infrastructure etc.) for future electric mobility applications. At the same time, we aim to enhance acceptance of this new technology among the general population: because the more people who see the positive aspects of switching to electric vehicles, and actually do so, the more our environment benefits.

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Climate change

Quelle: Faktencheck Energiewende

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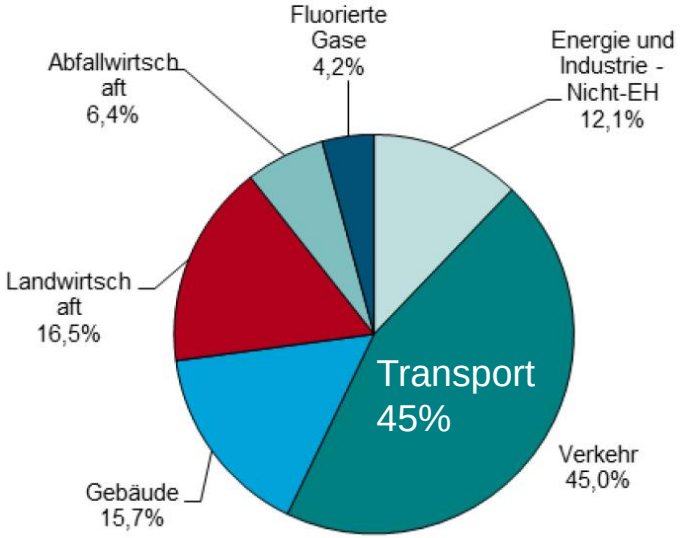
Milestone
Paris Agreement
12.12.2015

AIM Paris Agreement:
Holding the increase in the global average temperature to well below 2 ° C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 ° C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change.

07.2016 REGULATION OF THE EU

Binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 for a resilient Energy Union and to meet commitments under the Paris Agreement Vorschlag EU Verordnung:

Austria -36% reduction in 2030 (vs. 2005, non-ETS)



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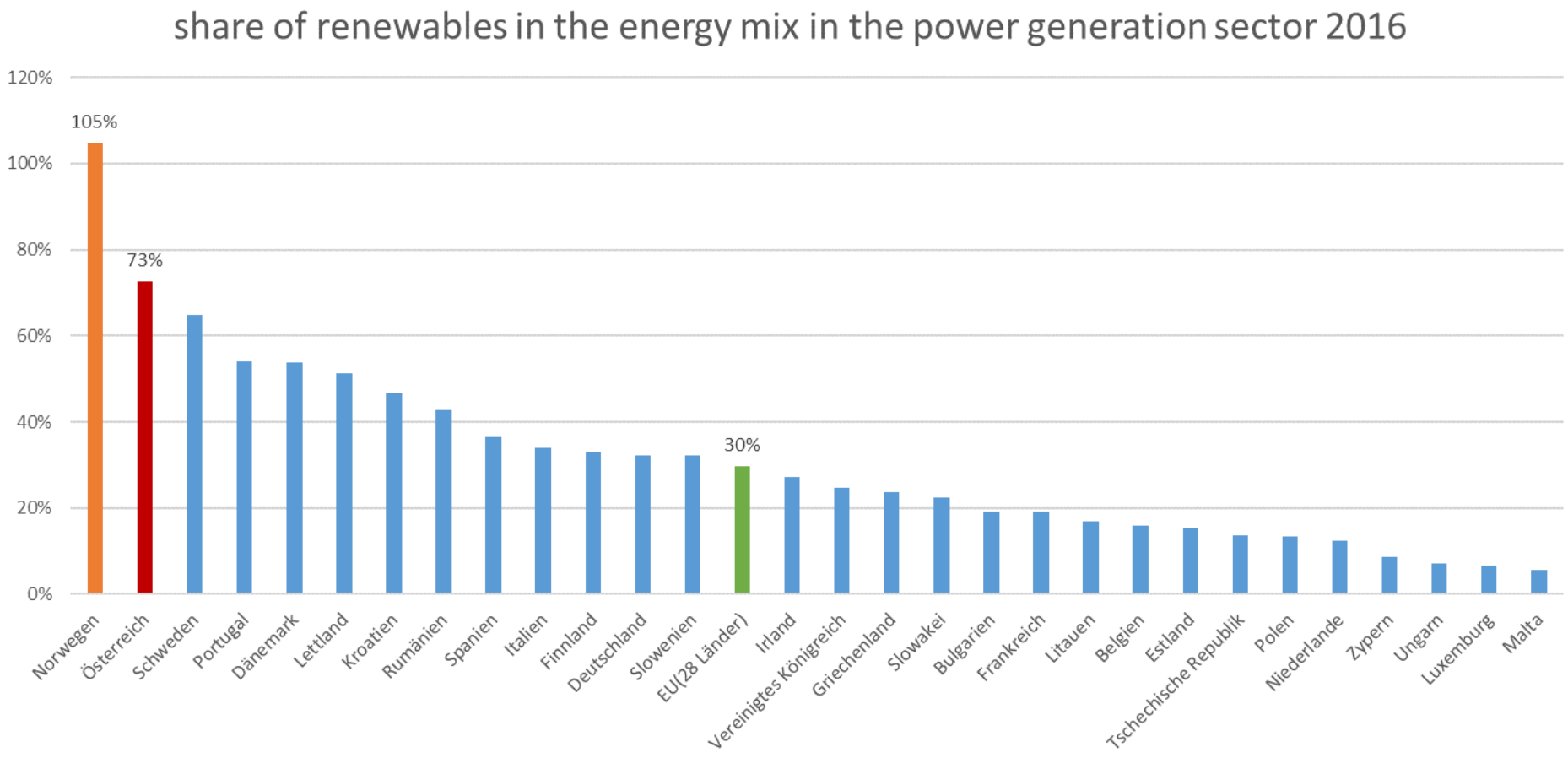
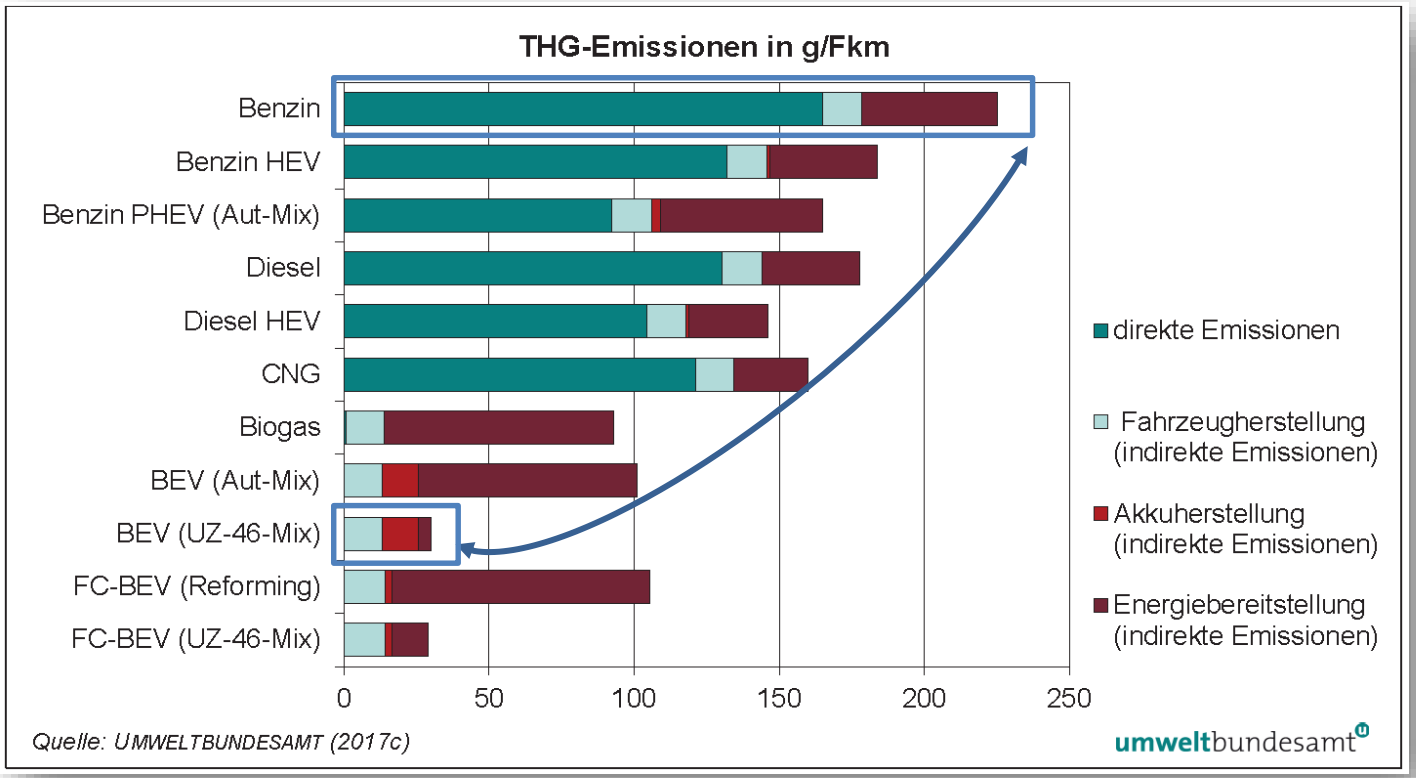


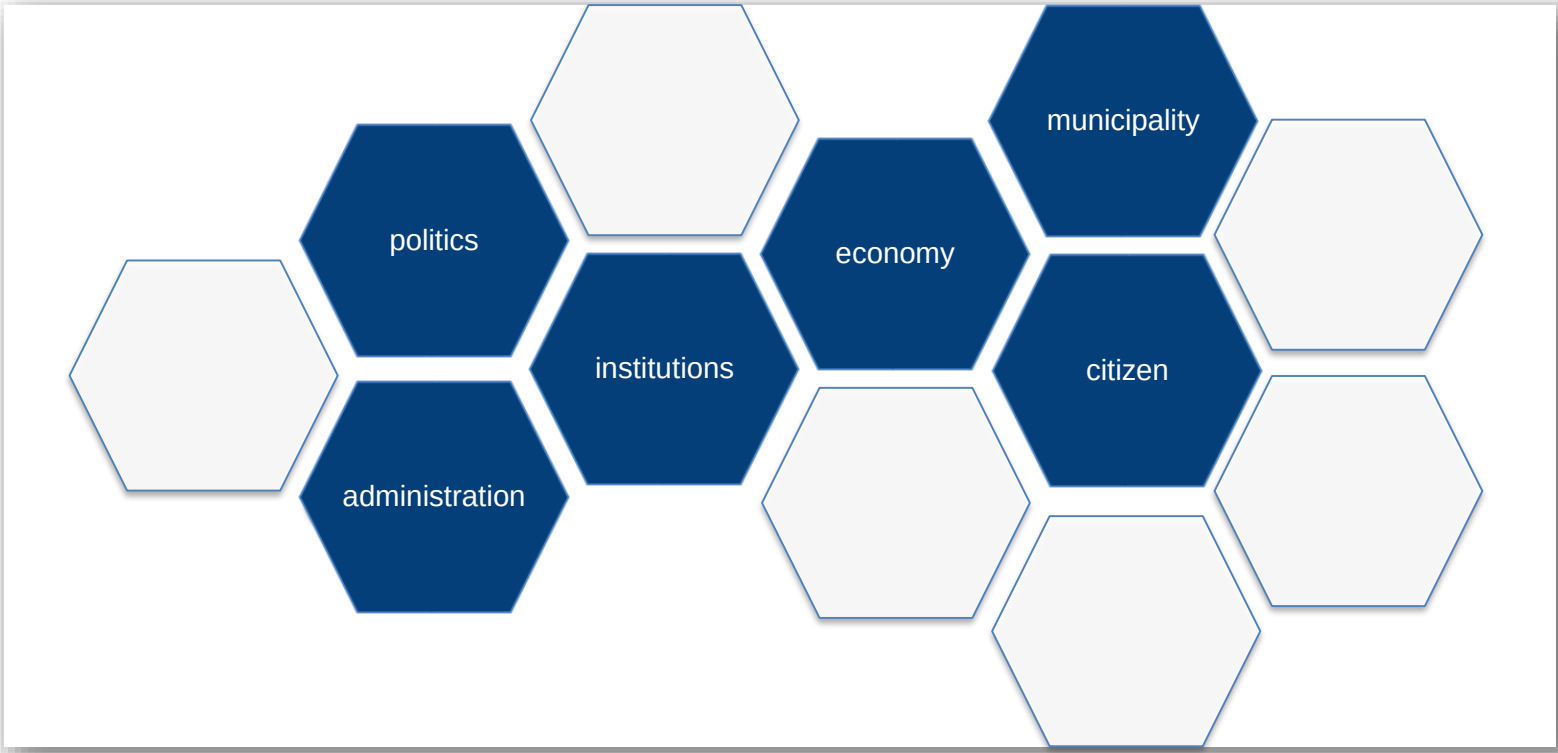
Source: EUROSTAT

Lifetime Global Warming Emissions for Cars in Austria

Gasoline Car 225g/km
Electric Car 30g/km



The cooperative way to achieve the goal



Lower Austria Electromobility-Strategy 2014-2020

Electromobility in Lower Austria makes a valuable contribution to CO2 and energy reduction, provides impulses for a new mobility behavior and strengthens economic power.

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Lower Austria Electromobility-Strategy 2014-2020

Goals and concrete measures

GOAL 1: 5% electromobility at overall car-stock in Lower Austria

M 1.1 Total cost of ownership advantage reached after five years

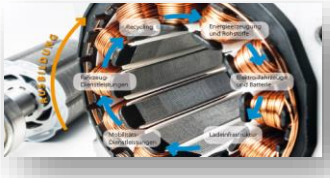
M 1.2 Outstanding infrastructure for electric cars established

M 1.3 Lower Austrians excited about e-mobility

GOAL 2: reduction of the individual traffic (25.000 people) through electromobility

M 2.1 E-mobility and multimodal transport linked

M 2.2 E-Bike applications expanded



GOAL 3: nationally outstanding growth rate of added value and employment in the area of electromobility

M 3.1 anchoring economic e-mobility potentials in companies

M 3.2 The most promising value-added sectors expanded

M 3.3 Strengthening research and education in the field of e-mobility

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Goals, measures and instruments

GOAL 1:
5% electromobility of overall car-stock in Lower Austria

M 1.1 Total cost of ownership advantage reached after 5 y

- Development of a promotion strategy 2017-2020
- Preparation and implementation of a financial support program for **private individuals**
- Preparation and implementation of a financial support program for **companies**
- Preparation and implementation of a financial support program for **municipalities**

M 1.2 Outstanding infrastructure for electric cars established

- Creation of an area plan for public and semi-public charging stations ✓
- Evaluation of the existing requirements and further development of the legal framework for the development of the charging infrastructure (public and not public)
- Implementation of non-monetary benefits for electric vehicles in road traffic ✓
- Expansion to the best e-vehicle dealer network in Austria
- Implementation of smart grid projects in combination with electromobility
- Ensure an interface between the federal government and the federal states in the holistic topic of electromobility
- Expansion of the charging infrastructure at public locations
- Awareness raising, advice and implementation to publicly accessible charging infrastructure
- Introduction of electric vehicles to the vehicle fleet of Lower Austria

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Goals, measures and instruments

GOAL 1:

5% electromobility of overall car-stock in Lower Austria

M 1.3 Lower Austrians excited about e-mobility

- Implementation of targeted events
- Carrying out targeted campaigns
- Implementation of awareness-raising pilot projects
- Lower Austrian Mobility Prize

GOAL 2: reduction of the individual traffic (25.000 people) through electromobility

M 2.1 E-mobility and multimodal transport linked

- Equipment of multimodal junctions with electrical infrastructure
- Support for development of e-car sharing in municipalities (further education / information / promotion)
- Support for municipalities in the conversion of municipal fleets incl. Charging infrastructure
- Incentive for electrification of shared taxi solutions
- Awareness raising and advice on the electrification of public, inner-city transport offers
- Support for multimodal or shared e-mobility in businesses, research and educational institutions
- Concept development and implementation of electrified public transport incl. On-demand traffic and e-car sharing in Lower Austria
- Preparation of electrical wiring in public park&ride lots

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Goals, measures and instruments

GOAL 2:

reduction of the individual traffic (25.000 people) through electromobility

M 2.2 E-Bike applications expanded

- "Train Station 2.0": Equipment with bike boxes / bike garages for bicycles (including e-bikes)
- initiate and accompany e-cargo bike pilot projects
- Carrying out an image campaign "e-bike for commuters"

GOAL 3: nationally outstanding growth rate of added value and employment in the area of electromobility

M 3.1 economic e-mobility potentials in companies

- Identification of economic potentials and qualifications of consultants ✓
- Financial support for individual consultation services for companies
- Symposium "e-Mobil in Niederösterreich"

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Goals, measures and instruments

GOAL 3:
nationally outstanding growth rate of added value and employment in the area of electromobility

M 3.2 The most promising value-added sectors expanded

- Initiate and accompany R & D and / or value-adding projects
- Support of start-up companies in the field of electromobility
- Development and initiation of optimal framework conditions to support the most promising value-added sectors

M 3.3 Strengthening research and education in the field of e-mobility

- Support for companies and research institutions in the context of R & D technology promotion programs and promotional calls
- Encourage training for companies and training institutions
- Fostering the school and university education and training in Lower Austria
- Knowledge transfer from other successful EU electromobility regions ✓

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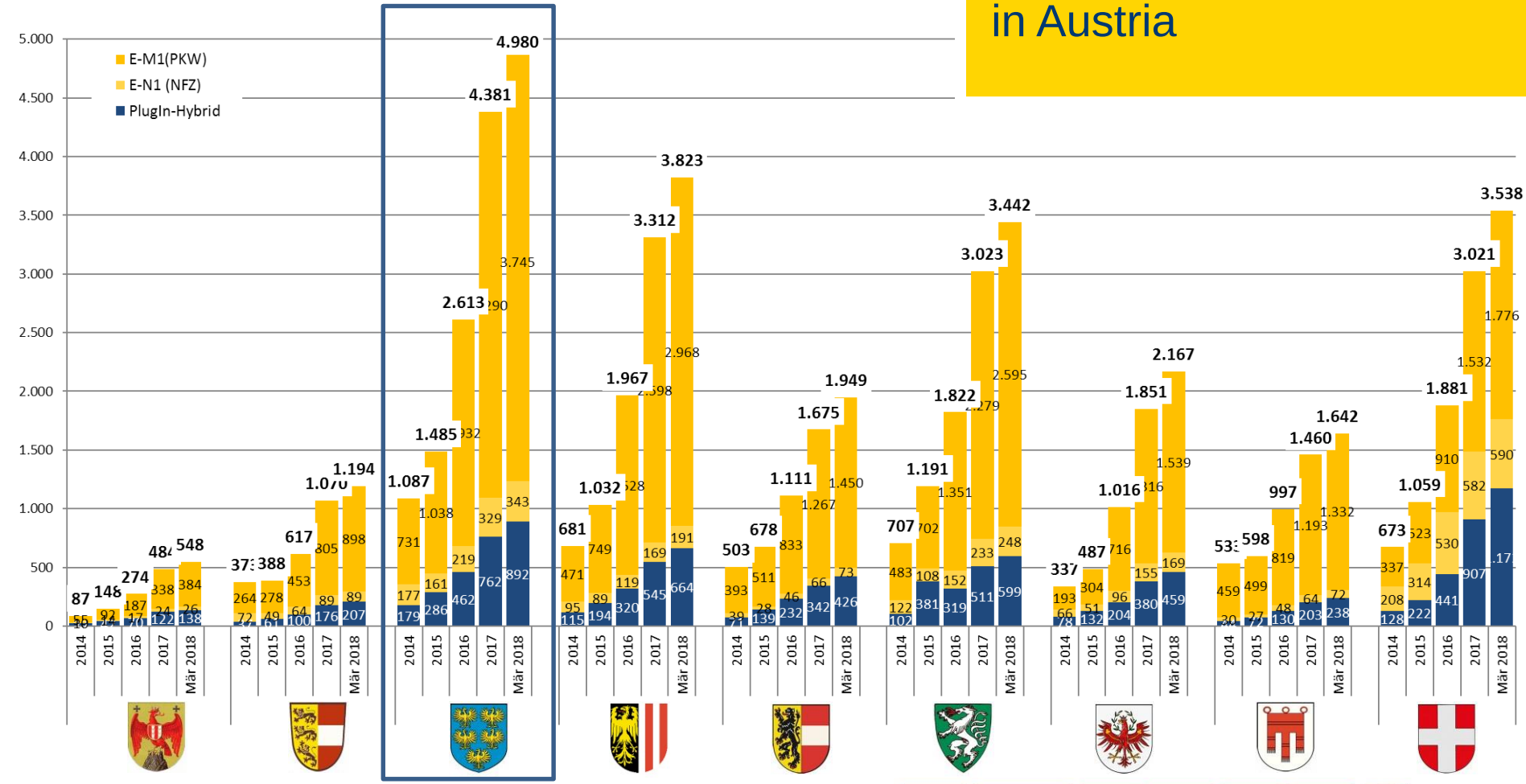
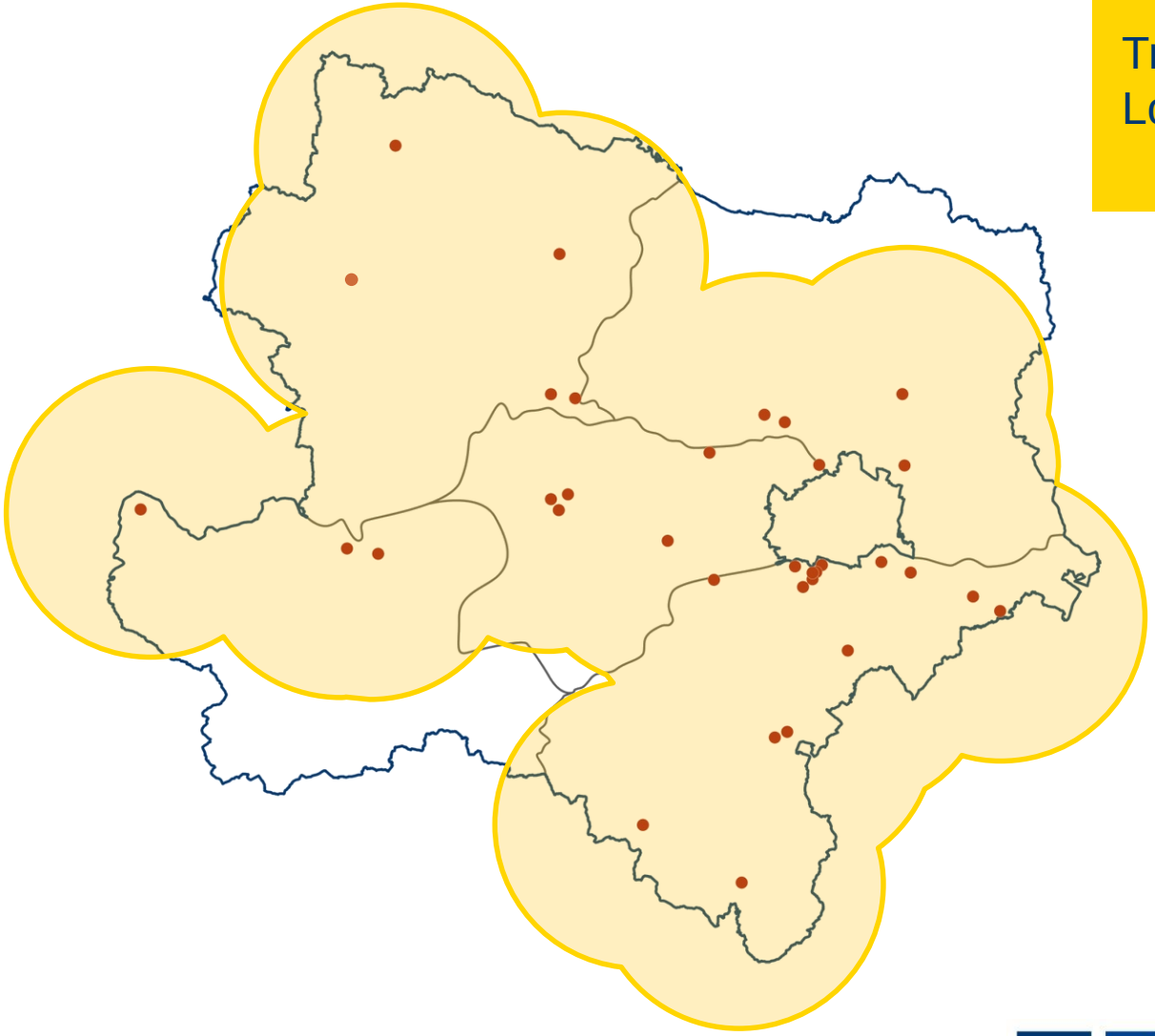
BEV, Plug-IN & REX in Austria



Source: Statistik Austria



Triple Fastcharger Lower Austria

45 Triple Fastcharger in Lower Austria

Charging Power	Number
20kW	**9**
50kW	**37**

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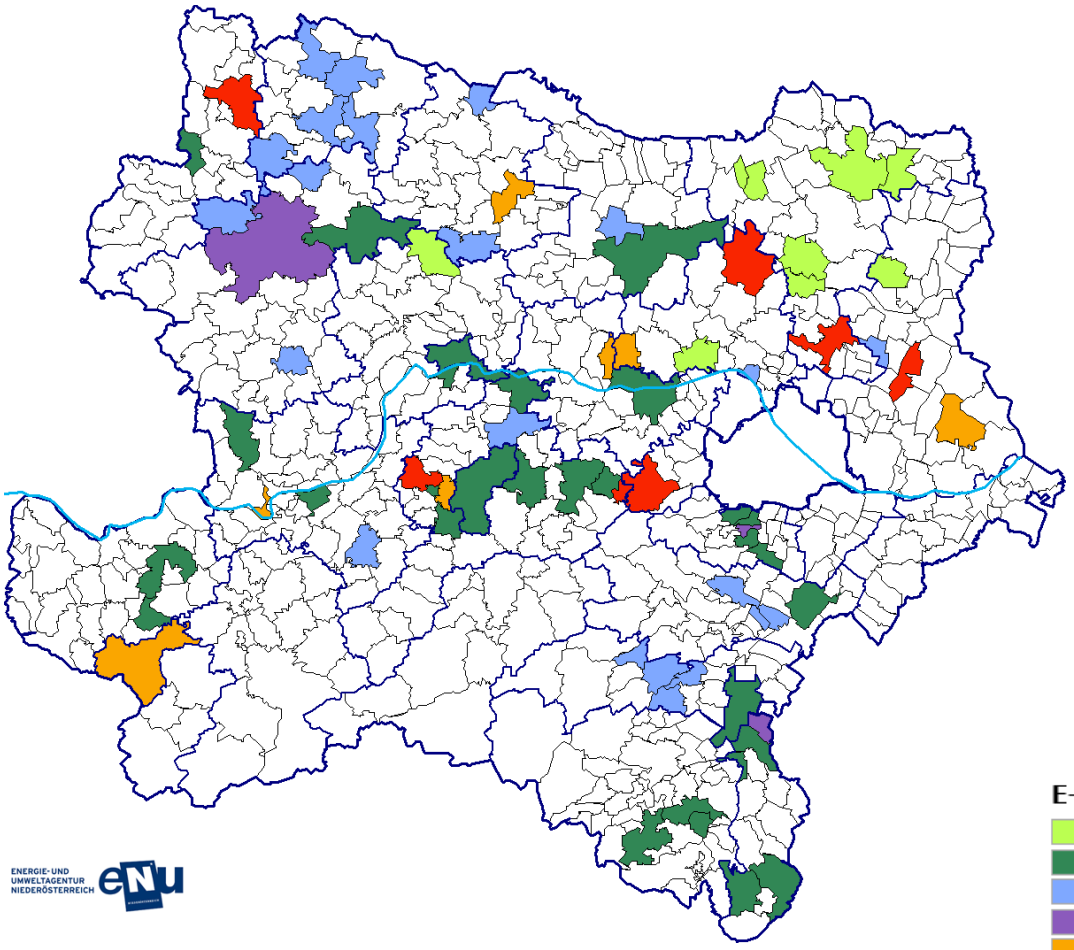
e-Car sharing in Lower Austria

More than 90 e-Car sharing vehicles
in 80 e-Car sharing projects



e-mobil in niederösterreich

The challenge

- as a private buyer you usually get an electric car only for a few hours, max. for a day from a dealer
- In this short time, the new technology can not be tested in everyday life

How it works

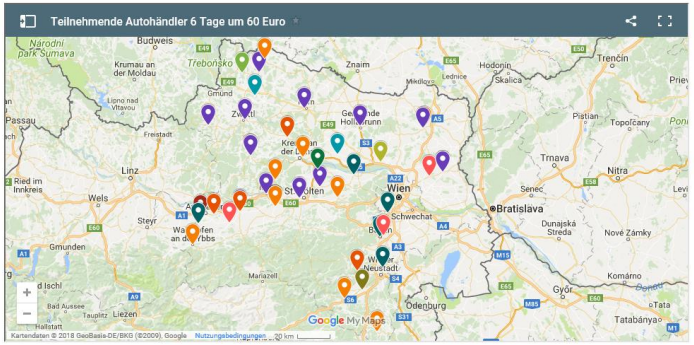
- dealers register and provide the vehicles to get listed on the homepage www.e-mobil-noe.at/testwoche
- private users sign up for the 6-day test use and pay 60 euros at the retailer
- detailed training by the dealer before handover
- the dealer takes over the further funding submission

The result

- in 2017, more than 1,500 people were already able to test electric cars
- Due to the success, the offer was extended to the year 2018

www.e-mobil-noe.at/testwoche

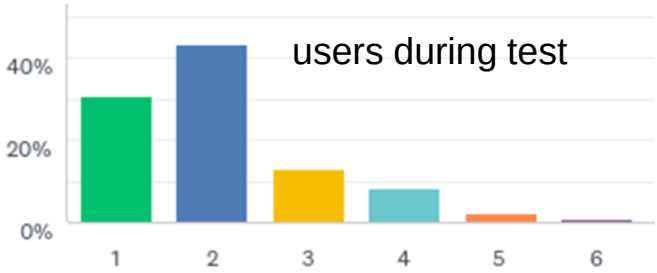
promotion 6 days test use for 60 euros

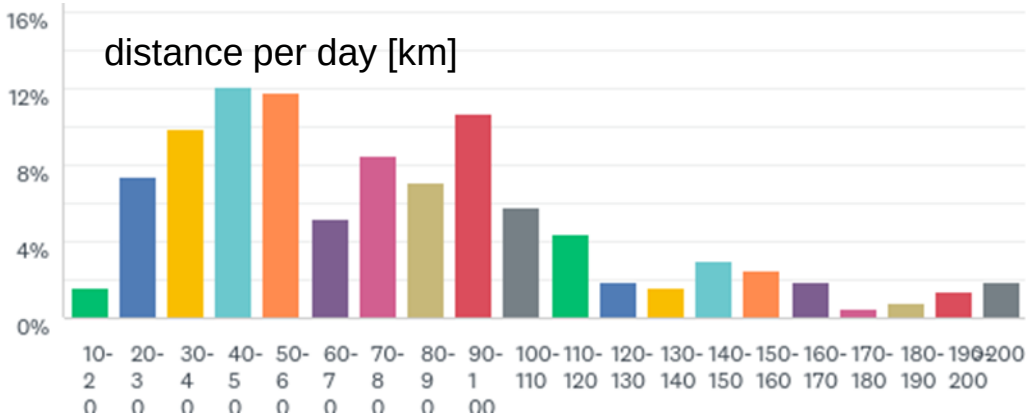


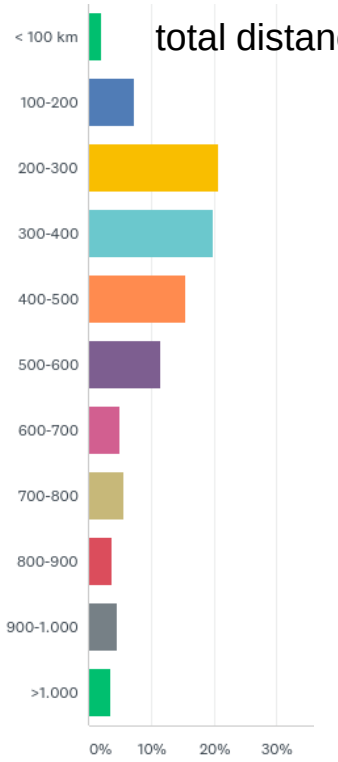
Europäische Union Investitionen in Wachstum & Beschäftigung. Österreich.

The evaluation of our online survey (> 400 returns)

promotion 6 days test use for 60 euros





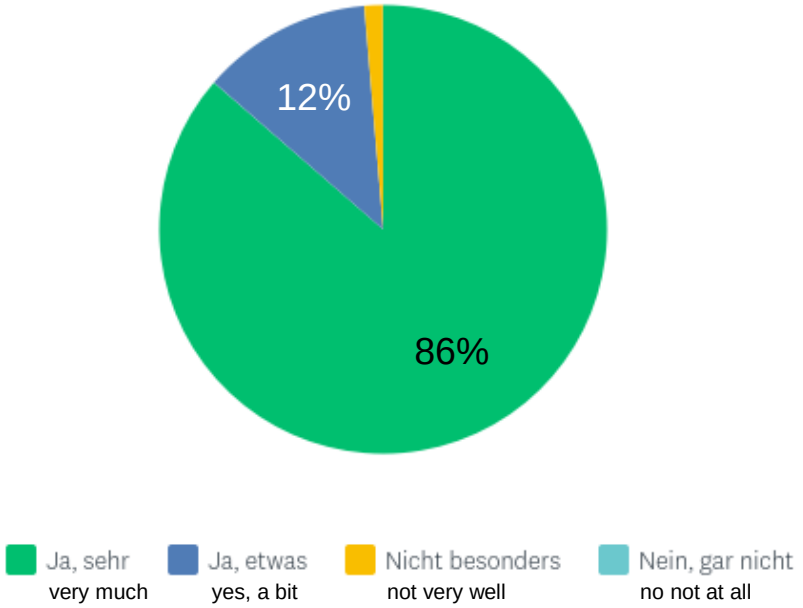


Europäische Union Investitionen in Wachstum & Beschäftigung. Österreich.

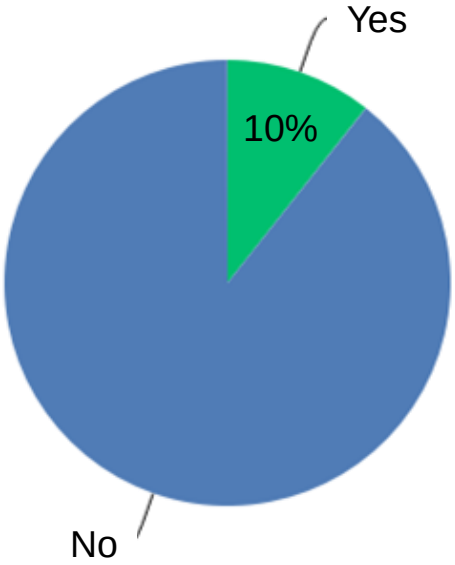
The evaluation of our online survey (> 400 returns)

promotion 6 days test use for 60 euros

Was it fun to drive electrically?



I already ordered an e-car after or due to the test week



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Field test in Seitenstetten

Initial questions:

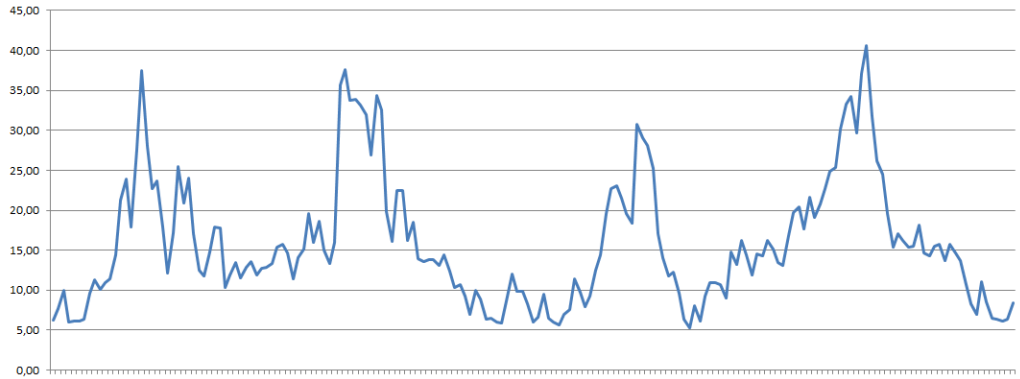
Are electric vehicles on the electricity distribution network

- a cost driver for grid expansion?
- a huge extra load?
- a risk to security of supply?

Approach to the experiment

P (U) Control of charging power at home

- regulation of the charging power with respect to the supply voltage
- decentralized units, no networking and data exchange between charging stations
- use of free network reserves



Additional questions

- Acceptance
- Users' difficulties
- Range problem

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Field test in Seitenstetten

Scope and process

- Selection of the network section by the network operator (network with high PV density, control transformer voltage measurements in the branches available, control transformer set during the experiment to constant mains voltage)
- Invitation of households by mail 28 people out of 18 households (16 households, 2 farms) out of a total of 25 possible households have applied to participate
- Raffle of 23 vehicles for the 18 interested households, 5 (6) households with second vehicles
- Households were equipped with charging stations, the installation was checked by an electrician and the circuit breaker was replaced
- For the period from September 25th to November 3rd, the participants were provided with an electric vehicle
- The participants agreed to use the electric vehicle for all routes (if possible) in their every day transportation wherever possible

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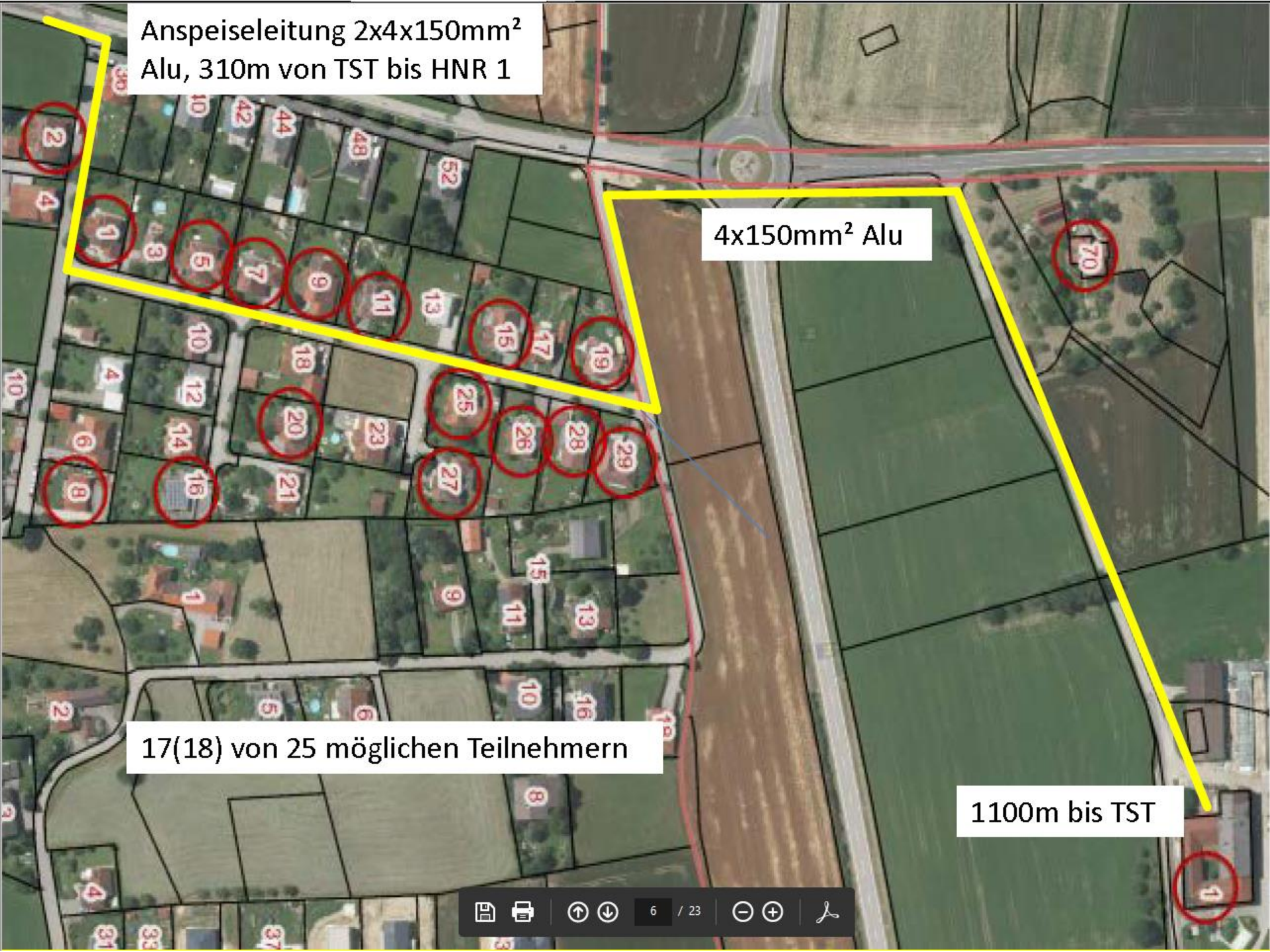
Anspeiseleitung 2x4x150mm²
Alu, 310m von TST bis HNR 1
4x150mm² Alu
17(18) von 25 möglichen Teilnehmern
1100m bis TST
6 / 23

Field test in Seitenstetten

Requirements of the network operator (power limits)

- 8% voltage drop: delayed switch-off after max. 1 min
- 10% voltage drop: immediately shut down

All charging stations are limited to 11kW charging power (16 Amps three-phase current), higher charging powers were not possible due to the existing home installations.

Data collection

- Online data acquisition every minute via own transducers and Linemetrics data concentrators and evaluation software
- Parallel data acquisition every 15 minutes in the demand side management system
- Upgrading of household energy meters to special ¼ hour performance energy meters
- GPS data logger in the vehicles

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	First vehicle	Second vehicle	Theoretic max charging power	Actual charging power (field trial)	cos phi
BMW i3, 33kWh	4		11kW 3ph	10,3 kVA	0,94 – 0,97
Nissan Leaf, 30kWh	4	2	7,2kW 1ph	3,5 kVA	0,95 – 0,98
VW e-Golf, 36kWh	6		7,2 kW 2ph	7,2 kVA	0,96 – 0,98
Kia Soul, 27kWh	3	1	7,2 kW 1ph	3,2 kVA	0,97 – 0,99
Renault Zoe, 22kWh	1	2	22 kW 3 ph	10,3 kVA	0,62

Charging power of all vehicles	149,1 kVA
Max. simultaneous charging power	124,8 kVA

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Field test in Seitenstetten

Mobility data from the personal survey, from driver's log and measurement data

Initial situation

- 18 households, 38 vehicles, 48 vehicle users, 568.000km annual mileage

Results

- 53,100 km of electric vehicle driving (1,172 km to 3,653 km), 2,309 km per vehicle
- corresponds to 22,400 km / vehicle

Energy demand at home charging stations:

- 8,189 kWh, 9.5 kWh / day per household and vehicle
  (about 89% of the required electricity was fueled at home)

Average consumption:

- 17.3 kWh / 100 km (13.0 -22.0)

The distance covered by e-vehicles (53,100km) corresponds to approx. 91% of the total annual mileage of the participating households. (disproportionate use during the test)

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Field test in Seitenstetten

What does the P (U) control mean for the charging process and the power grids

- reduction of the charging power or an extension of the charging times at the stations at the end of the electricity network in the evening hours
- temporary shutdowns of the charging process
- efficient protection of the mains voltage against impermissible shortfalls

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Field test in Seitenstetten

Results

- Voltage controls worked perfectly, there was no undue undershooting of the voltages at the charging points
- Voltage-related shutdowns have not led to any interruptions in the charging process, charging has restarted after voltage increase
- Delays in the charges due to regulatory intervention were not perceived as disturbing
- Local voltage regulation worked mainly at the end of the network
- Long power lines within the households lead to significant voltage drops and the reduction of charging power was seen more often
- Demand side management for vehicles with low charging capability lead to enormous charging times
- Demand side management in the late evening significantly relieved the distribution network

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Field test in Seitenstetten

	Energy consuption	Peak Load	# of e-cars
Week 1	1,223 kVAh	47 kVA	16
Week 2	1,598 kVAh	42,8 kVA	22
Week 3	1,728 kVAh	60,0 kVA	23
Week 4	1,617 kVAh, 1,500 kWh	43,6 kVA	23
Week 5	1,487 kVAh, 1,380 kWh	57,7 kVA*	23
Week 6 (5 days)	1,184 kVAh, 1,092 kWh	49,6 kVA*	23

*) Demand side management test period

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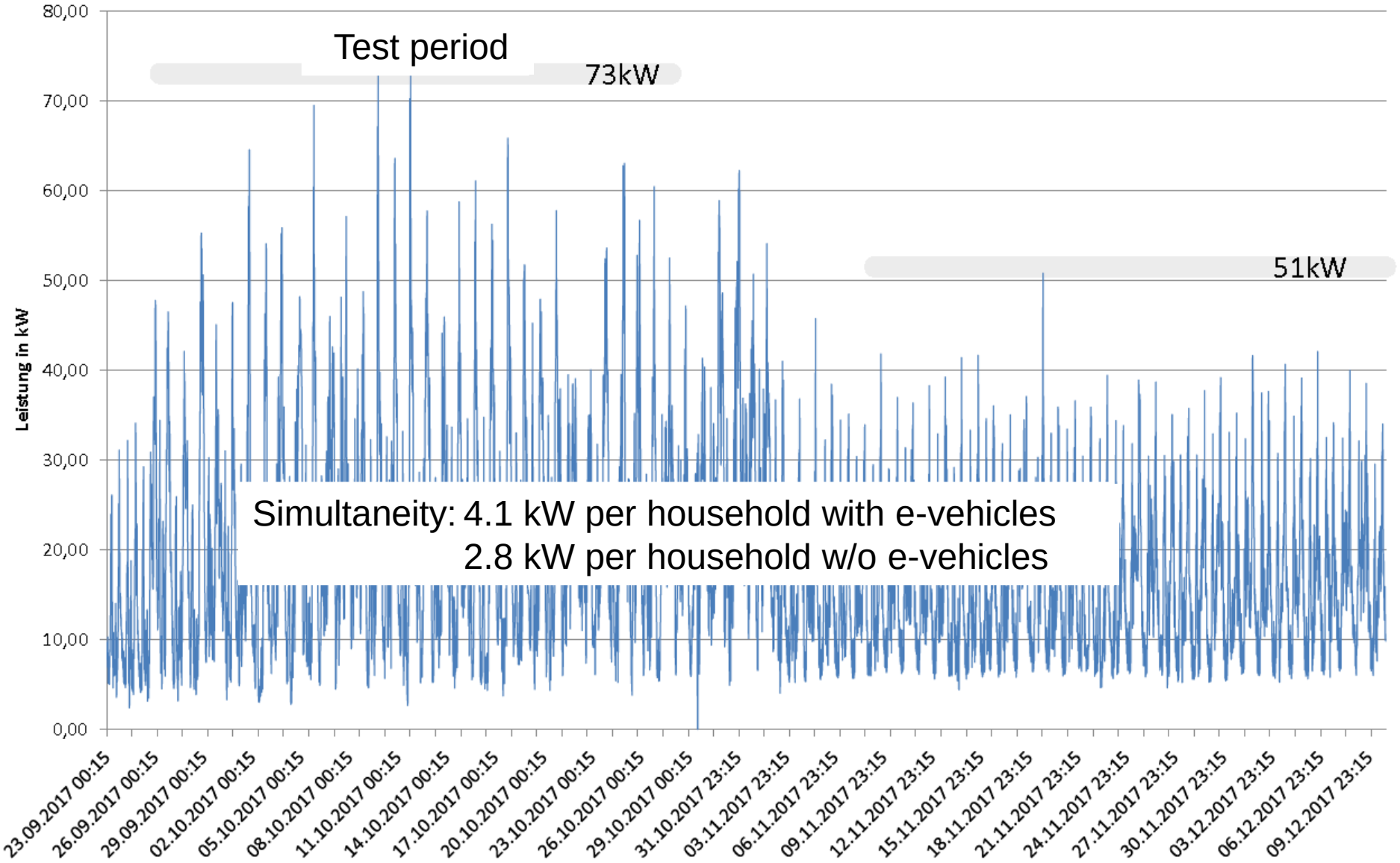
Feldtest Seitenstetten

Accumulation of all participating household load curves in the field test



Field test in Seitenstetten

Mobility data from the personal survey, from driver's log and measurement data

- Fifteen out of 18 respondents said they drove more than 90% of their journeys
- 17 out of 20 interviewees said they got used to the vehicle within a day, and the charge was "habit" for 19 participants within a day
- Eighteen out of 19 interviewees said they had no problem with the range of the e-vehicle in daytime traffic
- None of the participants perceived the duration for charging as a limitation

Conclusions

- The vehicles on the market and the existing infrastructure already meets the essential mobility needs
- A P(U) control (voltage regulation of the charging power) is suitable for using "existing free network capacities" in rural networks. Minor charging delays did not cause problems.

TODOs

- Further development of the P(U) control in P(U, impedance) control

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„e-mobil in niederösterreich“

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