Trends of changes in waste management and possible optimizations within the waste collection process

Prof. Dr.-Ing. Klaus Gellenbeck

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Past

Source: GGAWB e.V. Gütegemeinschaft Abfall- und Wertstoff-Behälter, Köln

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Today / Future

material	weight	material	weight
silicon	24,8803	bismuth	0,0063
plastic	22,9907	chromium	0,0063
icon	20,4712	mercury	0,0022
aluminium	14,1723	germanium	0,0016
copper	6,9287	gold	0,0016
lead	6,2988	indium	0,0016
zinc	2,2046	ruthenium	0,0016
tin	1,0078	selenium	0,0016
nickel	0,8503	arsenic	0,0013
barium	0,0315	gallium	0,0013
manganese	0,0315	palladium	0,0003
silver	0,0189	europium	0,0002
beryllium	0,0157	niobium	0,0002
cobalt	0,0157	vanadium	0,0002
tantalum	0,0157	yttrium	0,0002
titanium	0,0157	platinum	in traces
antimony	0,0094	rhodium	in traces
cadmium	0,0094	terbium	in traces

Material components of average mobile phone
(Weight proportion in %) *(Bardt, 2010)*

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Company Description

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Institute for Waste, Waste Water and Infrastructure Management GmbH

- **INFA: German consulting and research company, active in the field of developing waste management concepts for international projects since 1985**
- **Environmentally friendly waste recovery and disposal, disposal logistics, and quality management along with related base analyses and organisational consulting and software**
- **Interdisciplinary working institute**
- **number of employees: 50**

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Software Portfolio of INFA GmbH

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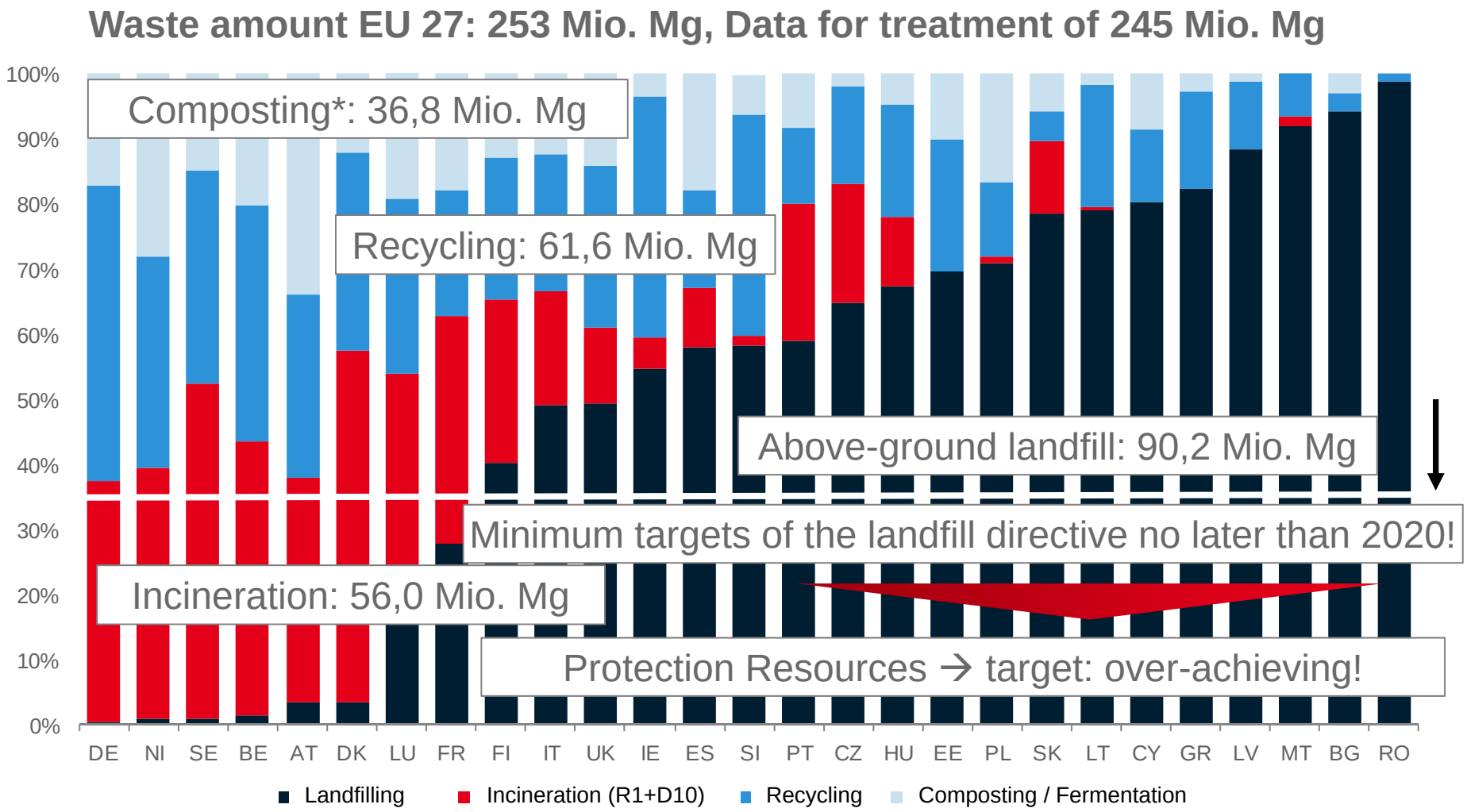
Treatment of Urban Waste in Europe (2011) (without NO + CH)



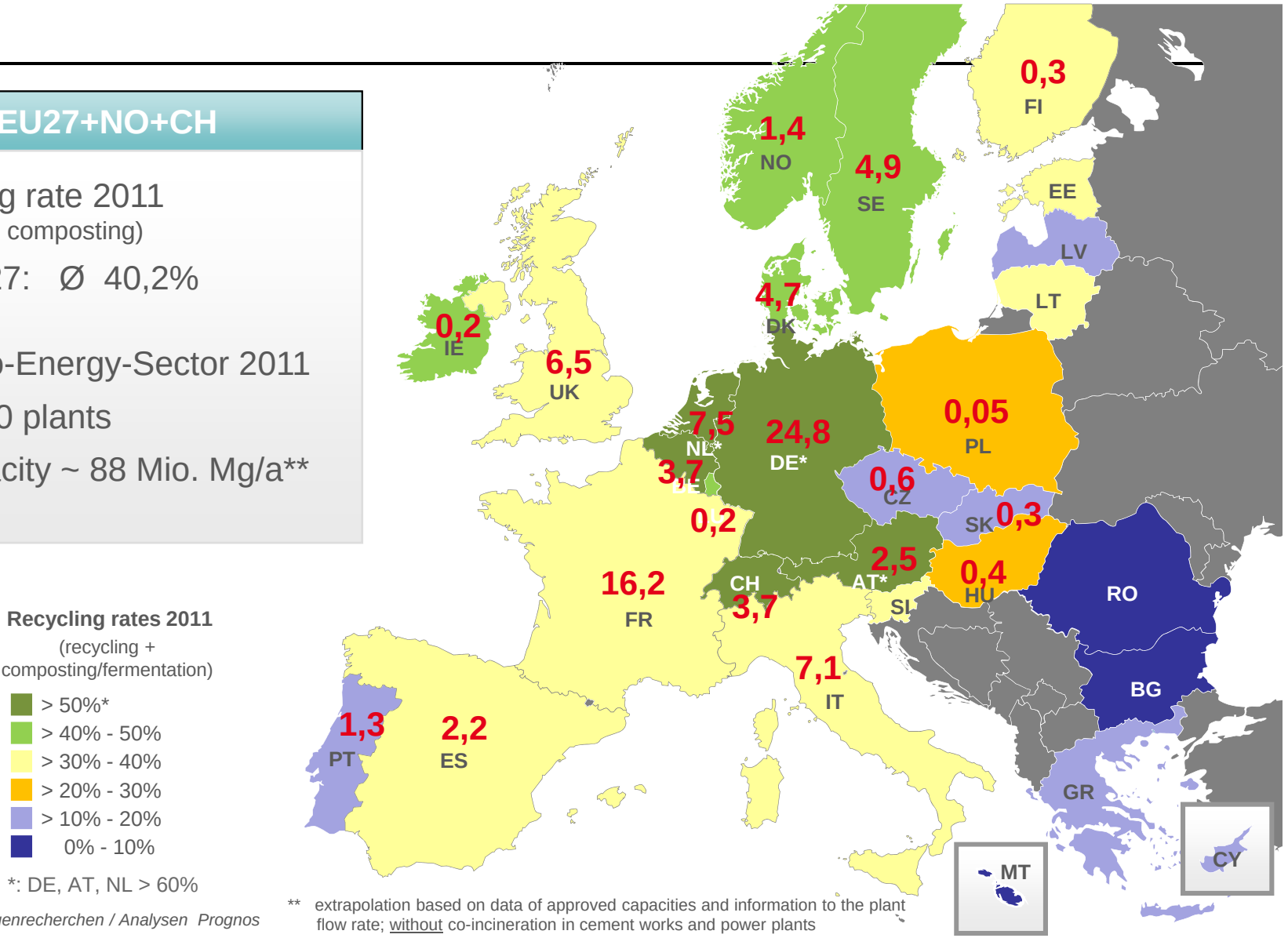
*: including fermentation processes and mechanical-biological treatment (e.g. for mixed waste)

source: Eurostat; Daten für 2011

Recycling Rates and Waste-to-Energy Capacities 2011

Situation EU27+NO+CH

- Recycling rate 2011
  (recycling + composting)
  - EU 27: Ø 40,2%
- Waste-to-Energy-Sector 2011
  - ~ 500 plants
  - capacity ~ 88 Mio. Mg/a**



Recycling rates 2011
(recycling + composting/fermentation)

- > 50%*
- > 40% - 50%
- > 30% - 40%
- > 20% - 30%
- > 10% - 20%
- 0% - 10%

*: DE, AT, NL > 60%

source: Eurostat, Eigenrecherchen / Analysen Prognos

** extrapolation based on data of approved capacities and information to the plant flow rate; without co-incineration in cement works and power plants

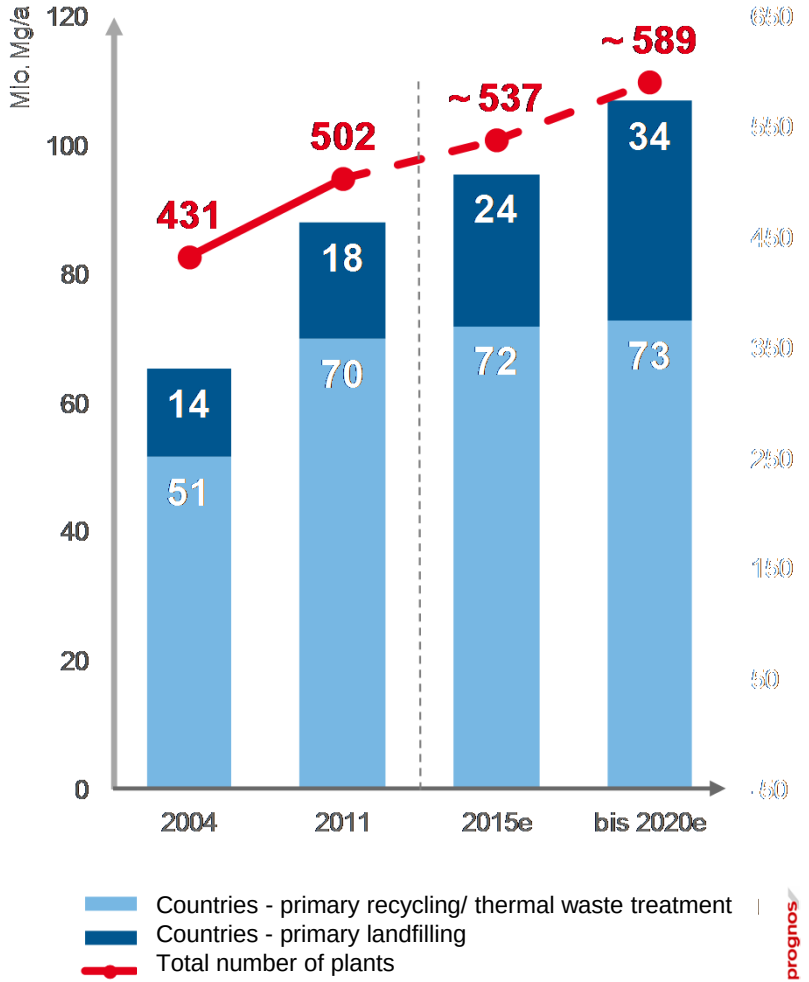
Waste-to-Energy – Expansion Needs

Development trends 2020 (lower scenario)

- Countries with primary recycling/ thermal waste treatment in 2011*
  - Capacity increase (new construction and extension):
    ca. 3 Mio. Mg/a (+ 4%)
- **Countries with primary landfilling in 2011****
  - **Capacity increase (new construction and extension):**
    ca. 16 Mio. Mg/a (+ 88%)

High market dynamics in UK, Implementation of demand capabilities in eastern Europe is braked by limited financing possibilities

source: Eigenrecherchen / Analysen und Prognosen Prognos

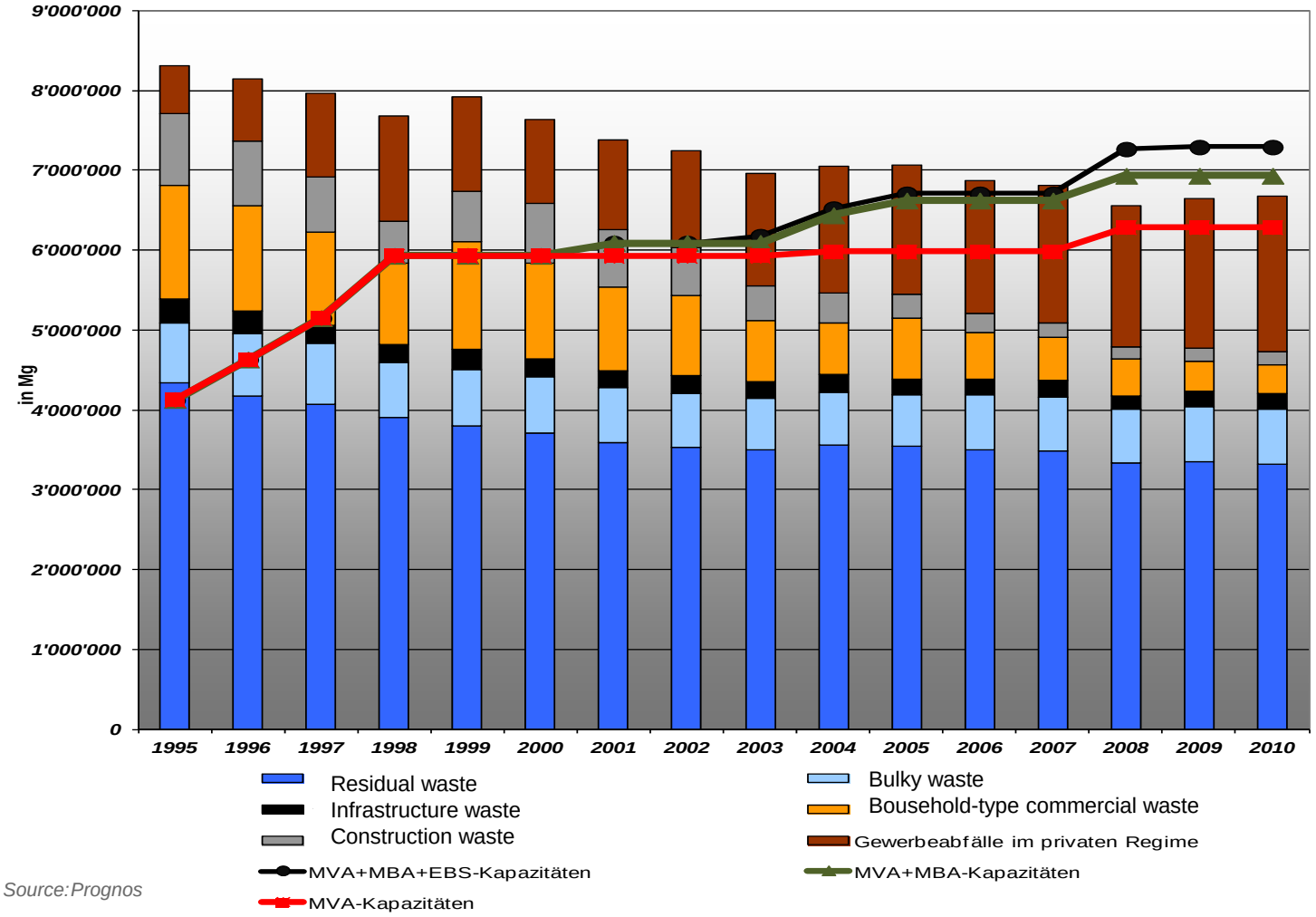


* Recycling and recovery rate > 60%

** Recycling and recovery rate < 60%

Recycling Quota and Waste Amount in Germany

- Development of waste that has to be pretreated -



Source: Prognos

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Recycling Quota and Waste Amount per Inhabitant
Example: Germany

	kg/(Inh*a) (average value)
residual waste	200
bio waste	100
paper	80
glass	30
light packaging	25
total	435

(additional other materials: bulky waste, used clothing, small quantities of hazardous waste, waste electronic and electrical equipment and many more)

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Recycling Quotae and Financing Challenge

- Development of the waste amount -

residual waste

bio waste

paper

glass

recyclable material

waste

raw material management
changed material flow

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1. General waste management in europe

2. Optimization process of disposal logistics
   a. Technologies (collection systems, Vehicles etc.)
   b. Benchmarking
   c. Optimization

3. The future and sustainability of waste management

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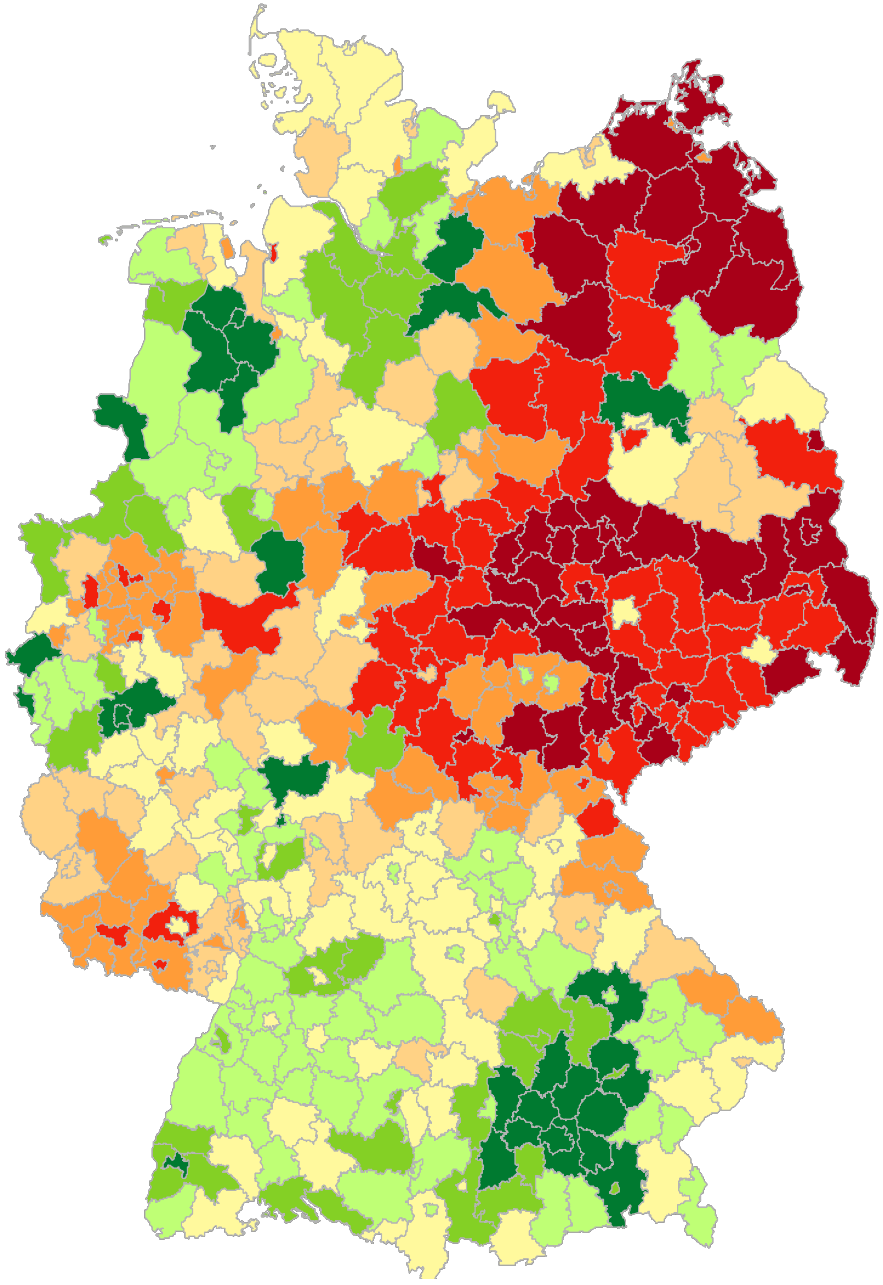
Regionally differentiated population development through 2030



- Population development from 2005 through 2030 in the **439** administrative districts and urban districts of Germany:
  - **54%** will shrink by more than 5%
  - **40 %** will stagnate (+/- 5%)
  - **6 %** will grow by more than 5 %.
- **Population growth** is mainly concentrated in the rural areas of large cities and metropolitan areas.
- The **sign of demographic change** will **change** in more than half of the municipalities over the next few years.

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Technologies

- Collection systems / Vehicle technology (rearloader) -

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Technologies

- Collection systems / Vehicle technology (rearloader) -

Bag: green dot system

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Technologies

- Collection systems / Vehicle technology (sideloader) in rural areas -

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Technologies

- Collection systems / Vehicle technology (underground containers) -

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Benchmarking and process optimisation

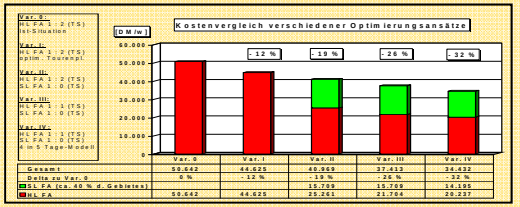
- Standard Optimization Procedure In The Field Of “Disposal Logistics” and “Street Cleansing” -

Bestandsaufnahme (Survey of…)

- **Analysis of existing Operating- and Organisation Data**

- **Survey of Performance Parameters in the operational area such as employees, vehicles etc. (accompanying Tours etc)**

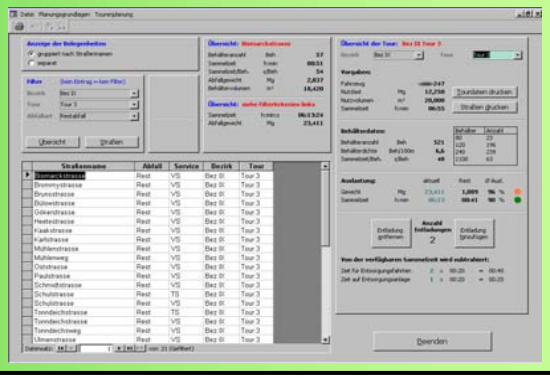
Bewertung (Evaluation of…)

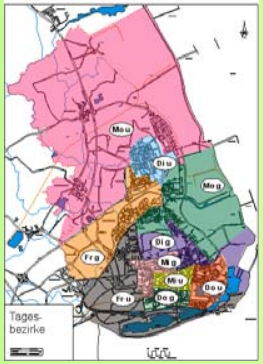


- **existing performance in consideration of respective basic parameters**
- **detailed comparison of performance with other companies/ cities**

Optimierungsmöglichkeiten (Optimization options…)

- **Illustration and calculation of different potential optimization options and cost reductions**
- **Optimization of Organisation and Routeplanning**





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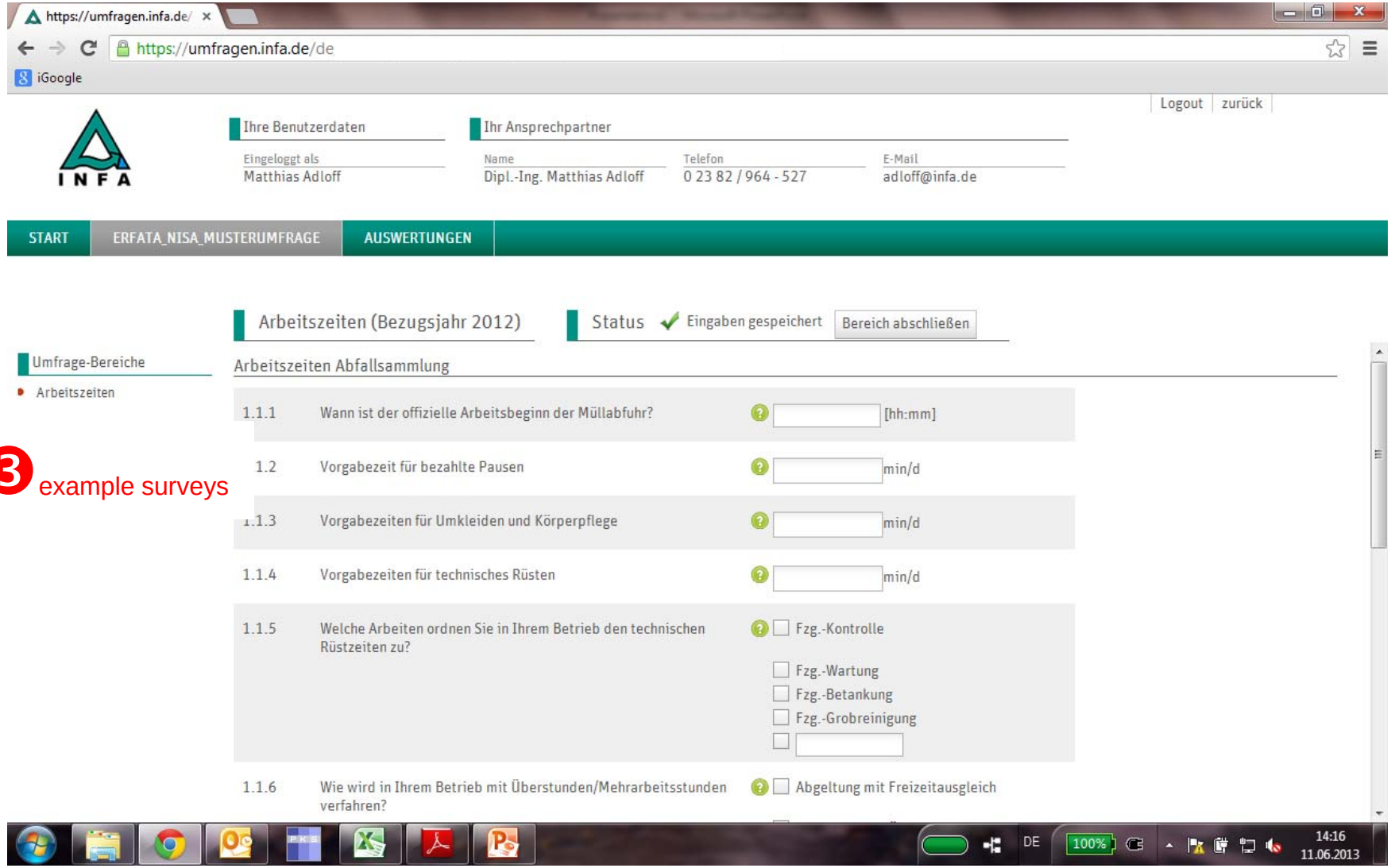
Benchmarking

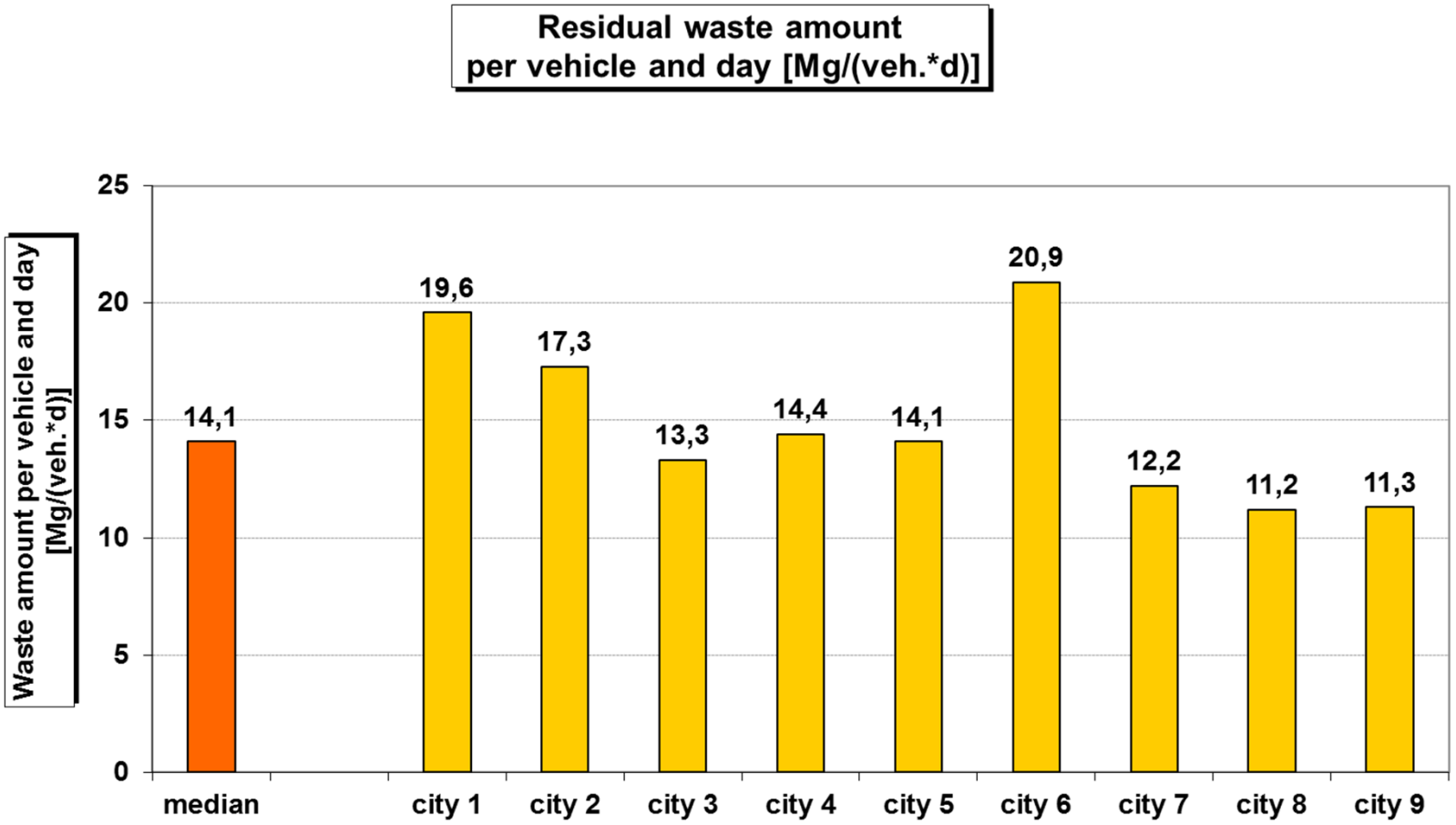
- INFA-Online-Softwaretool -



❸ example surveys

Benchmarking

- results (1. ex.) -



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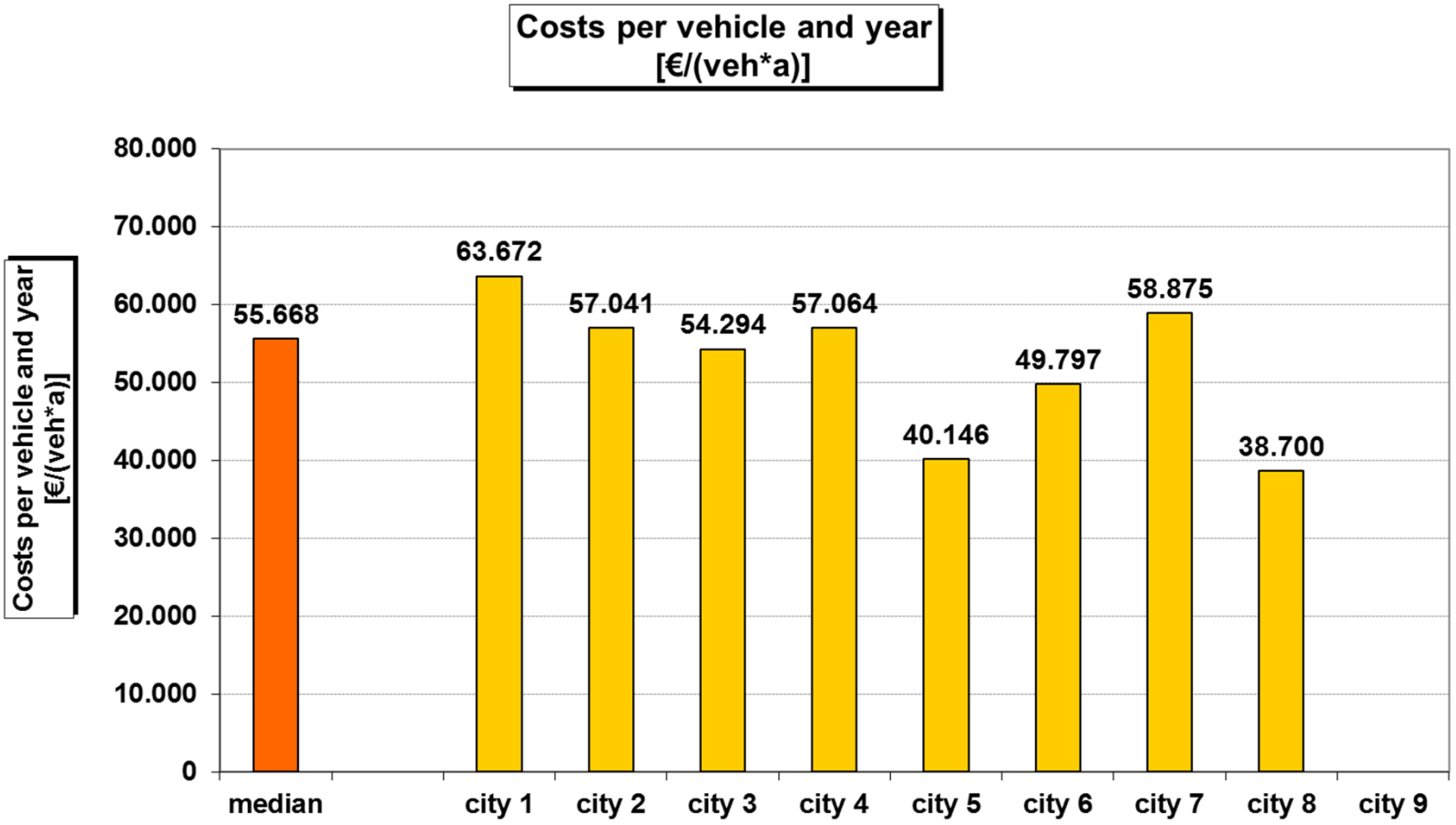
Benchmarking

- results (2. ex.) -



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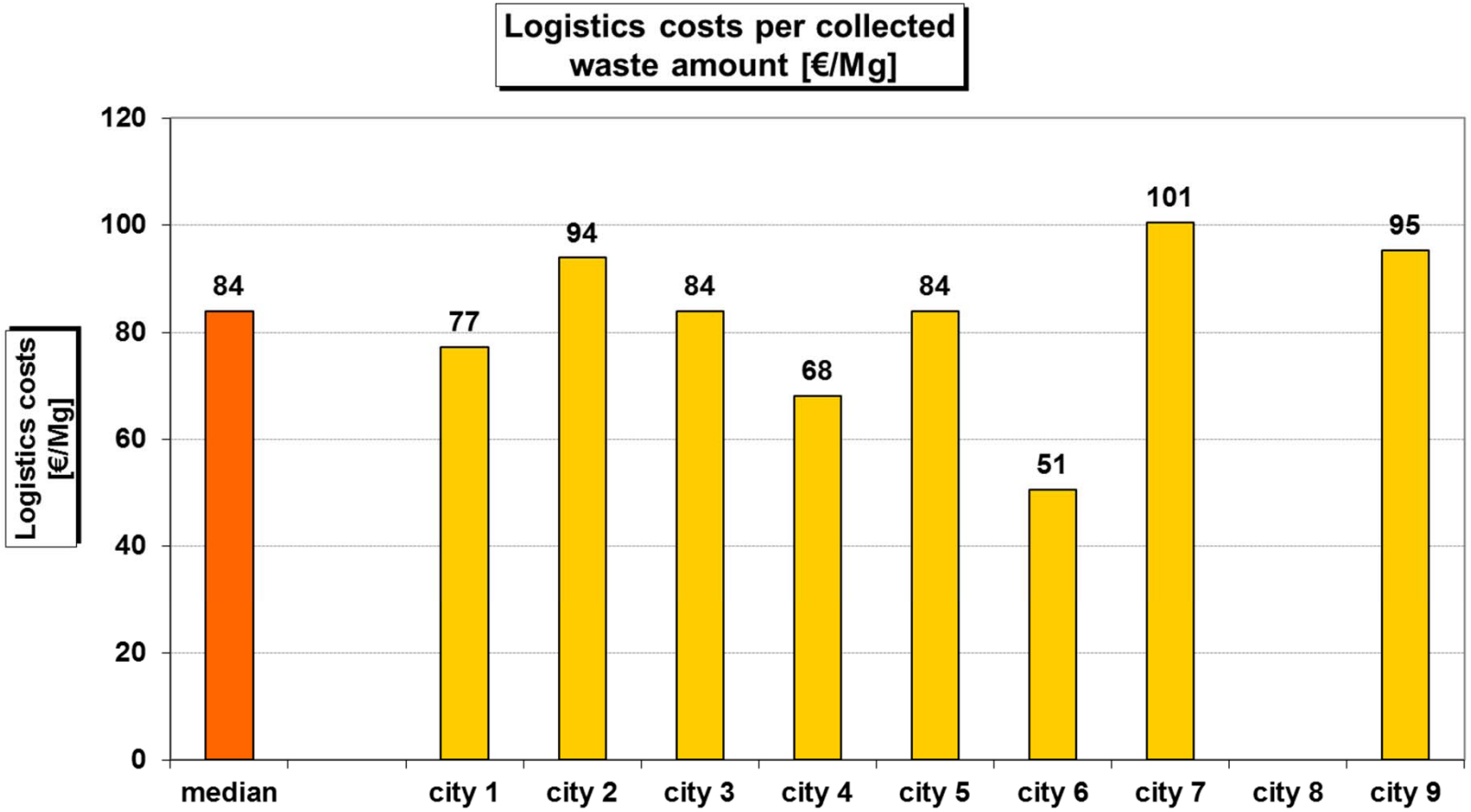
Benchmarking

- results (3. ex.) -



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Optimisation process of disposal logistics

- project with SNAGA company in Ljubljana -

1. **Optimization project SNAGA company in Ljubljana (2009/2010)**
   - Review of initial data
   - Trip recorder analysis
   - Accompanying tours
   - Benchmarking in comparison with other companies (Germany, Austria)
   - Suggested changes and effects on business performance
2. **SNAGA realized INFA suggestions arising from the optimization project**
   - reduction in emptying intervals etc.
3. **Implementation of INFA-DSPE software to plan and optimize the collection routes (2012/2013)**
   - reduce of various collection vehicles
     - result of the reduced emptying intervalls
     - result of optmized routes with less transportation ways etc.

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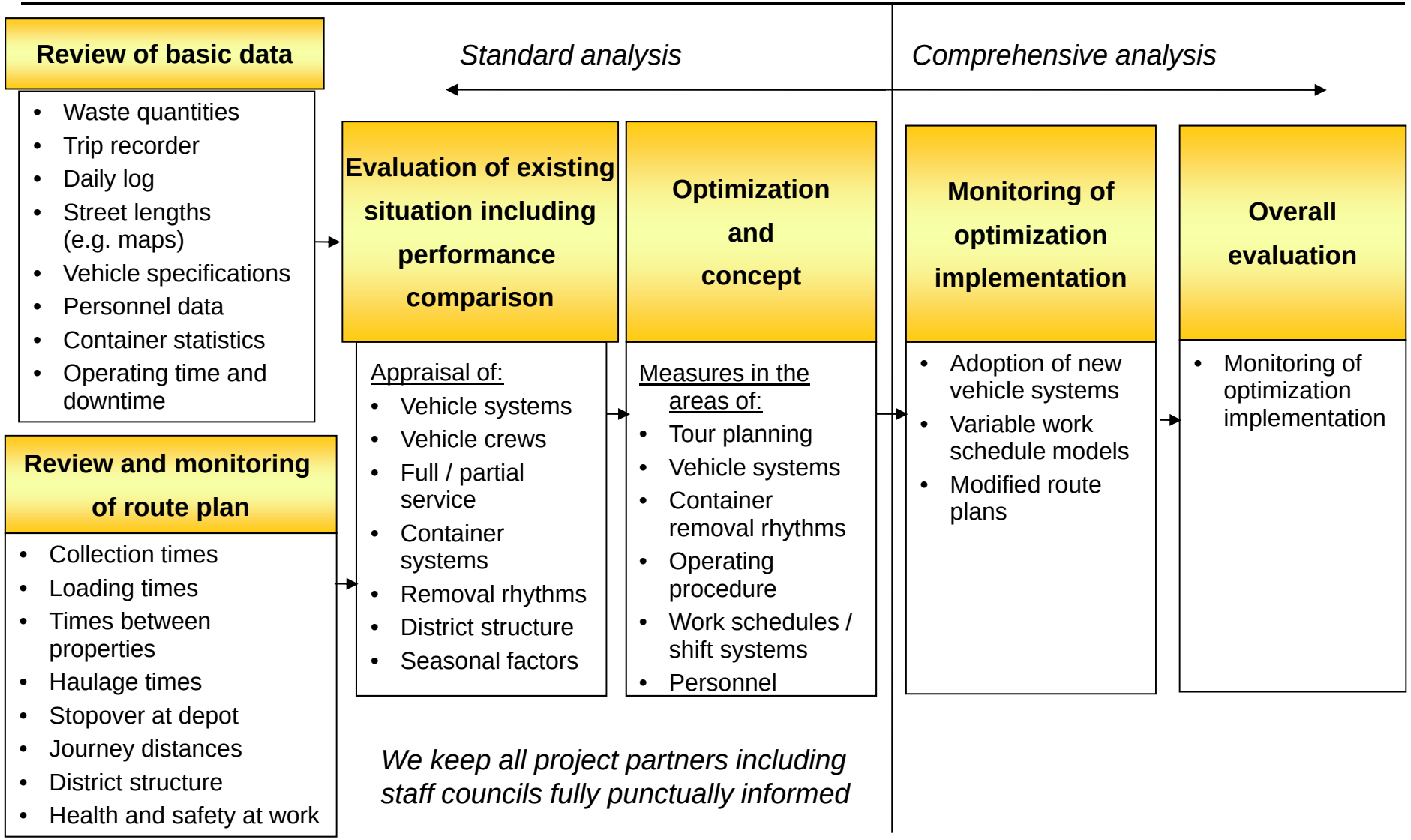
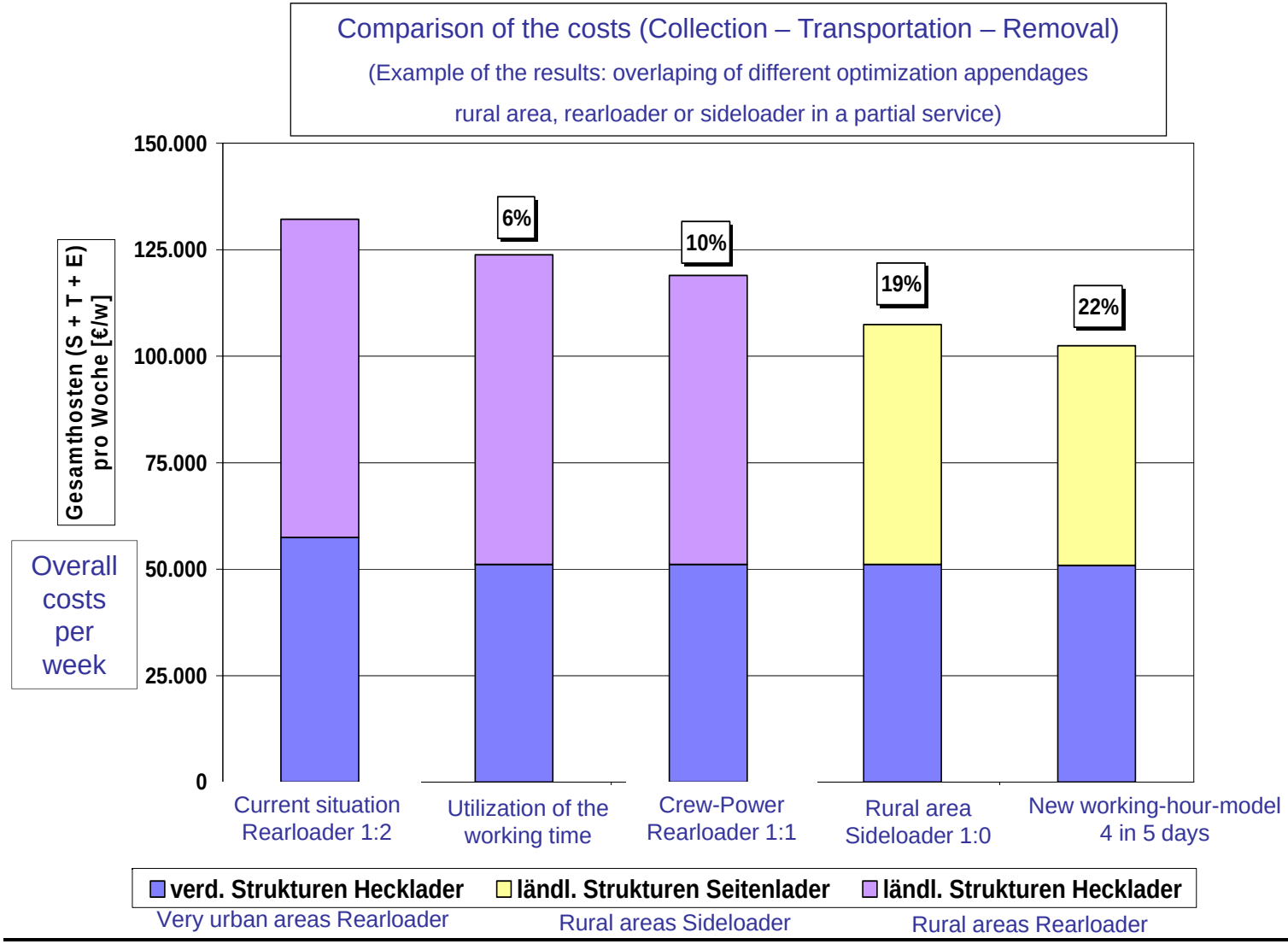
Disposal Logistics

- procedure investigation -



Monetary Effects (not SNAGA)



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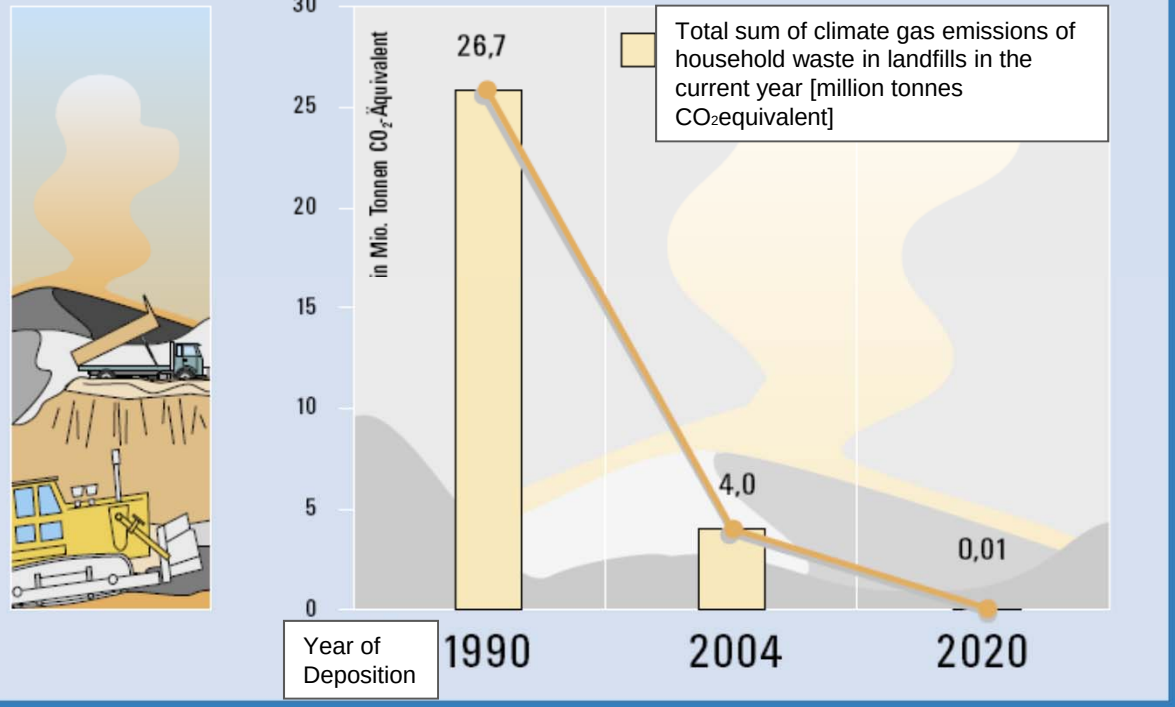
Ecology

- Waste Management and Protection of Resources -

Waste deposited after 2005 emits almost no climate gases
The end of a climate killer



Quelle: IFEU-Studie, 2006, Umweltbundesamt (UBA)

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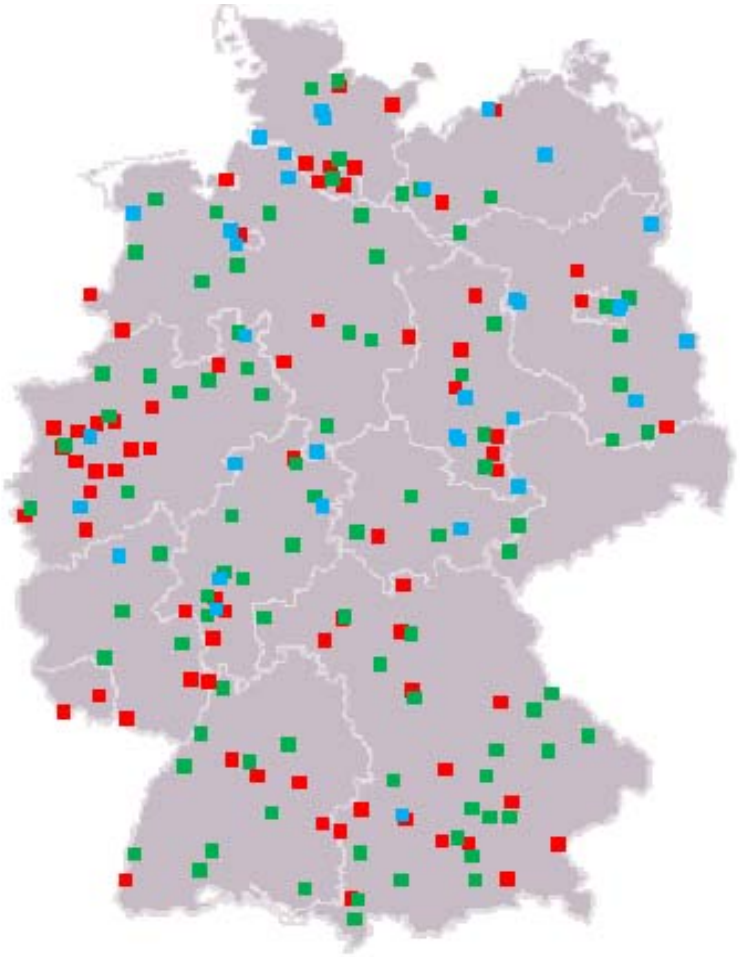
Ecology

- Measures of Waste Management for Power: decentralised energy supply -



Durchsatz/a	-	Flow-rate/a	
Wärmeabgabe	-	Heat emission	
Stromabgabe	-	Power supply	

 MVA	Durchsatz/a	19	Mio. Mg	Incineration plant
	Wärmeabgabe	14	Mio. MWh	
	Stromabgabe	7	Mio. MWh	
 EBS-Kraftwerke	Durchsatz/a	5,5	Mio. Mg	Refuse derived fuel (RDF-) power plant
	Wärmeabgabe	10	Mio. MWh	
	Stromabgabe	4	Mio. MWh	
 Bioabfall-vergärung*	Durchsatz/a	4	Mio. Mg	Biowaste fermentation
	Wärmeabgabe**	0,84	Mio. MWh	
	Stromabgabe	0,84	Mio. MWh	

*) In Karte nur ausgewählte Vergärungsanlagen mit > 5.000 Mg/a Bioabfalleinsatz dargestellt.

**) Geschätzte Bruttowärmeerzeugung.

Quelle: Faulstich, 2012

Waste managament in germany: 10 – 20 % from renewable energy!!

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Contact

- **If you**
  - have any further questions
  - need support

  please contact us:

INFA
Beckumer Straße 36
D-59229 Ahlen
☎ +49 (0)2382.964-500
+49 (0)2382.964-600
info@infa.de
www.infa.de

Prof. Dr.-Ing. Klaus Gellenbeck
gellenbeck@infa.de
gellenbeck@fh-muenster.de

Thank you for your attention!

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