



umweltbundesamt<sup>u</sup>

# Emission Accounts

MEDSTAT II / ESCWA / UNSD sub-regional training course on  
Water Accounting , Amman, 10-13 March 2008

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# Outline

- What do emission accounts measure?
- Concepts
- The standard tables of SEEA W
- Example of Austria
  - Policy uses and indicators



# What do emission accounts measure?

Emission accounts describe, in physical units, flows of pollutants added to wastewater as a result of production and consumption, and flowing into water resources either directly or through the sewage network.



# Why compiling emission accounts

Emission accounts provide information on

- Which activities are responsible for the emission
- How much is being emitted
- Where is being emitted

They are useful for designing policies aimed at reducing pressure on the environment



# Why compiling emission accounts

Since they are linked to the economic accounts (via the hybrid tables), they allow for

- the formulation of cost-effective policies aiming at reducing emissions
- the evaluation of the economic impacts of policies aiming at reducing emissions

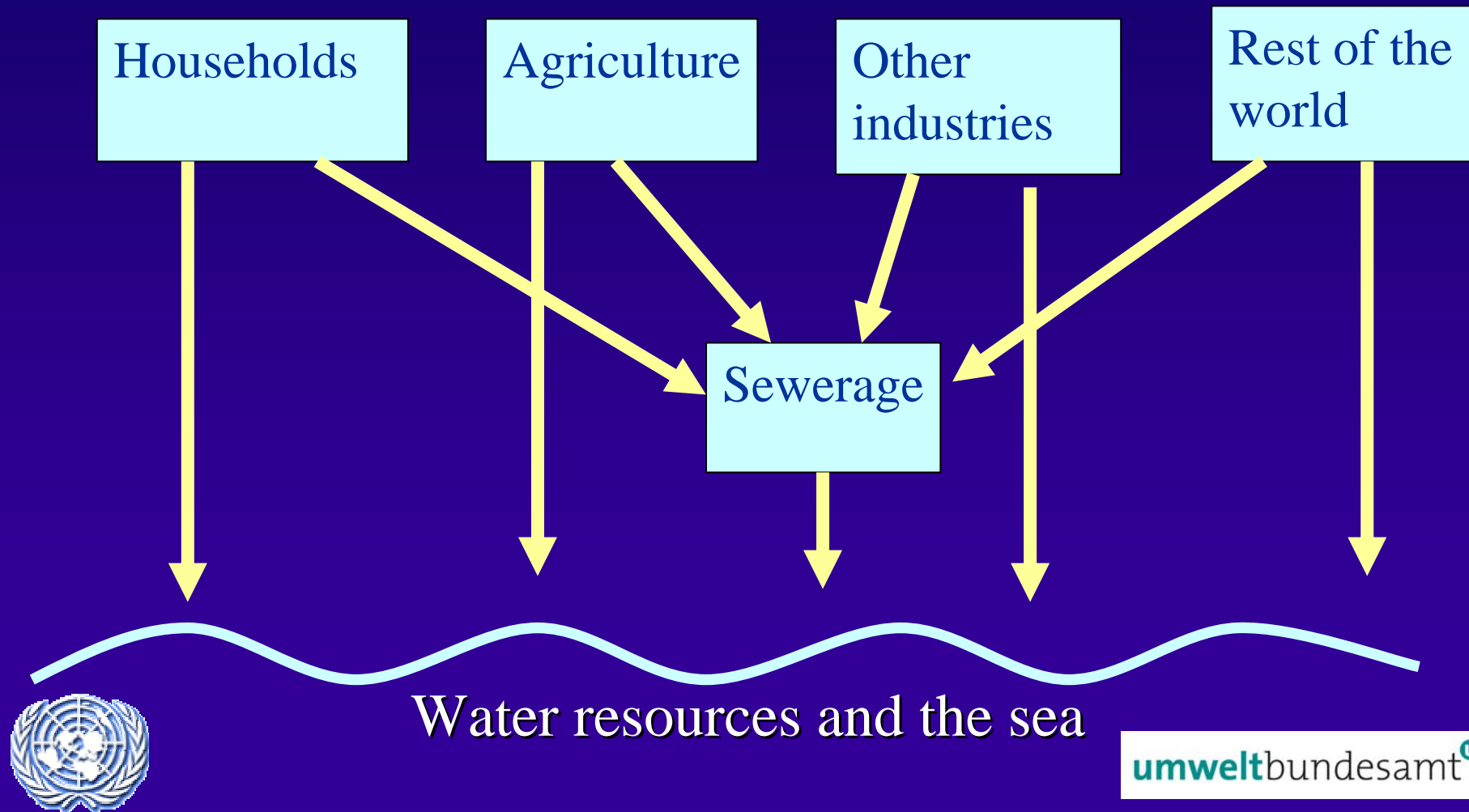


# Basic concepts and definitions

- **Emissions to water** are defined as direct release of a pollutant to water as well as the indirect release by transfer to an off-site wastewater treatment plant.
- The SEEAW focuses only on the release of substances into water resources through the (direct and indirect) discharge of wastewater into water resources.
- The direct discharge of heavy metals and hazardous waste not through wastewater is not covered in the water emission accounts but in the waste accounts.



# Wastewater and pollutants pathways



# Basic concepts and definitions

**Point source emissions** are those emissions for which the geographical location of the discharge of the wastewater is clearly identified (for example, emissions from wastewater treatment plants, power plants, other industrial establishments)

They are generally easier to measure since the point of emission to the water resources is clearly identified





# Basic concepts and definitions

**Non-point** (or diffuse) sources of pollution are sources without a single point of origin or a specific outlet into a receiving water body. Pollutants are generally carried off the land by storm-water run-off or may be the result of a collection of individual and small scale polluting activities which for practical reasons cannot be treated as point sources of pollution. The commonly used categories for non-point sources include **agriculture** and **urban areas**.



# Scope of emission accounts

Include:

Point sources:

Pollutants added to wastewater

Non-point sources:

Urban runoff

Irrigation water and rain-fed  
agriculture



Exclude:

Point sources:

Discharges of heavy metal and  
hazardous wastes not contained in  
wastewater (*included in the SEEA  
waste accounts*)

Pollutants resulting from in-situ use  
(e.g. navigation, fishing, etc.)

Non-point sources:

All non-point sources except for  
urban runoff, irrigation water and  
rain-fed agriculture (*included in the  
quality accounts*)

# Basic concepts and definitions

**Gross emissions** are the pollutants added to the water by an activity, assessed at the point where the wastewater leaves the activity's site (or the dwelling, in the case of households).

**Net (or final) emissions** correspond to the pollutants discharged into water resources after treatment.

**Net emissions = gross emissions** if there is no treatment of wastewater



# Emission accounts

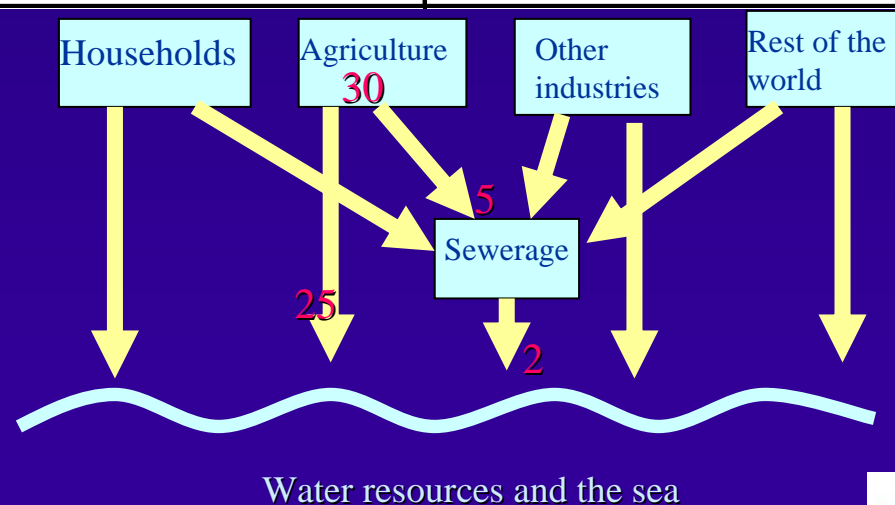
Industries, households and the Rest of the world  
are identified by columns

They record the pollution added to water by an  
economic unit (and not the total pollution  
discharged with wastewater)



# Emission accounts

tonnes										
Pollutant	Industries (by ISIC categories)							Households	Rest of the world	Total
	1-3	5-33, 41-43	35	36	37	38,39, 45-99	Total			
1. Gross emissions (=1.a+1.b)	30									
1.a. Direct emissions to water (=1.a.1+1.a.2=1.a.i+1.a.ii)	25									
1.a.1 Without treatment										
1.a.2 After on-site treatment										
1.a.i To water resources										
1.a.ii To the sea										
1.b. To Sewerage (ISIC 37)	5									



# Emission accounts by ISIC 37

tonnes	
Pollutant	ISIC 37
<b>4. Emissions to water (=4.a+4.b)</b>	
4.a After treatment	
To water resources	<b>2</b>
To the sea	
4.b Without treatment	
To water resources	
To the sea	

Now we can reallocate the emissions by ISIC 37 to the activity responsible for the emission



# Emission Accounts

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1.a.ii To the sea										
1.b. To Sewerage (ISIC 37)	5									
2. Reallocation of emission by ISIC 37	2									
3. Net emissions (=1a+2)	27									



# Urban runoff

**Urban run-off:** that portion of precipitation *on urban areas* that does not naturally percolate into the ground or evaporate, but flows via overland flow, underflow, or channels or is piped into a defined surface water channel or a constructed infiltration facility.

It is generally highly polluted and there is an increasing awareness in the potential danger of discharging it into the environment without treatment.





# Urban runoff

Emissions to water in the urban runoff are allocated to the Sewerage industry, ISIC 37 since this is the economic unit responsible for its collection and discharge



# Reallocation of emissions

Simplest method:

- Use global abatement rate (the assumption is that there is the same treatment capacity)

Otherwise

- Use information of the treatment type



# Supplementary information (1)

Emission to water resource:

- *Surface water (and further disaggregation into artificial reservoirs, lakes, rivers etc.)*
- *Groundwater*

Sludge production

- *Total sewage sludge produced (vol.)*
- *Load in total sewage sludge*



# Diffuse emissions

- European Harmonised Procedures for Quantification of Nutrient Losses from Diffuse Sources - **EUROHARP**
- Web: <http://euroharp.org/index.htm>



# Waste Water Emissions in Austria



# Information needs

- To answer **national policy relevant questions**:
  - Status, trends, forecasts on emissions and pollution control
- Fulfillment of **international reporting** exercises:
  - EU-Urban Waste Water Treatment Directive
  - EU-Water Framework Directive
  - EPER → PRTR
  - Eurostat / OECD Joint Questionnaire on Inland Waters



# Policy demands

- “Classical” policy questions:
  - What is the % of population connected to collecting system and urban waste water treatment plants?
  - Is pollution from urban areas and industry increasing or decreasing?
- New Policy questions
  - Mostly related to economic considerations (more about these later)



# “Classical” indicators

- **Population connected** to collecting system and waste water treatment plants
- **Waste water quantities** (m<sup>3</sup>) discharged (urban / industry)
- **Organic pollutants** (BOD / COD) discharged (urban / industry)
- **Nutrients** (Nitrogen and Phosphorus) discharged (urban / industry)
- **(Dangerous substances)**



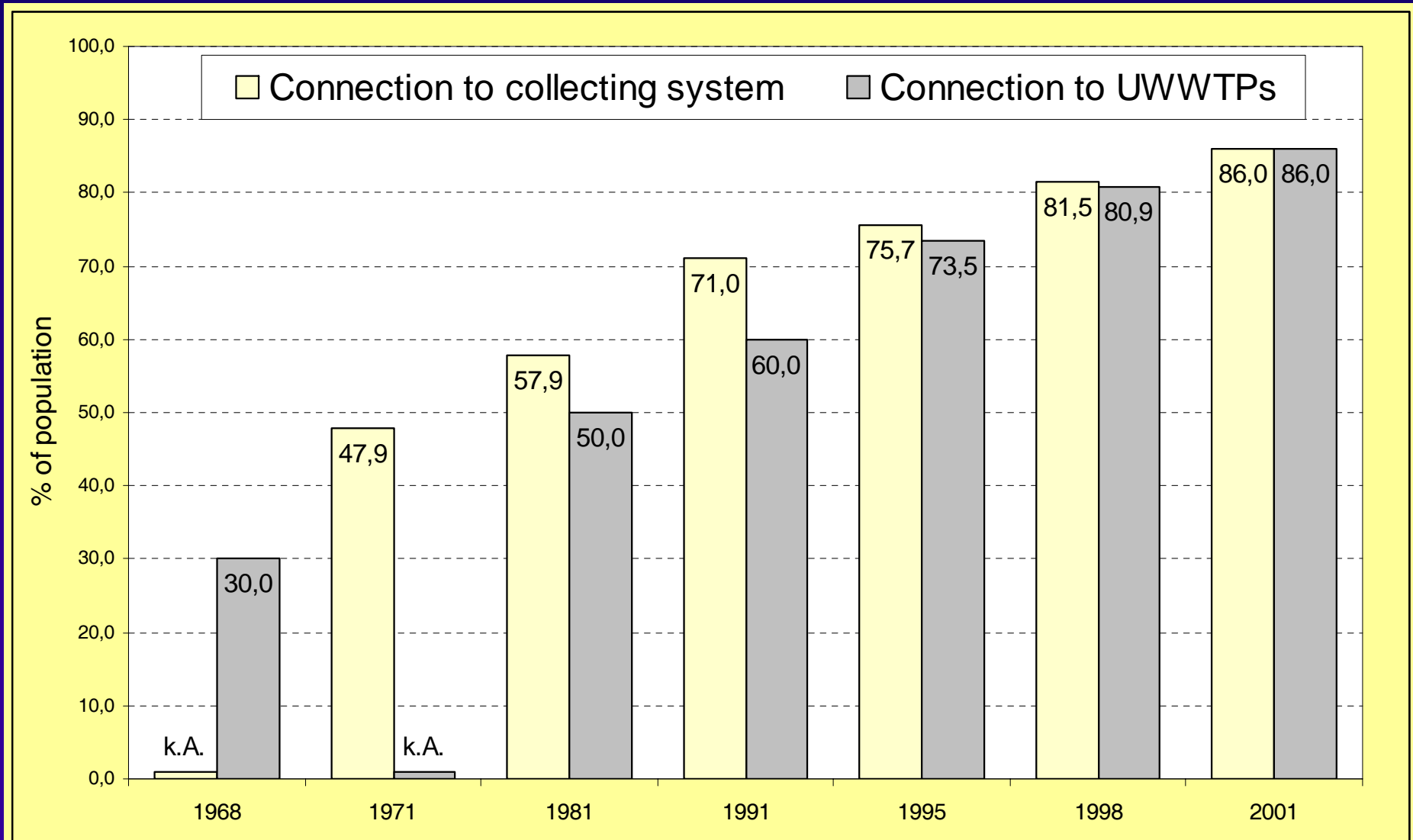


# Characteristics of “classical” waste water indicators

- Focus on **point sources** discharging into **surface waters**
- Policy relevant questions were related to the facts that:
  - pollution of surface waters stemmed mainly from **point sources**
  - **big potential for improvement** of treatment technologies and production processes
- Indicators have been the basis for regulations on **limitation of discharged pollutants** (production sector specific), **investments, subsidies** and other measures
- Indicators have been used for **monitoring** of progress and assessment of achievement of policy goals

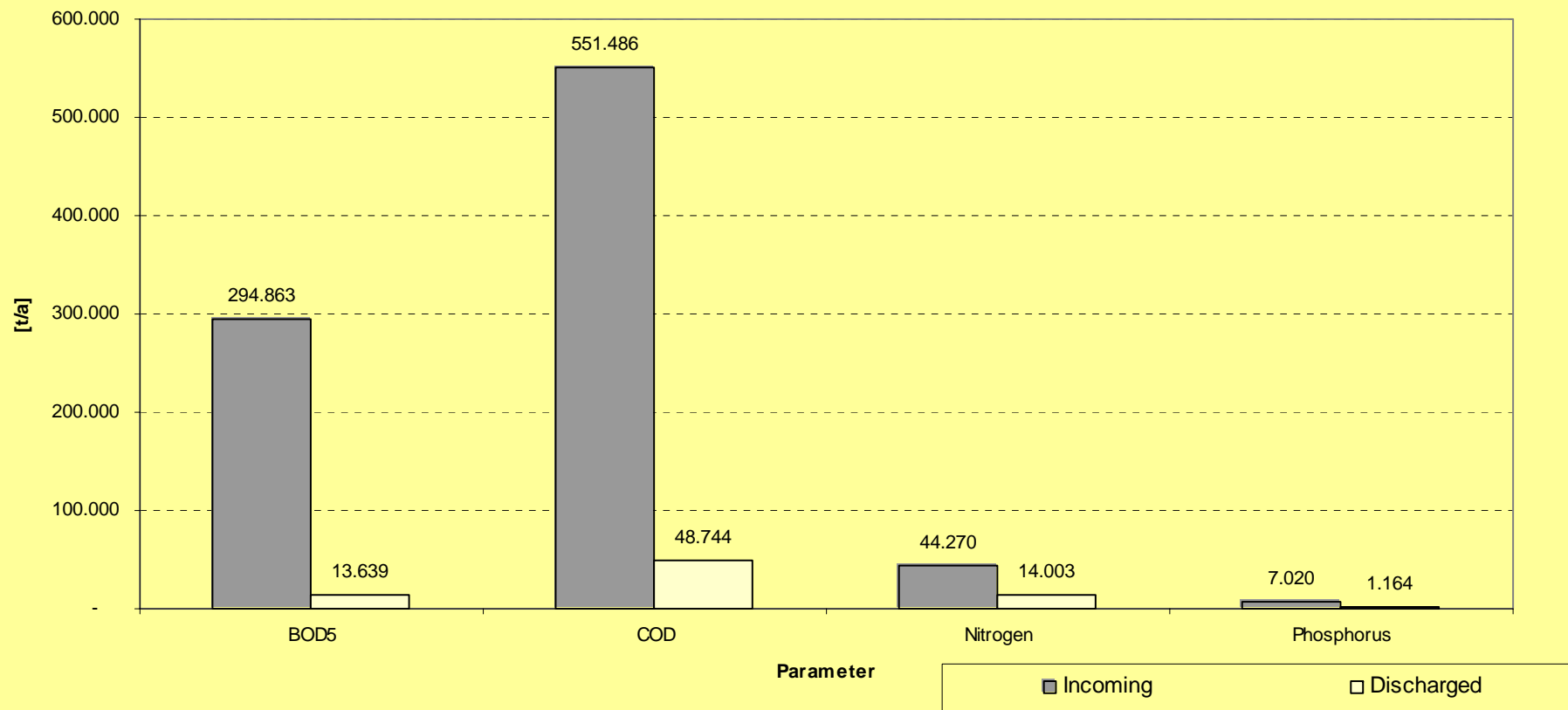


# Indicator: connections to sewerage



# Indicator:

## Treatment efficiencies and discharges



# New policy questions

- Which measures (as e.g. required according to EU-WFD) are the most cost-effective?
  - What are the costs to reduce 1 unit of a pollutant discharged from agriculture/industry/urban areas....?
- What are the socio-economic costs of polluted waters?
  - Health of society
  - Economic activities dependent from clean water: e.g. fishery, drinking water production, tourism,...
  - Other uncertain effects of loss of healthy environment

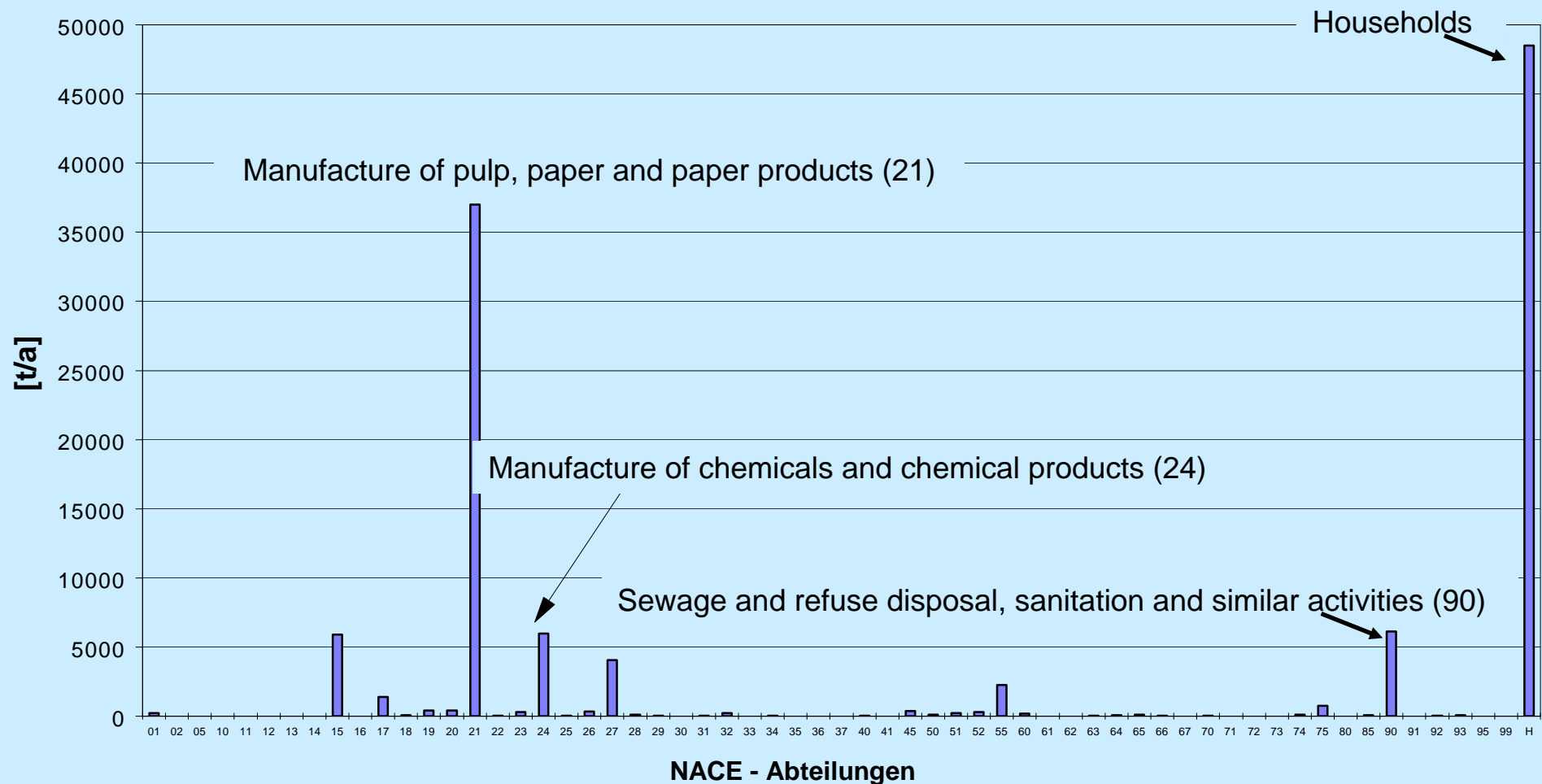


# New waste water indicators

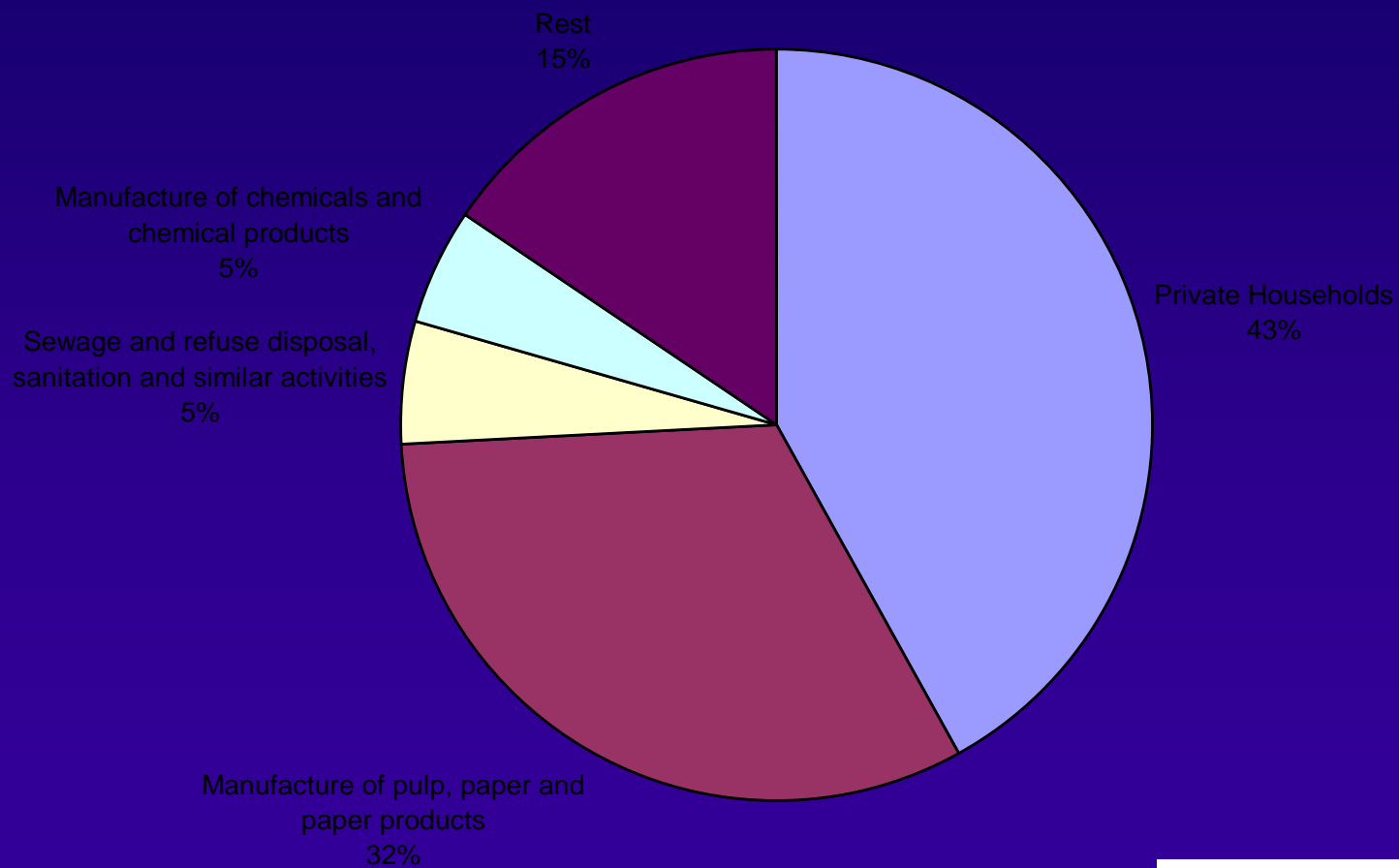
- **Better consideration of diffuse pollution** → to consider ALL sources of pollution
- **Industry aggregation** → link with economic indicators
- **Goals**
  - identify cost-efficient measures
  - assess socio-economic effects
  - monitor effects of changed production-technologies



# COD

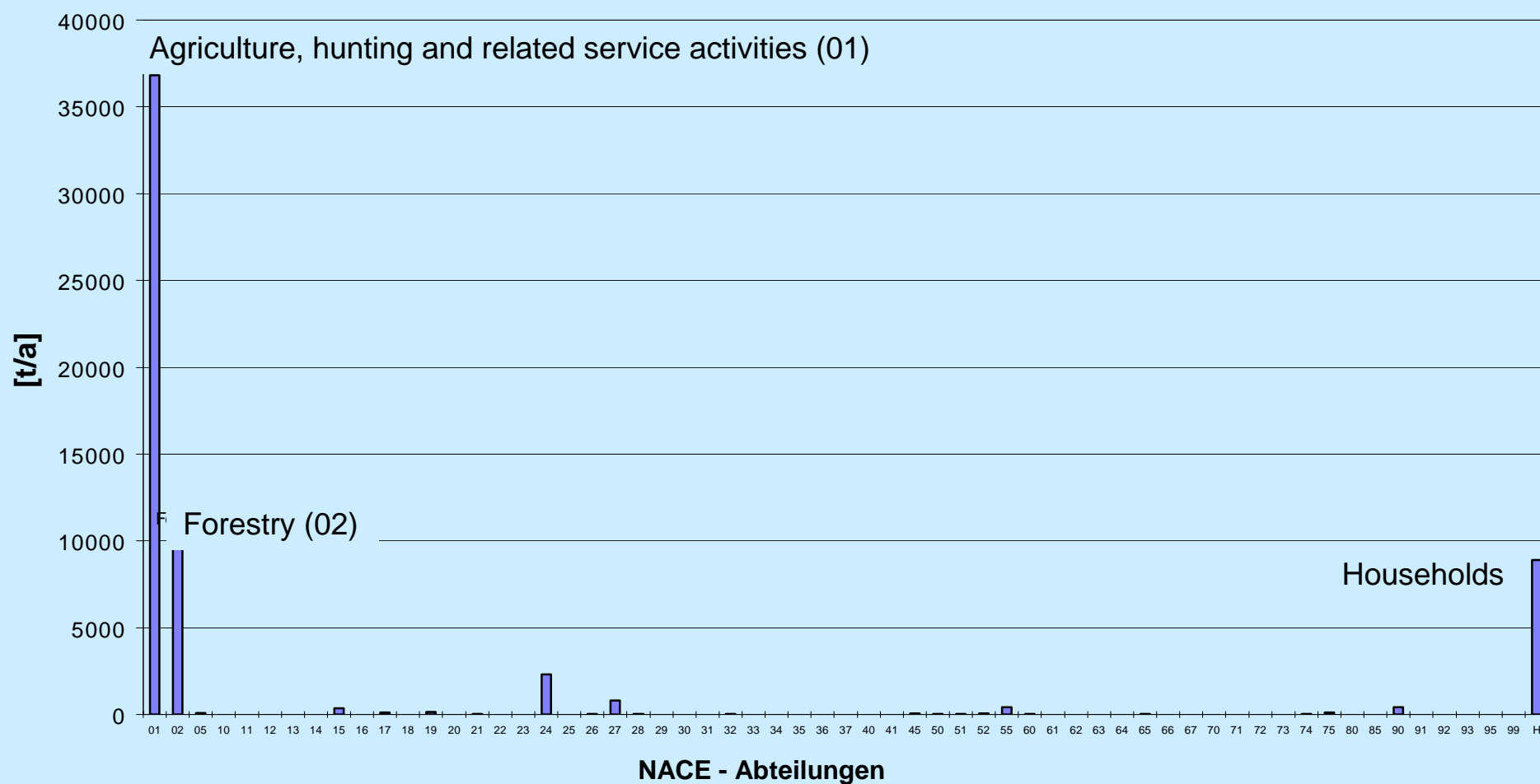


# Share of COD emissions



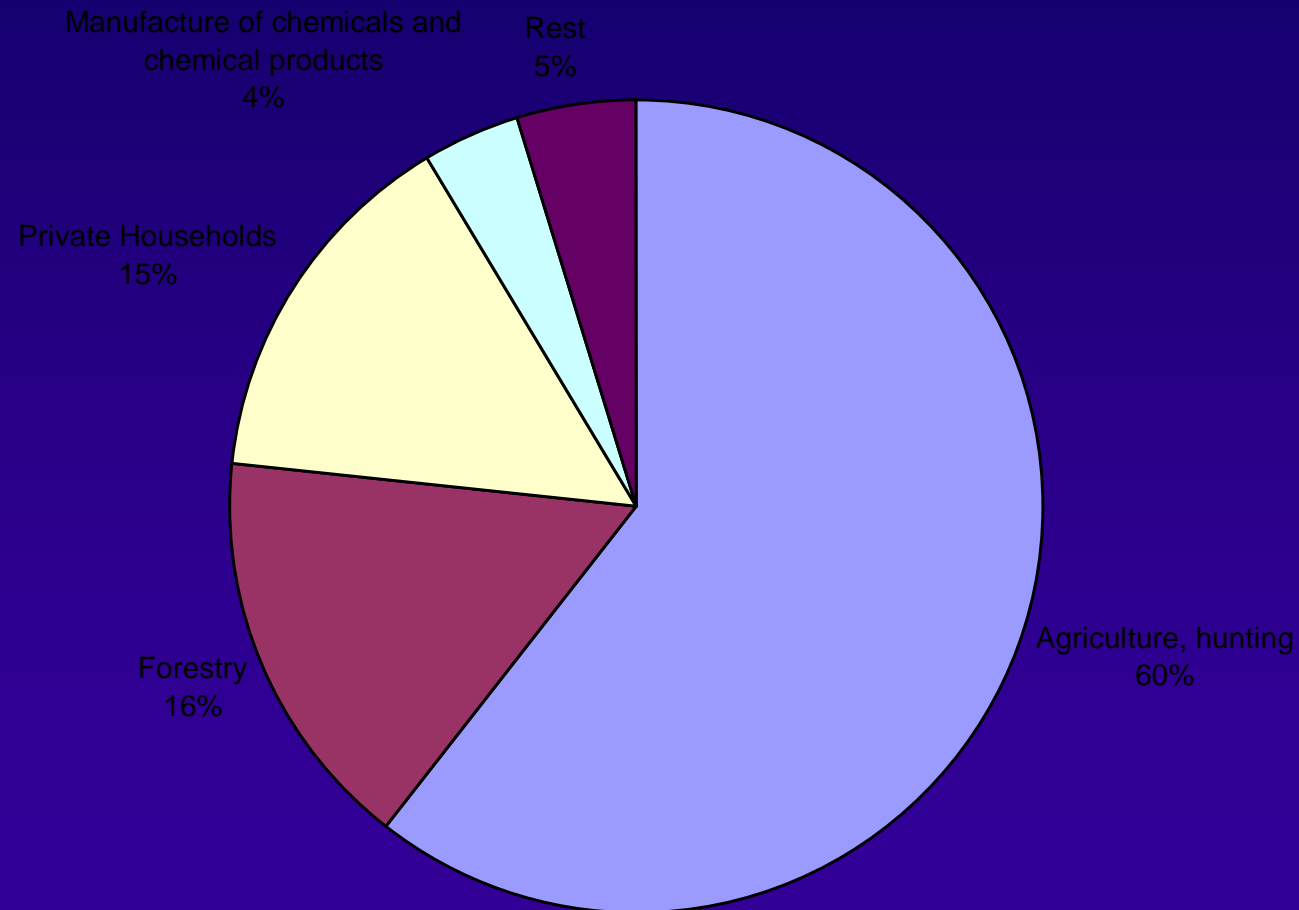
# Nitrogen emissions, direct discharges

## Nitrogen (total)



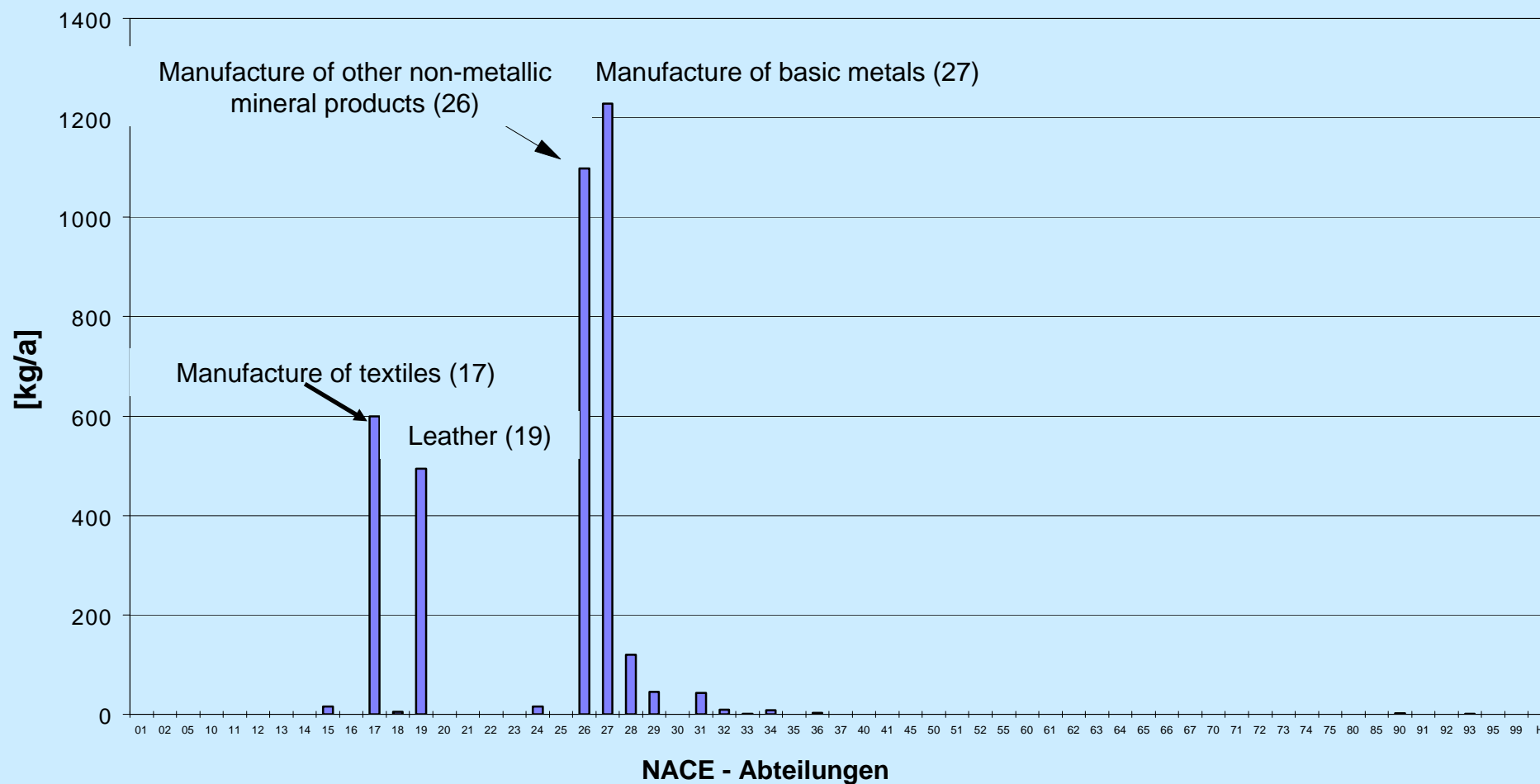


# Share of Nitrogen emissions

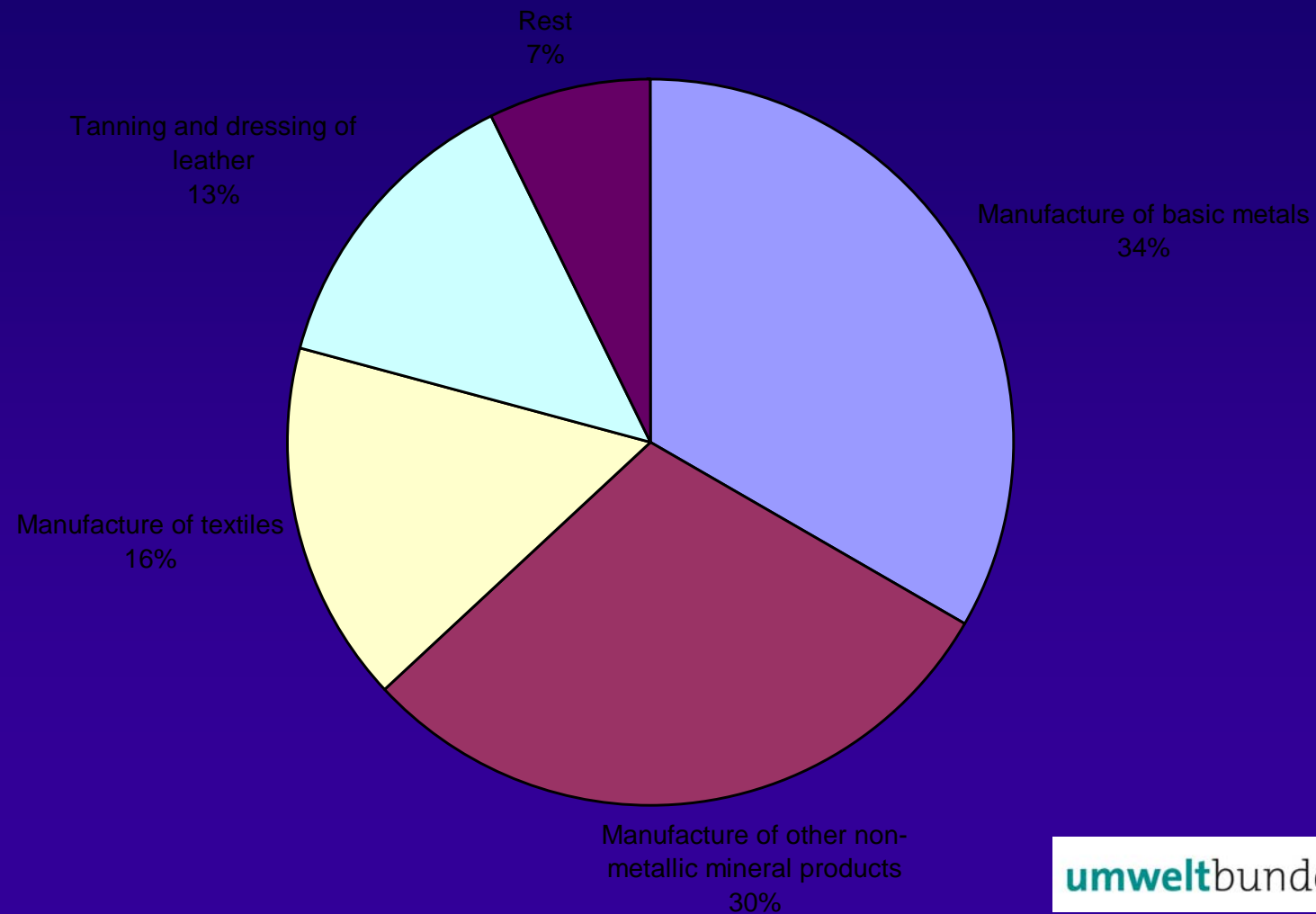


# Chrome emissions. direct discharges

## Chrome



# Share of Chrome emissions



# Data collection

- A lot of data collections exists:
  - National Accounts
  - National reports on the status of the environment
  - International reporting obligations (WFD, UWWTD, EPER, etc.)
    - Austrian Emissions Inventory: updated once a year with data from regional authorities (for each individual “significant” discharger)



# To further develop emission accounts in Austria

- Demonstrate usefulness to policy makers (e.g. for purposes of EU-WFD)
- Use already existing data collections as far as possible (usually legally binding)
- Modify data collections (and their legal basis) where this is necessary (coverage, sector-specific aggregation)



# Outlook for Austria

- Emission accounts project :
  - Use of data of the Austrian Emission Inventory on Surface Waters (developed according to EU-WFD, covers “significant” point sources and diffuse sources) for NAMEA-Water Emissions (2004-2005 data)
  - Develop methodology for consistent time-series based on WFD-data
- Overall goal: Regular update on the basis of WFD-data



# Conclusions

- Emission accounts are addressing new policy-relevant questions
- Existing data collection systems may contain useful information (e.g. Emissions Register)
- May need to set-up specific data collections
- Promotion of usefulness of (emission) accounts is very important. They will aide:
  - Understanding of the costs and benefits of measures
  - discussion with different stakeholders (e.g. agriculture versus industry as polluters of waters)
  - monitoring of environmental efficiency
  - definition of policy goals



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