

# *Impacts of Phosphorus recovery on waste water treatment*

## *P-recovery vs. P-elimination*



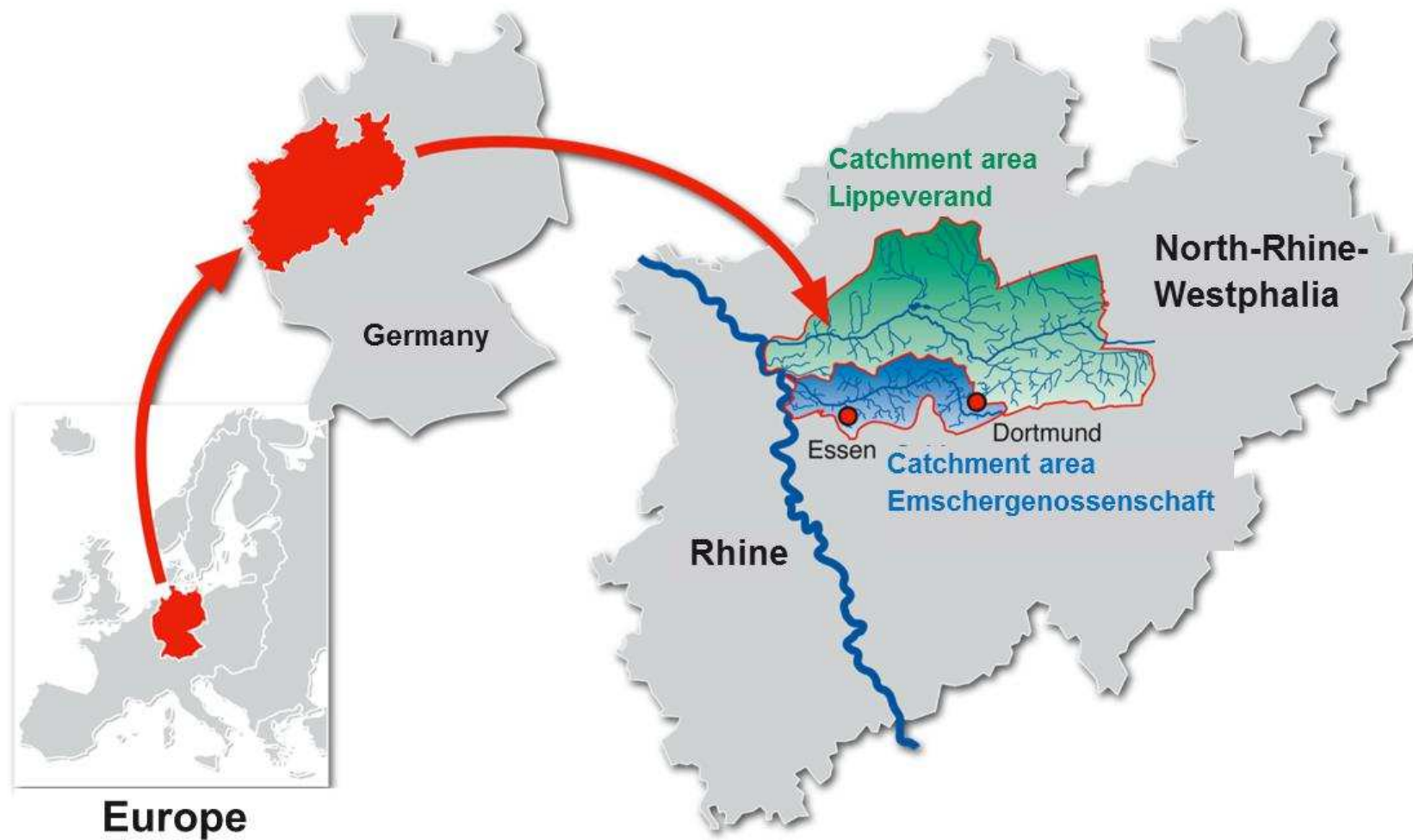
Daniel Klein, EG/LV; 17.05.2018, IFAT Munich



# EMSCHERGENOSSENSCHAFT/LIPPEVERBAND

Where we work

**EMSCHER** **LIPPE**  
GENOSSENSCHAFT EGLV.de VERBAND

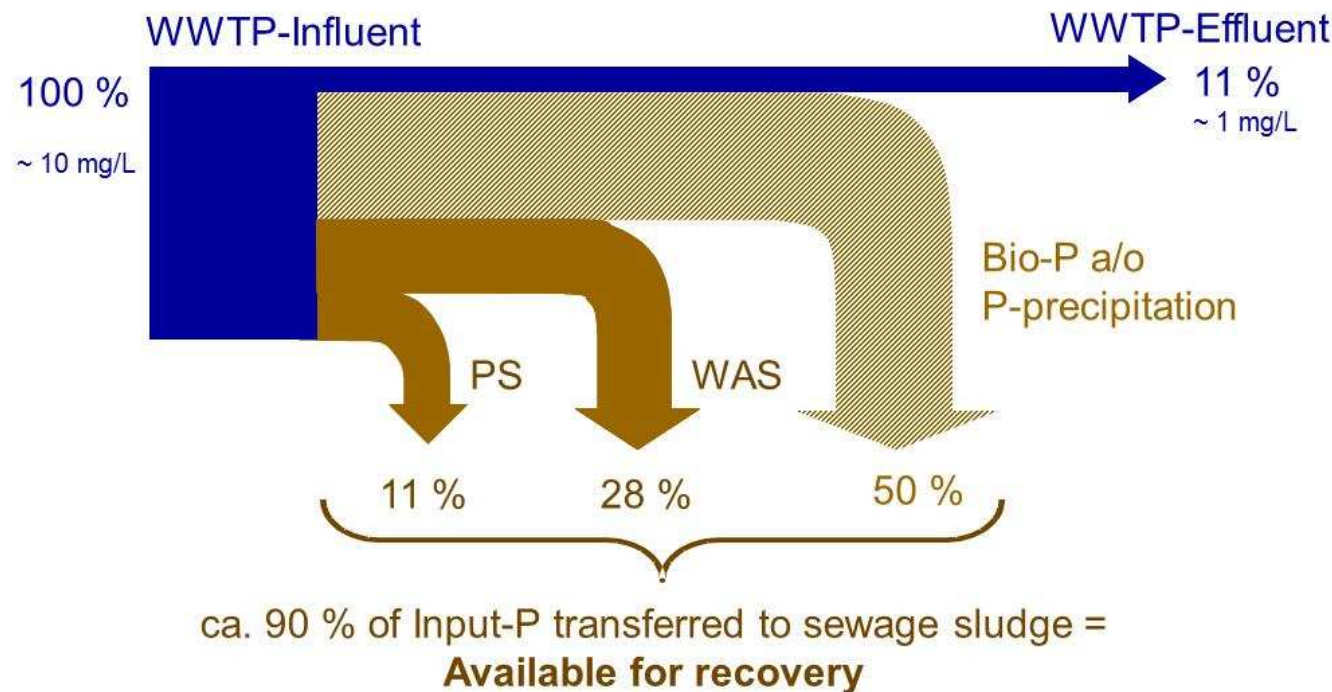


# CATCHMENT AREAS OF EG/LV

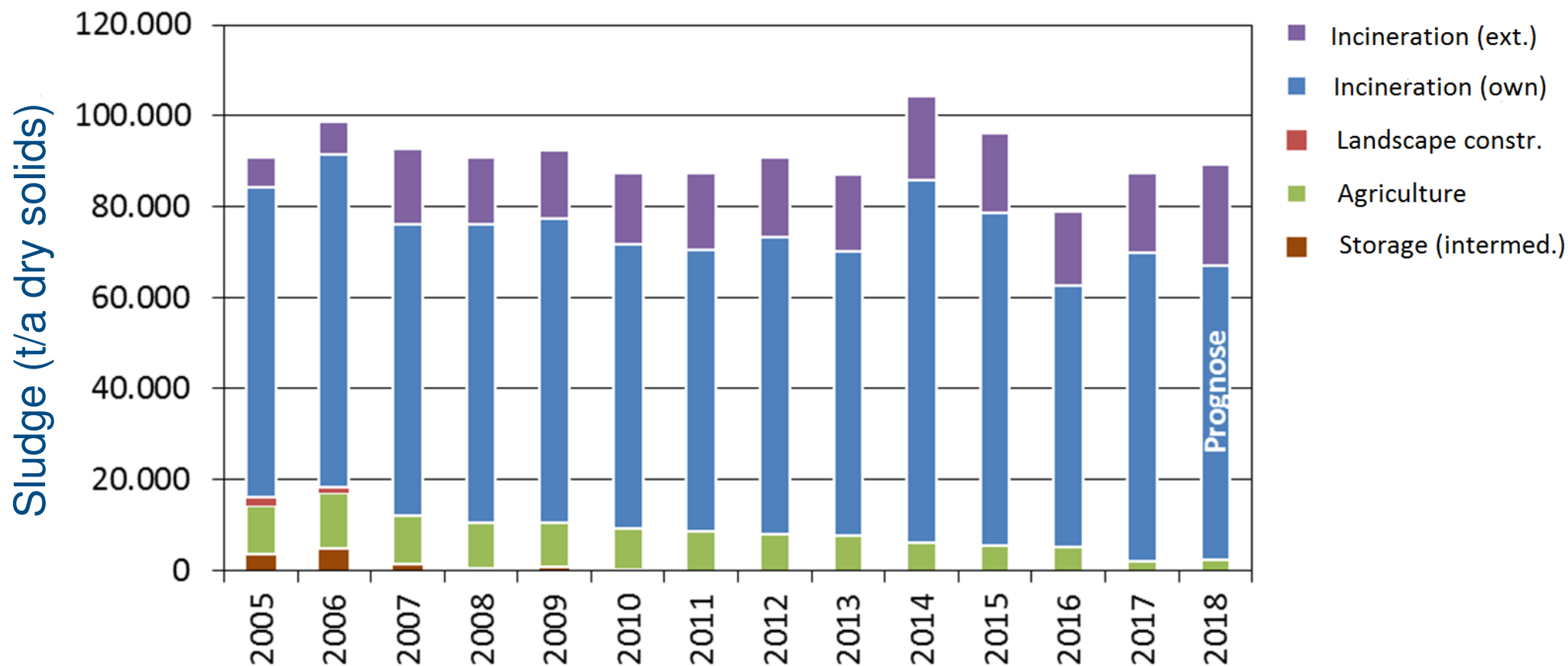


## “PHOSPHORUS” TODAY AT EG/LV

- Elimination via (enhanced) Bio-P and/or chemical P-elimination
- Low effluent concentrations (depending on size class); usually 1 mg/L
- No P-recovery so far (apart from struvite precipitation for operational reasons)



# SLUDGE TREATMENT / DISPOSAL AT EG/LV



- Focus of upcoming P-recovery activities: 1) Ashes 2) Sludge (thermal)

# ELIMINATION VS. RECOVERY: SYNERGIES?

- To reach low effluent concentrations, most of the P is (necessarily) transferred to sludge
- Thus, bio- and/or chemical P-elimination (=standard operation) are the basis of P-recovery from sludge or ashes
- With regard to recovery, additional improvement of P-elimination is usually not needed / not possible



Elimination and recovery are linked, but there are no actual synergies



P-Recovery is mainly a question of sludge treatment (and not of wastewater treatment\*)



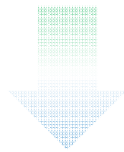
Recovery = **add-on-system** (sludge or ashes) with almost no influence on wastewater treatment (... and vice versa \*)

\*apart from processes that depend on the actual P-elimination process (chemical vs. biological bound P)

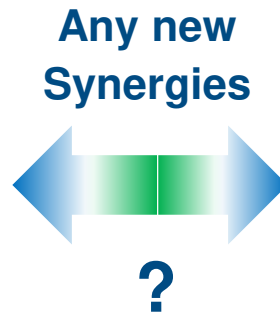


# “PHOSPHORUS” IN THE FUTURE

- AbfKlärV: Mandatory P-recovery (depending on P-content and size class)



- Additional processes needed
- Several options and strategies
  - (process water), sludge or ashes
  - central vs. de-central
- Questions e.g.
  - Costs?
  - P-use?



- Lower **effluent concentrations** requested / discussed: 0,5 m/L; 0,2 mg/L or even less?



- Improvement of standard operation sufficient?
- New technologies?
- Questions e.g.
  - Costs?
  - Impact on water bodies? (key word: WFD)

# “PHOSPHORUS” IN THE FUTURE

- Lower **effluent concentrations**  
requested / discussed: 0,5 m/L;  
0,2 mg/L or even less?



➤ Improvement of standard  
operation sufficient?



depending on actual limits and wwtp  
operation; but **likely not**

➤ New technologies?



(decentral) **add-on technologies  
needed** (basically effluent flocculation  
and filtration)

Any new Synergies?



**Usually not**



# CONCLUSIONS

- “Phosphorus” is both pollutant and resource
- Pressure to act from two sides  
... in most cases, with no link or synergies
- Both *P-recovery* and *improved P-elimination* ask for add-on technologies
- EG/LV: Step-by-step-approach, considering
  - ... size and structure of the catchment areas and the number of wwtp
  - ... related costs
  - ... open questions that have to be answered





*Thank you for your attention!*



[klein.daniel@eglv.de](mailto:klein.daniel@eglv.de)