Overview -

Existing framework, status and analytic review on rural wastewater management in the Danube region

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Rural Wastewater Treatment Workshop

19+20 January 2021

Content

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- Introduction
- EU legislation and its relevance for rural wastewater management
- National legislation and practice in the Danube region
- Choice of technologies
- Summary

Introduction

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- Collected but **untreated or poorly treated faecal sludge and wastewaters** can discharge organic substances, nutrients and hazardous substances in considerable amount into surface and subsurface water bodies.
- Urban and rural developments, connected to the sewer systems and to wastewater treatment plants with inappropriate treatment technology, are the **most important contributors of surface water contamination via point sources**.

Introduction

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- Access to water and sanitation is a **human right**

- UN Sustainable Development Goal 6 (**SDG 6**) on "Clean Water and Sanitation"
  - **Target 6.2**. (achieve access to **safely managed sanitation** systems for all) and
  - **Target 6.3**. (improve **water quality** by reducing pollution)

SDG 6 - Target 6.2.

Indikator 6.2.1

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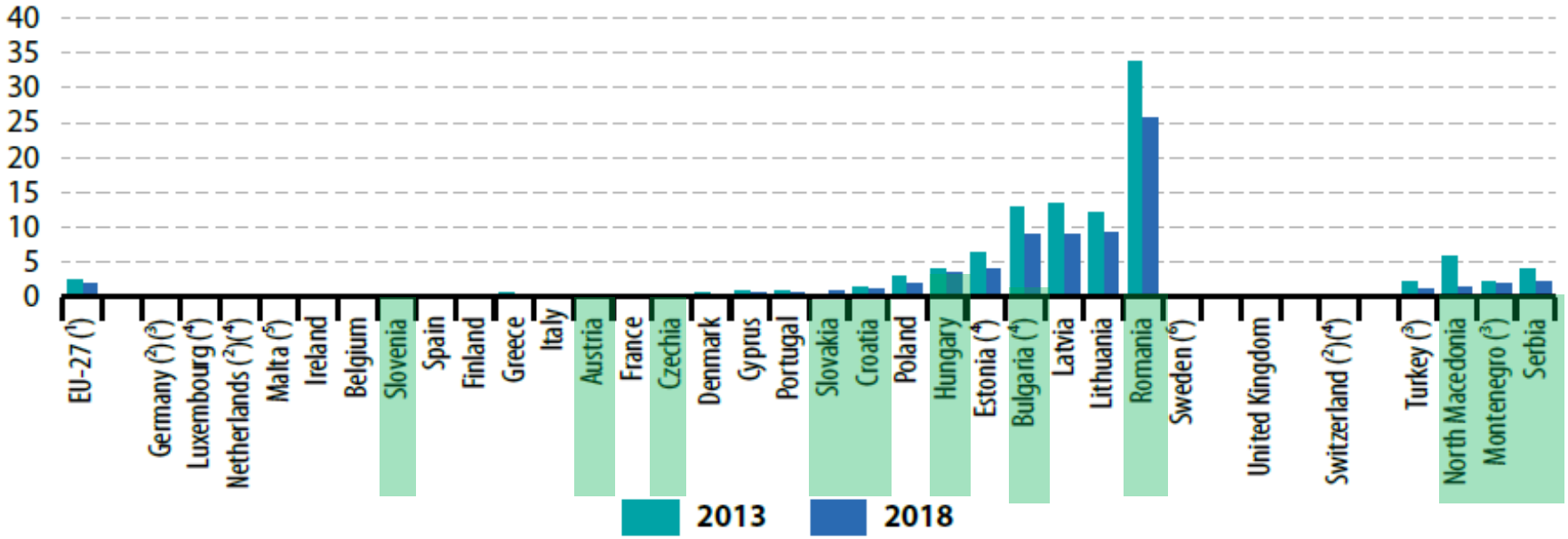
Figure 6.2: Population having neither a bath, nor a shower, nor indoor flushing toilet in their household, by country, 2013 and 2018
(% of population)



EU (2020 Edition) Sustainable development in the European Union – Monitoring report on progress towards the SDGs in an EU context.

SDG 6 - Target 6.3.

Indikator 6.3.1

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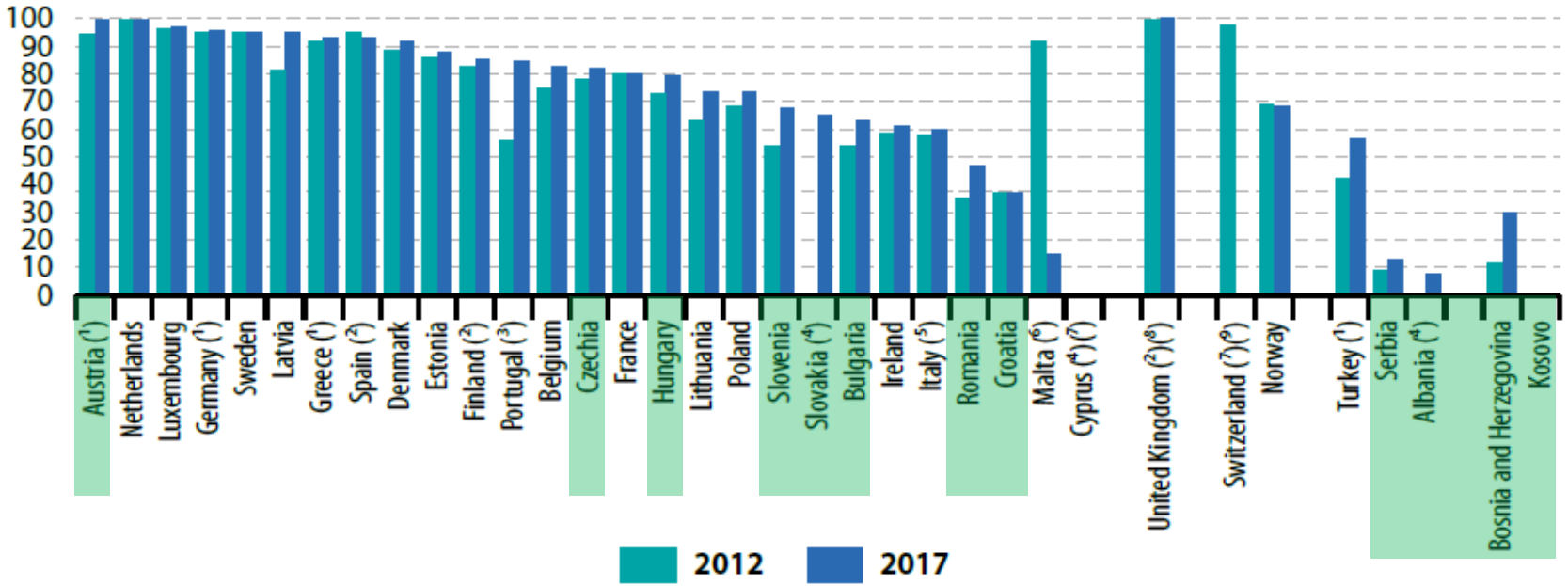
Figure 6.3: Population connected to at least secondary waste water treatment, by country, 2012 and 2017
(% of population)



EU (2020 Edition) Sustainable development in the European Union – Monitoring report on progress towards the SDGs in an EU context.

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EU legislation

Relevance

DRB comprises

- EU Member States
- Candidate Countries (Albania, Montenegro, North Macedonia, Serbia)
- Potential Candidates (Bosnia and Herzegovina, Kosovo)
- other countries (Moldova, Ukraine)

EU Member States

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EU legislation

Urban Wastewater Treatment Directive (UWWTD)

- regulates the treatment of wastewater from agglomerations larger than 2'000 population, i.e. urban wastewater needs to be
  - collected in all agglomerations larger than 2'000 PE (Article 3)
  - treated according to the requirements given in the UWWTD (Article 4), and
  - more stringently treated in sensitive areas (Article 5)

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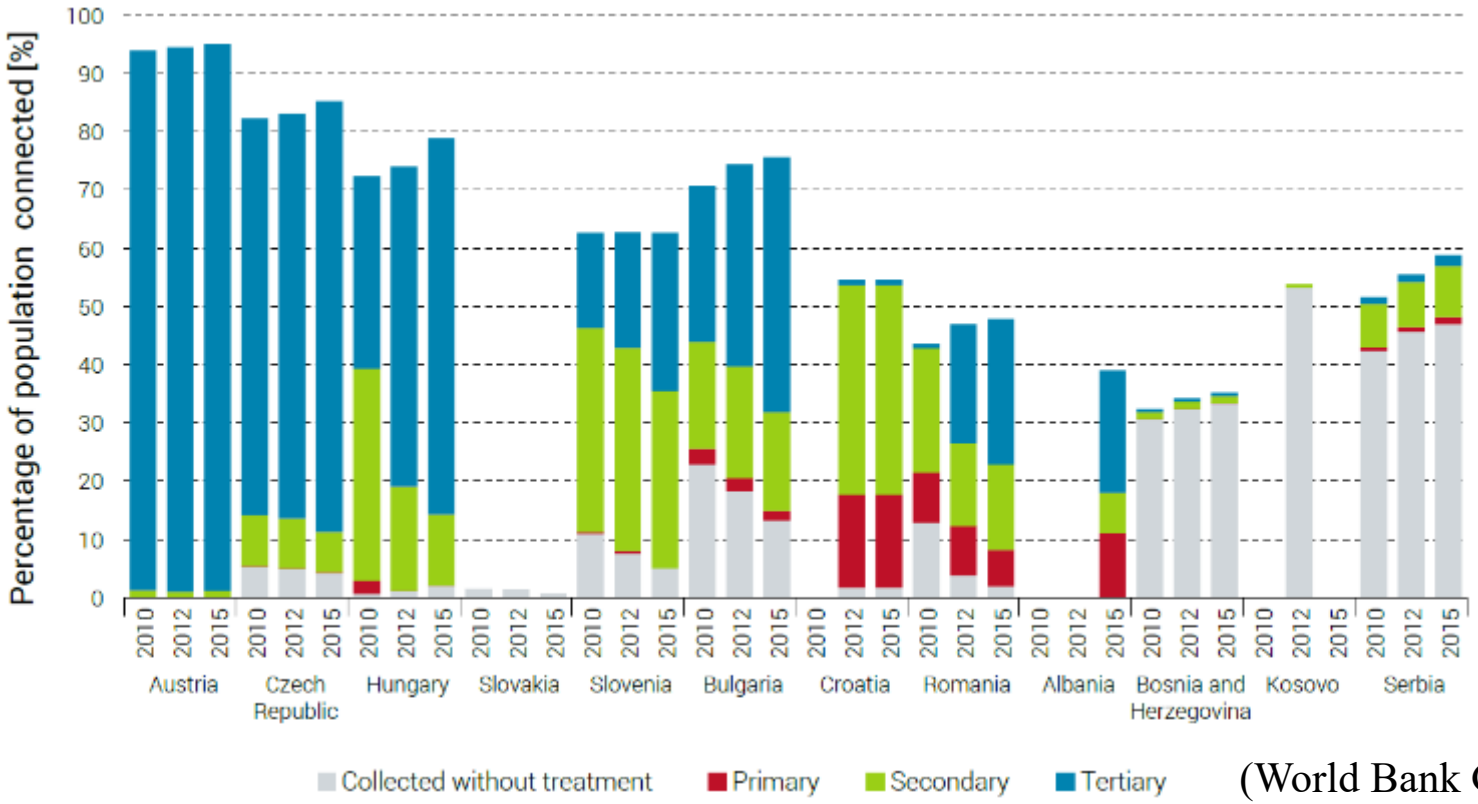
EU legislation

Urban Wastewater Treatment Directive (UWWTD)



(World Bank Group, 2019)

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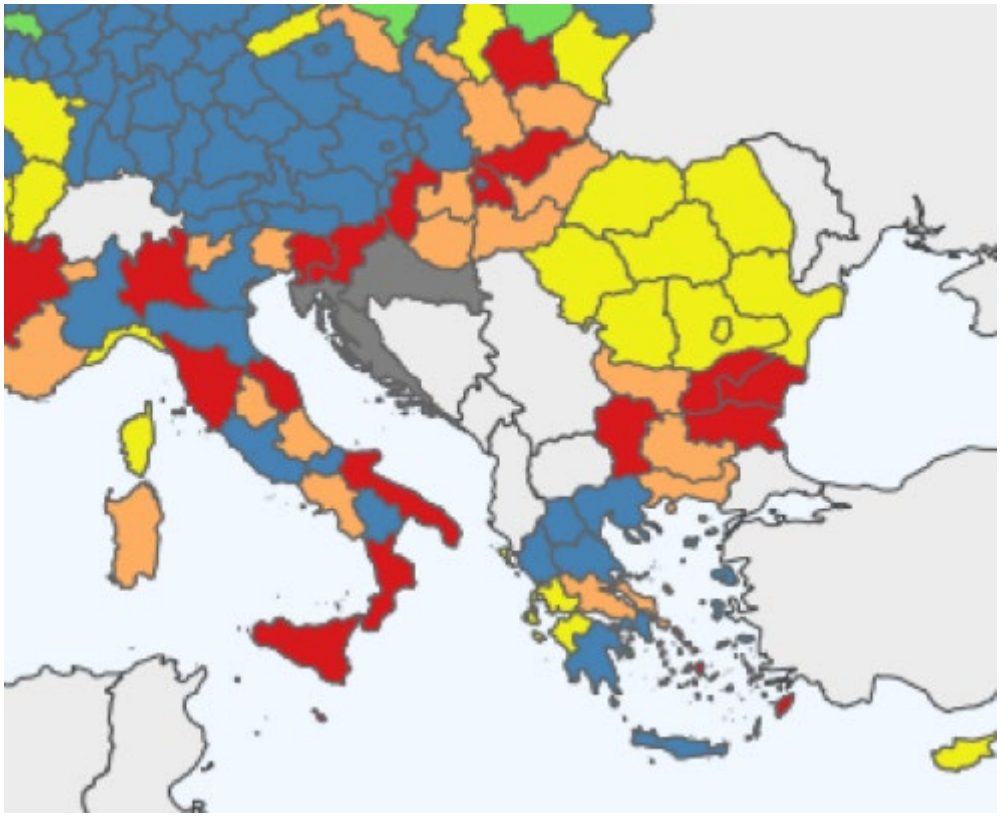
EU legislation

Urban Wastewater Treatment Directive (UWWTD)



Map of compliance with Article 4 (treatment) at regional level in 2016

(2020 UWWTD implementation report)

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EU legislation

Relevance of the UWWTD for rural WW management

- UWWTD does not give general discharge limits for agglomerations **smaller than 2'000 PE**
- Article 3(1) states that "*where the establishment of a collecting system is not justified either:*

  a) because it would produce no environmental benefit or

  b) because it would involve excessive cost,

  individual systems or other appropriate systems (IAS) *which achieve the same level of environmental protection shall be used*."
- "**appropriate treatment**" allows the receiving waters to meet the relevant quality objective

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EU legislation

Relevance of the UWWTD for rural WW management

- Revision of the UWWTD is currently discussed
- Points with strong relevance for rural areas:
  - Smaller agglomerations
    - decrease "agglomeration" from 2000 to 1000, 500 or 200 PE
    - EU fixed approach to define agglomerations of PE per ha
  - IAS: e.g.
    - EU standards for IAS design
    - inspection strategies for regular monitoring and maintenance
    - establish a national database of IAS

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National legislation and practice

Legal requirements for WWTPs < 2'000 PE

Country	Design size (PE)	Parameter				
		BOD_5 (mg/l)	COD (mg/l)	TSS (mg/l)	NH_4-N (mg/l)	TP (mg/l)
Austria	≤ 50	25	90	-	10 [1]	-
	51-500	25	75	-	5 [1]	-
	501-5'000	20	75	-	5 [1]	1 [2]
Czech Republic	< 500	40	150	50	-	-
	500-2'000	30	125	40	20	-
Hungary [4]	< 500	80	300	80	4	4
	500-2'000	50	200	75	4	4
Romania [4]	≤ 2'000	20	125	60	15	2
Serbia	≤ 600	80	-	100	-	-
	601-2'000	50	-	75	-	-
Slovakia	≤ 50	40	-	-	-	-
	51-2'000	30	135	30	-	-
Slovenia	< 50	-	200	-	-	-
	50-2'000	30	150	-	-	-
Ukraine [4]	≤ 2'000	15	80	15	0.39	-
UWWTD	> 2'000	25	125	35	-	- [3]

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National legislation and practice

Design guides or norms for small WWTPs

- In general, a permit for operating the WWTP required
- For new developments this often linked to the building permit
- European standard EN 12556 for compact technical WWTPs less than 50 PE
- Country specific design guides to match specific discharge limits:
  - e.g. Austria for technical plants and treatment wetlands

    → process for getting the permission for operating the WWTP is simplified

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National legislation and practice

Management and monitoring of small WWTPs

- Monitoring requirements (intervals and parameters to be monitored) given in the permit
- Self monitoring and external monitoring
- Training of owner/operator of small WWTPs !

  → likelihood that plant is operated and maintained well increases if owner/operator is trained

- Most national waterworks and wastewater associations in the Danube region offer trainings among their services

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Influence of operation on performance

Kläranlage		A		B		C		D	
Ausbaugröße (EW) **PE**		100		200		450		4000	
Betriebsführung*)		-	+	-	+	-	+	-	+
CSB **COD**	(mg/l)	361	43,4	209	33,2	151	27,8	136	32,0
TOC	(mg/l)	-	14,2	72,9	11,9	-	7,5	61,4	10,9
NH_4-N	(mg/l)	45	1,4	44,3	11,3	39,1	2,7	4,0	1,5
NO_3-N	(mg/l)	1,5	4,6	0,2	4,3	0,5	24,8	5,2	15,4
PO_4-P	(mg/l)	5,4	1,6	5,0	3,1	10,0	1,4	0,7	0,2

*)Betriebsführung: - ..... unzureichend, schlecht
+ ..... ordnungsgemäß, gut

Spatzierer (1998)

Influence of **good (+) and bad (-) operation** on the treatment performance (based on evaluation of reports from external evaluation of the WWTPs)

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Choice of technologies

Small WWTPs – characteristics / requirements

Characteristics

- highly fluctuating wastewater flows, and high concentrations of the wastewater constituents with high fluctuations.
- additionally only few trained personal is available to operate wastewater treatment plants

→ General requirements for small WWTPs

- simplicity of the technology,
- simple operation and maintenance,
- high robustness,
- large volume, to buffer the high fluctuations of flow and concentrations,
- high stability, and
- low sludge production

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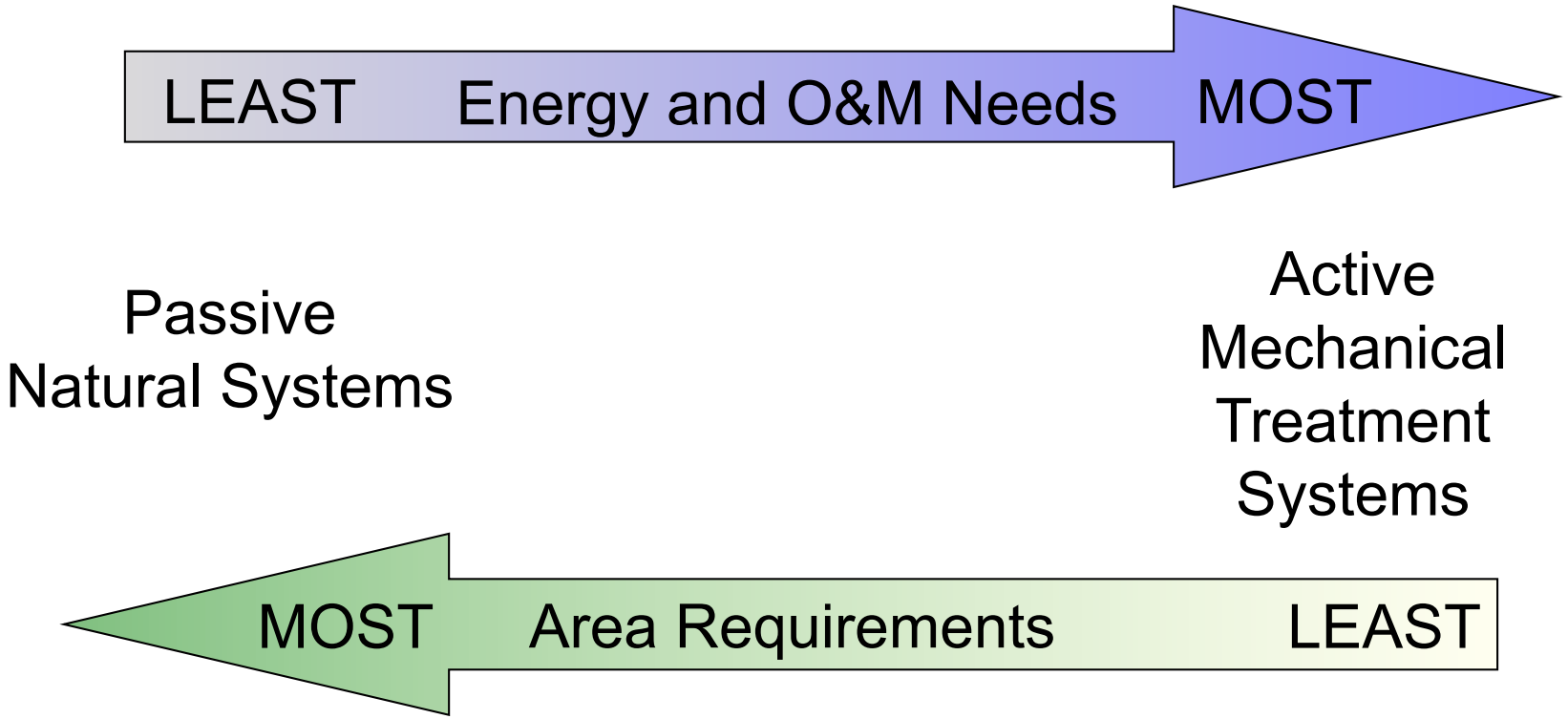
Choice of technologies

Natural vs technical wastewater treatment



By courtesy of Scott Wallace

Summary

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- Rural wastewater management is a challenge in all countries of the Danube region.
- Rural developments, connected to sewer systems and WWTPs with inappropriate treatment, contribute of surface water contamination.
- Clear legislation for small WWTPs less than 2'000 PE is required.
- Design standards for small WWTPs facilitate their implementation.
- Technologies that are simple and robust and that have low operation and maintenance requirements and costs are most suitable.
- Training of owners/operator of small WWTPs is a key factor for good performance of these systems.

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