

# REGATA

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## Research Stays 2017

### Measurement of energy efficiency of wastewater treatment plant based on economic foundations

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#### Objectives

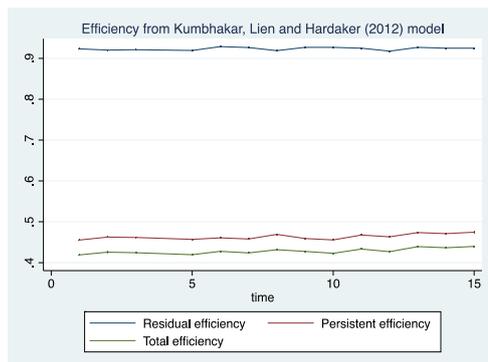
The objective of this study is to investigate how overall energy inefficiency of WWTPs is decomposed between persistent and transient inefficiency. This will allow an elaborate evaluation of energy saving measures because both components convey different types of information.

#### Methodology

In study we argue that the estimation of a measure of the efficient use of energy of WWTPs could be based on the estimation of a single conditional input demand frontier function in order to econometrically estimate the level of energy efficiency of a set of 183 Swiss WWTPs for the period 2002 to 2016. The model used is a new Stochastic Frontier Model, which not only distinguishes between time-varying and time-invariant inefficiency but also between inefficiency persistent and the latent firm effect.

#### Results

Based on the energy efficiency estimation results for the 183 WWTPs, both residual and persistent inefficiency are present, being the latter considerably more important in the analysed set. Residual efficiency is estimated to be 92 percent on average, persistent efficiency 47 percent, and overall efficiency 43 percent.



#### Highlights

The findings show that the persistent inefficiency has a significant higher importance in comparison with the residual one. By knowing where the inefficiency comes from, it will be possible to develop targeted energy efficiency policy. Since the persistent inefficiency has a significant higher importance in comparison with the residual one, in order to increase overall efficiency wastewater operators should concentrate their efforts trying to identify and reduce the sources of these persistent inefficiencies.

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