

# New balancing rule for the electricity market

A comparative evaluation of a newly proposed meter readings approach >



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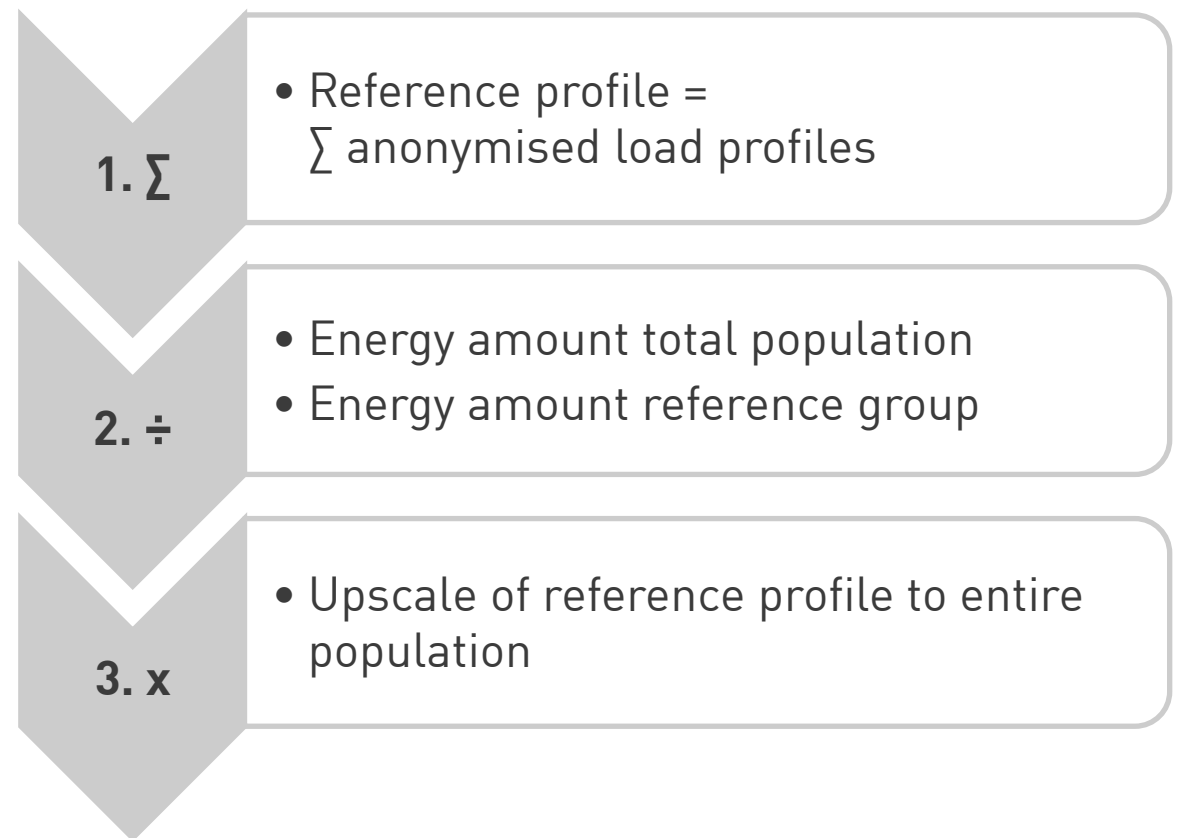
Dresden, April 17th 2015

- 1. New balancing approach as an answer to the challenges of the “new energy world”**
- 2. Comparison of smart-metered customers and the standard load profile**
- 3. Evaluation of reference profiles at different sampling combinations**
- 4. Summary**

## Shortcomings of current balancing rule for small-scale customers

- Flexibility options for physical integration of fluctuating RES necessary (e.g. Demand Response)
- Price based or other priceless signals needed to influence customer behaviour
- With currently applicable balancing principles based on standard load profiles (SLP), suppliers not able to display differences in the load behaviour.
- No incentive for providers to influence the demand of their customers due to missing benefits in the procurement.

## New mass market-capable balancing approach on the basis of anonymised meter readings



# New balancing approach as an answer to the challenges of the “new energy world”



## **Starting point:**

- › Measured load profiles of 1.000 two-rate domestic customers on a quarter-hour basis in the year 2013

## **Objective of the comparative evaluation:**

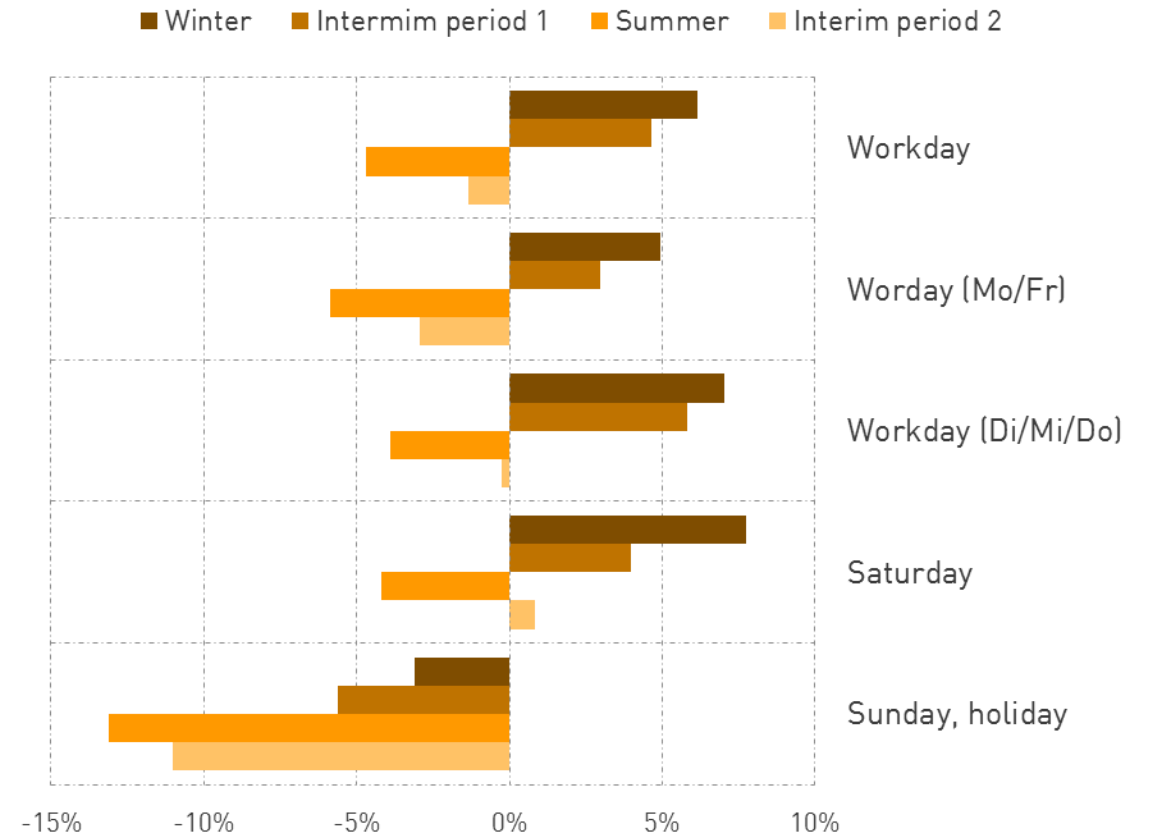
- › To show potential improvement of the current SLP for household customers.
- › To validate the new balancing approach on the basis of anonymised meter readings and to identify the process limits with random sampling.
  - Smallest sample size
  - Minimum number of customers
  - Formation of substitute values is unnecessary

## Typical days used within SLP are not fitting optimally to display the energy amount

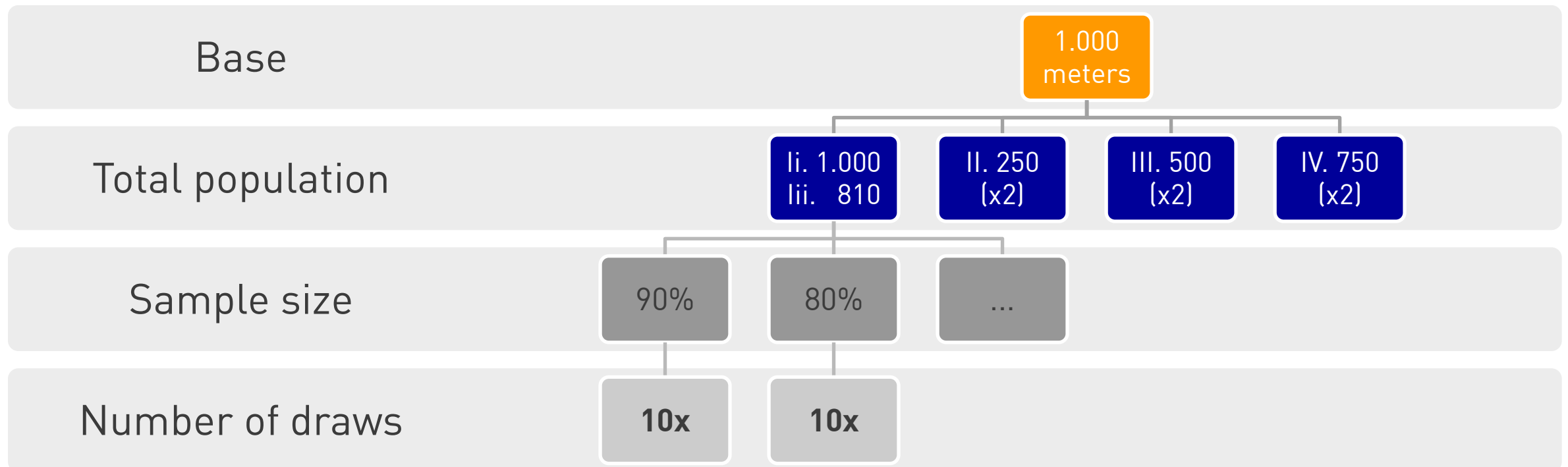
- > Obvious deviation of the client's behavior from the typical days, especially on Sundays and holidays
- > Generalization of working days seems to be unfavorably

The German Association of Energy and Water Industry (BDEW) distinguishes between working days, Saturdays, Sundays or holidays within three seasons

## Differences between the typical days of BDEW (SLP H0) and the customer behaviour



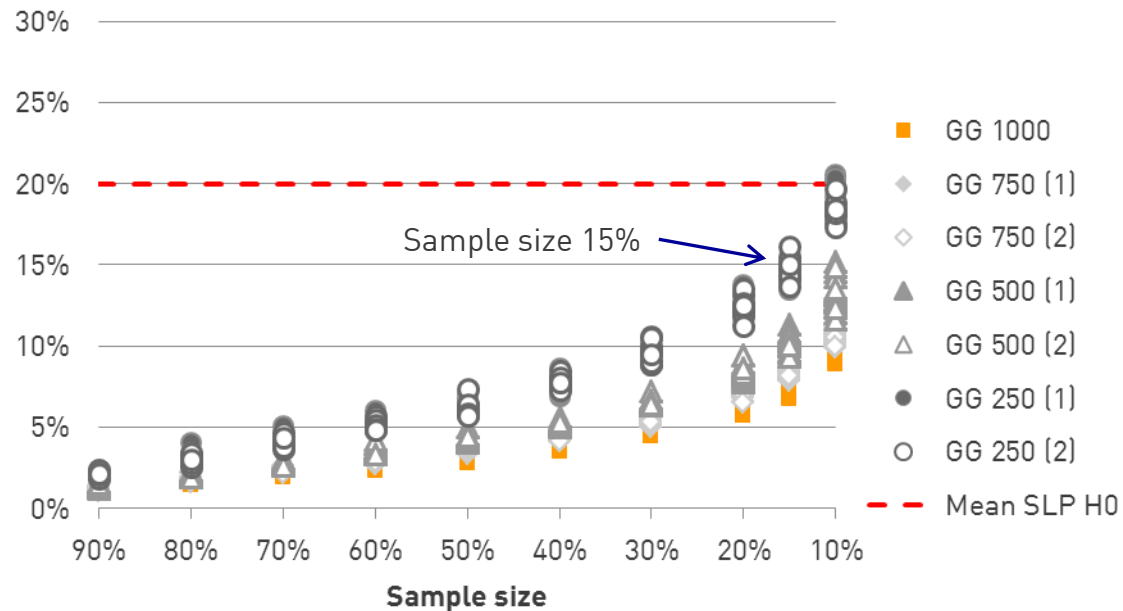
## Sampling concept



Case A: 1.000 time series

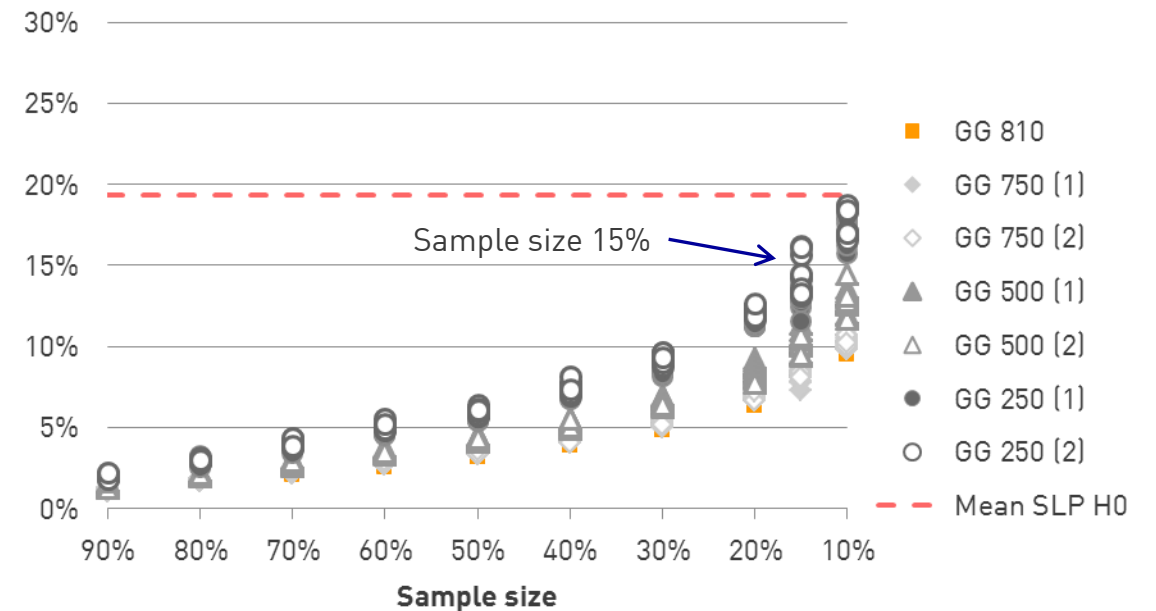
Case B: 810 time series: exclusion of times series with >300 missing data sets and temperature-dependant behaviour

## Standard deviation for the relative differences of the drawn reference profiles (without filtering)



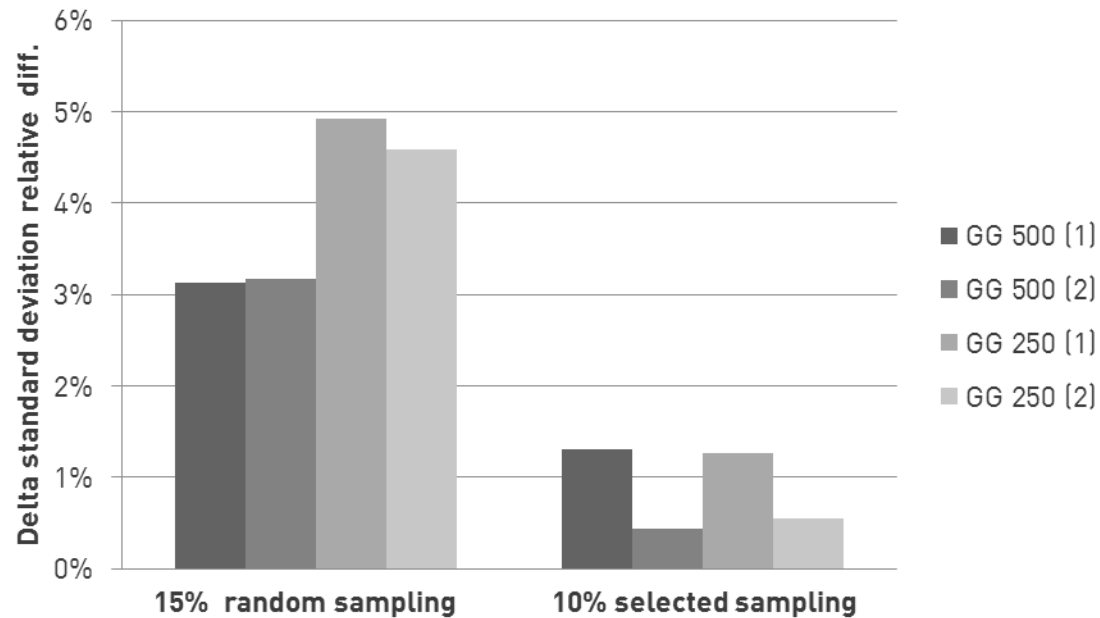
- Large scattering of differences at 10% sample size
- Reference profile reaches the values of the SLP H0

## Standard deviation for the relative differences of the drawn reference profiles (with filtering)



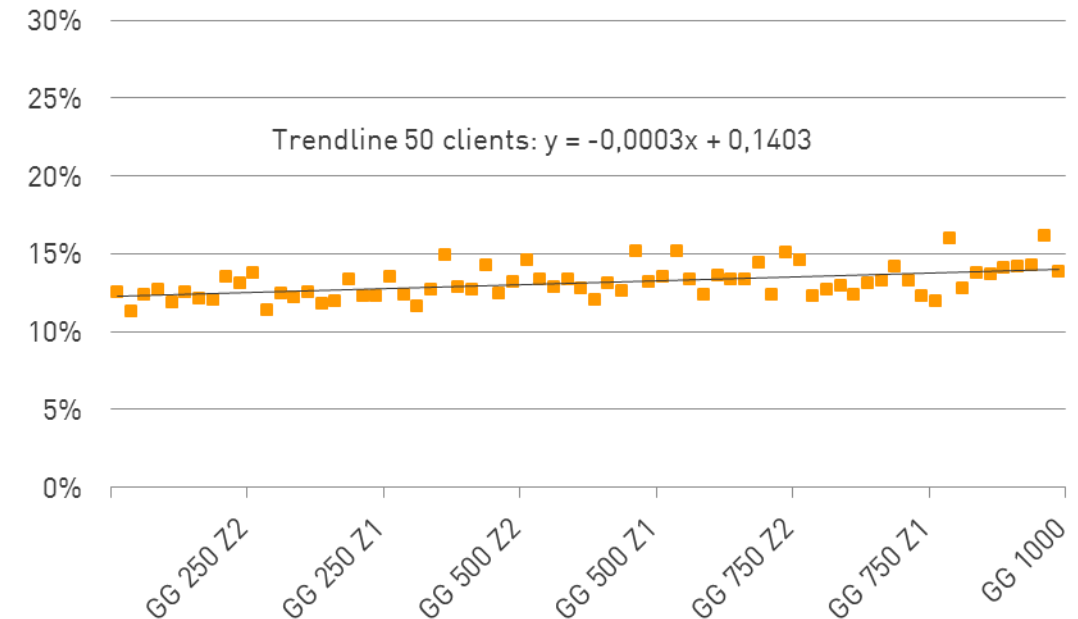
- Decrease of the scattering within the respective sample size especially at low samples sizes

## Improvement with selected sampling compared to the random 10% sample size (absolute)



- › Differences decrease, the more the reference profiles are corresponding to the annual energy distribution of the population.

## Standard deviation for the relative differences of the drawn reference profiles (sample size 50 clients)



- › Even at low sample sizes, the proposed meter readings approach reflects the load behavior of household customers better than the SLP-method



- › The typical days used within the SLP-method differ clearly from the behaviour of the 1.000 two-rate domestic customers (especially for Sundays and holidays)
  
- › Already small subsets of larger populations can generate load profiles, which exhibit a sufficient accuracy for the balancing of energy amounts in the mass-market:
  - **Subset of 15%** at random draw
  - **Subset of 10%**, corresponding to the annual energy distribution of the population.
  - **Starting with 50 customers** at random draw
  - **No formation of substitute values** for appearing data gaps necessary
  
- › New balancing approach creates possibility to display a demand change also in procurement. As a result, it provides the basis for the introduction of variable tariffs.

Thank you for your attention!



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