

Load Management at Distribution Grid Level:
A Pricing Model
following the 'Polluter Pays Principle'

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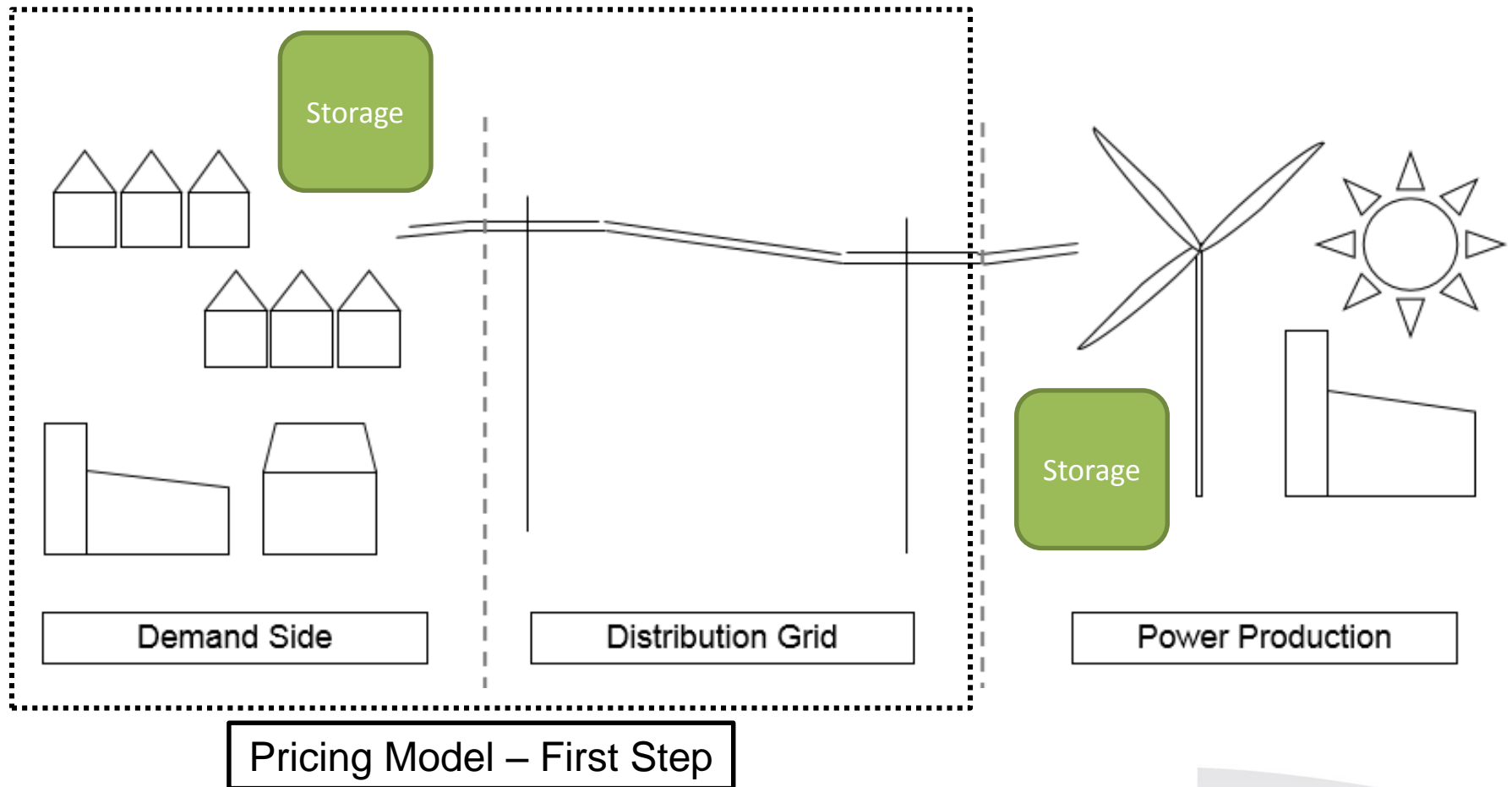
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Introduction



Current Pricing System

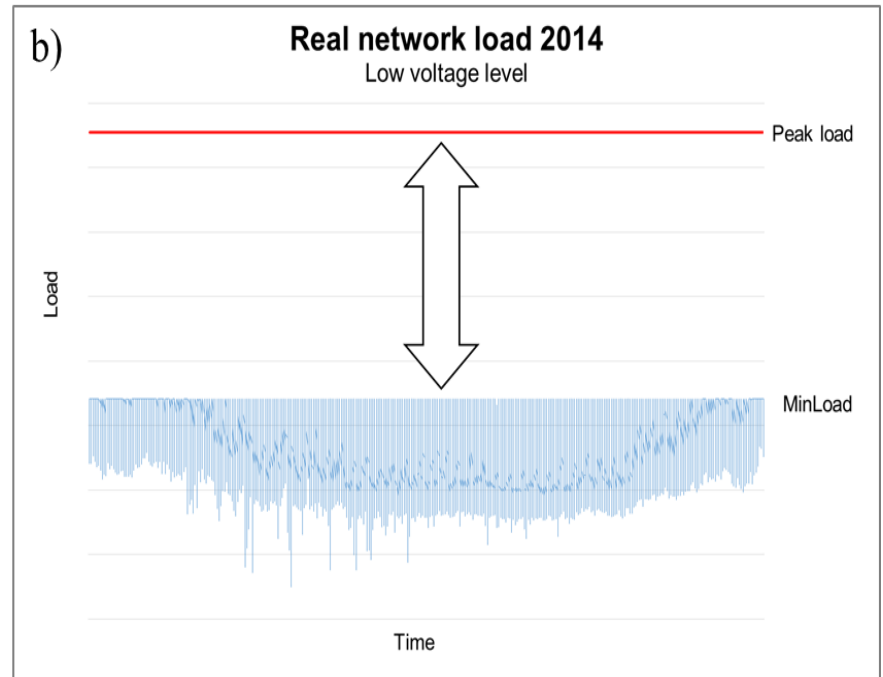
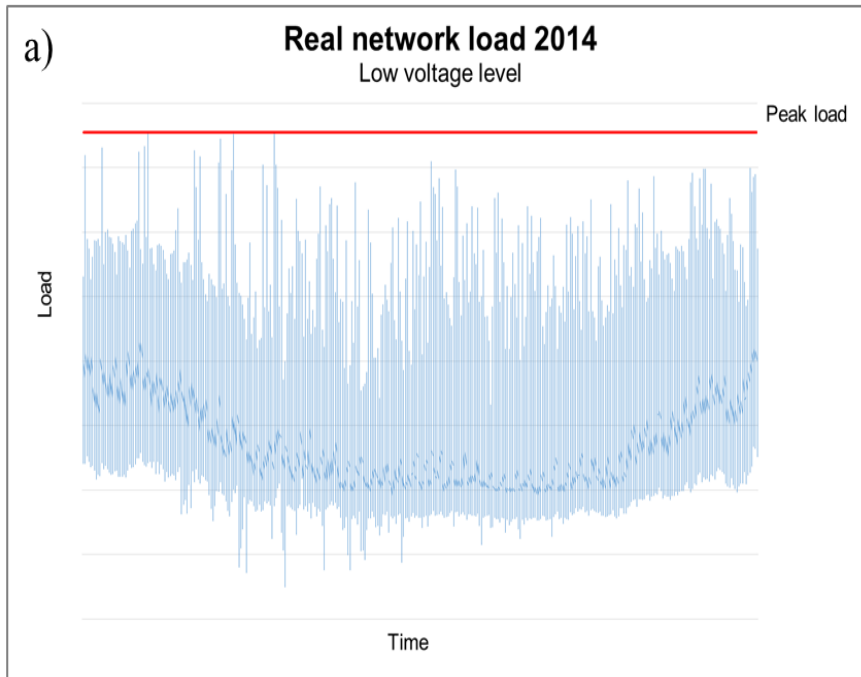
Pricing system for withdrawal **with** load metering

Network level	Annual utilization time			
	< 2500 h/a		≥ 2500 h/a	
	Demand Rate (DR 1)	Energy Rate (ER 1)	Demand Rate (DR 2)	Energy Rate (ER 2)
	€/ kW	Ct / kWh	€/ kW	Ct / kWh
NL 5: Medium Voltage (MV)	3.30	3.61	77.82	0.62
NL 6: Transformation Level MV/LV	5.15	3.69	83.59	0.55
NL 7: Low Voltage (LV)	5.88	3.68	79.79	0.73

Pricing system for withdrawal **without** load metering

Network level	Base Price	Energy Rate
	€/ a	Ct / kWh
NL 7: Low Voltage (LV)	20.00	4.11

Solution Approach



Solution Approach: MinLoad Pricing Model

MinLoad pricing scheme	
Network level	Respective grid costs (A)
NL 5	4 146 300 €
NL 6	870 300 €
NL 7	3 102 000 €
Σ	8 118 600 €

MinLoad NL 5

= Total amount of electricity demand / 8 760 h

= 165 523 059 kWh / 8 760 h

= 18 895 kW

Solution Approach: MinLoad Pricing Model

Model Customer NL 7₁

NL: 7 – Electricity Demand: 5 300 kWh – MinLoad: 0.6 kW – Peak Load: 1.4 kW

Current Pricing System

= **237.83 €**

MinLoad Pricing Model

→ Without Peak Load Contribution

= **211.20 €**

→ With Peak Load Contribution

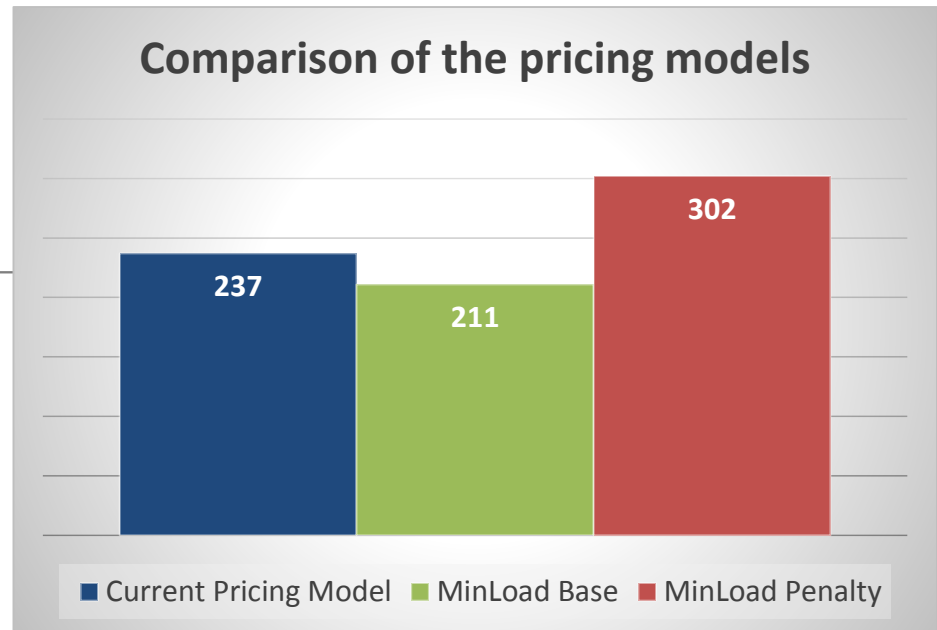
Total cost [€] =

= MinLoad [kW] * BDR_{NL7} [€/kW] + (Peak Load – MinLoad) [kW] * PDR_{NL7} [€/kW]

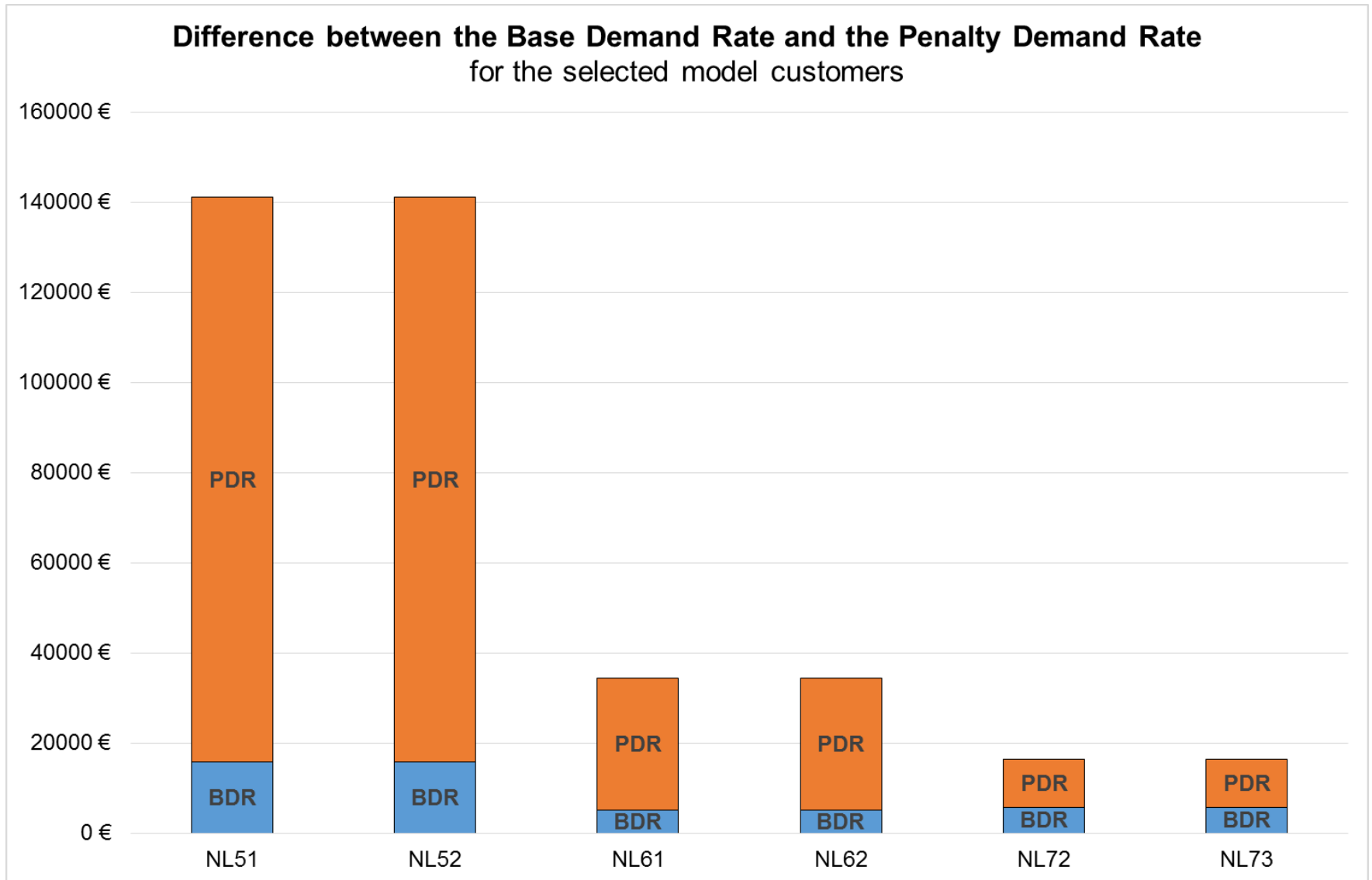
= 0.6 kW * 352 €/kW + (1.4 kW – 0.6 kW) * 114 €/kW

= 211.20 € + 91.20 €

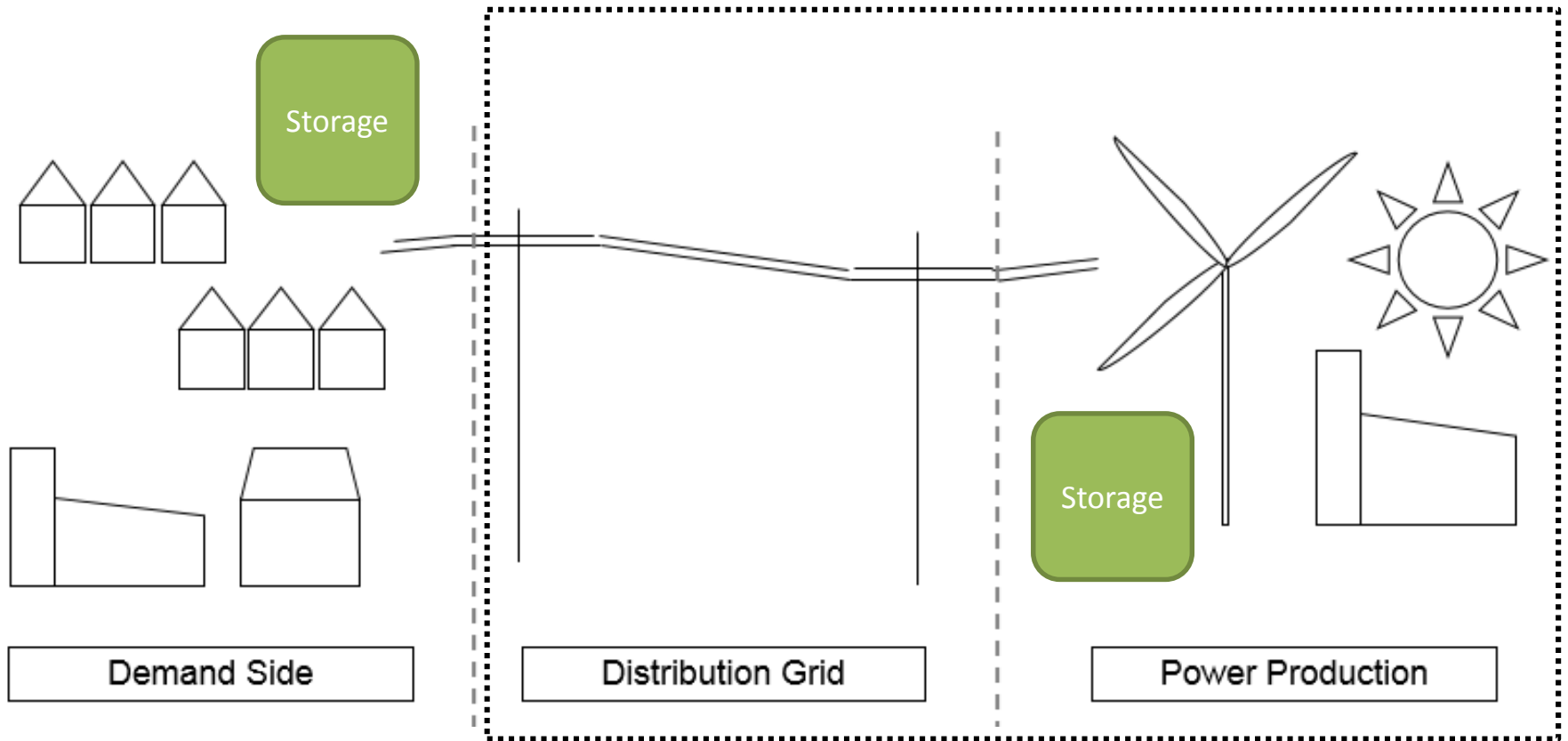
= **302.40 €**



Solution Approach: MinLoad Pricing Model



1. The MinLoad pricing model does allocate the grid costs following the 'Polluter Pays Principle'; it incentivizes costumers to smooth their load profiles and to avoid peak loads.
2. Covering the total peak loads is very expensive and electricity storages are not economically viable (only financed by grid charges) at present
 - BUT: there is a savings potential
 - the most efficient technology will be found out over the years
3. Problem:
Monetary savings at the network levels 5 – 7 mean less grid revenues for the operator of the upstream network level
 - over time, grid charges (NL 4) will increase
 - incentives to reduce peak loads will increase
 - potential savings will decrease
 - the effect will be annulled over time → second step of the pricing model



Pricing Model – Second Step

Thank you for your attention!

Questions?

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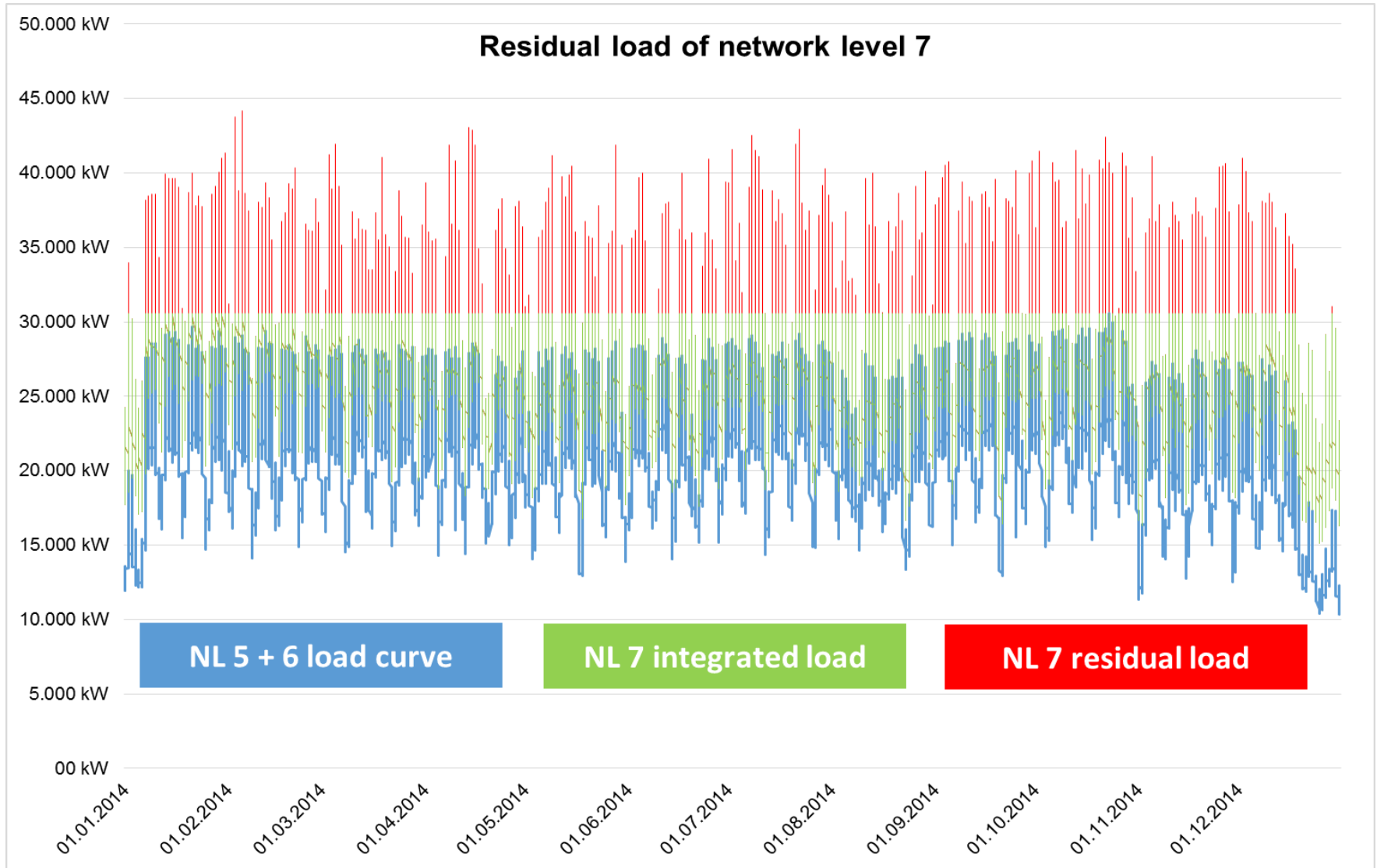
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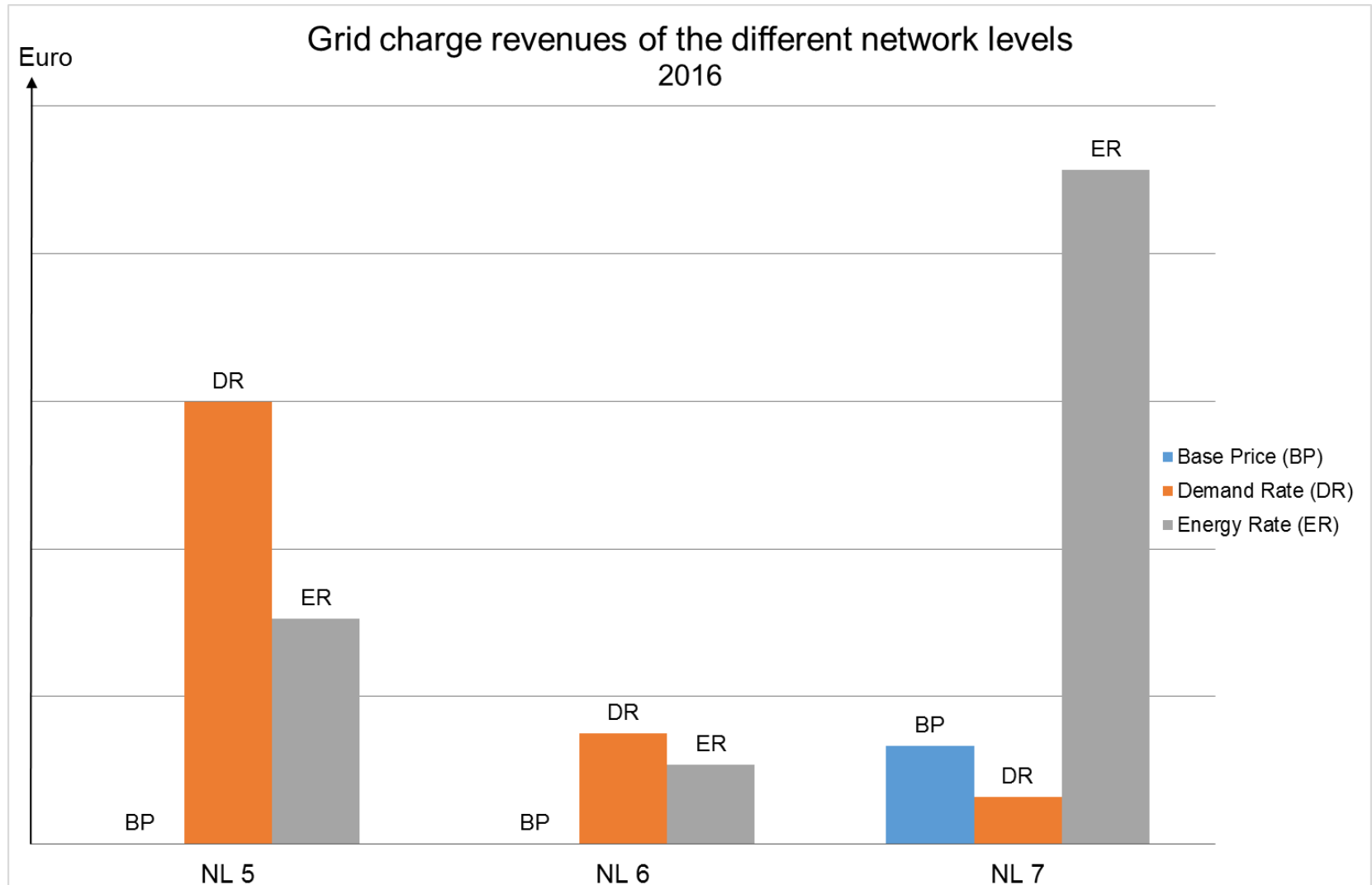
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Storage based Load Management System



Current Pricing System



Veränderung des Einsparpotenzials des Beispielkunden bei Senkung der Gesamtnetzerlöse

Kunde: NE 5, > 2.500 h, 950 kW Jahreshöchstlast

