

ANALYSE VON GESCHÄFTSMODELLE FÜR BETREIBER VON HYBRIDEN-VIRTUELLEN- KRAFTWERKEN

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Georg Lettner, Lukas LEIMGRUBER , Tara ESTERL, Jan W.
BLEYL , Gregor TALJAN , Christoph GUTSCHI, Ernst MEIßNER

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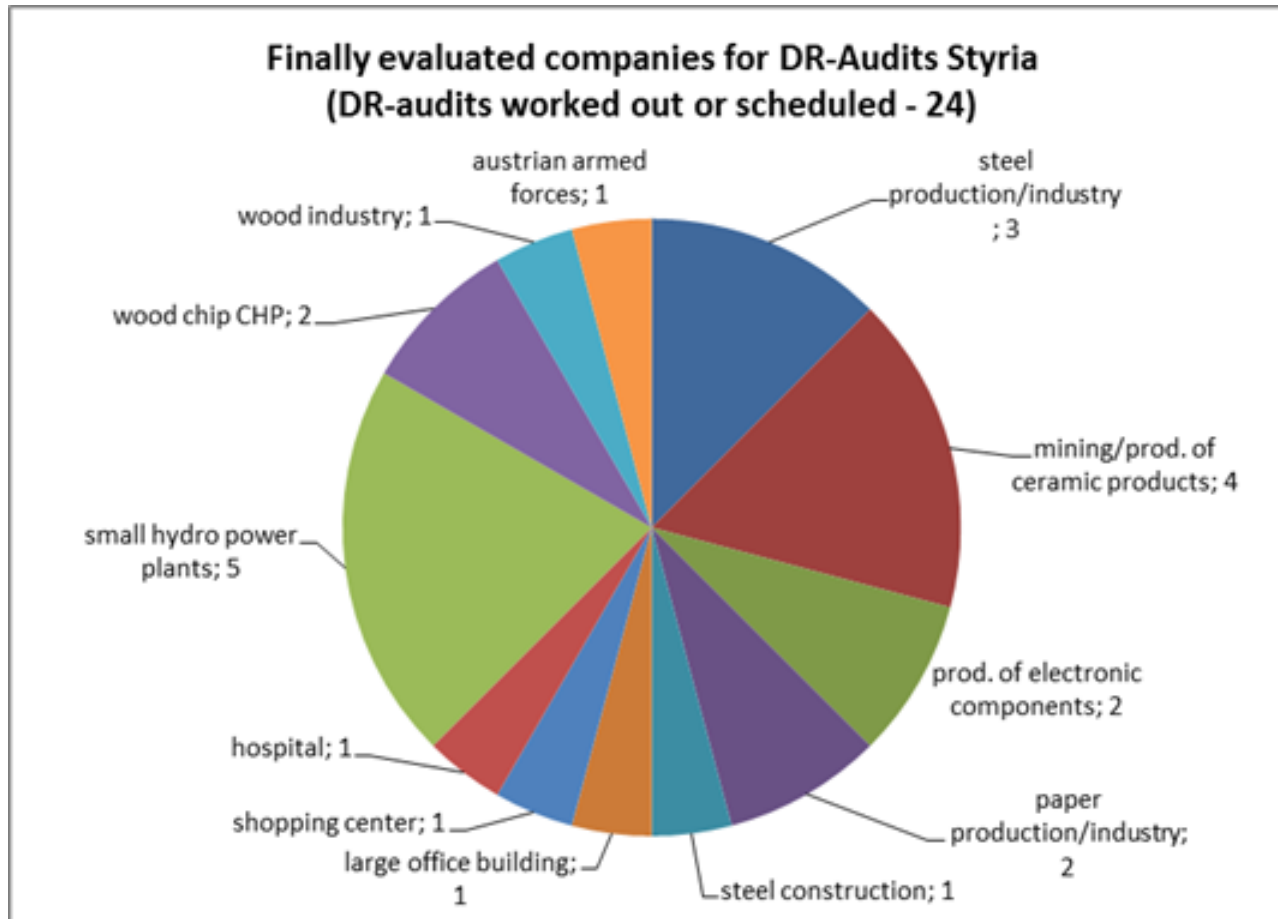
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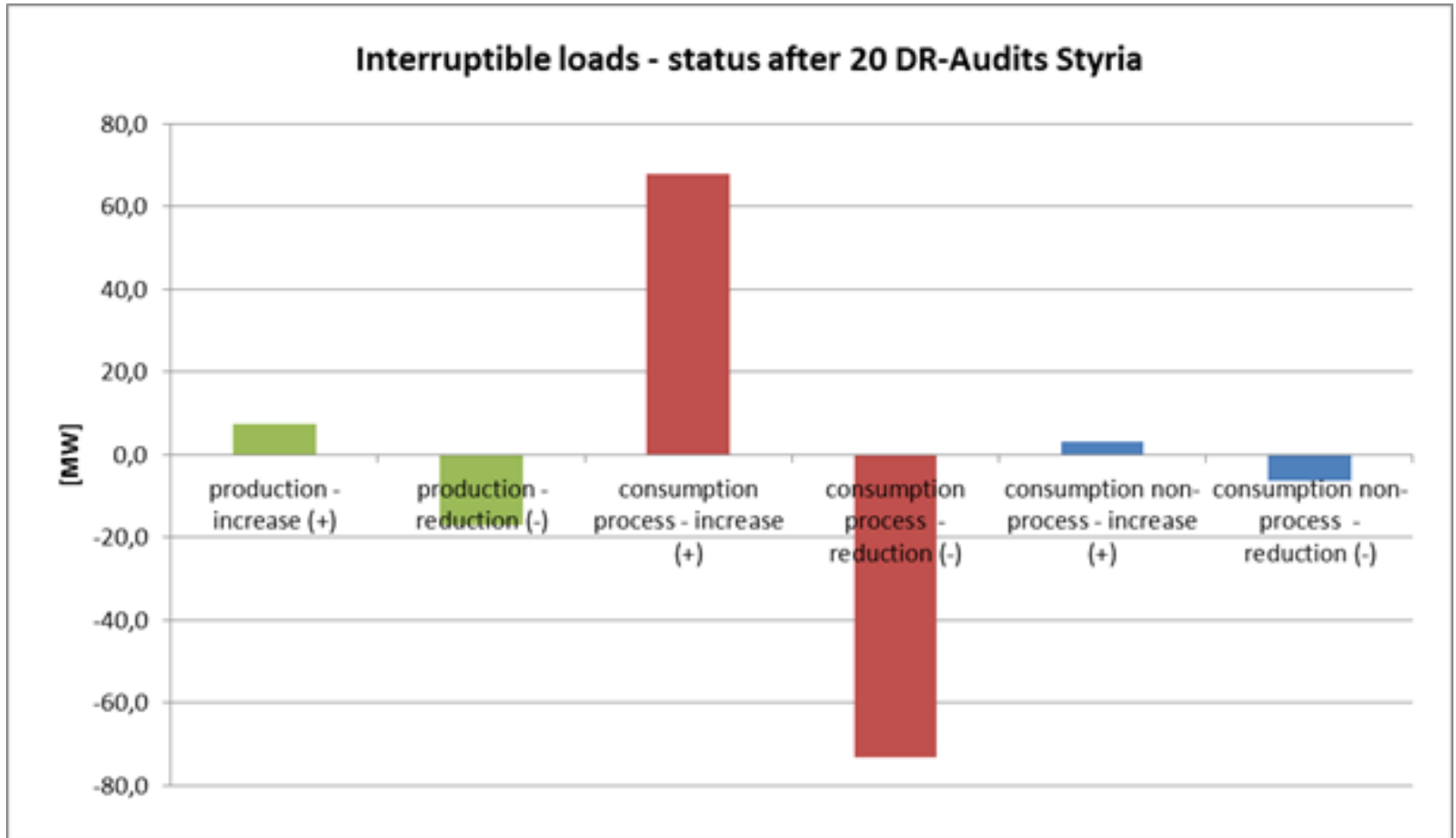
Projektdate Hybrid-VPP4DSO:

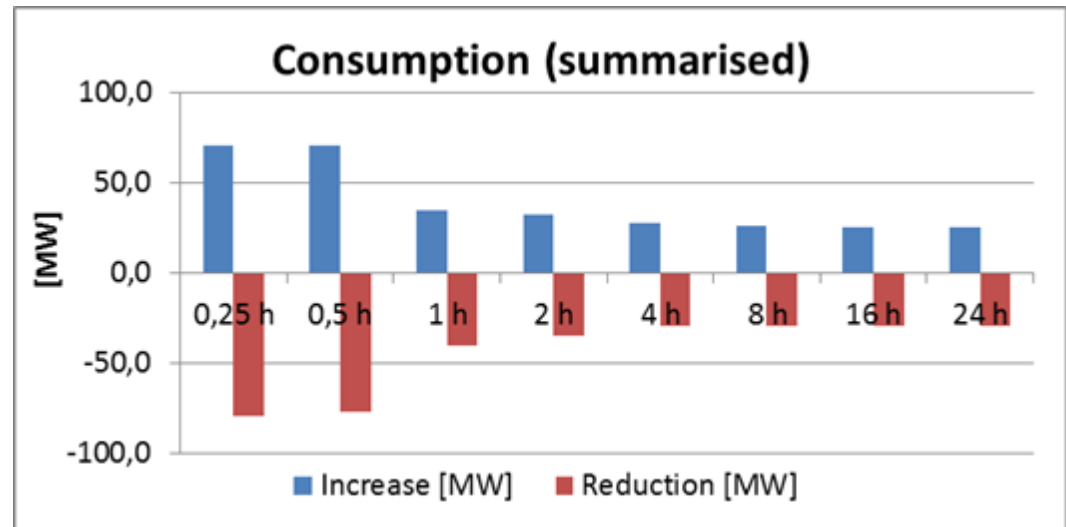
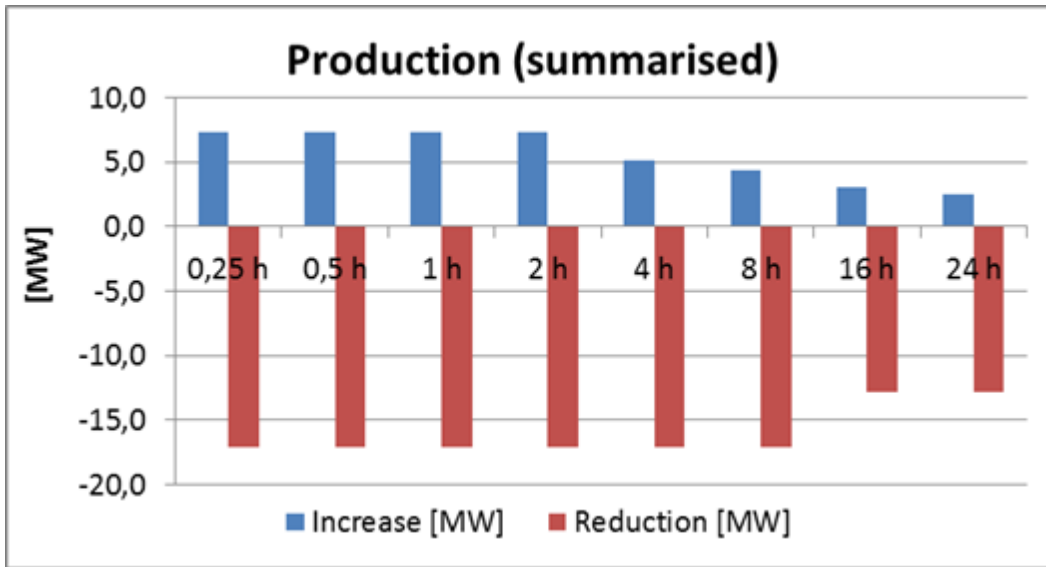
- Laufzeit: 10/2014-09/2016
- 9 Projektpartner
- Weitere Informationen <http://www.hybridvpp4dso.eu/>

Demand Response Audits - Steiermark

- Durchgeführt von Grazer Energieagentur, Energie Steiermark Kunden GmbH und Energienetze Steiermark GmbH
- Ziel:
 - 20-30 Unternehmen mit unterbrechbaren Lasten
 - Über 50% der Unternehmen in den kritischen Netzabschnitten
 - Anschlussleistung Last/Erzeugung > 100kW







Sector	Potential	Specifics	Shifting times [h]
Steel production	High	Reduction with electric arc furnace for raw materials but the higher the requirement for the good the less the chance for load shifts ; nearly no chance for load shifts in thermal treatment processes	0.25 - 24
Mining/ceramics	High	Mainly depending on level of automation, storage capacity and actual degree of their capacity utilization	0.5 - 8
Paper	Small/medium	Mainly depending on storage capacity before/after shredders, grinding machines, mills etc.	0.5 - 24
Large office building	Small	From ventilation, air conditioning , etc.	0.25 - 1
Hospital	Small	Emergency generators cannot be used in general (disaster protection); but small potential from ventilation, air conditioning, steam humidifiers, etc.	0.25 - 2
Small hydro power	Medium	Depending on capacity level : April to June 100%; consideration of feed-in regulation	up to 24
Wood chip CHP	Medium	Reduction possible if bypass for heat production is foreseen; consideration of feed-in regulation	up to 12

Betriebsarten Hybride-Virtuelle-Kraftwerke

Market

Hybrid

Grid

passive

active

Market-VPP

The grid is robust enough to permit the operation of VPPs in the Electricity Market while not being jeopardised by it.

Hybrid-VPP (passive)

The degree of participation of the VPPs in the Electricity Markets is agreed with the DSO beforehand. This agreement guarantees that the grid limits are not violated.

Hybrid-VPP (active)

The VPPs participate in the Electricity Markets as long as the grid limits are not violated. If a critical situation is identified during the VPPs operation, an algorithm takes care of it by limiting the participation of the VPP.

Grid-VPP

The VPPs do not participate in any Electricity Market, but only provide active local services to the DSO.

Geschäftsmodelle

- 4 Geschäftsmodell je nach Hybrid-VPP Betreiber
 - Verteilnetzbetreiber
 - Energiehändler
 - Unabhängiger Aggregator
 - Kunden VPP

- Wechselwirkung mit anderen Interessensgruppen
 - Verteilnetzbetreiber
 - Energiehändler
 - Aggregator
 - Flexible Kunden im VPP
 - Andere unflexible Kunden

Bewertungskriterien

- Technische Anforderungen
 - Lösung von Netzproblemen
 - Datensicherheit
 - Einschränkung Geographisch bzw. Teilnehmer
- Organisatorische Anforderungen
 - Systemkomplexität
 - Bestehendes Wissen
 - Bestehende Kundengruppe
- Regulatorische Rahmenbedingungen
- Politische Zielsetzungen
- Andere Vorteile
 - Grünes Image
 - Neue Tarifstrukturen

Bewertungskriterien

- **Ökonomische Aspekte**
 - Erlöse aus Marktsicht
 - Energy-only Markt
 - Regenergiemarkt
 - Minimierung Ausgleichsenergiekosten
 - Kapazitätsmechanismen
 - Erlöse aus Netzsicht
 - Minimierung der Netzanschlusskosten
 - Minimierung Netzinvestitionskosten
 - Versorgungssicherheit
 - Minimierung der Kosten für das übergelagerte Netz
 - Investitionskosten in notwendige IKT-Lösung
 - Vermiedene Netzverstärkung

Qualitative Analyse: Geschäftsmodell „DSO“

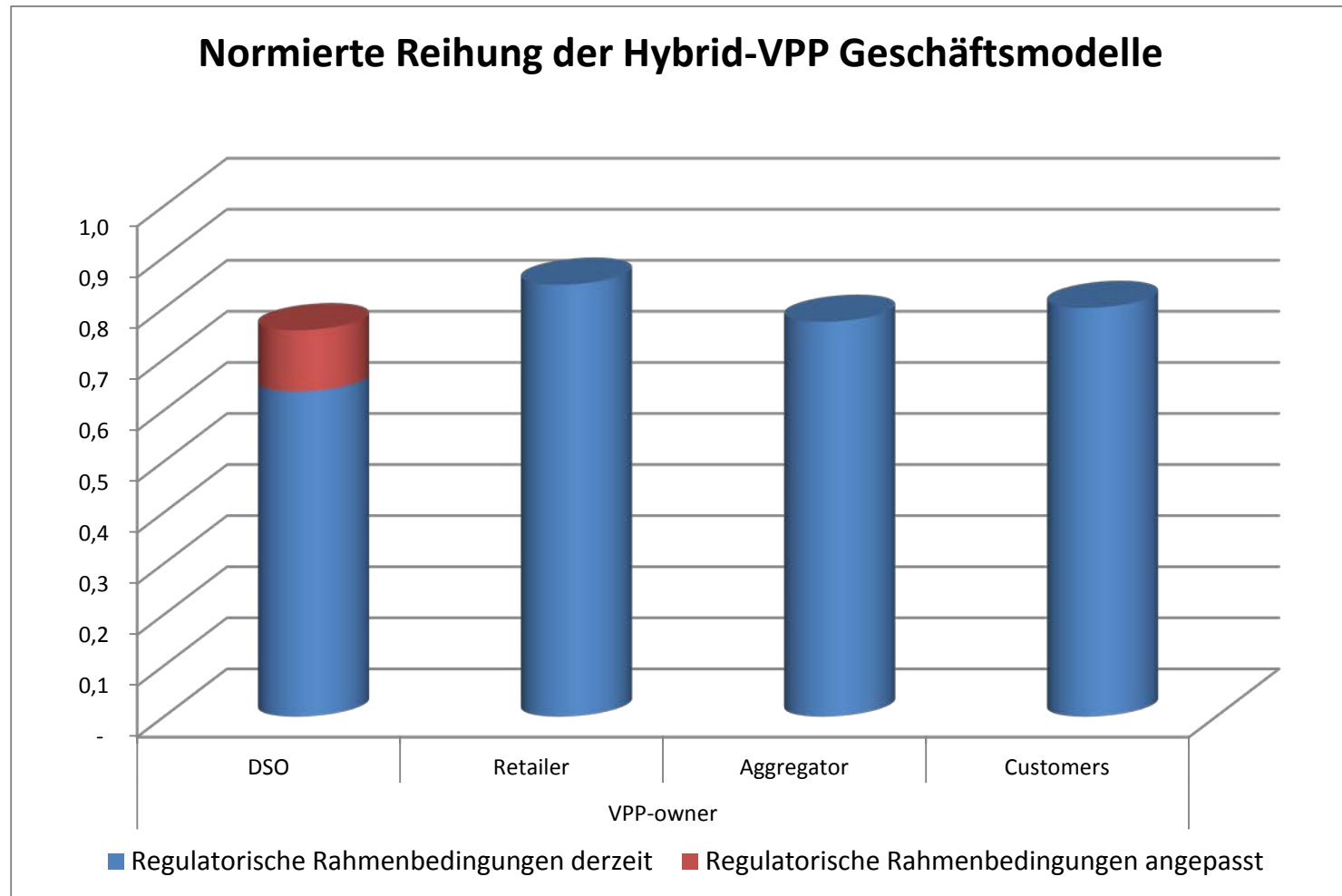
active hybrid-VPP		VPP-owner	Stakeholders					Total	VPP-owner
		Affiliation of VPP - DSO	DSO (comp. without VPP)	Energy Retailer (comp. without VPP)	Aggregator (comp. with market-VPP)	hybrid-VPP-participant (flex. load/gen)	Other Customers		Affiliation of VPP - DSO
Technical	Solution of grid problems	++	0	++	++	++	++	++	++
	Data safety and security	0	0	0	0	+	0	+	0
	Geographical limitation / limitation in participating units								
	> geographical limitation	-	0	0	0	-	0	0	-
	> limitation in participating units	+	0	0	0	0	0	+	+
Organisational	High system complexity	++	0	0	0	++	0	+	++
	Existing information / know-how								
	> information about own facilities	--	0	0	0	-	0	0	--
	> know-how about trading / energy markets	--	0	0	0	-	0	0	--
	Existing customer pool	+	0	-	--	0	0	0	+
Regulatory	Compliance with regulatory framework	--	0	0	0	--	0	0	++
Political	Fullfilment of political framework conditions e.g. climate targets								
	> share of RES	0	0	-	+	+	++	+	0
	> energy efficiency	0	0	-	+	+	++	+	0
Monetary	Possibility to get revenues by business cases - market view								
	> energy only market	--	0	+	+	--	0	0	++
	> balancing market	--	0	+	+	--	0	0	++
	> minimizing imbalance costs	--	0	0	0	--	0	0	++
	Possibility to get revenues by business cases - grid view								
	> minimizing connection costs for customer	0	0	0	0	++	0	+	0
	> minimizing grid investments for the DSO	++	-	+	+	++	++	++	++
	> energy provision during failures	++	-	+	+	++	++	++	++
	> Minimizing grid tariffs charged by DSO / TSO	0	0	+	+	+	+	+	0
	Low investment costs: ICT, infrastructure, etc.	++	0	0	--	+	0	+	++
Avoided grid enhancement	+	-	++	++	++	++	++	+	
Other	Green image	++	--	0	0	++	0	+	++
	New tariff structures / products	++	--	0	0	++	0	+	++
Total		+	0	+	+	+	+	+	+

Bewertung bei Veränderung regulatorischer Rahmenbedingungen

Qualitative Analyse: Geschäftsmodellvergleich

active hybrid-VPP		VPP-owner			
		DSO	Retailer	Aggregator	Customers
Technical	Solution of grid problems	++	++	++	++
	Data safety and security	0	-	--	+
	Geographical limitaion	-	++	++	+
	Limitation in participating units	+	+	+	--
Organisational	High system complexity	++	+	-	-
	Information about own facilities	--	+	+	++
	Know-how about trading / energy markets	--	++	+	-
	Existing customer pool	+	++	--	+
Regulatory	Compliance with regulatory framework	--	++	++	++
Political	Share of RES	0	+	++	++
	Energy efficiency	0	+	++	++
Monetary	Energy only market	--	++	++	++
	Balancing market	--	++	++	++
	Minimizing imbalance costs	--	++	+	++
	Minimizing connection costs for customer	0	0	0	++
	Minimizing grid investments for the DSO	++	+	0	0
	Energy provision during failures	++	+	+	+
	Minimizing grid tariffs charged by DSO / TSO	0	+	+	+
	Low investment costs: ICT, infrastructure, etc.	++	-	--	--
	Avoided grid enhancement	+	+	+	+
Other	Green image	++	++	++	++
	New tariff structures / products	++	++	++	+
Total		+	++	+	+

Qualitative Analyse: Geschäftsmodellvergleich



Schlussfolgerungen

- Regulatorische Anpassung für Geschäftsmodell „DSO“ notwendig
- Neue Tarifmodelle (v.a. Netz) notwendig
- Anreizemechanismen für Netzdienstleistung schaffen
- Notwendige IKT Strukturen schaffen (Smart Grids)
- Robuste Datensicherheit
- Optimale Kombination unterschiedlicher DR-Potentiale erhöht bestmöglichen Einsatz von aktiven Hybrid-VPP

Vielen Dank für die
Aufmerksamkeit!

Georg Lettner

lettner@eeg.tuwien.ac.at