Grundgrün Energie GmbH
Trading Electricity from Renewables: Competitive trading and marketing of renewable energy power plants

IEA Workshop, Paris, March 24, 2015
Grundgrün as leading energy services company focused on next generation power markets

Overview

**Our customers**

- Renewable energy producers
- Energy user, retailers & utilities
- Grid operators

**Market focus**

- Predominantly Germany, capabilities to extend across European energy trading pools
- Within top #5 trader of renewable energy in Germany, currently placing ca. 2.7 GW of power annually for over 250 wind, solar and biogas generators

**Our state-of-the-art service delivery platform**

- Arguably the industry’s most efficient, cost-effective, scalable and flexible service delivery platform, creating significant competitive advantages in the rapidly changing wholesale energy services market
- Delivery of strategic, high value services
- Power forecasting and risk management capability, including integrated trading

**Our services**

- Wholesale power marketing & placement
- Balancing
- Procurement
- Demand response
- Portfolio optimisation
- End-to-end fulfilment services
- Billing
- White-Label / Multi-Brand
- C&I services

**Our performance**

Growth from launch in 2011 to ca. €132 million annual revenue in 2014

**Employees & headquarters**

65+ experts, based in Berlin
Management with over 100 years experience in the European energy and utility industry

Source: GG
March 2015

Dr. Felix Grolman – CEO
Our platform is custom-built for the delivery of new energy services

The traditional market for centralised power is in terminal decline

≈200 power plants in Germany
Capital intensive - owned by utilities

Centralised Utilities

Energy Delivery

The new power market has become decentralised...

100,000s of independent power stations
Separation of ownership from delivery of services

Platform

For renewable generators:
• Wholesale power marketing & placement
• Procurement, billing & end-to-end fulfilment services

For grid operators:
• Balancing
• Demand response
• Portfolio optimisation

For energy users, retailers & utilities:
• White-label / multi-brand
• Procurement, billing & end-to-end fulfilment services
• Small PV marketing and placement
• C&I services
• Energy for mobility

Source: GG
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Source: GG
March 2015

Dr. Felix Grolman – CEO
We have reached high competitiveness in renewable production, enabling matching of demand

| Better forecasts | Continuous improvement of weather forecasts  
|                  | Historical data available now for at least last 3 years |
| Monitoring, metering, modelling | Continuous online metering of production  
|                  | Quantitative models, big data analyses delivering results |
| 24/7            | Selling or adjusting the production at the exchange 24/7 |
| High resolution/frequency | Quarter hourly resolution lead to marketing at the exchange 96 times a day |

Source: GG  
March 2015  
Dr. Felix Grolman – CEO
Better forecasts lead to lower costs ...

- Today the production prognosis has more than 90% accuracy 1 hour before delivery
- Gate closure before delivery will be reduced to 30 minutes in 2015
- Renewable index future on German renewable production will be tradeable starting this year on both Nasdaq OMX and EEX

(1) According to EPEX Spot
Source: GG
March 2015
Dr. Felix Grolman – CEO
... that show in a decline of balancing costs

- TSOs were historically restricted to day ahead marketing of renewable production
- TSOs marketed by generating balancing costs of around 4 €/MWh
- Today the average direct marketer realises costs of around 1 €/MWh

Source: GG
March 2015
Germany introducing marketing of small scale power plants

Regulatory background

- Starting 2016 direct marketing of renewable energy production is mandatory for power plants < 100 kW

Typical example

Small scale power plant in Berlin
- Capacity: 100 kW
- Yearly performance: 88,500 kWh
- Service fee: 0,1 Ct/kWh
- Annual Revenue: 88,50 €

Market comparable to automated flow consumer business

Source: GG
March 2015

Dr. Felix Grolman – CEO
**Power marketing and placement becomes standardised process due to smaller asset size**

| Customer acquisition | • Acquisition and closings highly automated  
|                      | • Preferably via internet |
| Contracts            | • Standard terms and conditions  
|                      | • No exceptions |
| Customer service     | • Highly standardised  
|                      | • Highly automated |
| Processes            | • Highly automated communications  
|                      | • Automated data exchange with involved parties: Plant owner, system/grid operators, other traders |

**Natural fit with mass end consumer processes and decentralised generation**

Source: GG  
March 2015  
Dr. Felix Grolman – CEO
We connect production with consumption directly to enable cost efficient access to renewable energy

Wind, Solar, Biomass/Biogas

Connectivity, prognosis, controlling

Central platform

Trading

EPEX/EEX, OTC

End consumer delivery

Households and industrial customers

Balancing power

Grid operators

Source: GG
March 2015

Dr. Felix Grolman – CEO
Matching of consumption profile with production profile possible using market access for differences

Projected energy consumption end consumers with ~500 k customers (illustrative)
Thank you!

Dr. Felix Grolman
CEO
Grundgrün Energie GmbH
felix.grolman@grundgruen.com