Energy artificial intelligence for effective energy imbalance cost reduction in the steel industry

METEC & 4th ESTAD, Düsseldorf, 25.06.2019

Presenter: Dr. Christian Zaugg, CSO Alpiq Digital AG
Co-authors: M. Hitz, G. Dr. C. Montoya, S. Röthlisberger, A. Kaufmann, Dr. O. Sundström, Alpiq Digital AG, Switzerland;
P. Schwartz, Swiss Steel AG, Switzerland
Alpiq in brief

- Active in 30 countries throughout Europe, headquartered in Switzerland
- Key figures 2018: CHF 5.2 billion net turnover and EBITDA before exceptional items of CHF 166 million
- Approximately 1,550 employees
- Generation ca. 18 TWh/a (hydro and pump storage, renewables, nuclear, conventional thermal)
- Trading, optimisation & sales
- Digital Energy & E-mobility solutions
An Energy Market in Transformation

- Wind, solar PV & storage growth
- Electric vehicles growth
- Industrial assets: consumers, producers, prosumers
- Energy value chain
Challenge: volatile power consumption = cost and risk!

Financial impact & risks:
- **Long-term supply**: Absolute energy cost, hedging, structured supply
- **Optimization**: Short-term price fluctuations and imbalance cost
- Grid-tariffs & peaks (capacity)
- Flexibility revenues and load-shifting

Power quality & security:
- CO2 targets
- Security of supply / uninterruptable power supply / black-start
- Power quality

- 5-10% of energy cost is imbalance Energy
- Ca. 1 m€ per year
- Imbalance cost is very volatile
**Excursion: Imbalance price – not influenceable**

**Imbalance cost** = \( \text{[scheduled volume} - \text{actual volume]} \times \text{imbalance price} \)**

Source: Swissgrid.com

- **Volatile generation**
- **Transmission grid**
- **Volatile consumption**
Excursion: Imbalance price – not influenceable

**Imbalance cost** = [scheduled volume – actual volume] * imbalance price

**Imbalance price** is:
- Volatile
- Unpredictable
- Not influenceable
- Dependent on weather changes, outages, market, season, regulation, speculation.

Imbalance price is a **risk** to the **bottom line** – best strategy is to **avoid it**!
Excursion: Imbalance volume – influenceable

Imbalance cost = \([\text{scheduled volume} - \text{actual volume}]\) * imbalance price

Monthly imbalance volume ~10 GWh!
Simple solution – Energy AI

**Imbalance cost** = \([\text{scheduled volume} - \text{actual volume}]\) * imbalance price

Day ahead nomination is only a rough estimate – individual 15-min values are difficult to forecast day ahead.

So how can the imbalance energy volume be reduced? **Intraday nominations!**

Key ingredients:
- Automated **Energy AI forecast** – updated every 15 min
- **Automated** market access for renomination
Results – up to 25% reduced imbalance energy

• Imbalance energy reduction by up to 25%!
• Effective imbalance cost reduction
• No interference with core business:
  • Fully automated process
  • Opt-out anytime
  • Maximum security
• Future proof: simple adaption

**Monthly imbalance energy volume**

- Day-ahead (benchmark)
- Intraday re-nomination

**Relative monthly imbalance energy avoided with Energy AI**
Putting it into context – make most of Energy, AI and Industry 4.0

<table>
<thead>
<tr>
<th>Solution provides added value today:</th>
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<tbody>
<tr>
<td>Reduce energy cost and risk</td>
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<td>Automated intraday nominations</td>
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<td>Best performance: Energy AI</td>
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<td>Value based pricing / revenue sharing</td>
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<td>Contribute to “Energiewende”</td>
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<th>Future potential to make the most of Energy:</th>
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<td>Include more sensors &amp; data</td>
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<td><strong>New features</strong>: industry 4.0 (e.g. automatic alarms, anomaly detection)</td>
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<td>Future ready to include new markets</td>
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<td><strong>Upgrade</strong> for battery storage, PV or electric vehicles</td>
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Let’s partner up!

Industry competence + Energy AI = operational excellence + sustainability

- Minimize energy / grid cost
- CO2 and sustainability
- Security of supply
- Energy AI, industry 4.0, automation

Volatility and risks in energy cost

Flexibility markets, grid tariffs & load shifting

Maximise flexibility, security of supply, CO2 footprint and battery storage

Don’t waste time and money on Energy
- Protect against risks
- Focus on your operational excellence

Forecast & nominate

Control & balance

New assets

Alpiq Digital

Your core-business

Alpiq AI-Platform

Flexibility markets, grid tariffs & load shifting
Thank you, we are here for you!

Alpiq Digital at METEC-ESTAD 2019:

**Athanassios Roumeliotis** (athanassios.roumeliotis@alpiq.com)

**Alexander Kaufmann** (alexander.kaufmann@alpiq.com)

**Alexander Ludwig** (alexander.ludwig@alpiq.com)

**Christian Zaugg** (christian.zaugg@alpiq.com)