Project challenge:

Integrated Connectivity And Intelligence In The Russian Grid

Country challenge-provider: Russia

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Russian Grid Ecosystem

Economic damage of 40 Mln ₽ (0.6 Mln €) due to grid outages (2017 within the region of North West Federal District only)

On top: Risk of severe penalties by contract violations up to 10 Mln ₽ (150,000 €) per hour off-grid
What makes your Grid get Digital?

Rosseti’s commitment to investments for the energy system of the future

Initial situation: 904 Bln Rub (12 Bln €) revenue of Rosseti in 2016

2022
370 Bln Rub (5 Bln €)
• Isolated investments
• Basic functionalities
• 1st priority: visibility through smart meter

2025
575 Bln Rub (8 Bln €)
• Advanced level of integrated connectivity
• Enabling far-reaching remote control

2030
355 Bln Rub (5 Bln €)
• Progressive implementations
• Preparation of full-scale roll-out

Challenge → Solution → Business Model

Initial situation: 904 Bln Rub (12 Bln €) revenue of Rosseti in 2016
What makes your Grid get Digital?

**Data Source**
- Smart sensors
- Communication
- Big data
- A.I. / Algorithms

**Data processing**
- Remote control
- Predictive maintenance
- Clear picture of failure situation
- Load management
- Risk oriented asset management
- Online monitoring

**Data usage**

Challenge ► Solution ► Business Model
Data Monetizing

Market value of data is constantly growing

Successful use cases

Stakeholders of Rosseti’s data

• OEMs (Original Equipment Manufacturers)
• Analytic consultants
• GIS (Graphic Information Systems)
• Other grid companies
• Regulators

“Value of electrical utility customer data in the U.S. $4.6 Bln/yr (4 Bln €/yr)”
Digital Age — Data is the new Product

**Problem:**

Challenge → Solution → Business Model

**Smart equipment**
- Load
- Switching operations
- Parameters of equipment
- Event log
  → Sell to OEM

**General data**
- Meteorological data
- Performance data
- Development plan
  → Sell to OEM & GIS

**Consumer data**
- Consumption
- Forecast
- Installed load
  → Sell to OEM & analytic consultants

**Sensitive grid data**
- Energy flow
- Critical infrastructure
- Topology
- Switching state
  → Safely share with grid & regulators

**Data Hub**
- Grid data
- OEM data
- Analytics
- Storage

**Data monetizing**
Innovative Collaboration Setup

... *more than just customer relations*

**Grid operators**
- ROSSETI
- e.on
- enel

**OEMs**
- SIEMENS
- ABB
- Schneider Electric
- GE

- Equipment data
- Service agreements
- Smart grid concept
- Connected equipment
- Performance contracts
- Special conditions SA

Challenge ——> Solution ——> **Business Model**
Benefits for OEMs

Predictive maintenance
Permanent performance test
Long-term agreements
Benefits for Grid Operators

- Improve of SAIDI & SAIFI
- Optimization of investment
- Decrease of field service reaction time

Challenge ➔ Solution ➔ Business Model
Pilot Cases

Implementation of a Business Model

Kaliningrad region
- Most enhanced part of Russian grid
- Existing data can already be used
- Gaining experience with data trading in pilot region

Krasnodar region
- Smart grid concept in cooperation with OEMs
- Rural “non-smart” grid
- Installation of intelligent equipment
- Analysis of results and further actions

Make the most of your data!

Challenge — Solution — Business Model
Appendix
The data treasure chest: Is there a market to sell utility data?

By: Jim Mazeek

Utilities that have deployed smart meters are now awash in terabytes of valuable consumer data. According to Accenture estimates, in the United States, 2.8 billion data points are captured on a daily basis including energy usage, customer move-in/move-outs, payment/service history, and utility-program participation. This data can pave the way for future utility insights, but can also enable an emerging market for other companies looking to offer new energy-related products and services to consumers.

There are two distinct utility data offerings and associated “use cases” that can be considered: (1) utilities offering anonymized customer data to companies that are researching or designing new energy-related products and services and (2) utilities (with customer permission) offering specific customer data to enable other energy-related companies to explicitly target new customers. Accenture estimates these markets in the United States to be worth $1.3 billion and $3.3 billion, respectively.

Russia’s Federal Grid Company CEO Oleg Budargin said, “We haven’t missed the smart grid train yet,” and added that the upgrade of the grid could reduce electricity losses by 25 percent and save as much as 35 billion kWh of power.

As the world’s third largest consumer of energy, Russia has announced plans to modernize its energy infrastructure, expanding its use of the smart grid electrical framework to make its energy transmission more efficient and less wasteful.

Smart grid technology is already in use in Russia, but as the current distribution infrastructure loses 12 percent of its transmitted energy (compared to, Europe electrical network losses rest at only 4-9 percent), which adds up to a loss of $15 billion per year, there is an incentive to expand the use of the technology. The Russian power transmission and distribution company JSC Russian Grids, has identified the smart grid as a solution, and has secured partial funding from the National Welfare Fund (NWF).

In fact, according to a report by Zanjme, Russia’s smart grid system is expected to grow from $5.5 billion in 2012 to $16.7 billion by 2017.

The Rolls-Royce Intelligent Engine

With more people flying than ever before and an increasing demand for more efficient travel, Rolls-Royce has defined a vision for the future of aircraft power that will help deliver travelers more reliably and more efficiently than ever before. The Intelligent Engine vision is based on a belief that the worlds of product and service have become so closely connected that they are now inseparable, thanks to rapid advancements in digital capability. By the end of this year Rolls-Royce will be set to receive more than 70 trillion data points from its in-service fleet each year. [www.rolls-royce.com]

- Collaboration with customers
- Business model is based on data exchange
- Use data analytics, industrial artificial intelligence and machine learning
- Financial rebates for data sharing

[www.rolls-royce.com]
Imec is the world-leading R&D and innovation hub in nanoelectronics and digital technologies. As a trusted partner for companies, startups and academia we bring together brilliant minds from all over the world in a creative and stimulating environment. By leveraging our world-class infrastructure and local and global ecosystem of diverse partners across a multitude of industries, we are accelerating progress towards a connected, sustainable future.

[https://www.imec-int.com]

- Leuven, Belgium
- Data is shared between all stakeholders
- Shared infrastructure
- New business partners can buy in into existing data pool
- Competitors willing to share data
SIEMENS Sensformer: Born connected

Transformers meet connectivity. Utilize the data your transformers provide to dive into digitalization and optimize your operations and business decisions.

Transformers already are a vital and decisive part of power grids – no matter if conventional or digital. The Sensformer™ will enable you to digitize this important keystone of your grid. Now your transformers are connective! A Sensformer™ contains the necessary sensors for entering the most important operating parameters – such as oil-level, temperature, LV winding current and GPS-positioning.

• Simplified fleet management
• Enhanced operations
• Increased availability
### Investment

<table>
<thead>
<tr>
<th></th>
<th>Stage I: Up to 2022</th>
<th>Stage II: Up to 2025</th>
<th>Stage III: Up to 2030</th>
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<tr>
<td>Smart meters</td>
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<td>Telemechanics</td>
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<td>Control systems</td>
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<tr>
<td>Digital secondary systems</td>
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<td>75</td>
<td>113</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>370 (5)</strong></td>
<td><strong>575 (7,8)</strong></td>
<td><strong>355 (4,8)</strong></td>
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Figures in Billion Rubles (Billion Euro) [Team Russia]
### Investment

**Figures in Billion Rubles (Billion Euro)**

<table>
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<tr>
<th>System of Management</th>
<th>I этап 2022</th>
<th>II этап 2025</th>
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28% 370 Billion Rubles 45% 575 Billion Rubles 27% 355 Billion Rubles

[Team Russia]