PGE Group’s strategy update
New technologies and business models

Modern conventional electricity

Flexibility and efficiency
PGE Group’s environment

is constantly changing

Moderately rising demand

- Weakening correlation between the rise of electricity demand and the GDP growth rate
- Expansion of electric transportation as a potential growth factor
- Growing importance of energy efficiency

Growing customer awareness

- Growing customer awareness, both with respect to the energy market’s operational model, as well as the product offering of the competition
- Expectation of a comprehensive service with a broad product offering

Growth of new technologies

- Energy storage technology race is underway
- Commercialization of new technologies changes the market model and the profile of services provided thereon

Cumulative growth rates of GDP and electricity demand (2010=100%)

Number of TPA customers ('000)

Declining costs of lithium-ion battery manufacturing (USD/kWh)
PGE Group’s environment is constantly changing (continued)

Fossil fuel price volatility
- Hard coal price fluctuations due to changes in the global economy
- Lower margins in the generation segment
- Lower premium for cost efficiency of lignite-fired power plants

Climate policy
- EU ETS system reform underway
- In the future older conventional power plants less competitive
- More stringent regulations with respect to SO\textsubscript{2}, NO\textsubscript{x}, dust and mercury emission standards – additional capital expenditures

Evolving market model
- Growing importance of RES, distributed power generation and improving energy efficiency
- Pressure from electricity imports
- Implementation of the capacity market

ARA coal price, Monthly average (USD/t)

Price of CO\textsubscript{2} emission allowances (EUA) DEC-16, Monthly average (EUR/t)

Electricity prices on RTT TGE and average total production cost (PLN/MWh)
Redefining PGE Group’s mission

changes necessary

PGE Group’s new mission

We provide security and growth based on reliability of supply, technical excellence, modern services and partnership relationships.
Redefining the Group’s overall objective and vision

changes necessary

Increasing the company’s value for the shareholders and the key role in ensuring Poland’s security of power supply

PARTNERSHIP | GROWTH | RESPONSIBILITY

Leader in generation, actively taking advantage of growth opportunities

Reliable and active utility and service supplier

Poland’s most efficient and flexible energy group

Leader in developing new business models and lines of business
Implementation of PGE Group’s mission and vision

requires defining priorities and sequence of actions

EFFICIENCY AND FLEXIBILITY

Cost and operational efficiency is a precondition for implementing an expansion program and achieving readiness for PGE Group’s transformation

DEVELOPING MODERN CONVENTIONAL ELECTRICITY

Implementing an ambitious CAPEX program and applying new, more efficient technologies to maintain competitiveness of production and reliability of supply

DEVELOPING NEW TECHNOLOGIES AND BUSINESS MODELS

Expanding operations that use new technologies, such as renewable and distributed energy sources and based on developing services for customers
PGE Group’s cost and operational efficiency is a precondition for accomplishing the other strategic goals.

On the other hand flexibility is key to achieving the ability to respond quickly to opportunities arising in PGE Group’s environment.
By 2020 PGE Group will achieve a further reduction of the controllable costs in the amount of PLN 500m versus 2016.

This will allow for the total cost reduction in 2016-2020 by approx. PLN 3.5bn versus the current efficiency scenario.

The goal of the cost reduction is to strengthen PGE Group’s competitiveness and potential, and it forms the basis for PGE Group’s further expansion.

Efficiency improvements will be implemented in PGE Group’s each line of business.
Integrated asset management system

Unified approach to planning of expenditures on PGE Capital Group’s production assets will allow for reducing asset maintenance costs and CAPEX, while maintaining the security of power supply.

Key assets
- Priority direction of CAPEX and OPEX
- Ensuring high degree of availability

2nd and 3rd class assets
- Optimizing costs of maintenance and overhauls

4th class assets
- Seeking alternative ways to increase profitability or reduce losses

Reducing expenditures on modernization and replacements (2016-2020): approximately PLN 500m
Retail supply

Efficiency
- Efficiency of sales and customer service channels aiming to improve quality and reduce costs
- Tying marketing expenses to achieving sales objectives
- Operational efficiency supported by modern IT systems

Strengthening customer relationships
- Expanding knowledge of customers, their needs and reasons for switching suppliers
- Aligning the pricing policy to customer groups
- Developing new sales and customer communications channels
- Building long term relationships based on trust

Expanding product offering
- Identifying customer needs, other than energy supply, in each segment
- Adding new products and services to the offering, complementary to electricity, responding to customer needs and strengthening the relationship

- Cost efficiency of sales and customer service channels builds competitive advantage
- Good relationships with customers provide an opportunity to sell new products and services
- Market competition is forcing an expansion of product offering and activities aimed at minimizing costs
Efficient and customer-friendly distribution segment

Efficient customer service model

- Single call center and a single phone number for the company’s customers
- Modified structures at customer service desks
- IT systems to streamline customer service processes
- New communications channels

Flexible organization

- Standardizing and optimizing management and development processes
- Simplifying organizational structures at branches
- Specialized support teams
- Separate functions responsible for implementing investment projects and operating assets and lighting

Strengthening dialogue with the regulator

- Cooperation in defining long term strategy, methodology and metrics for DSO
- Earlier adaptation to the regulatory changes

Increased use of external funds

- Optimizing the structure of the expansion plan financing
- Rising expenditures on innovative activities, financed from external sources
The goal of changes to the company’s organizational structure is to improve operational efficiency and prepare PGE Group to expand in the most promising lines of business in the changing market conditions.

- Standardizing the support processes and optimizing the management structure will enable improving operational efficiency
- Separating the “Cogeneration” line of business will increase growth potential on the heat market, in particular for the co-generations sources of various scale in combination with network ownership
- Mechanisms implemented to efficiently set up new lines of business will allow for taking advantage of market opportunities
Developing workforce competences

- Constantly developing professional competences of the employees
- Implementing talent management system
- Retaining and acquiring personnel with competences desired by the Group

Process and organizational efficiency

- Standardizing and optimizing the support functions Group wide
- Accelerating the decision making, analytical and reporting processes
- Simplifying PGE Group’s organizational structures and enhancing decision making at lower management levels
- Process and organizational optimization of subsidiaries
- Eliminating overlapping functions

Flexibility

- Monitoring the environment and quickly reacting to changes
- Openness to business cooperation with external partners, also on international markets
- Cooperation with scientific and academic centers
We are aware of the role that we play for our stakeholders and the responsibility that we bear.

PGE Group is implementing an ambitious CAPEX program in order to take advantage of the full potential of the company’s core operations.
Electricity generation

Opole Power Plant, units 5 and 6
- Project advancement >50%
- Planned commissioning: 2018/19
- Option of a partner’s participation in the project

Turów Power Plant, unit 11
- Work in progress, in line with the schedule
- Planned commissioning: 2020
- Option of a partner’s participation in the project

PGE Group’s other generation units
- Analysis of CAPEX in conventional power generation (e.g. at Dolna Odra Power Plant) based on the new market model
- Adapting to the environmental requirements (BAT) to the optimal degree
- Taking advantage of the biomass co-firing potential

- New Opole and Turów generation units will be operating in the baseload mode
Cogeneration

PGE Group’s heat segment

- Placing cogeneration assets in a separate organizational unit
- Implementing an optimal heat segment expansion model
- Developing integrated solutions for the heat segment (various scale cogeneration / trigeneration and heating networks)

- Large potential for expanding and building value based on numerous operational and cost synergies as well as the strong position on regional heat markets
Distribution of electricity

Goal of reducing System Average Interruption Duration Index (SAIDI, in minutes)

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>442</td>
<td>196</td>
</tr>
<tr>
<td></td>
<td>-56%</td>
<td></td>
</tr>
</tbody>
</table>

Goal of reducing System Average Interruption Frequency Index (SAIFI)

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.72</td>
<td>2.11</td>
</tr>
<tr>
<td></td>
<td>-56%</td>
<td>-56%</td>
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</tbody>
</table>

Goal of reducing average customer connection time (in days)

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>295</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>-40%</td>
<td></td>
</tr>
</tbody>
</table>

- Substantial improvement of grid reliability by 2020 as a result of investment projects underway
- Faster and more customer-friendly connection process
Innovations

in the mining and generation segments

In modern conventional power generation innovative solutions will be key to competitive advantage and will contribute to reducing impact on natural environment, in accordance with the principles of circular economy.

<table>
<thead>
<tr>
<th>Premises</th>
<th>Directions of innovation</th>
<th>Implementation methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tightening of the climate policy</td>
<td>▪ Applying innovative technologies to reduce SO$_2$, NO$_x$, dust and mercury emissions</td>
<td>▪ Sector based program</td>
</tr>
<tr>
<td>New environmental standards</td>
<td>▪ Optimizing replacement activities in the mining segment</td>
<td>▪ Joint ventures with partners</td>
</tr>
<tr>
<td>Lignite mining costs using current technologies</td>
<td>▪ Developing mining process automation systems</td>
<td>▪ Venture Capital fund</td>
</tr>
<tr>
<td>Costs of waste storage</td>
<td>▪ Increasing furnace waste and gypsum utilization</td>
<td>▪ Research and development centers</td>
</tr>
<tr>
<td>Increase of intermittent sources</td>
<td>▪ Increasing flexibility of the operation of generation units</td>
<td>▪ Optimal organizational structure to support developing and implementing innovative solutions at PGE Group</td>
</tr>
</tbody>
</table>
Innovations in the mining and generation segments

Waste management

- Gypsum and furnace waste production: +10%
- Sales: Decrease
- Storage: Decrease

Goal:
- Increasing the utilization efficiency of combustion process by-products

Flexibility of generation units

- Startup time: -10%
- Load change rate: +10%/min.

Goal:
- Aligning generation assets to the new energy market model

Automating processes and optimizing replacement activities in the mining segment

- Reducing machines maintenance costs: -5%
- Extending lifecycle: +5%
- Energy efficiency: +5%

Goal:
- Maintaining the competitiveness of lignite mining

*for selected units
Innovations in electricity distribution

**Premises**

- Quality performance based regulation
- Growth of distributed generation sources
- Controllable costs
- Rising peak demand
- Computerization of services required

**Directions of innovation**

- Developing electricity quality monitoring system
- Implementing grid management methods while dealing with the growing share of distributed generation sources
- Active use of demand side response services
- Applying drones to identify failures and use of repair robots
- Distribution grid operation automation
- Smart metering pilot programs
- Installing digital transmission system
- Reducing electricity consumption for own needs

- Current operations of the operator will be subject to technological transformation aimed at raising the service quality and reducing the costs
- Implementing innovative solutions in the distribution segment will contribute to achieving quality performance based regulation goals and prepare the company for the coming changes

PGE Group’s strategy update
It is necessary to adapt PGE Group to the world where changes are occurring rapidly and only the most innovative and customer needs-oriented companies stand a chance to grow.
Growth

of renewable energy sources

On-shore wind farms

- Maintaining the leading position in wind generation in Poland
- Implementing the most advanced projects in case of success in winning auctions

Off-shore wind farms

- Option to build an approx. 1000 MW off-shore wind farm in the Polish exclusive economic zone of the Baltic Sea
- Implementing investment projects based on an auction support system and innovative financing model
- Positive impact on the new jobs’ creation and growth of the manufacturing industry

Distributed generation sources

- Growing involvement in the microgeneration segment under the new business model
- Comprehensive offering for households and business customers

Wind farms’ installed capacity (MW)

<table>
<thead>
<tr>
<th></th>
<th>PGE</th>
<th>TOP 15*</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGE</td>
<td>529</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOP 15*</td>
<td></td>
<td>2 799</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1 867</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*excluding PGE

Forecast decline of total production costs of off-shore wind farms

-33%

Decline of total costs of photovoltaics versus forecast electricity prices for end users

- LOCE PV
- VAT
- Taxes, fees
- Distribution
- Electricity price

2016 | 2020 | 2030
Aspirations with respect to electricity generation from renewable sources

PGE’s aspirational share in Poland’s electricity production from RES

- PGE’s aspiration is to achieve ~25% share in Poland’s electricity production from RES in 2030
- The goal can be achieved, among others, by building an approx. 1000 MW off-shore wind farm and increasing biomass co-firing
- Pace of implementation and choice of technology will depend on the support system

<table>
<thead>
<tr>
<th>Year</th>
<th>PGE’s share in Poland’s electricity production from RES (TWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>3.8</td>
</tr>
<tr>
<td>2010</td>
<td>10.7</td>
</tr>
<tr>
<td>2015</td>
<td>22.6</td>
</tr>
<tr>
<td>2030 (forecast)</td>
<td>~40 TWh</td>
</tr>
</tbody>
</table>
New technologies

services and business models

Preparing new solutions and technologies
- Energy storage
- Power to gas
- Smart grid
- Distributed power generation
- Electric transportation
- LNG
- Energy efficient solutions
- Smart integrated solutions

Introducing new products on the market
- Preparing new products
- Launching new lines of business
- New business models
- New channels to reach the customer

Comprehensive customer offering
- Photovoltaics
- Demand Side Management
- Smart home
- eMobility
- Audits and improving energy efficiency
- Natural gas offering
- Integrated solutions

SELECTED SUPPLIERS OF TECHNOLOGY, SERVICES AND SALES CHANNELS

Setting up a research and development center

Setting up a demo laboratory – PGE LAB

PGE Group’s strategy update

25
Energy efficiency
new line of business

Improving energy efficiency

- Production and distribution of electricity, heat and cooling
- Manufacturing and services
- Buildings
- Transportation
- Local government units
- Individual consumers

ESCO type operations

Building PGE Group’s brand as energy efficiency market leader

Benefits

Customer
- Costs of electricity consumption
- Continuity of supply
- Monitoring system and metering data
- Image

PGE Group
- Division of benefits due to the reduction of consumption costs
- Building long term relationship with the customer
- Obtaining white certificates
Coal gasification
new applications for domestic deposits

Products of the process and further utilization options *

- **Synthesis gas**
  - Ammonia, methanol
  - Liquid fuels, hydrogen
  - Artificial fertilizers
  - Olefines

- **By-products**
  - Aggregates
  - Construction materials
  - Prefabricated elements

- **Electricity and heat**

- Construction of the coal gasification installation opens a number of options to further utilize the process products and diversify PGE Group’s revenue sources

- Preferred scenario is a joint venture with an industrial partner, with close cooperation of the scientific community and involvement of the supplier of the selected technology

*construction of dedicated plants/installations may be required*
Commercializing innovative solutions and technologies

**Goals**
- Commercializing new solutions and technologies for the energy sector and related industries

**Expectations**
- Cooperation with partners having competences that would allow for generating synergies and obtaining competitive advantage
- Partner’s strong strategic motivation to achieve the common goal
- Openness to know-how exchange
- Optimal split of responsibilities

**PGE Group’s support**
- Financial involvement or co-financing depending on the venture type
- Support with respect to subject matter and organizational affairs

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**Research and development**
- Selecting and developing new solutions – the research and development stage as well as pilot and demo facilities

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**Products**
- Developing products based on new solutions and finding partners to manufacture and supply them

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**Implementation**
- Finding business partners to develop a sales network or participate in the investment project

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**Criteria**
- Technology proven in the form of a working laboratory prototype
- Partner’s credibility, references
- Rate of return linked to the venture’s risk profile
Our responsible approach towards natural environment, customers, shareholders and public interest will allow us to safely implement PGE Group’s mission and vision.
We are a responsible organization, aware of its impact on the environment, building shareholder value and ensuring sustainable business growth.

**Customer**
- Ensuring high service quality
- Taking care of customer needs
- Education with respect to efficient use of energy and environmental impact

**Security of supply**
- Reducing environmental impact
- Use of diversified energy sources
- Constantly seeking innovations inside and outside the organization

**Building value**
- Operating based on ethical principles
- Promoting safety among employees, taking care of their satisfaction and commitment

**Economy**
- Activities for the benefit of local communities (building local partnerships committed to growth and cooperation)
- Support for organizations and persons in need
Code of ethics
values and principles in everyday work

PARTNERSHIP | GROWTH | RESPONSIBILITY

- We take care of sustainable, safe growth of PGE Group
- We are here for our customers
- We take care of natural environment

- We compete honestly
- We do not tolerate corruption or dishonest behavior
- We handle company information in a responsible manner

- We take care of friendly work conditions
- We are improving and we are proactive
- Employee safety and health are our priorities

- We take care of relationships with business partners
- We are building trust by providing reliable information on our operations
By 2020 PGE Group will incur capital expenditures of ~ PLN 34bn.

Efficiency improvement will unlock additional investment potential.

PGE Group is ready for substantial investments in new lines of business, also abroad.

**Beyond 2020** PGE Group will be implementing a new CAPEX program, based on selected strategic options, system needs and new market model.
Strengthening position on the energy market

and balancing the value chain

Maintaining leading position on the generation market

PGE Group’s share

2015: 38%
2020: 39%

Balancing the value chain exposures

TWh

2015: 56
2020: 39
Aspiration

- New conventional and renewable capacity will strengthen PGE Group’s position on the electricity generation market
- PGE Group’s goal is to achieve an at least 40% share in Poland’s electricity generation market beyond 2020
- PGE Group’s aspiration is to raise the balancing level of its trading exposure while increasing the total gross margin
Strategic options

optimal choice

Options to consider:

- Construction of Poland's first nuclear power plant, following the development of a model guaranteeing economic viability of the investment.
- Construction of approx. 1000 MW capacity in off-shore wind farms, based on an auction support system.
- Utilization of new lignite deposits in case there is a significant easing of the climate policy.

* SMR - Small Modular Reactors
HTR – High Temperature Reactors
Implementing firm actions within PGE Group

EFFICIENCY AND FLEXIBILITY

PGE Group’s Efficiency Improvement Program
Implementing integrated asset management system
Improving the organization’s structure and the way it is managed
Optimizing sales and customer service channels

DEVELOPING MODERN CONVENTIONAL ELECTRICITY

Opole, Turów: on-schedule implementation of the investment projects in cooperation with a partner
Developing cogeneration segment in cooperation with a partner
Achieving quality performance based regulation
Implementing innovations in the mining, generation and distribution segments
New conventional generation capacity

DEVELOPING NEW TECHNOLOGIES AND BUSINESS MODELS

Maintaining leading position in the RES segment
Developing new services and products portfolio
Developing research and development centers
Implementing new business models
Maximizing ROIC

overall objective

EFFICIENCY AND FLEXIBILITY

- Reduction of* controllable costs: PLN 3.5bn
- CAPEX IMO**: PLN 0.5bn
- Customer satisfaction
- Organizational structure: New model

DEVELOPING MODERN CONVENTIONAL ELECTRICITY

- Opole 5&6
- Turów 11

Cogeneration: New development model
- On-schedule implementation
- SAIDI, SAIFI: -56%
- Connection time: -40%
- Flexibility of power plants and utilization of combustion by-products
- Biomass co-firing

DEVELOPING NEW TECHNOLOGIES AND BUSINESS MODELS

- Share in RES generation: 25% in 2030
- EBITDA: - New business operations
- Percentage of successful implementations: >50%

*Total reductions in 2016-2020 versus the current efficiency scenario
** Total reduction of the modernization and replacement expenditures in 2016-2020
Implementation of the strategy

will be dependent on external factors

- Poland’s energy policy supporting implementation of PGE Group’s mission and vision
- Available capacity remuneration mechanism (capacity market)
- System wide new investment projects support mechanisms
- Implementing agreed solutions with respect to free CO₂ emission allowances

Increasing PGE Group’s investment potential allowing for implementing the long term growth vision

Periodic updating of the Strategy in response to new market opportunities
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