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# Intergenerational solidarity in energy transition

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Developing the concept for Poland

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COP24 – Katowice 2018



MŁODZI LIDERZY  
W ENERGETYCE



Instrat

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On sustainable development:

*... development that meets the needs of the present without compromising  
the ability of future generations to meet their own needs.*

a passage from: Our Common Future,  
UN World Commission on Environment and Development, 1987,  
the so-called Brundtland Report



# **Table of contents**


<b>Introduction</b>	<b>7</b>
<b>Part I - Theories and concepts</b>	<b>9</b>
<b>Part II - The Polish perspective: key challenges</b>	<b>13</b>
<b>PART III - Policy recommendations</b>	<b>21</b>
<b>Abbreviations</b>	<b>26</b>
<b>References</b>	<b>27</b>




# Introduction

The concept of intergenerational solidarity today is typically referred to as just redistribution and cost-sharing among living generations such as the pay-as-you-go pension system developed in the 19th century or universal education.

In this form, it can be also found in the energy sector where added value from fossil fuels extraction has been the foundation for the prosperity of modern developed economies and a source of income for workers and their families for decades. The recent retraction from fossil fuels and the introduction of climate change countering policies in several OECD countries have made thousands of jobs disappear from those traditional sectors. In the absence of public support, these shocks often contributed to an increase in inequality and spawned polarization.

 Against this backdrop, it is perceived as a moral obligation to support labour force still active in legacy industries as the market forces and progressive policies lead to further job shifts. This has been so far traditionally perceived as **the only approach to solidarity between generations - the younger towards older ones.**

 What has not been present in the debate so far, is the reversed obligation. The recent academic research on climate change (IPPC, 2018) has made it clear that by extracting and burning fossil fuels to produce energy, previous and present generations – consciously or not – have vastly contributed to the climate change phenomenon. This will severely and negatively affect future cohorts. On the contrary to the first approach, **intergenerational solidarity within this context would require an upward redistribution,** whereby contemporary societies relinquish parts of their potential

gains to save for future peoples. This would be then a rational and moral thing to do from the perspective of those to come.

Climate change is a global phenomenon with local consequences. Dealing with them requires cooperation between governments as well as an intensified cross-nation dialogue giving regard to future generations. Since energy production remains a major contributor to the greenhouse effect and climate change, a formalized and institutionalized framework for intergenerational solidarity is urgently needed in energy transition.

This paper aims to bring closer the second, longer-term approach to intergenerational solidarity since most debates on just transition depict only the first traditional one.

First, it highlights philosophical and economic theories underpinning the concept of intergenerational solidarity and the related paradigm-shifting policies and academic proposals. Then, it takes a deep dive into the Polish energy sector's approach to intergenerational solidarity – formulated and applied by both public and private actors in Poland. It concludes with recommendations for public and private actors - on both institutional and conceptual level.



# Part I - Theories and concepts

## Intergenerational solidarity as a philosophical and economic concept

We all contribute to and benefit from intergenerational solidarity even though we may not always realise it. Completing school would not be possible without older generations willing to invest in our human capital through their taxes. In return, once part of the labour force, we dedicate a share of our incomes to pay their pensions. These are well-established solidarity mechanisms between overlapping generations which are the foundations of modern societies.

But what about more distant future generations? Do we have any responsibility towards people who will only be born after we are all gone? And if yes, what underpins it?

The idea of intergenerational solidarity is relatively new, though it has a solid basis in philosophy and political theory. **Libertarians** often trace it back to the Lockean concept of natural rights, whereby each person has the right to do whatever she chooses, with whatever she legitimately owns, so long as she does not violate the rights of others not to be harmed. Thus, they argue, if we assume that ‘others’ include future generations, the present society should act in a way not to cause them distress.

Meanwhile, **egalitarians** posit that future generations should be left with equally good conditions as present ones. In their view, the idea of intergenerational solidarity is enshrined in the theory of justice developed by John Rawls which serves as a model for identifying what is and what is not fair.

According to Rawls, current generations should adopt such a savings principle that they wish all previous generations to have followed; this would ensure equal distribution across generations.

Yet other approaches are **sufficientarianism** whereby future generations must be left with at least good enough living conditions and **utilitarianism** which postulates that at any point in time, the conditions must lead to the happiness of as many people as possible. Therefore, if resources could be used to satisfy more people in future, they indeed should be saved. Finally, a relatively new theory emphasizes that future generations do not have a voice in the current public debate and are therefore vulnerable. Their unfair treatment would thus constitute exploitation.

The concept of intergenerational solidarity has also been explored by economists including Arthur Pigou, the proponent of the tax on harmful emissions known as the Pigouvian tax. In his *Economics of Welfare* (1920), he argued that whilst future people should be treated equally with the present, it is inherently human to devote too few resources to investment. Therefore, the need for intergenerational justice leaves an important role for the state.

One may question whether interests and desires of future generations ground legitimate claims on present peoples. For it could be argued that non-existing groups or individuals do not have rights. Or, that those rights are within the discretion of present generations whose actions today determine whether future generations will at all emerge; without those actions, future people could not have even been born. Thus, they claim, it is not possible to say that they leave future generations worse off.

These counter-arguments have been addressed by the communitarian theory which considers societies to be transgenerational policies which have a past and a future. Consequently, according to **communitarians**, theories of justice, rights and political responsibility should reflect the importance of transgenerational relationships.

Furthermore, it should be noted that the above critique fails to recognise the unique nature of the idea of intergenerational solidarity. Today, it is beyond dispute that future generations, when they come to existence, will have certain rights and interests. Yet, these may happen to be under threat at present; for example, by continuing to invest in high-polluting power plants we put at risk the ability of future generations to breathe clean air. If those rights and interests are indeed at threat, they must have already

materialised. Therefore, by rejecting the concept of intergenerational solidarity, present generations would deny future generations their rights.




Hence, despite there being no consensus as to its rationale and scope, there should be no dispute as to the strong theoretical foundations for intergenerational solidarity.

## **UN Sustainable Development Goals and solidarity with future generations**

In practice, the concept of intergenerational solidarity has proven difficult to translate into actual policies within the context of energy and climate. One of the most prominent endeavours so far has been the UN report *Our Common Future* (1987), compiled under the direction of former Norwegian prime minister Gro Harlem Brundtland, which concluded that the global development must “meet the needs of the present without compromising the ability of future generations to meet their own needs.”

Yet, the UN Sustainable Development Goals to which the report had been translated, have focused rather on solidarity with overlapping generations rather than longer-term impact, with the time frame for recommended energy goals extending only to 2030.

Such short-termism demonstrates the so-called **non-identity problem** which stems from three limitations:

-  Current generations are less likely to preserve the interests of future generations than their own;
-  Political institutions have incentives to focus on short-term goals enabling them to demonstrate achievements quickly and relate them directly to voters; and
-  Future generations lack representation and accountability mechanisms.




And whilst, the first limitation is inherent to human nature and cannot be eliminated on a substantial scale, its impact can be nonetheless mitigated by redesigning the remaining two which are structural barriers.

## Intergenerational solidarity and policy-making: energy and climate perspective

Energy has become key to the development and survival of the modern world. It is difficult to conceive our lives now or in future without access to various forms of energy for the purposes of working, travelling and studying. The cost of energy has also become an important factor for the competitiveness of modern economies. Particularly in goods production, energy forms an important element of the costs. Finally, most forms of energy production and its utilisation in transport, produce high air pollution and contribute significantly to the greenhouse effect.

The importance and consequences of these factors extend beyond current generations. Therefore, securing access to clean and affordable energy in a long-term should be one of the central goals for policymakers.

The energy sector is unique in three main aspects:

-  Energy systems are complex and their components heavily inter-linked which makes it rarely possible to change one component without altering others. For example, increasing energy system's saturation with renewable resources usually forces out coal plants and/or raises the demand for gas.
-  Investment horizon in the energy sector is very long, both with respect to the time of project completion and expected lifetime. Completing a new coal power plant block takes on average 4 years and a nuclear plant up to 15 years. The lifetime of the first is approximately 40 and of the second up to 60 years.
-  Energy infrastructure is very costly and requires significant funding.

Because of these characteristics, decisions taken now will determine the future of the energy sector for decades. Hence we need to act in solidarity with future generations.

# Part II - The Polish perspective: key challenges

## Intergenerational solidarity within the context of Polish energy & climate policy

The Polish energy sector is at crossroads between its path dependence on traditional energy generation technologies on the one hand and the need to secure its competitiveness in the low-carbon future on the other. The choice to be made has a crucial intergenerational aspect which can be summarised in three objectives:

- 1) Securing the long-term competitiveness of the economy: ensuring that future energy prices will not place Polish businesses at a disadvantage compared to their EU counterparts;
- 2) Preventing air pollution and harmful emissions thereby following the global effort to limit the greenhouse effect and protect the lives and health of its citizens in the decades to come;
- 3) Increasing spatial and cross-income energy access to reduce inequality and increase welfare, thereby contributing to the creation of a fairer society.

Pursuant to the Polish Energy Act (*Ustawa Prawo Energetyczne*), the government is required to formulate, regularly update and evaluate a long-term energy policy based on the principle of sustainable development. However, intergenerational solidarity as such is not explicitly mentioned in the legislation. Thus, it is only taken into account indirectly.

The recent publication of the new Polish Energy Policy 2040 (*Polityka Energetyczna Polski 2040*, PEP 2040, Nov 2018) and the announced call for consultations leave space for comments and critique on the current approach towards solidarity with future generations.

Its previous version– PEP 2030 (published in 2009) by far represented an altered approach to the possibilities offered by RES and innovative technologies in energy generation and transmission. At the same time, it rightly emphasized the need for a social dialogue and just transition for labour force under the restructuring process in the coal mining sector.

The 2018 proposal also gives ground to these issues, yet the wider intergenerational aspect is not present. As authors of PEP2040 stress, energy generation based on coal extraction and combustion has profoundly shaped the labour market in Poland and any new attempts of reforms cannot be undertaken without considering this factor. This seems to be a genuine, yet the incomplete perception of the intergenerational solidarity concept as the recent developments in science on climate change, energy economics and trends on capital markets in the energy sector appear to have been insufficiently addressed.

## **The intergenerational dimension of PEP2040: strengths and limitations**

Indeed, in order to fully internalize the concept of intergenerational solidarity, PEP2040 would require precise and explicit statement formulation. In the current proposal, ambitious goals in terms of energy efficiency or shift from oil and gas-fuelled transport towards electromobility are counterbalanced by references such as “rational management of existing and new coal deposits” or “promising lignite deposits”. It has to be stressed, that a going concern scenario is based on keeping hard coal extraction and consumption volume constant. Such an approach to coal phase-out would mean only its relative percentage decrease as a component of GDP. This underlying assumption is in line with the first, but not the second understanding of solidarity with future generations.

PEP2030 and PEP2040 underpin the interpretation of energy security and stability with the assumption of fuel diversification by default guaranteeing competitiveness of the Polish economy. Almost a decade had passed between the publication of both documents and a huge effort towards natural

gas import diversification, sourcing and transmission has been made in Poland. Yet, the approach towards non-fossil fuels remains a challenge still as the costs of climate policy measures are considered a burden for GDP rather than a growth-boosting opportunity. Moreover, the European requirements to quit least efficient and dirty technologies for energy generation (EU BAT Conclusions, 2017) and induced decommissioning continue to be taken as a threat to energy supply and stability.

Wind and solar are public and non-traded goods on the global energy commodity market – **no other fuels guarantee that magnitude of sovereignty and independence, yet with security constraints**. The perception of renewable energy sources as genuinely domestic ones would imply a radical yet evolutionary shift towards an environmentally and socially acceptable energy mix. It has been documented that **renewables are more labour intensive** (IRENA, 2011) which is highly beneficial given their falling prices - both in terms of economic competitiveness and the propensity to create new, well-paying jobs.

Leaving behind the obvious challenge of nuclear power plant construction, Poland should be on a good path towards CO<sub>2</sub> emission reduction. Substituting lignite with nuclear in the energy mix enables maintaining the daily profile of energy generation with technology characterized by high fixed and low variable costs, operating in base load. Yet, considering the recent substantial progress in the field of nuclear power generation, investing in smaller but more densely located reactors would allow Poland to benefit from the advantages of the technology - without leaving future generations locked in a system with significant nuclear generation component for decades.

Heat (and cold) generation remains still a problem in smaller municipalities and was fairly addressed in PEP2040 - all envisaged costs of lost lives and premature deaths associated with low air quality are allocated to regions without district heating. The CHP sector (small/medium sized operators in particular) lacks clear investment incentives and its existence is believed to be threatened by the new EU emission standards set for LCPs or MCPs (IEŚ, 2014). By increasing density of gas distribution network, the operators could help alleviate the air pollution.

The transition towards electromobility and progress in energy efficiency in residential housing are rightly addressed and key parts of the strategy. Externalities induced by air pollution from fossil fuel-based transport and heat

production are a major contributor to the carbon emission (addressed by *Clean Air* programme, 2018). Any progress however in these two areas generates **highest marginal gains from investments**. Shift from diesel-fuelled cars and coal heating stations in dispersed residential sector poses to some extent a task for a social planner and – if not right managed – might drive future inequalities.

Transmission and distribution system operators (TSOs and DSOs) play a key role in the long-term development of the energy sector which has been for the first time emphasized in PEP2040. By initiating activities concerned with proper and effective management of generation and consumption they could help decrease the ratio between energy consumption and GDP growth - being a key indicator of a shift from energy intensive to a modern economy.

Hence, investments in smart grids and establishment of meter data operator (MDO) are one of the key positive elements of PEP2040 from the perspective of future generations as they allow for a more **active role of citizens in shaping the energy market**. Strengthening the consumer position on the electricity and gas market in the future would both fulfil all three constraints depicted above - in particular, to clean energy and price affordability aspects. New technologies for DSR, battery storage or even establishment of energy clusters **prevent citizens and companies from paying excessive prices** and contribute to a secure energy supply for the economy.




## The role of the private sector

The inherent characteristics of every energy sector are its heavy dependence on and entanglement with the governmental policies. In Poland, all the more given that despite the ongoing liberalisation and market decoupling, both electricity and gas markets remain dominated by the state in terms of ownership. **Nonetheless, the private sector can and often does play part in fostering solidarity with future generations.**

Through their long-term corporate strategies, energy conglomerates and infrastructure providers have the power to set the direction for long-term energy market perspective. Without their involvement, intergenerational solidarity cannot be appropriately accounted for.



The Polish private sector is to play an important role in securing the interests of future generations. In this analysis we give regard to the development strategies of the following parties:

-  gas and electricity transmission system operators (respectively: GAZ-SYSTEM S.A., Polskie Sieci Elektroenergetyczne S.A.) - responsible for the development of gas and power transmission infrastructure, as well as security system operation and co-shaping of the legal and technological framework for the development of next-generation energy technologies;
-  largest electricity market players, namely the four vertically integrated groups: Polska Grupa Energetyczna, Energa, Enea, Tauron - their activities are present at every stage of the electricity supply chain: spanning from fuel sourcing and generation infrastructure, through distribution services to supplies to the final customer; thereby having enormous impact on the overall direction of energy transition on Poland; and similarly
-  key market player in the gas sector - Polskie Górnictwo Naftowe i Gazownictwo S.A. - with operations covering upstream, midstream, storage and supplies to the final customers.

All of the aforementioned entities have at least indirectly incorporated intergenerational solidarity in their official long-term development strategies. Though, most emphasis is put on future infrastructure- or generation-related investments. However, only two companies clearly indicate intergenerational solidarity as an important driver of its agenda.

The most widely adopted aspect of intergenerational solidarity is future economic competitiveness wherein the level of energy prices remains a major concern. The sharp price increases observed in the second half of 2018 highlighted the growing importance of carbon taxes and primary energy costs as components of energy prices in Poland. Ensuring that any potential increase would not impair the competitiveness of the Polish economy by exposing Polish companies to disproportionately high costs compared to their EU counterparts should be considered crucial from the perspective of future generations.

Further, all vertically-integrated energy groups focus on securing future supplies of electricity and other fuels through investments in additional generation units or exploring new resources. Still, some strategies foresee the development of new coal- or lignite-fuelled power plants which raises concerns from both pricing and pollution perspective.



Strategies of the infrastructure operators include proposals for more comprehensive changes in the market design aimed at enhancing the pricing process. Crucially, these include plans for **the transition from the centralised to distributed energy generation**, in particular through onboarding prosumers and developing demand side response mechanisms.





Almost all strategies include development plans to counter sharp price surges in future such as investments in electricity grids facilitating efficient management of the power system and providing access to energy markets in the neighbouring countries. The Polish electricity TSO, Polskie Sieci Elektroenergetyczne, on the other hand, developed a plan for a **shift from copper plate to locational marginal pricing (LMP)** in the long term, in order to improve price signals. Such design could also contribute to **securing universal access to energy** and prevent network users from bearing unnecessary costs related to current network maintenance and its future development.

Most of the abovementioned solutions foster maintaining energy prices on a foreseeable level and aim to prevent the power system from failures or implement solutions allowing to improve the energy efficiency. However, one should keep in mind that each of those instruments ought to take into account its future consequences and market conditions, which may certainly differ from the current ones.

Thorough cost-benefit analysis of investment options is not only a corporate and managerial obligation but a long-term way of **responsible planning**. This would include the estimated costs of fuel, EUA allowances, characteristics of applied technologies and their compliance with EU BAT standards and environmental burden (i.e. natural landscape conservation and restoration costs).

Therefore, the other indicated pillar of intergenerational solidarity includes efforts aimed at preventing air pollution and the greenhouse effect. All analysed strategic documents recognise the issues of climate changes and the need for pro-ecological actions. In this context, various steps towards increasing renewables penetration in the system, facilitating their management or limiting harmful emissions were included in the strategies, e.g. investments in:

-  large-scale renewables: offshore wind farms;
-  small-scale renewables: biogas/biomass stations;





-  facilities aimed at reducing air pollution: EV charging, car-sharing or CNG/LNG fuel infrastructure;
-  grid aimed at providing power system resilience with multiple distributed resources connected;
-  construction of the nuclear power plant;
-  power storage facilities

as well as increasing gas distribution network penetration in order to reduce 'white spots' with primary goal of providing the residential sector with an alternative source of heating.

Despite the above examples, bold decisions on investments in renewables are present in only few agendas. Furthermore, concrete action plans for phasing-out the fossil-based generation are insufficiently addressed or not indicated at all. The **plans to invest in renewables or low-emission power plants have even been dropped** due to unfavourable regulatory environment or cost-optimisation strategies.

Apart from the above, it must be underlined that several companies emphasize their dedication to RES, whilst continuing their involvement in the mining industry. It raises the questions on the accuracy of refurbishment plans for the post-mining landscape and their social transformation cost. Meanwhile global financial players (pensions funds, insurance corporations) **divested from coal** industry and generation often due to moral and environmental concerns, not economic ones.

Last but not least, considering the third pillar of intergenerational solidarity, most corporate strategies demonstrate intentions to increase or expand access to clean and affordable energy. These include:

-  facilitating renewable generation on a local level, through establishing local balancing areas (energy clusters) with the use of energy storage facilities, wind power plants and biogas power plants,
-  supporting prosumer micro-installations and energy management solutions;
-  deployment of smart grids and smart meters, helping final users to optimise their use of energy and facilitate connections of small renewables;
-  establishing cooperation with local municipalities and implementing energy management systems in the cities e.g. for street lighting.

All entities declare dedicating substantial resources to developing innovative technologies, including the **creation of sandboxes for testing new concepts and solutions**, which could in future accelerate the implementation of plans described above. It is important to note that the most of the above actions are included in strategies for grid development, in particular on the distribution level.

In the light of the above findings, it can be concluded that the private sector in Poland is currently focused on the first rather than second understanding of intergenerational solidarity. **Thus, the three pillars of intergenerational solidarity are not equally addressed in the development agendas.**

# **PART III - Policy recommendations**


Securing interests of the future generations remains a major challenge for policymakers in Poland and beyond. The pace of technological progress and political pressure to instantly deliver results translate into a limited possibility of taking the longer-term perspective into account.

Whilst the current institutional framework includes helpful directives to plan ahead, more emphasis on intergenerational dimension is required to secure the best possible opportunities for the Polish society and economy in decades to come.


Current policy proposals set out in PEP2040 form a strong basis for debate on scenarios for the Polish energy sector. Though, it also requires some more ambitious and innovative solutions to become a truly long-term strategy, giving justice to present as well as future peoples.

This paper should serve as an introduction to rather than a conclusion of the debate on how the interests of future generations can be better captured in planning for the energy sector transition on Poland. This debate could start with addressing the following recommendations.


## Future Generations Ombudsman


 How to shape policies for the generations of tomorrow without their representation today? Appointing a Future Generations Ombudsman or a Commissioner for Intergenerational Solidarity as an independent organ to warrant that interests of future cohorts are considered within the context of energy and climate policymaking would be an important step towards equal representation across generations.


## Sustainability goes along with solidarity

 Full incorporation of intergenerational solidarity requires legal foundations. An explicit requirement within the Polish Energy Act to broaden the sustainability objective by addressing intergenerational solidarity in future Polish Energy Policies, as well as corporate strategies of energy companies, would ensure that it is appropriately addressed.



## Security of supply

 Society and economy demand energy to prosper. Disparities in access to energy infrastructure between the regions may foster inequalities. TSOs and DSOs, despite being natural monopolies, should play a leading role in ensuring that all households and business have access to clean and affordable energy.




 Metering Data Operator would counteract energy losses and prevent both utilities from excessive generation and final consumers for paying too much. Smart metering is a service offered by market competitors, yet requires strict cooperation - gains concern both final consumers and DSOs themselves.

 Energy mix might change faster than we think - would TSOs be capable of managing the revolution in renewables? Shift from copper plate to locational marginal pricing might be an evolutionary process - giving ground to a revolution in energy generation. LMP could also be a step towards strengthening investment signals for new production facilities for the future



## Data economy philosophy

-  Establishing public data transparency and sharing standards for all energy submarkets would strengthen market decoupling and foster renewables integration within the grid. New technologies (ML, AI, blockchain) developed by the domestic ICT industry and standards applied in other industrial sectors form a strong basis. Banking and telecoms already felt a strong push towards data openness - energy sector needs it to an even greater extent.
-  Centralized effort to train AI capable of supporting energy markets, especially when smart grid comes into play, should be coupled with decentralized opportunities for SMEs and start-ups to create new business models and services. The interplay between innovation and energy sector allows for mission-oriented development of data solutions so that the state plays a vital role not only by fixing market failures, but by actively building public capacities and steering ICT innovations in the desired direction.

## Capacity building

-  New technologies like power-to-gas, hydrogen boilers, DSR and battery storage require public sector involvement that goes beyond simple market reaction and adaption. State should pave paths by funding basic and applied research fostering innovation in grid and zero-emission energy generation resources.
-  Good practices are not too far to reach for. Such institutions as Germany's Fraunhofer Institute for Solar Energy Systems ISE or UK's Catapult have delivered plenty of solutions and helped companies to bring new products and services to the market. Linkages between SMEs, academia and public research institutions have made their home countries global frontiers in technology for energy transition. In order not to remain an imitator, Poland should consider moving beyond the outdated academia silos and focusing on learning process and transfers, through joint ventures and partnerships with leaders.
-  Clear technology roadmaps and investment directions are needed for utilities and grid operators to follow the ambitious goals of supplying current and future consumers with clean and affordable energy.

## Energy efficiency & transport

-  Solidarity towards future generations is not only about a high-level philosophical debate - it's about local action. District heating networks penetrating 'white spots' would prevent local communities from using solid and polluting fuels. Hence, the *Clean Air* programme should continue as the trajectory towards low and emission-free district heating. Future generations would not have to bother who and when had set the path for their emission-free housing, heat and cold supply - they would just benefit
-  The need for regular and affordable public transport be a foundation of electromobility. Its agenda has a potential to address excessive environmental burden from private transport. Simple fuel switching in private cars (diesel to hydrogen) would mean nothing if car density remains at an extraordinarily high level. Poland could and shall become frontier in implementing mobility-as-a-service solutions, securing prosperity for all citizens.

Environmental and climate policies shall not be perceived as a burden but rather an opportunity to give justice to future generations. Just as we equally exploit education and pension systems to increase our wellbeing, future generations are entitled to do the same. Unable to exercise their voice at this and any other COP - they should be treated with regard to their rights to breathe clean air, use unpolluted water and enjoy a peaceful life.





# Abbreviations

BAT Best Available Techniques

CHP Combined Heat and Power

CNG Compressed natural gas

DSO Distribution System Operator

DSR Demand Side Response

EUA EU Allowances

LCP Large Combustion Plants

LMP Locational marginal pricing

LNG Liquefied natural gas

MDO Metering Data Operator

MCP Medium Combustion Plants

PSE Polskie Sieci Energetyczne S.A.

RES Renewable Energy Sources

TSO Transmission System Operator

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