



Evaluation of the 2030 Report

**Impact of the European Commission's Energy
and Climate Package of 23 January 2008 on
energy system, economy and households in
Poland**

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1. Subject of the evaluation

The evaluation analyses the 2030 Report, entitled: *Impact of the European Commission's Energy and Climate Package of 23 January 2008 on energy system, economy and households in Poland*, prepared by the company Badania Systemowe "EnergSys" (System Research "EnergSys") and commissioned by the Polish Electricity Association. The evaluation focuses on the final version of the Report's Synthesis of 19 June 2008, with references to other updated parts of the Report – version of 30 September 2008.

2. General evaluation

2.1. The primary purpose of the Report was to "comprehensively assess the consequences of the introduction of the Energy and Climate Package of 23 January 2008 in Poland and, particularly, its consequences for the electricity system, the entire national economy and individual households". The Report analyses, however, only the main goals of the Package, i.e. a 20% CO₂ emission reduction, a 20% increase in the renewable energy share and an improvement in energy efficiency that will allow for a 20% reduction in fuel consumption. The energy efficiency objective is seen here rather as an assumption than a result of targeted actions undertaken in different economic sectors. An increase in the biofuel share to a level of 10% transport fuel consumption, another objective of the Package, is disregarded in the Report. The Report also does not refer to yet another proposal from the Package, i.e. a 10% CO₂ emission reduction goal in the sectors not covered by the EU ETS in the EU as a whole, and for Poland a possibility to increase its CO₂ emission in these sectors by 14% until 2020.

The Report's analyses and model calculations for the implementation of the main goals of the 3x20% Package are limited to the electricity sector. Such an approach would be justified if the Report was to analyse only the impact of the Directive on the EU ETS post 2012 and not the whole Package. Implementation of the Package's objectives should involve the whole economy as well as the third sector (public utility, households, etc.).

Therefore, if the analysis covered the whole economy and society, the overall results could differ from the fragmentary results presented in the Report.

2.2. The analyses and model calculations presented in the Report have been conducted correctly. Nevertheless, substantive mistakes appear in the assumptions and the choice of options that lead to the implementation of the Package's objectives. They are described in the

section on detailed evaluations. The most significant mistakes, with a large impact on the Report's final results, include regarding energy efficiency options only as arbitrarily assumed values and shifting the whole 15% RES share objective only to the electricity sector.

2.3. The Report tries to highlight all the negative aspects of the Package's implementation, which makes it at times biased. This holds true especially when it comes to the presentation of impacts on the economy and households. It disregards potential benefits and opportunities for the economy, especially when it comes to less energy-intensive and more innovative economic development. It ignores an opportunity to allocate the profits from the auctioning system in such a way that they stimulate additional GDP growth. The Report tries to blame all of the current problems with the development and security of the fuel and energy sector on the difficulties with the implementation of the Package.

3. Detailed evaluation

3.1. Methodology

3.1.1. The calculation models applied for the purposes of the Report (CGE-PL, PROSK-E, EFOM-PL) are characterised by rather conservative parameters of econometric functions (CES) and are too strongly based on historical trends, which does not allow for a correct forecast in abruptly changing conditions. This refers mainly to the sudden increase in fuel and energy prices on the global market and more expensive energy as a result of the auctioning of CO₂ emission allowances at the auction. Given that within several years (2009 – 2015) electricity prices are to grow nearly twofold (without ETS – auction) or threefold (ETS – auction from 2013), the impact of this incentive on the changes in the economic structure and energy demand is underestimated in the Report. This may be exemplified by the basic scenario (basic variant), which predicts an increase in electricity demand of 68.5% by 2020, compared with 2005, and of 109.9% by 2030. If, however, electricity demand was to change according to the GDP energy-intensity calculated for recent years, the same GDP growth would involve an increase in electricity demand of 39.7% by 2020 and of 55.8% by 2030. The assumptions and the results of the model calculations appear to be inconsistent. For example, the 20 – 70% increase in electricity prices between 2010 – 2030 does not have any impact on the energy demand forecast in the basic scenario, as under this scenario the increase in electricity demand is larger than an increase that would result from the continuation of the current trend.

It is hard to find any justification for the assumption adopted for the basic scenario where the economy is predicted to increase its energy-intensity despite more stringent conditions that will stimulate more energy-efficient behaviour.

3.1.2. The models applied in the Report do not take into account energy efficiency as an option for GHG emission reduction in the criteria of models' equilibrium. They lack the approach of the integrated planning methods, which analyse all the demand and supply options for energy resources and the CO₂ reduction potential. Economic equilibrium should allow for the implementation of the objectives (here the Package) with such a set of supply and demand options that would guarantee the lowest implementation costs possible. The scenarios analysed in the Report, however, arbitrarily adopt a certain energy efficiency level without any assessment as to whether it is technically feasible or economically justified or whether a higher energy efficiency level would not bring more benefits for the economy and society.

3.1.3. The basic scenario assumptions, which follow governmental assumptions, are based on values that predetermine energy-intensive economic development. For example, steel production is forecast to increase by over 70% between 2005 and 2030, while land passenger transport should decrease by over 15%. The latter seems questionable, as all the global forecasts, including that of the IPCC, assume that mobility will significantly increase. Such an arbitrary adoption of quantitative product data in the macroeconomic scenario seems unjustified and results rather from the limitations of the calculation models used for the purposes of the Report. A much better approach would be first to define the assumptions on the level and structure of final consumption, which would serve as a basis for forecasting material and energy demand. Such an approach allows one to reflect the progressing structural changes. Research on the energy-intensity of the Polish economy shows that more than half of the decrease in energy-intensity in the last 10 years results from changes in the GDP generation structure, i.e. from the growing share of less energy-intensive products and services, and less than half from the improvement of energy efficiency in direct energy consumption.

3.1.4. Adoption of the two separate variants: BAU (continuation) and ODN (reference), appears rather pointless. The first is just now ceasing to be relevant, and the second does not take RES objectives beyond 2010. The analysis should consider one BAU-continuation

variant that would provide a forecast based on the current objectives and policies. It should be also noted that the ODN price for the emission allowance of 20 Euro/t refers to the missing allocations, not covered by the NAP II, purchased within the ETS. The Report lacks a scenario/variant (the Report uses the two terms inconsistently) that would assume the implementation of all the objectives of the Package (CO₂, RES and energy efficiency) and at the same time would allow for the lowest possible implementation costs.

3.1.5. Adoption of the same level of energy efficiency objectives and policies for the BAU-E and EUMIX-E also raises reservations, as it disregards the impact of significantly different electricity prices (an almost twofold difference) under the two scenarios on electricity demand.

3.2. Impact on the energy system

3.2.1. It does not result from Figure II and Table VIII (in the Synthesis) that scenarios EU_CO2 and EU_MIX directly implement the CO₂ emission reduction objectives for 2020. Nevertheless, if 1990 is assumed as the base year, the emission values are quite near to the objective. It would be justified to show which scenarios (variants) fulfil the CO₂ emission reduction objectives. Also, none of the scenarios considers a simultaneous implementation of the following assumptions: energy efficiency + energy mix + technological mix, including RES, which would partly fulfil the 20% CO₂ reduction objective (1990 – 2020) for Poland and at the same time allow for 21% CO₂ emission reduction within the ETS (2005 – 2020) at the lowest possible cost.

3.2.2. The costs of meeting energy needs do not include energy-efficiency costs. If the latter were included, the total costs of meeting energy needs would decrease. At least 20 – 30% of the reduction in current electricity consumption could be achieved through energy efficiency measures, and these measures are profitable under current energy prices and capital conditions. During the life-cycle of such projects, incremental costs are negative, which shows that if energy efficiency measures are implemented, the costs of meeting energy needs decrease. Given the significant increase in electricity prices forecast by the Report, the potential for profitable energy efficiency projects will be much more significant.

3.2.3. The results presented in the Report show that the average unit CO₂ emission reduction cost for the RES objective (15%) are extremely high; over 2.5 times higher than the unit CO₂ emission reduction cost under the modified EU ETS (40 Euro/t + auction). Therefore, implementation of the RES objective will have a tremendous impact on the increase in costs of meeting the energy needs of the economy and society. The presented technological electricity generation structure for the EU_MIX scenario shows that the capacity of new RES power plants comes mainly from wind power plants. For example, the capacity of wind power plants in 2030 is around 6.5 times higher than that of biomass power plants. Considering the low productivity of wind power plants under Polish wind conditions (currently, the average annual utilisation of rated power amounts to 17%), which translates into high electricity generation costs in these power plants, other cheaper solutions in electricity generation from RES should be suggested. The most viable option here is biomass. Its potential in Poland appears to be underestimated, especially when one considers the potential resulting from the transformation of Polish rural areas.

3.2.4. Forecast lignite and hard coal prices do not provide for such an increase that would allow for covering the necessary investment outlays for modernising and restoring production capacities in coal mines. Even current steam coal prices (end of 2008) are 20 – 30% higher than those assumed in the Report for 2010. Moreover, even at the current prices, the profitability and capital accumulation in coal mines are low. Therefore, the BAU scenario, where the share of coal in electricity generation is the largest, underestimates energy supply costs. As a result, the difference between the Package scenario and the BAU scenario should not be so wide.

3.2.5. CO₂ reduction options and electricity demand and supply balances do not take into account the possibility of purchasing electricity from outside Poland. This results from the assumption that the electricity import-export balance should be zero. Given, however, the current knowledge on the possibilities for the development of common European energy systems and the will to construct new transboundary connections within the EU, disregarding such an option is unjustified. Such a solution could also to a certain extent reduce the costs of the Package's implementation.

3.2.6. The Report does not suggest any policy measures that should be introduced in order to implement the Package, e.g. a recommended scenario. Most probably, this was not the

purpose of the Report. The increase in electricity prices can be mitigated if state aid is granted for electricity producers in order to reduce their CO₂ emission. This could be helpful in discussions and negotiations with the EU on earmarked state aid, as this type of state aid is preliminary being considered in EU studies and documents.

3.2.7. The Report assumes that the whole 15% increase in the RES energy share until 2020 should be achieved in electricity generation. This is a flawed assumption as the draft Package formulates an objective of a 20% (for Poland 15%) RES share in the final energy balance. Shifting this objective to the electricity sector constitutes the most expensive option. If the share of electricity generation from RES in electricity consumption remains at a level of 10% (Polish objective for 2010 – 2014), the costs of meeting electricity demand will be significantly lower, electricity costs will be also much smaller, and in consequence, the economy and society will be much less burdened by the Package's implementation costs. Referring once again to the results of Table VIII from the Report: the increase in energy supply costs is the most considerable – over 50% – for the new RES goal (in the Report, it is interpreted as a 15% RES share in electricity production). As a result, the new increased electricity prices in the variants that implement this goal (EU_CO2 and EUMIX) are seriously overestimated. The 15% RES objective in the final energy balance should be implemented as much as possible in those areas where there is sufficient RES potential and the costs are the lowest, i.e. in biofuel production (Poland will have to fulfil the 10% goal in the share of biofuels anyway), in heating and in other areas not covered by the EU ETS. The approach adopted in the Report considerably overestimates the negative results of the Package's implementation on the Polish economy and society.

3.2.8. If a part of the RES objective is shifted outside the electricity sector, investment outlays in the EU_MIX scenario will approximate the ODN scenario. In such a case, the increase in the investment outlays necessary for implementation of the Package would be insignificant.

3.3. Impact on the economy

3.3.1. The average annual GDP loss at a level of 0.6%, presented in the Report, is overestimated. This may result from the following reasons:

- The Report does not provide for a possibility of earmarking the profits from the CO₂ emission allowance auctioning system, i.e. 18 – 20 billion PLN/year, so that it

stimulated additional GDP growth. Such an increase would be possible if the funds were allocated to the most innovative and productive sectors of the economy.

- The Report overestimates the increase in electricity prices and energy supply costs. This results from burdening the electricity sector with the obligation to fulfil the whole 15% RES objective and disregarding a possible cut in the costs through the implementation of profitable energy efficiency measures that will decrease energy consumption.
- The scope of the analysis is limited to the electricity sector and disregards the costs that are necessary for the implementation of the basic and reference scenarios, e.g. in the mining sector.
- The economic parameters in the applied econometric models are too conservative and underestimate the impacts of the strong incentive provided by growing electricity prices. Most probably, these models would fail to forecast the results of the dramatic increase in the prices of oil and oil-derived fuels that occurred in 1973 and 1981. After a temporary fall in the GDP growth rate in developed countries, the economies transformed themselves and adjusted to the new conditions, and the GDP growth rate returned to the previous level or even increased. The results of other calculation models show that the GDP in Poland will decrease much less as a result of the Package's implementation.
- It appears improbable that a reduction in energy-intensive production should have such a tremendous negative impact on GDP growth given that the share of such production in GDP generation is steadily and significantly decreasing (structural changes).
- The impact on the import balance is negligible due to the small differences between the BAU and EU_MIX scenarios.

3.4. Impact on households

3.4.1. The Report claims that household expenditures on energy will increase by 2 – 3% per person to a level of 14%. This number is compared with the 10% threshold from which energy poverty begins. At the same time, the Report neglects the fact that within that period, household incomes will increase nearly three times due to large GDP growth. Such a presentation of information must be seen as biased. Energy poverty is not reflected by the

percentage of expenditures on energy, but by the financial resources (in absolute values) that are left for all other types of expenditures, and this amount is going to increase over twofold.

3.4.2. The analysis of expenditures for energy in different types of households is flawed. It compares the different income levels of employees and pensioners (Table XVI) with average energy expenditures, which most probably are the same for all the groups. However, in reality, there is a clear correlation between the income level and energy consumption, as less affluent groups consume less energy and bear lower energy expenditures. If the Report indeed assumes the same energy expenditures for all groups, the presented share of energy expenditures in the groups with the lowest income is overestimated.

3.4.3. The Report discusses the impact of the transfer of 50% of the profits from the auctioning of CO₂ emission allowances on changes in the structure of energy expenditures in household budgets. It concludes that although the share of expenditures for energy will fall from 16.2% to 14.4% in 2030, it will remain high; higher than the 13.2% share in 2010. Such a reallocation of the profits from the auctioning system would be, however, highly ineffective, as it would also cover the group with the highest income and the highest energy consumption. It would passively introduce constant energy subsidies instead of creating active programmes for efficient energy use that would lead to decreasing expenditures for energy in households. Those households which will put funds from the auctioning system to proper use and implement sufficient and profitable energy-efficiency measures may even see their expenditures for energy fall.

3.5. Conclusions – summary

3.5.1. The Report's summary presents a set of conclusions that highlight the negative consequences of the implementation of the EU Energy and Climate Package. They refer to an increase in the costs of meeting energy needs, an increase in electricity prices, a partial GDP loss, a decrease in household disposable income and an increase in the share of expenditures for energy in household budgets. These factors will, to a large extent, be influenced by the change in the EU Emission Trading Scheme, as provided for by the amended Directive, i.e. a shift from free allocation, as in 2005 – 2012, to the auctioning of CO₂ emission allowances after 2013.

The detailed comments, discussed in points 3.1 – 3.4 of the evaluation, present reservations to some assumptions of the analysis and to the manner of conducting the calculations. If these reservations are taken into consideration, the negative impact of the implementation of the Package may be significantly minimised. It may even create an opportunity for different, more innovative and less energy-intensive (including less electricity-intensive) economic development. Point 3.1.1 addresses this issue in greater detail.

3.5.2. The summary takes the Package's negative impacts even further and refers to results that are difficult to quantify, such as: a serious increase in the risk associated with production and investment activity in the electricity sector, high demands on the quality of work performed by the governmental administration and a maze of legal regulations that may paralyse the energy sector. These conclusions go too far and are not entirely justified. What is more, most of them should be addressed at recent years and the current situation. Poland has long been long lacking a consistent and balanced policy in e.g. regulation of electricity prices which would allow not only for the setting of prices at a socially acceptable level, but also to cover the investment costs of new power plants (as marginal costs in these investments significantly exceed electricity market prices in recent years). As a result, an electricity shortage may occur between 2010 – 2014. This constitutes the main threat for the energy safety and sufficient electricity supply to the economy and society. Poland will have enough time to develop such economic, social and energy policies that would considerably minimise the potential negative impacts of the Package. It is also obvious that, regardless of the Package, the operations undertaken by the governmental administration should improve as soon as possible. This holds true especially for the preparation of multi-scenario and comprehensive studies that would evaluate the consequences of the Package's implementation across all sectors of the economy and not only the electricity sector. Such studies should also be widely consulted. It is essential that the government prepares an implementation programme and defines effective implementation measures. Otherwise, we will have to continue facing the situation described in the report, with unclear responsibilities and competences, a maze of mutually exclusive legal and financial mechanisms, lack of consistency in the monitoring and enforcement of existing legislation, disregard for urgent issues with short- and long-term results, etc. Blaming all of these unsolved problems on the consequences of the Package's implementation is a gross simplification.

3.5.3. The Report states that investments in the development of RES capacities will be extremely expensive. It is difficult to argue with this statement, and the consequences for the economy and society may be significant, especially if the RES objective is fulfilled as proposed in the Report, i.e. only by the electricity sector and mainly through wind power plants. It has been mentioned earlier that the costs and other consequences could be much less significant if fulfilment of the RES objective was shared by the whole economy and if, in the electricity sector, more capacity was added for co-combustion of biomass from energy plantations.

3.5.4. Poorer households will have problems not only with meeting their energy needs, as pointed out in the Report's summary, but also with all other needs, regardless of the Package's implementation. An active social policy will be necessary, a policy that will allow for the satisfying of energy needs, and not only those of the poorest social groups. It should reduce energy consumption through the implementation of energy efficiency measures. This will necessitate an active energy efficiency programme supported from the funds collected through the auctioning system.

3.6. Recommendations of the Polish Electricity Association

3.6.1. Based on the assumption that EU-27 members should be burdened with costs proportional to the current GDP/capita, the EU has already reduced some of the Package's goals for Poland. The RES objective for Poland is 15%, while for the whole EU-27, it is 20%. Moreover, Poland is not obliged to reduce its CO₂ emission by 10% in the sectors not covered by the EU ETS as other countries are. Instead, Poland may increase its CO₂ emission in these sectors by 14% until 2020.

3.6.2. It is in Poland's interest to maintain this interpretation and the 15% RES share in the final energy balance. This share should be distributed across sectors and not shifted only to the electricity sector, as has been assumed in the Report.

3.6.3. The Polish government has supported the PEA's recommendation to introduce the auctioning system in a gradual way. It has proposed that the EU should adopt emission benchmarking for European power plants and introduce lower and upper limits for emission allowance prices at the auction.

3.6.4. The PEA's recommendations to relax further proposals made in the draft of the amended ETS Directive do not follow directly from the analyses presented in the Report and are not included in any of the scenarios. This refers to the recommendation that 20% of the allocation should be distributed among poorer countries and that the obligations imposed by the ETS Directive on respective countries should be treated in a flexible, not very stringent manner. If Poland wants to introduce these recommendations for an EU-wide discussion, it should have a study conducted for all the EU-27 countries, showing that such proposals will not put unequal burden on the respective countries and that they will not upset the whole market construction of the EU ETS. It is especially important to prove that such a move away from the full auctioning system will not result in undue profits for some of the ETS subjects that will be able to obtain their allowances for free. Undue profits are seen as one of the major problems of the current ETS, and they constitute one of the main arguments used by the EC to promote the move towards auctioning.

3.6.5. Recommendations for the changes in the CCS Directive are justified as the Directive's provisions go further than the expected technological development and credible economic and environmental assessments for the advancement of CCS technologies.

3.6.6. The authors of this evaluation also agree with the recommendation for urgent development of an implementation programme for the Energy and Climate Package, so that the implementation costs are the lowest. Moreover, this programme should also create opportunities for creation of an innovative and less energy-intensive economy.

3.7. Macroeconomic part

3.7.1. The macroeconomic part of the Report 2030 is presented in sections 4 and 5 (section 5 up to point 5.3.3). It may be generally assessed, at most, as acceptable. It contains quite a lot of mistakes and oversights. Some of them are the authors' fault, while some result from dynamically and suddenly changing external factors.

3.7.2. The main reservation to the macroeconomic part is that it is chaotic. The authors present several macroeconomic scenarios – the first two have been prepared by external Polish institutions (The Energy Market Agency and The Gdańsk Institute for Market

Economics), and the remaining two have been prepared by the authors of the Report. One of the own scenarios is based on the external scenario prepared by The Gdańsk Institute for Market Economics, and the other own scenario draws from other scenarios, but they have not been clearly defined (available forecasts, Euroelectric). Moreover, the Report refers to two scenarios (reference and alternative) from World Energy Outlook 2007, which should constitute a logical framework for the own scenarios. It is, therefore, not easy to keep track of all the relations between the scenarios used in the Report.

3.7.3. Once the Report goes through the description of all the scenarios, it presents two final macroeconomic scenarios for Poland: basic and moderate. It is quite surprising that the scenarios are not presented here in detail. The authors refer at this point only to the previously described scenarios (e.g. that of The Gdańsk Institute for Market Economics), describing the differences between the original scenario and the basic one as well as the set of assumptions for the basic and moderate scenarios. The Report lacks here a detailed presentation of the selected scenarios and the assumptions for further analysis, which should be seen as a serious shortcoming of the Report. At the same time, it appears that the analyses of the scenarios that were not used (Energy Market Agency) or that were modified (The Gdańsk Institute for Market Economics) were unnecessary.

3.7.4. Despite the fact that the presented macroeconomic scenarios (those that constituted the starting point and the own scenarios) have been developed quite recently, they are already quite seriously outdated. The 5.1% average annual economic growth rate, as assumed in the basic scenario, may prove difficult to achieve due to much less advantageous external conditions than at the time of developing the forecast. The global financial crisis already has and will have a significant impact on the real economy – mostly in Europe, and therefore in Poland. Although the extent and the duration of the crisis's results are difficult to foresee right now, it is quite certain that GDP growth for 2006 – 2010 at the level assumed in the basic scenario, i.e. 5.7 %, will be impossible to achieve.

3.7.5. External factors, such as the results of the global financial crisis, may also have an impact on the timing of the economic cycles that are assumed in the basic scenario. They may delay certain processes that were included in the forecast – for example the transition of the Polish economy to the post-industrial development stage, where the role of the service sector increases and the role of industry decreases.

3.7.6. As previously mentioned, the moderate scenario was developed on the basis of unspecified “available forecast materials for Poland”. The authors claim that growth rates are similar to those in the assumptions in European studies. In the basic scenario, we at least know the value of the average GDP growth in the analysed period. In the moderate scenario, we are informed only that it “is higher than in the forecasts prepared by European institutions by 0.4 – 0.3¹ percentage points”. The authors do not specify this value. Nor do they inform us of the values forecast by the European institutions, which makes it impossible for readers to calculate the average GDP growth by themselves.

3.7.7. The numerical data, i.e. the main indices and assumptions for the basic and moderate scenarios, can be found only in Table 5.9, which is several dozens of pages after the description of the scenarios. This reinforces the feeling of chaos in the macroeconomic part.

3.7.8. Table 5.9 itself is also considerably unclear. It presents historical data, scenario assumptions and average growth rates for the selected demographic and macroeconomic parameters in both scenarios and some information on Poland's external environment (UE-15, UE-25). The Table does not follow commonly used layout rules, applied e.g. by the Central Statistical Office, which makes using it less intuitive.

3.7.9. Section 5.2. is entitled “Assumptions to macroeconomic scenarios”. It analyses a number of historical trends in the Polish economy, and based on this, it develops assumptions for projecting the trends for future periods. It discusses, among others: demand-related GDP growth, the impact of foreign trade, the role of investments in economic growth, the labour market and changes in the sectoral structure of the economy. Most of the assumptions appear to be correct, but as in the part on the scenario description, this part is chaotic. Lack of a summary that would concisely present all of the adopted assumptions is especially problematic.

3.7.10. Nevertheless, some of the conclusions (assumptions) raise doubts. For example, the authors assume that “the impact of direct foreign investments on the development processes in Poland will continue **growing**” (p. 68). This is a risky statement, given that the significance

¹ It would be correct to specify the range as 0.3 – 0.4, as the lower limit should go before the upper one.

of these investments has already been high in the transformation of Poland so far. Direct foreign investments will definitely have an impact on the development of the Polish economy, but it is questionable whether this impact will grow. In another place (p. 63), the authors claim that the globalisation processes “will instigate further intensive growth in the involvement of foreign capital in the Polish economy”. This growth should be supported by the high “availability and qualifications of employees”. Such an assumption also seems questionable, as globalisation usually leads to situations when investments are moved e.g. to Asian countries, where the availability of workers is much more considerable than in Poland.

3.7.11. Summing up, the largest shortcomings of the macroeconomic part include:

- its chaos and lack of clarity,
- outdated information in the indices adopted in the scenarios, due to the different external conditions than at the moment of the scenario's development.