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Republic of Moldova

District Heating and Electricity Tariff and Affordability Analysis

October 26, 2015

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FINAL

World Bank
October 2015



Foreword

This study was financed by Energy Sector Management Assistance Program (ESMAP) and conducted by a team lead by the World Bank Energy and Extractives Global Practice, with team members drawn from Poverty Global Practice and Social Protection and Labor Global Practice.

The objective of the study is to:

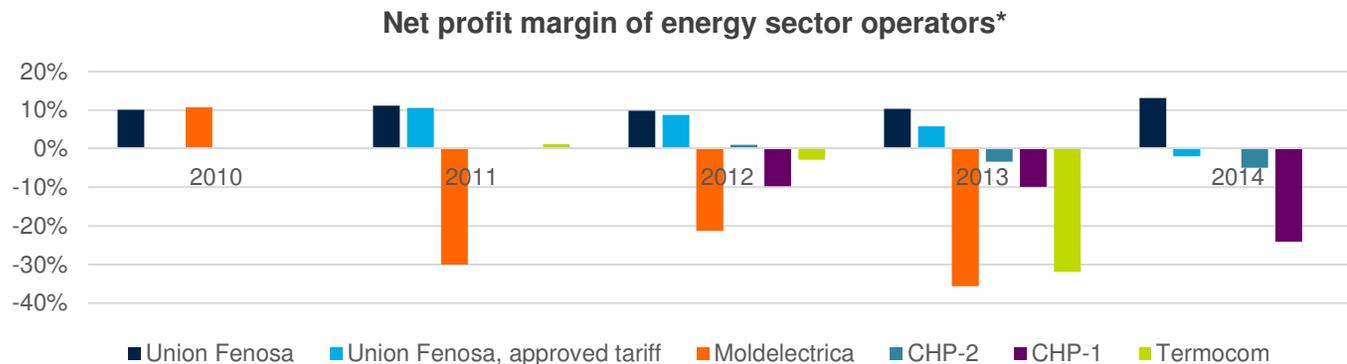
1. Assess the adequacy of the existing heat and electricity tariff levels for achieving financial viability of the energy sector operators
2. Analyze the distributional implications of energy tariff increases
3. Assess the effectiveness of the existing social assistance programs and how to adjust them to mitigate the impact of energy tariff increase on the poor

This report presents the key findings and recommendations for the government of Moldova as well as other energy sector stakeholders. The report starts with a synopsis that summarizes the key findings and recommendations. The main report section starts with an introduction to country context, presents the design of tariff setting methodologies and assesses the adequacy of tariffs based on constructed scenarios. Thereafter analysis of the distributional impact of projected range of tariff increases and the need to adjust the social assistance programs to mitigate the impact on the poor are presented. The report concludes with recommendations for the government on actions to be implemented on tariff setting methodologies and social assistance as well as areas for further research. Appendices include further background information of the analysis.

Synopsis

Moldova is dependent on energy imports and is vulnerable to supply and price shocks. The current regulatory system is well structured, but implementation is lagging. Nominal energy tariffs have not been adjusted since 2012 due to delay in regulatory actions by the regulator, ANRE. On July 18, 2015, ANRE decided on new electricity and gas tariffs, but the implementation of tariff adjustment has been suspended for 60 days. During this time, companies are required to conduct an audit to inspect the justification to raise consumer tariffs. Since the 2012 adjustment, costs have risen continuously and energy tariffs have fallen short of cost recovery, which has had a negative impact on the financial status of the sector.

The currently suspended tariff changes are based on current electricity import tariff and the MDL exchange rate. ANRE decided on increasing the end-user electricity tariff by 37% for RED Union Fenosa, 30% for RED Nord and 35% for RED Nord-Vest. No decisions on adjusting district heating as well as heat and power generation tariffs have been made. The suspended tariff adjustments do not aim to cover past deviation caused by lagging tariff increases. ANRE will evaluate the deviations and may change tariffs accordingly in the future.



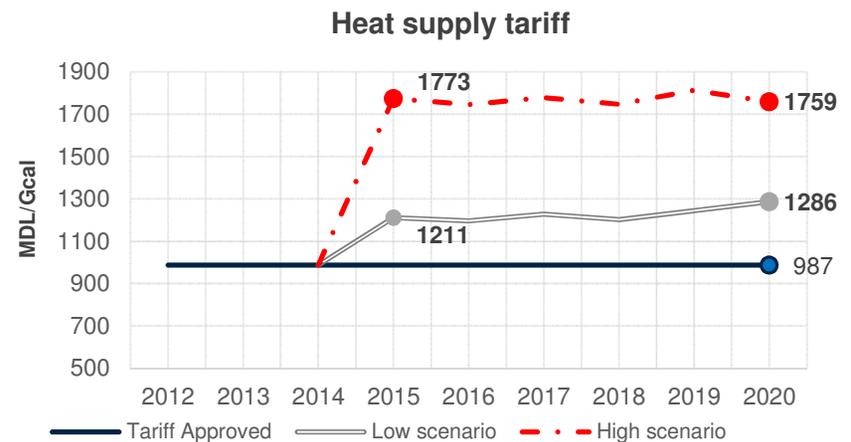
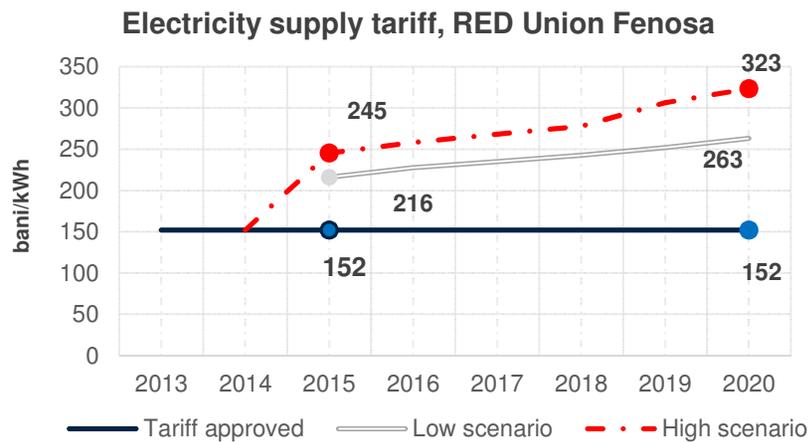
**The profit reported by Union Fenosa is based on an assumed revenue calculated based on tariffs according to regulation, but not approved by ANRE. Deducting the annually accumulated receivables results in a net profit margin shown as "Union Fenosa, approved tariff"*

2014 data not available for Termocom and Union Fenosa

Synopsis

Scenario analysis conducted in this study estimates the future range of electricity and heat tariffs by constructing a low and a high scenario based on parameters influencing the end-user tariffs. The analysis takes into account among other factors the electricity and gas tariffs decided upon by ANRE in July 18, 2015. A new heat tariff has not been decided upon. Based on the analysis, the cumulative electricity tariff increase is estimated to range between 42-61 % from 2014 to 2016 and 73-113% from 2014 to 2020. The range of cumulative heat tariff increase is estimated to be 21-80% by 2016 and 30-78% by 2020.

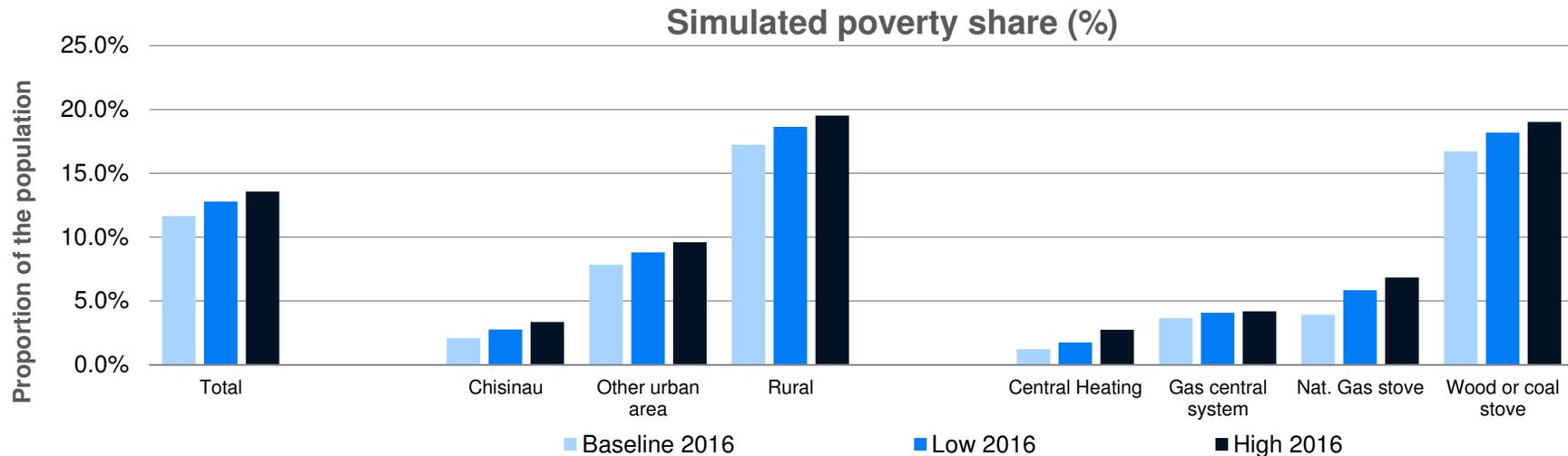
The consumer gas tariff increase is assumed to be 25% by 2016 based on the tariff decided upon by ANRE in July 18, 2015 and the analysis assumes a cumulative increase of 50% by 2020.



Synopsis

The Household Survey Data (2013) indicates that 80% of Moldova’s population may be considered to be in “Energy Poverty”, meaning they spend more than 10% of their budgets on energy bills. On average, energy expenditure is 17% of the total, which is high compared to other countries in the region. The estimated range of energy tariff increases would increase the average share of energy costs in total expenditures to 18–20% in 2016 and with projected economic growth, the share would decrease to 17-18% in 2020. The impact on poverty is highest among the groups that already have a high poverty rate: women living alone and rural population, because of their high vulnerability to electricity tariffs. However, overall impact on poverty will be moderate.*

Within the estimated range of energy tariff increases, the poverty rate is expected to increase moderately. In 2016, poverty rate would increase by 1.1-1.9 percentage points compared to a baseline and in 2020 by 1-1.5 percentage points.

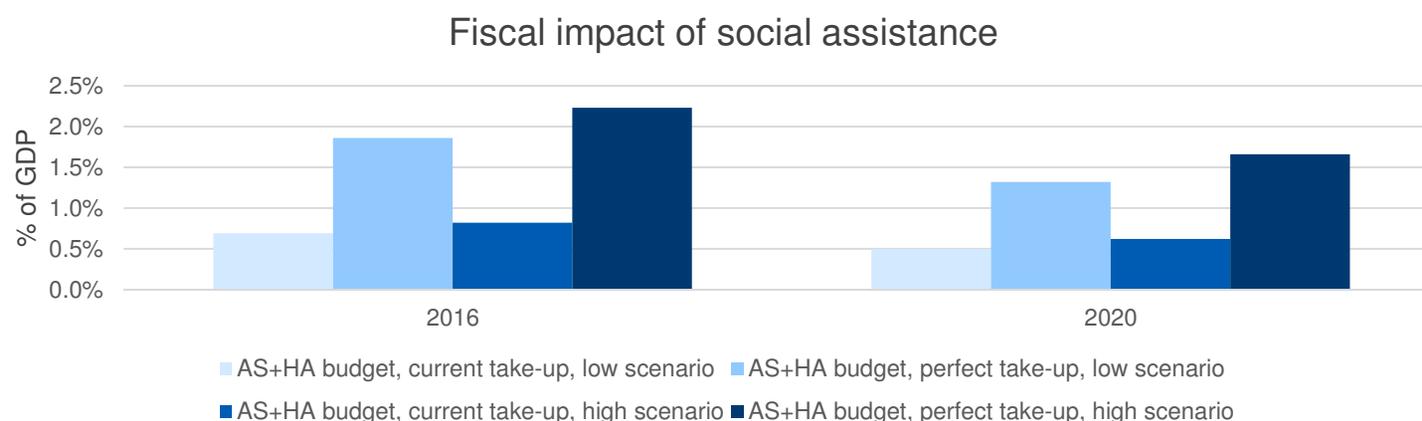


*These simulations incorporate the World Bank projections for economic growth: Annual average private consumption growth 0.6% by 2016 and 2.3% by 2020.

Synopsis

The projected poverty impacts of higher tariffs would increase the need for social assistance. The national level social assistance programs, Ajutor Social and Heating Allowance, are generally well targeted, but the programs could be improved to increase uptake and provide more support to poorest population. To ensure adequacy of social assistance, the threshold and benefit size of the programs should be adjusted in line with the increasing energy costs, which will have fiscal implications.

Adjusting social assistance in line with the estimated energy cost increases, would increase social program share of government budget from 0.5% of GDP to 1.9-2.2% in 2016 and 1.3-1.7% in 2020 assuming that all eligible people apply for assistance. In case the take-up remains at the same level, social program share of GDP would increase to 0.7-0.8% in 2016 and decrease to 0.5-0.6% in 2020.



Synopsis

Conclusions:

Under the current situation, the security of energy supply and the sustainable development of the sector are jeopardized due to the risk of service disruptions and the lack of capital for needed investments in the infrastructure. The delay in regulatory actions has led to loss of confidence and credibility in the institution and process of the tariff setting regime. Restoring confidence in the system is urgently needed to provide for an investment climate that would attract the badly needed capital to Moldova. The Government needs to urgently take action to ensure the financial viability of the energy sector, such as pass through mechanism for fuel costs and forex volatility. The impact of the needed tariff increase on poverty rate is expected to be moderate. However, the Government should plan and budget to mitigate the impact of tariff increase on the most vulnerable population by adjusting the targeted social assistance programs, Ajutor Social and Heating Allowance, and by increasing the take-up among poorest population. To accommodate increased fiscal cost of targeted social assistance, the Government is recommended to consolidate other categorical benefits.

Recommendations:

- Consider introduction of automatic pass through mechanism for fuel and electricity costs and other measures to ensure timely tariff adjustment.
- For the recovery of past deviation, consider an approach to adjust tariffs over multiple year period in agreement with regulated companies to limit impact of tariff increase on the vulnerable.
- Improve targeted coverage of the social assistance for the poor, adjust threshold and benefit size to be in line with increasing energy costs, and improve targeting to control the fiscal impact of increased need.
- Design a plan to communicate about the planned tariff adjustments, their reasons and available social assistance.
- Develop detailed approach to how the above may be implemented.

Outline

- Introduction
- Design of heat and electricity tariff setting methodologies
- Tariff adequacy and forecast of tariffs
- Distributional impacts of tariff adjustments
- Social protection

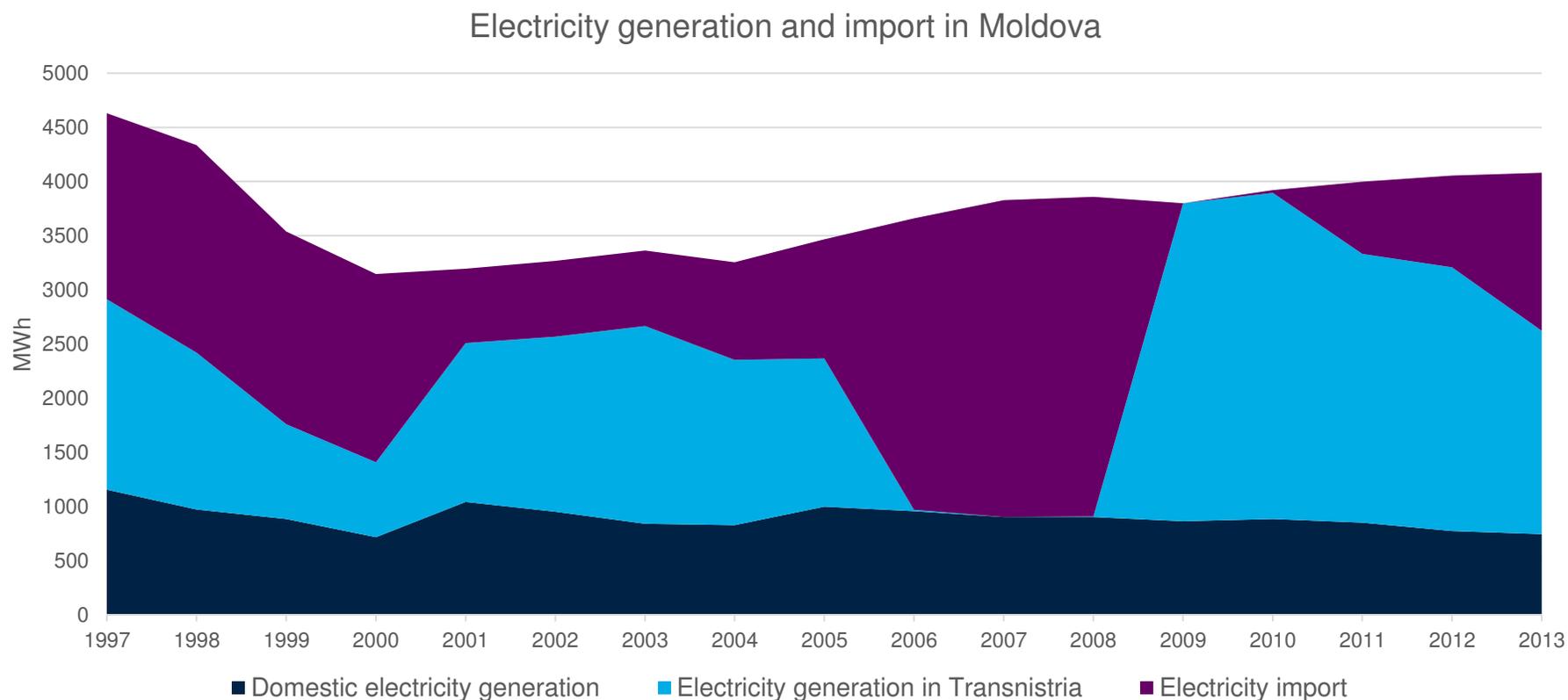
- Conclusions
- Recommendations for government

- Appendices
 - Appendix 1 – Detailed analysis of tariff setting methodologies
 - Appendix 2 – Detailed scenario analysis and sensitivity analysis of heat and electricity tariffs
 - Appendix 3 – Recommendations on tariff methodology and implementation
 - Appendix 4 – Detailed analysis of relations of heating type and poverty
 - Appendix 5 – Detailed analysis and conclusions on social protection
 - Appendix 6 – Summary of scenario analysis



INTRODUCTION

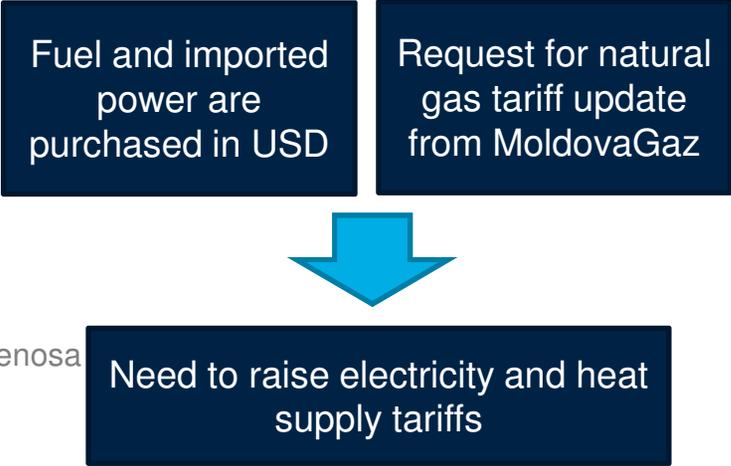
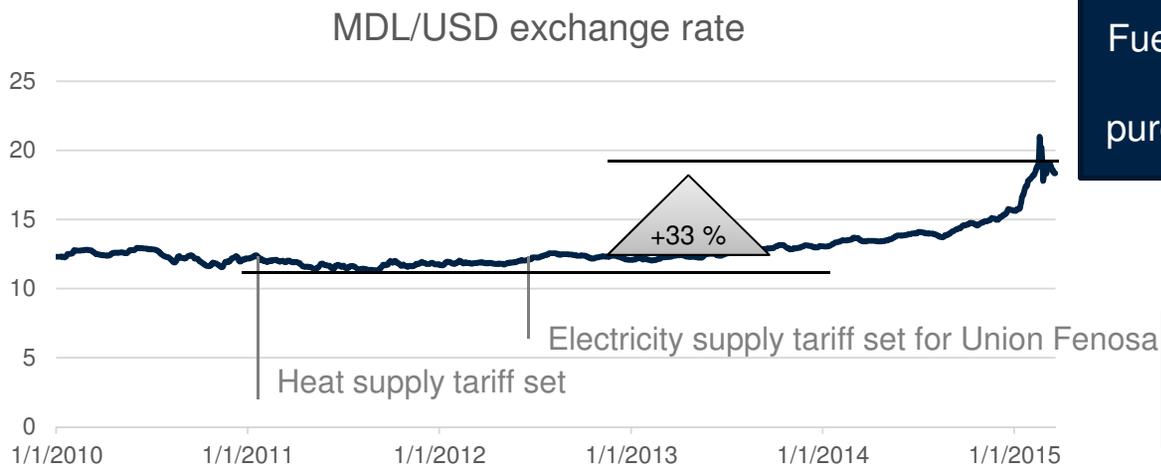
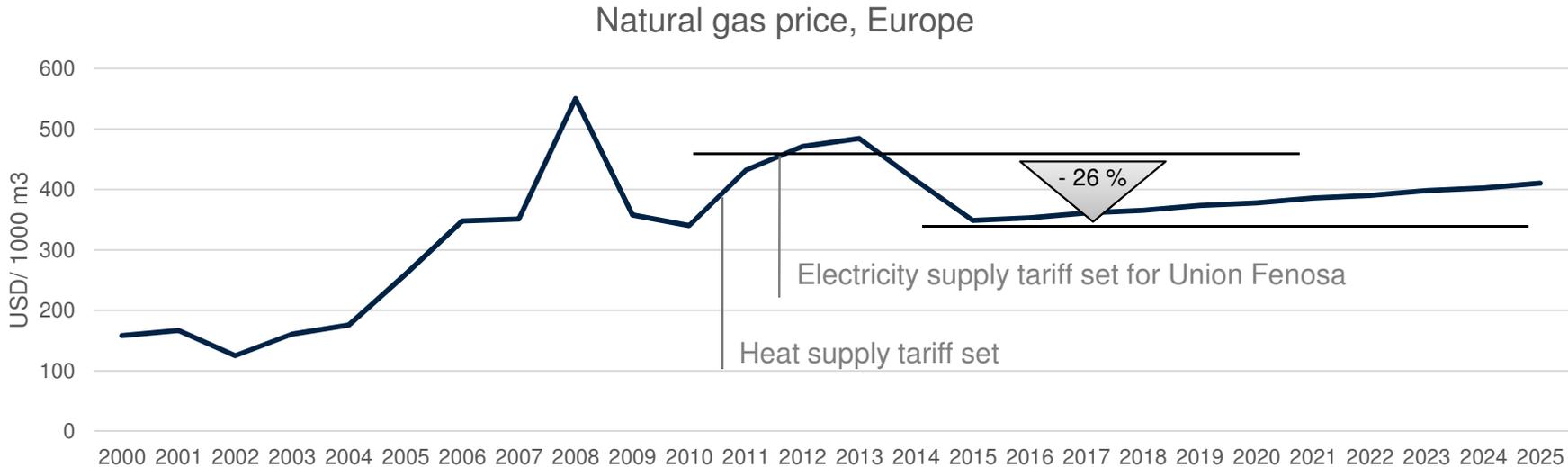
Moldova is highly dependent on imported electricity and fuel



In 2013:

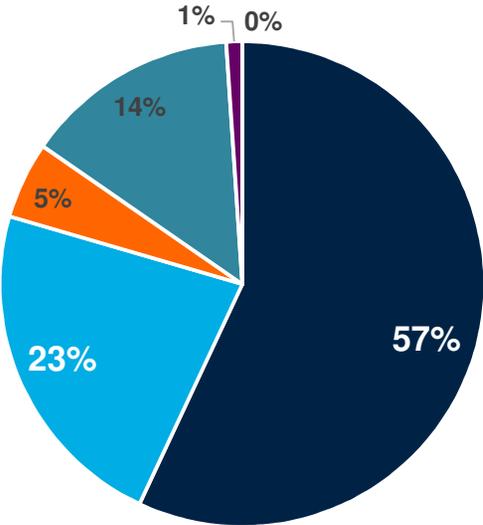
- 82 % of electricity was imported
- 93 % of domestic electricity generation was based on imported fuel
- 100 % of centralized heat production was based on imported fuel

The exchange rate is the main driver of recent electricity tariff increase and drives the need for heat tariff adjustment



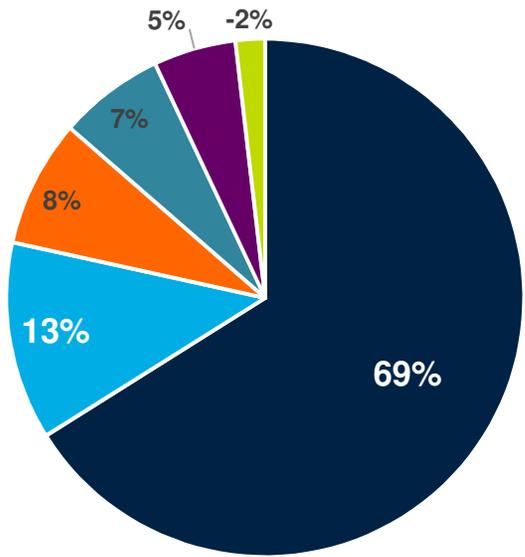
Fuel cost and the cost of imported electricity heavily influence the heat and electricity tariffs

Heat Tariff Structure (Termocom), 2012



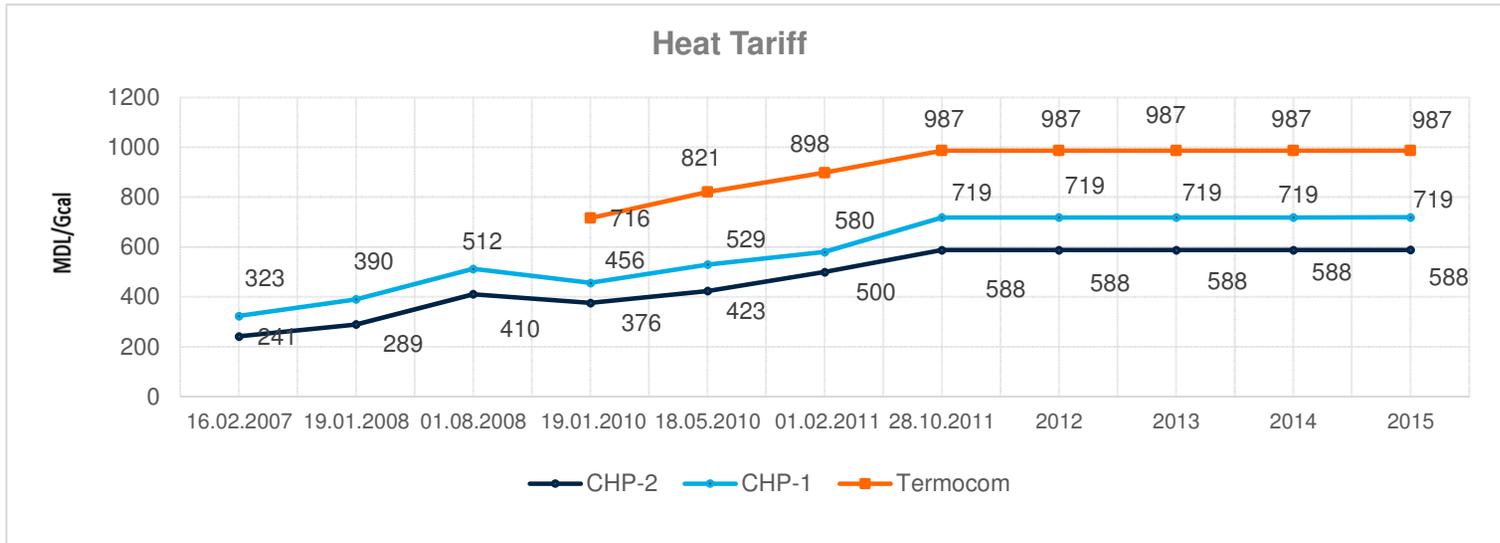
- Heat other sources
- Cost of capital
- Profit
- Own heat
- Operating costs
- Deviation

Electricity Tariff Structure (RED Nord), 2012

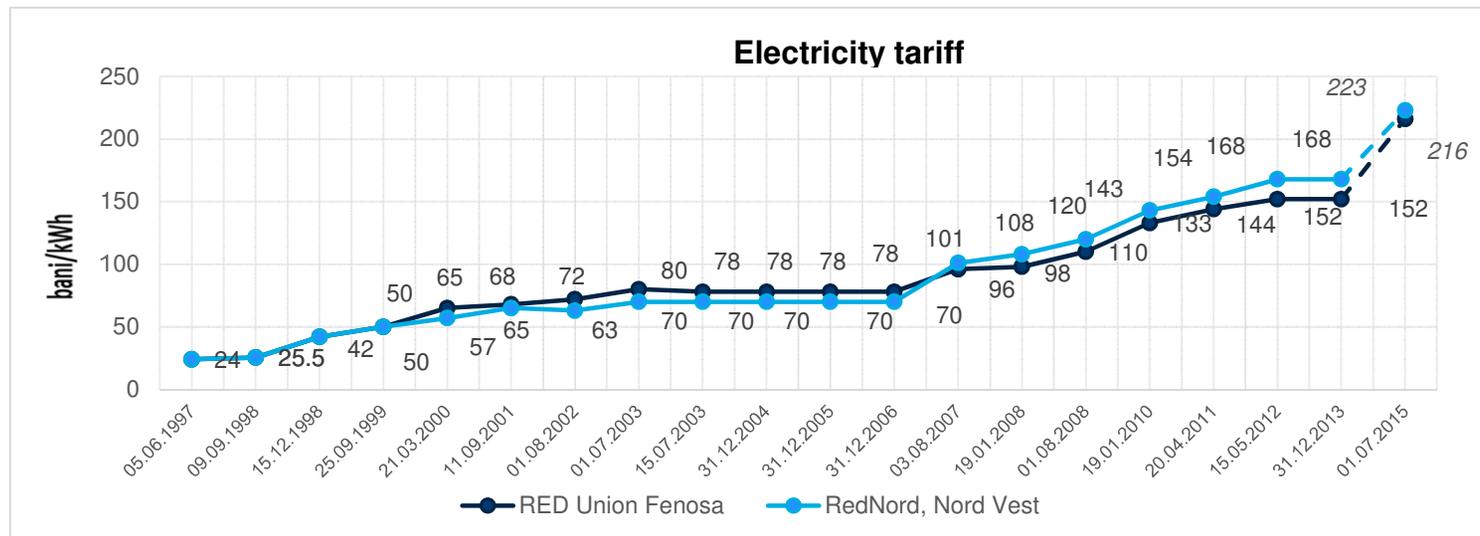


- Electricity costs
- Capital costs
- Operating costs
- Other costs
- Transmission
- Deviations

From 2007 to 2012, nominal electricity and heat tariffs have increased significantly due to periodic adjustments

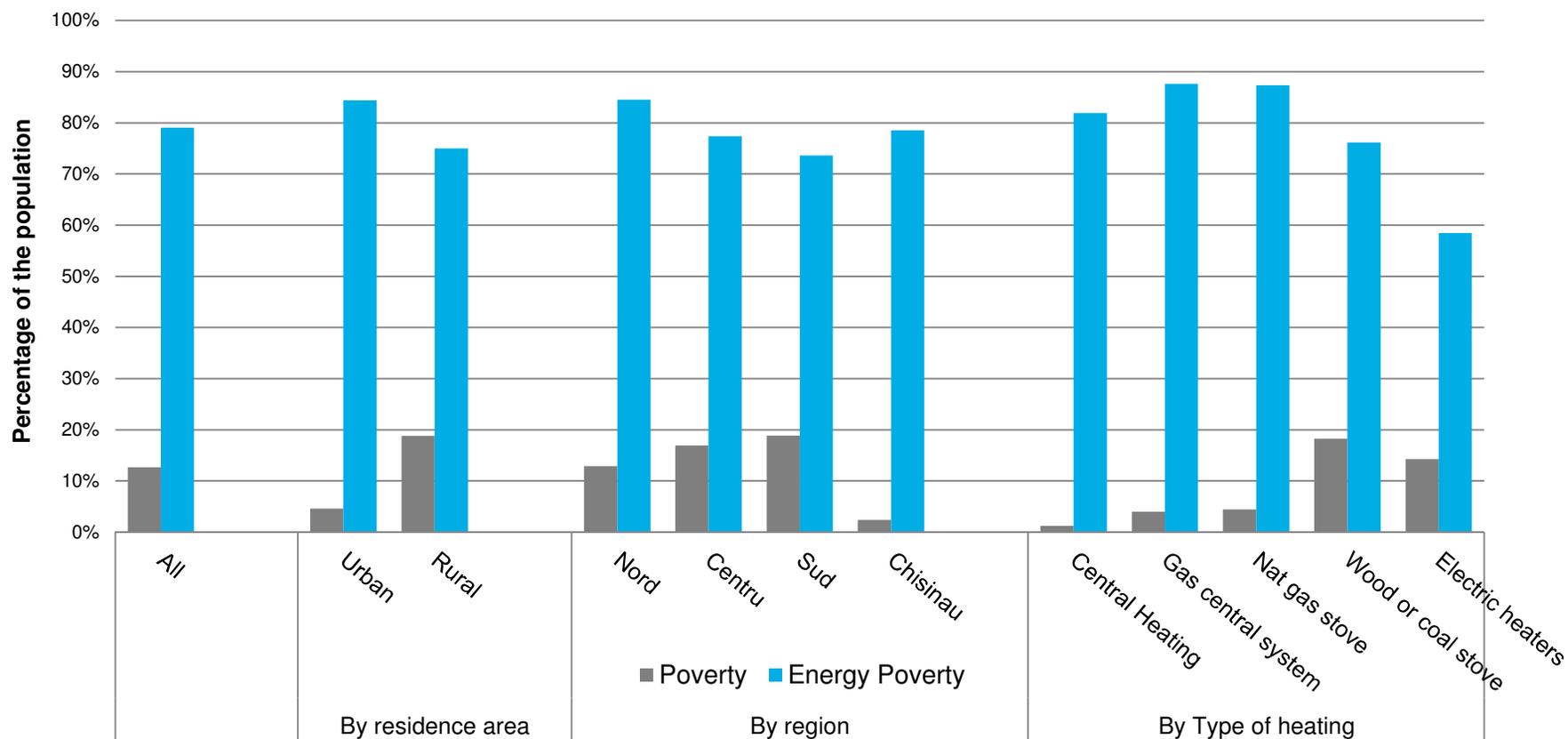


No new heat tariffs have been set after 2011



Electricity tariff increase decided upon in July 2015 has been suspended for 60 days

The Energy Poverty rate is high in Moldova



Data source: HBS 2013

“Energy Poverty” is defined as: More than 10% of total household expenditures devoted to energy (heat, electricity, gas, wood, coal)

Well-targeted social protection measures can play an important role also in improving energy affordability

- Targeting of social protection improved in Moldova in 2009
 - However, most social assistance benefits are provided to certain groups of beneficiaries regardless of their welfare.
 - Since 2009, the country has launched two cash transfers targeting the poor and has eliminated a few inefficient categorical benefits.
 - This resulted in declined spending from 2.6% of GDP to 1.6% and more pro-poor benefits distribution.
- However, after 2012, some policies were reversed
 - Targeted benefits were reduced and categorical transfers were boosted
- There is need to improve the existing social protection schemes
 - The targeted transfers need to be expanded to offer a safety net to the poorest households and cushion income shocks, including those stemming from higher energy costs.

DESIGN OF HEAT AND ELECTRICITY TARIFF SETTING METHODOLOGIES

Moldova has established regulatory structures and aims to implement the core EU energy legislation

National regulatory structures

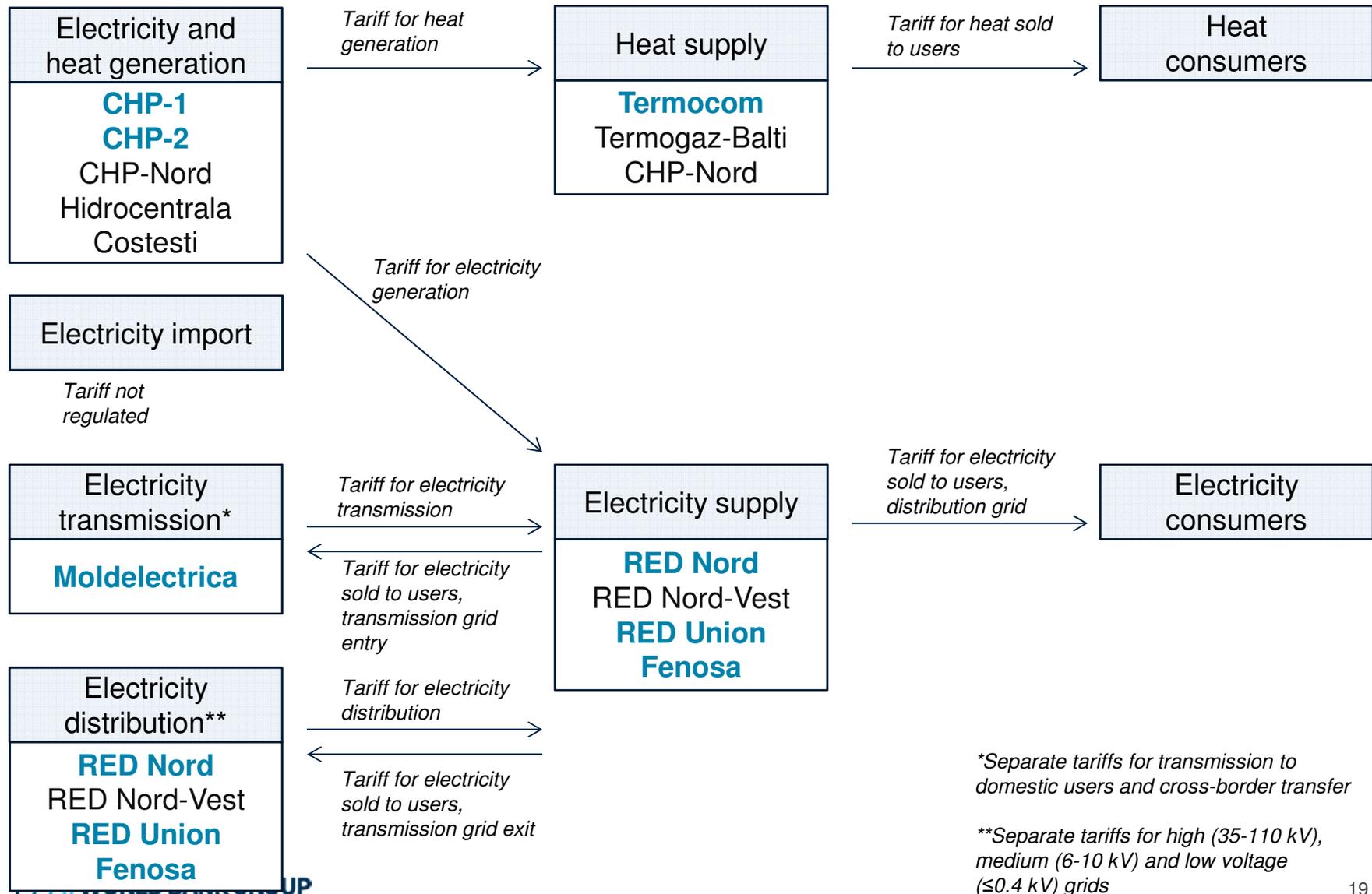
- Ministry of Economy is responsible for energy sector policies and legislation
- The National Agency for Energy Regulation (ANRE) is an independent organization responsible for setting energy tariffs

Most important sector laws

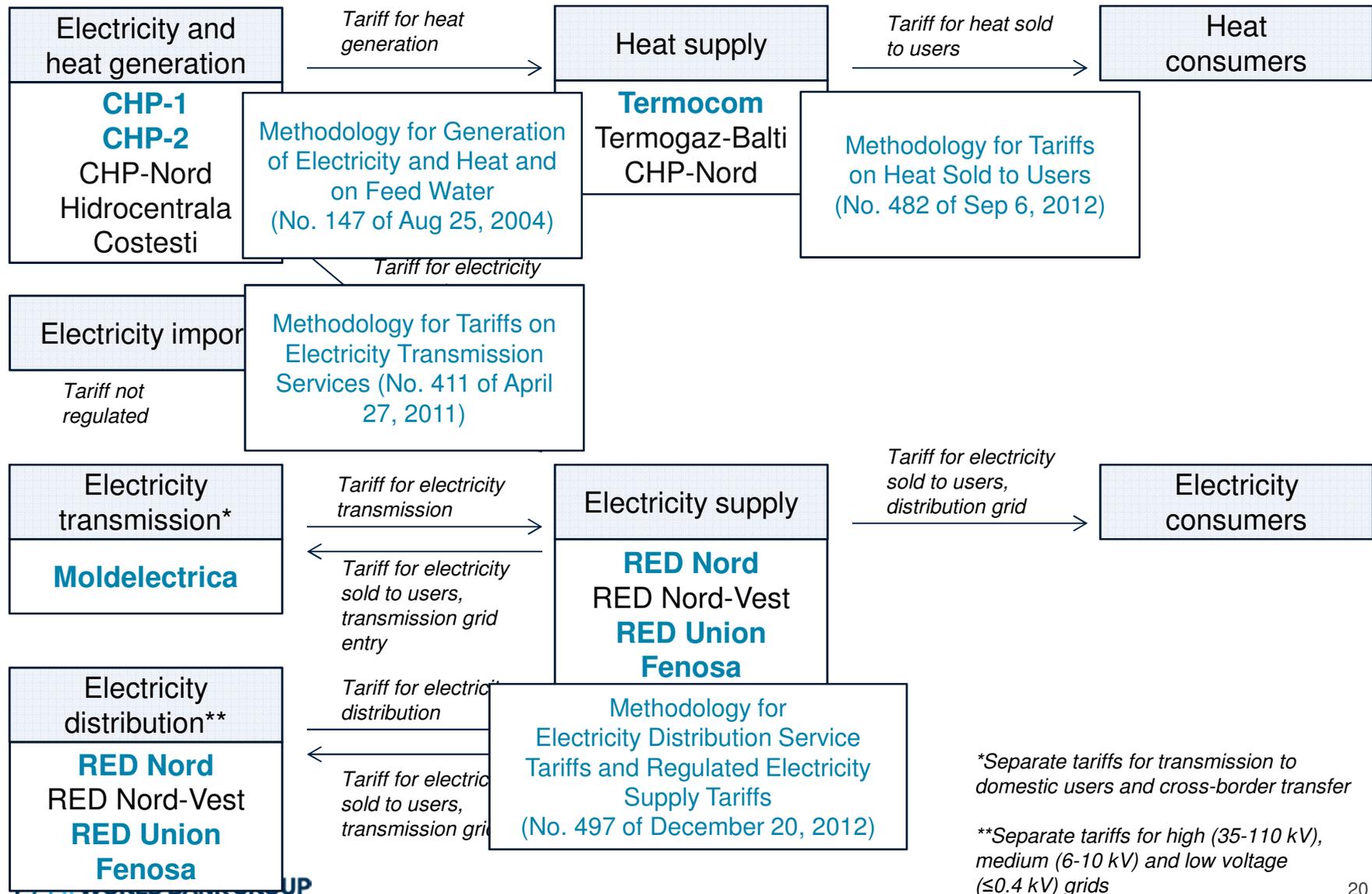
- Law on Electricity, December 23, 2009
- Energy Sector Law No. 1525-XIII of February 19, 1998 (amended February 27, 2003)
- Law on heat and promotion of cogeneration, No. 92 of May 29, 2014

Moldova is a member of the Energy Community and is therefore committed to implementing the core EU legislation in electricity, gas, environment, competition, renewable energy, energy efficiency, oil and statistics

Energy sector has been unbundled and tariffs are set for each company by ANRE



Tariffs are set based on specific regulations

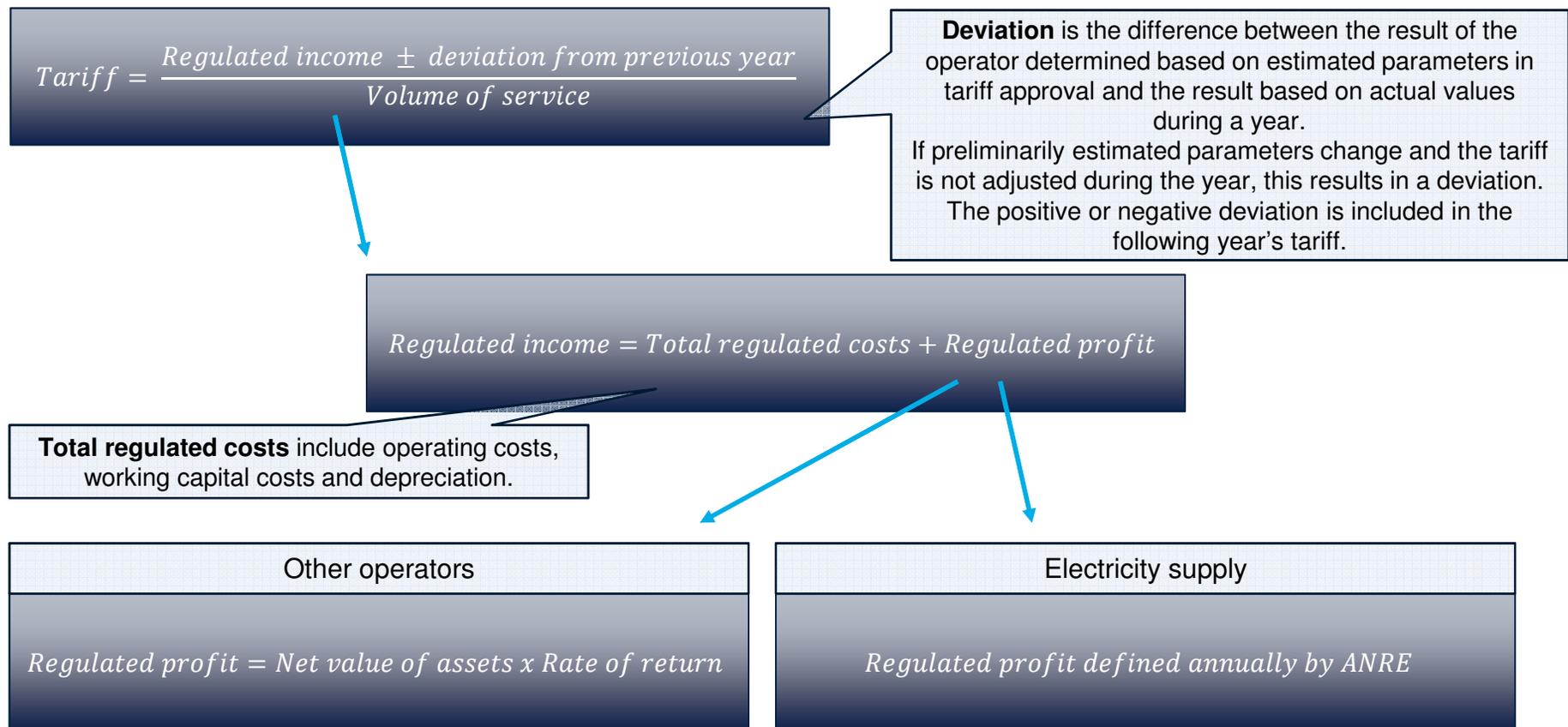


*Separate tariffs for transmission to domestic users and cross-border transfer

**Separate tariffs for high (35-110 kV), medium (6-10 kV) and low voltage (≤0.4 kV) grids

Tariffs follow a rate-of-return methodology

- General principle of tariff the setting methodology is defined below. More details of the tariff setting is given in appendix 1.

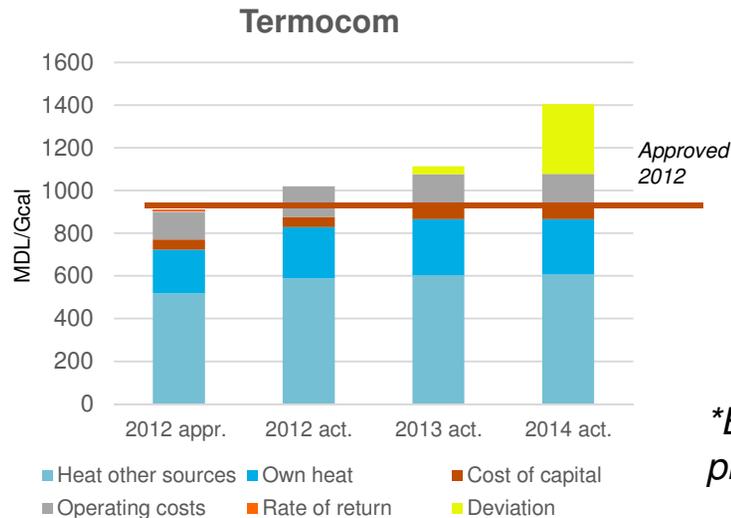
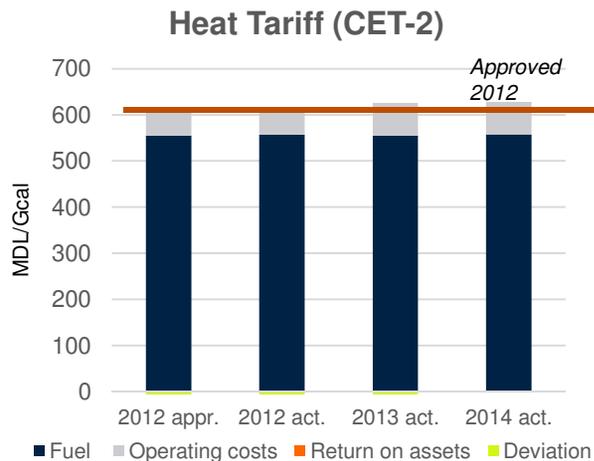
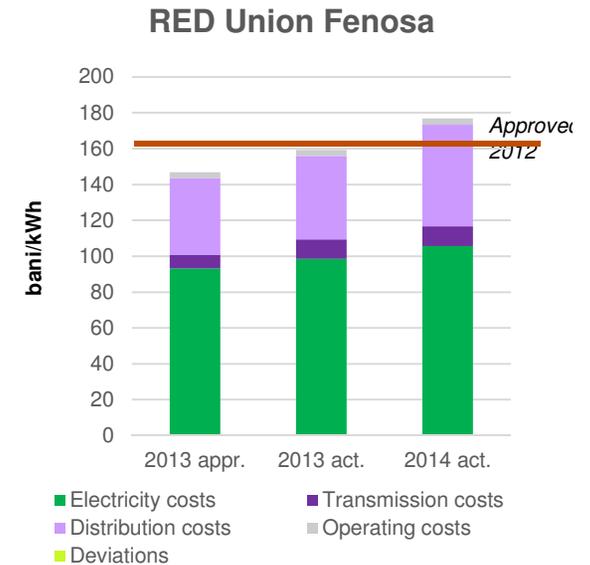
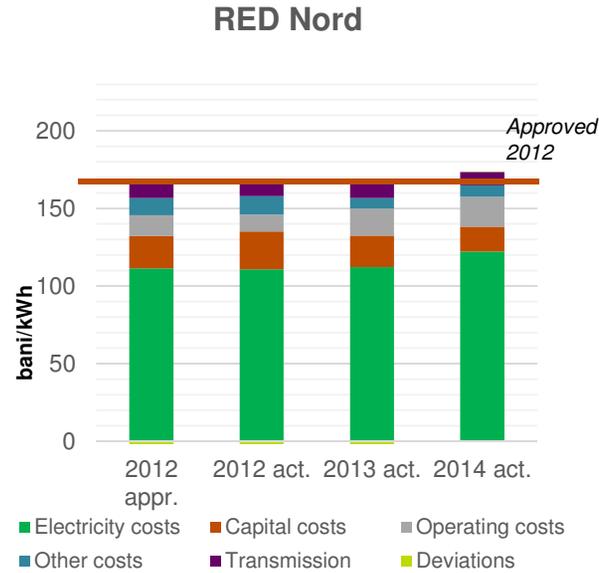
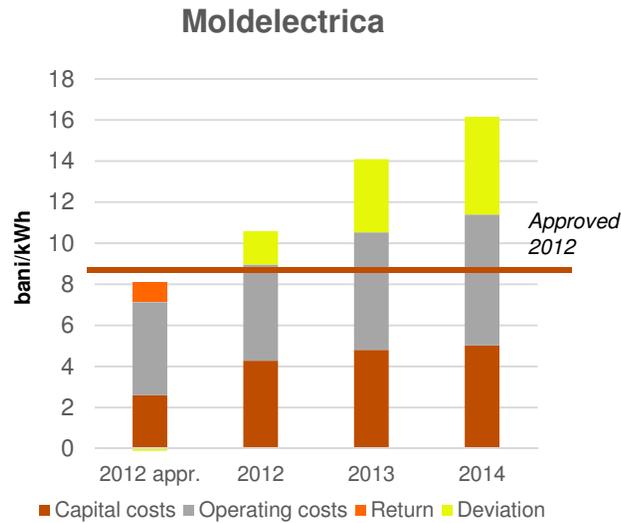


Main finding: Tariff regulation is based on global good practices, but further capital attraction is needed

- Heat and power tariff setting has been mainly well defined and they are based on a global good practice, rate of return methodology
- Electricity and heat generation tariff setting methodology is not as well defined and lacks a definition for a rate of return
- Both heat and power sector have high investment needs in the future and therefore attraction of capital with a fair return is necessary
- District heating and natural gas tariff revision should go in parallel, otherwise increasing the heat tariff may lead to disconnections from district heating system

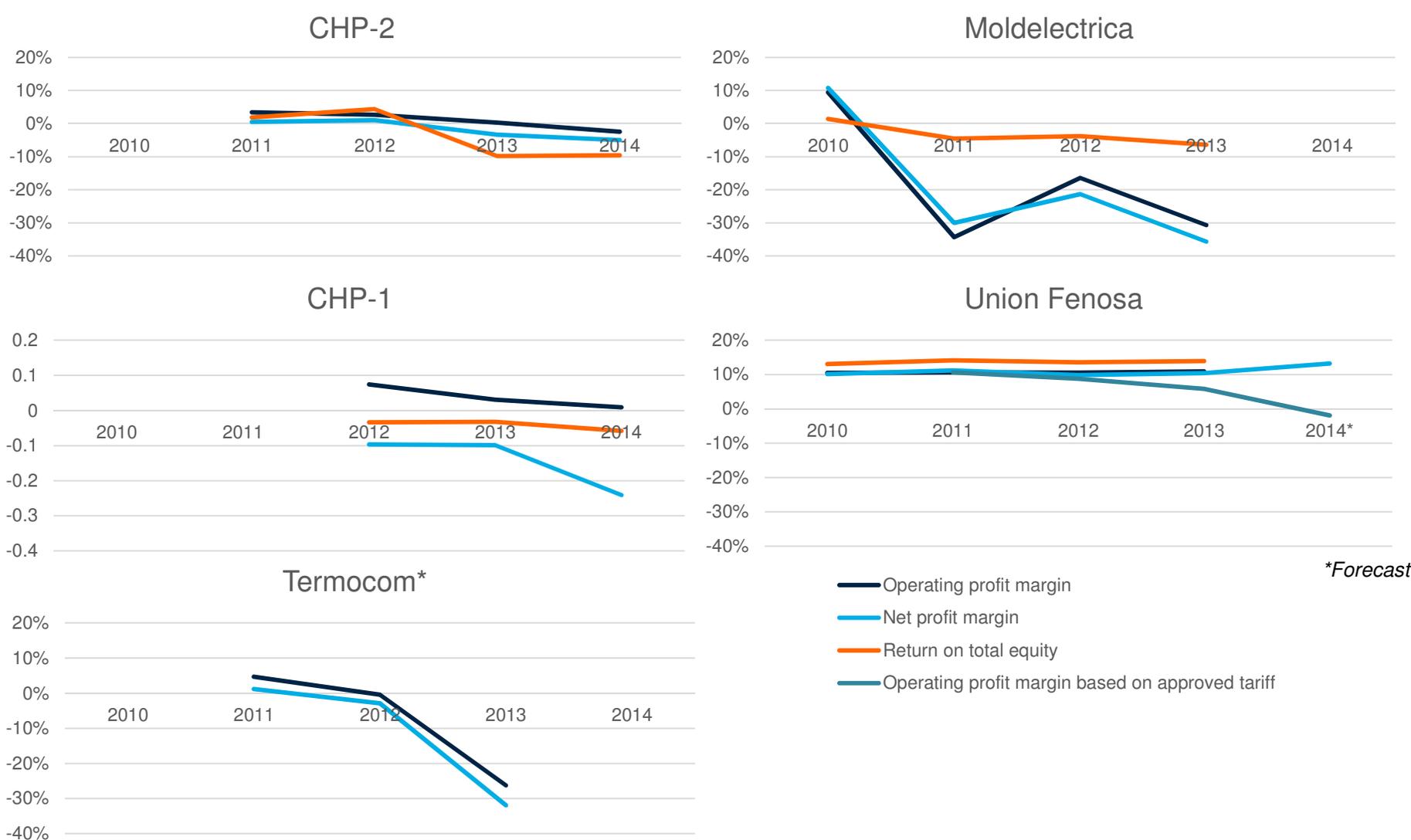
TARIFF ADEQUACY AND FORECAST OF TARIFFS

While tariffs have remained unchanged in 2012–2014, the utilities' costs have increased*



**Based on the costs provided by the companies*

The financial status of the sector has been deteriorating

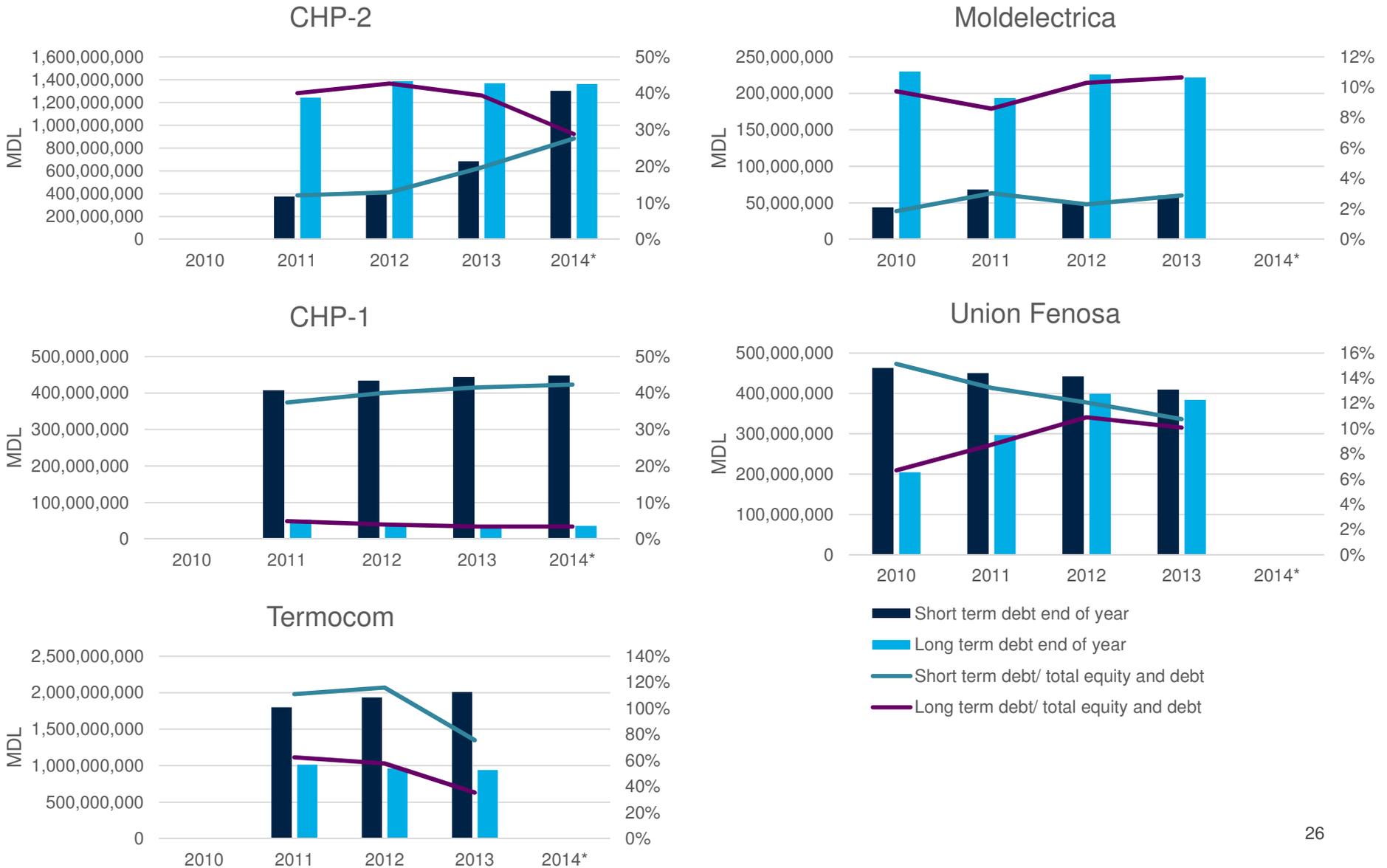


*Forecast

- Operating profit margin
- Net profit margin
- Return on total equity
- Operating profit margin based on approved tariff

*Termocom – negative equity

All operators have accumulated either short or long term debt – debt levels vary substantially



The estimation of future tariffs is based on scenario analysis

- Scenario analysis aims to present potential future development of the tariffs
 - The scenarios are not presented to indicate what the tariff level should be in the future, but projections based on the implementation of current tariff setting methodologies used in Moldova.
 - The baseline assumption used for the analysis is that current tariff methodology is fully complied with (see information on next slide)
- Scenarios constructed and the projected consumer tariffs are presented in the following slides
 - Macroeconomic and sector specific common assumptions of the scenario analysis and detailed projections of tariffs are presented in Appendix 2

The baseline of the scenario analysis are the previously approved methodologies

- Although the new methodologies for tariff setting have been approved in 2012, no tariffs have been set based on them for:
 - Heat supply
- Tariffs used as a starting point are:
 - Heat generation– Oct 2011
 - Heat supply – Oct 2011 (old methodology)
 - Electricity generation in CHP – Oct 2011
 - Electricity distribution and supply – July 2015 (implementation suspended)
 - RED Union Fenosa: increased from 158 to 216 bani/kWh
 - RED Nord: increased from 171 to 223 bani/kWh
 - RED Nord Vest: increased from 173 to 233 bani/kWh
 - Electricity transmission – July 2015
 - Moldelectrica: increased from 8.02 bani/kWh to 14.5 bani/kWh
 - CHP gas tariff – July 2015 (implementation suspended)
 - Moldovagaz: increased from 5237 to 6028 MDL/tcm
- Some companies are requesting revaluation of assets for regulatory purposes, which would lead to increased depreciation and assets remuneration. The analysis includes no impact of revaluation in the low scenario and includes the impact in full in the high scenario.

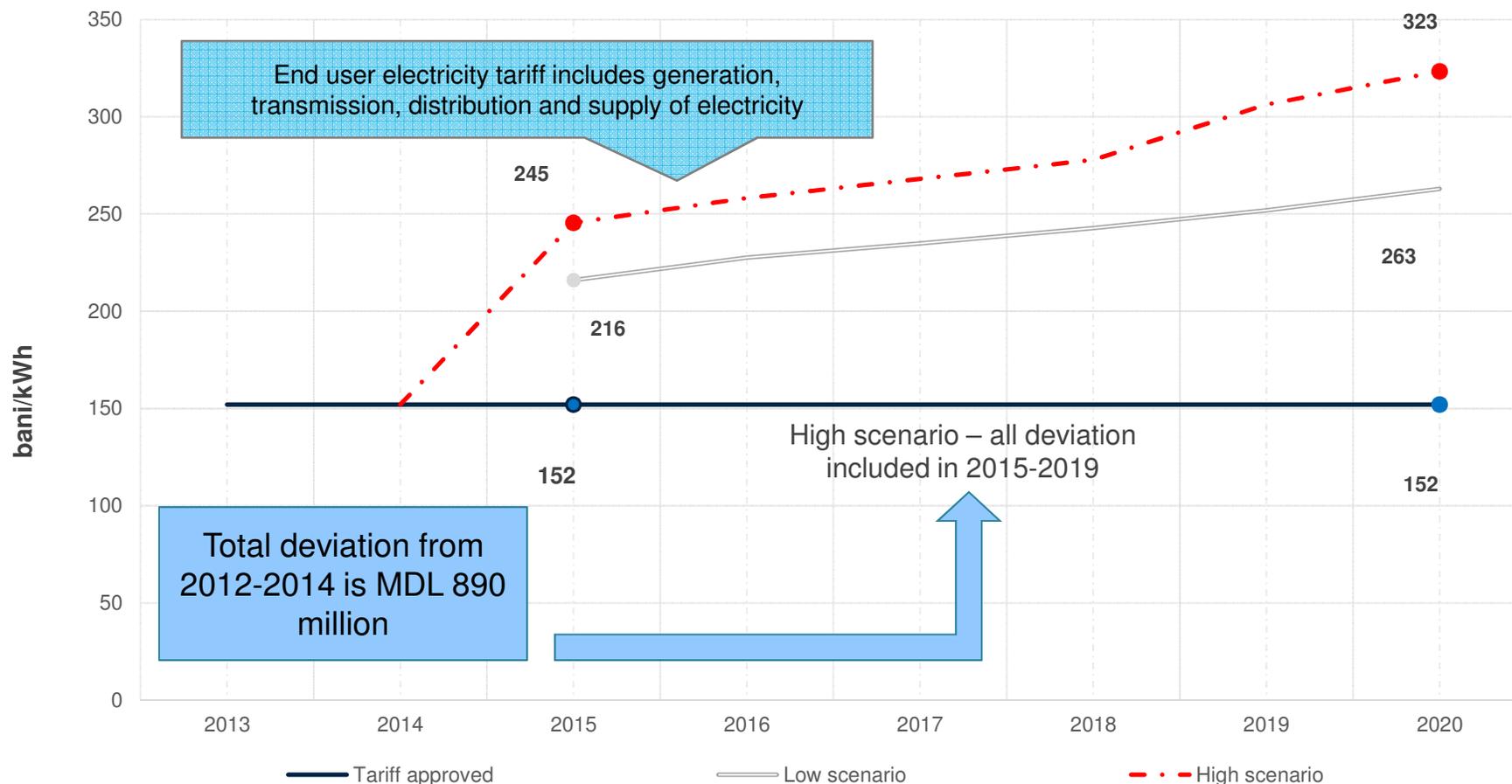
The constructed scenarios project a range of potential tariff levels

- **Low scenario**
 - Based on July tariff adjustment
 - Tariffs as decided by ANRE on July 18, 2015 and assumed inflation thereafter
 - Heat tariff based on gas tariff as decided on July 18, 2015
- **High scenario**
 - Based on estimated maximum tariff
 - Estimated high value of commodity prices, exchange rate, other operating costs and investments
 - Past deviation divided to 2015-2019 tariffs
 - Revaluation impact included in full

Scenario	Commodity prices, exchange rate	Other operating costs	Deviation from past years	Investments	Revaluation of assets
Low scenario	Electricity: Tariff as of July 18, 2015				
	Heat: Gas tariff as of July 18, 2015	Heat: As approved in 2011	Heat: 0	Heat: BAU (annual average)	Heat: 0%
High scenario	Passed through	Actuals of 2014 +indices	Split to 2015-2019, revaluation part included	Transmission line: 2019-2020, DH rehabilitation: 2017-2022	100%

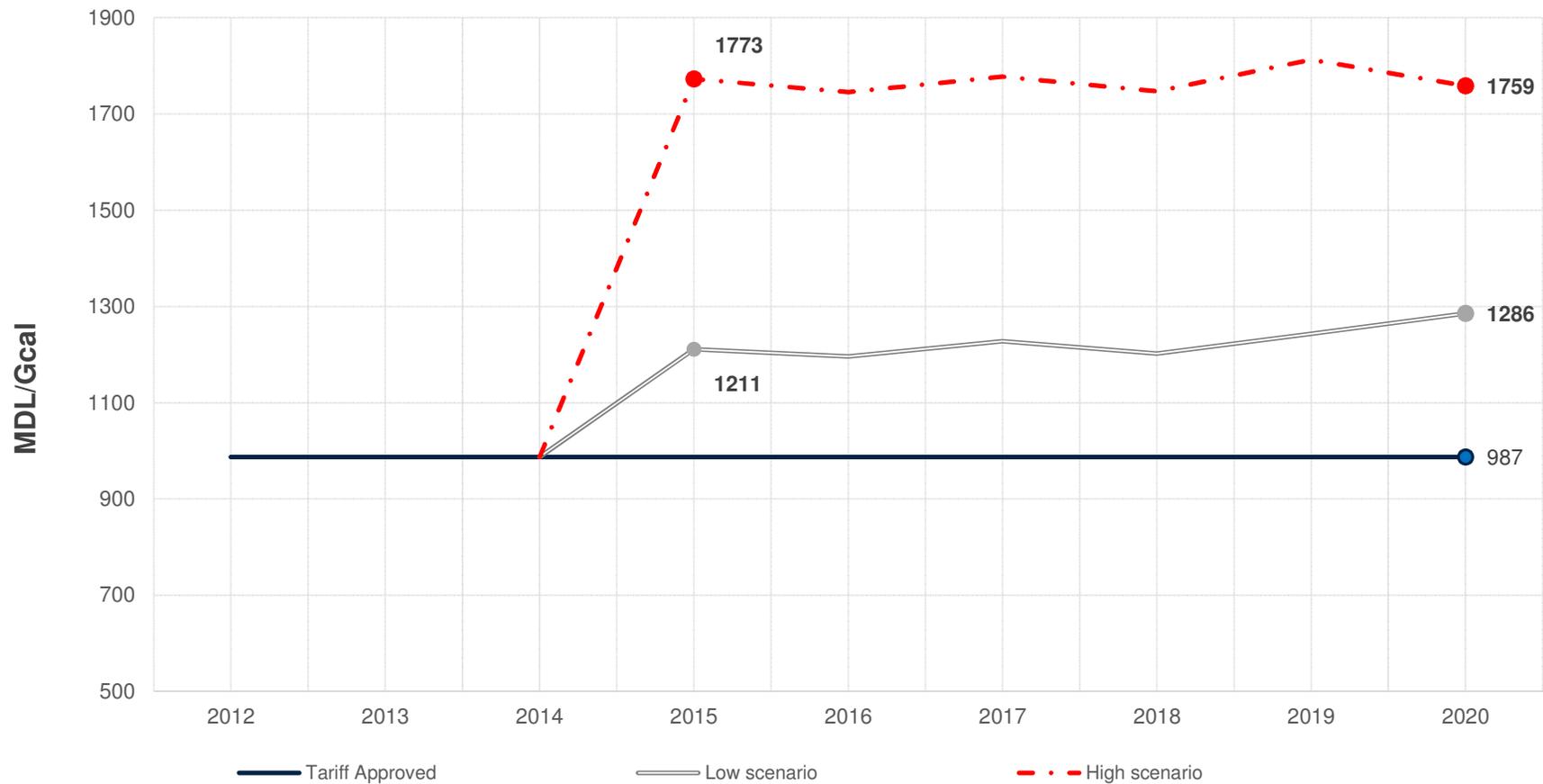
Based on High Scenario, nominal end user electricity tariff could be twice as high in 2020 compared to 2014

RED Union Fenosa nominal end user electricity tariff



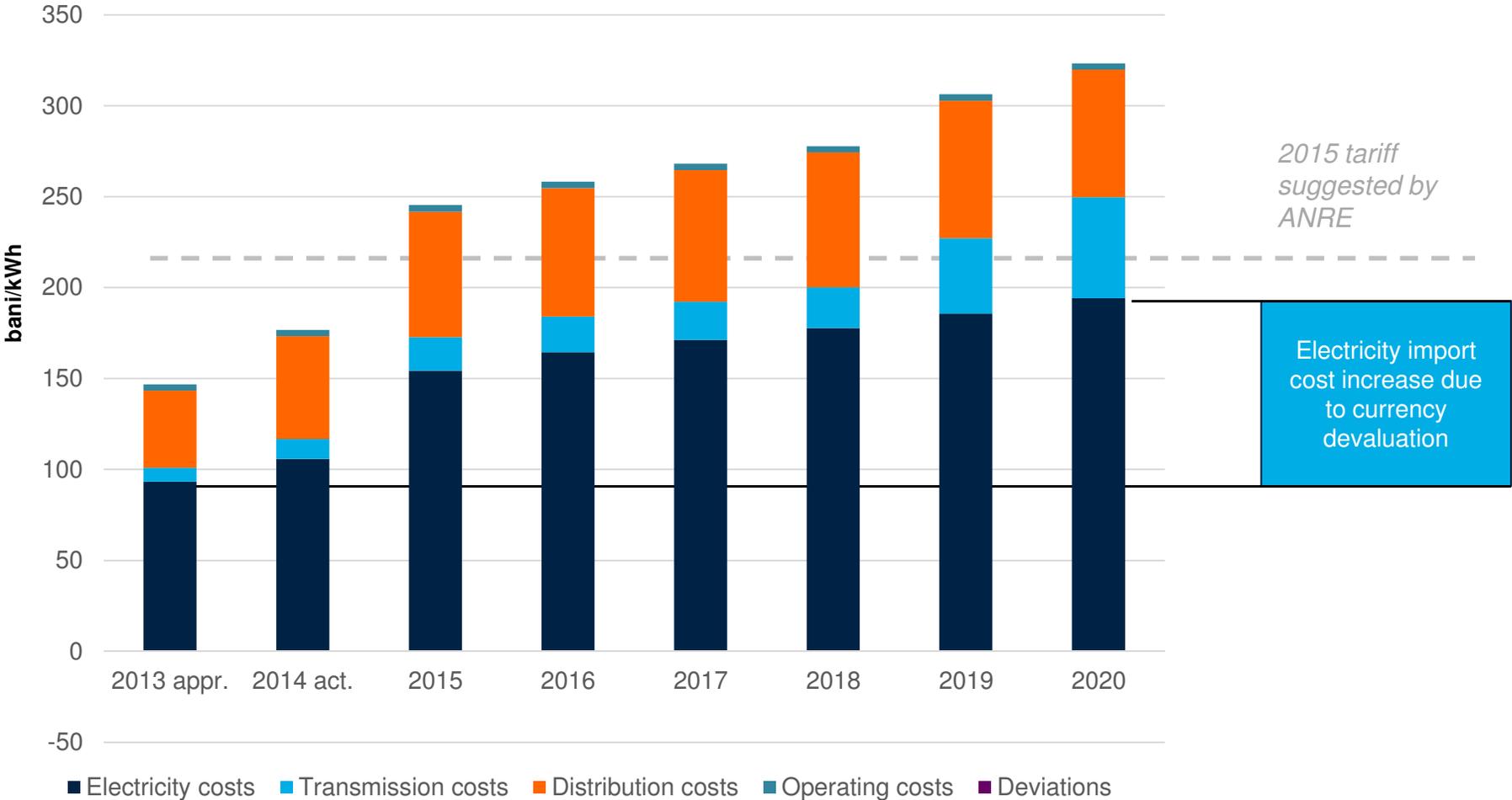
Based on High Scenario, nominal end user heat tariff could be 80 % higher in 2020 compared to 2014

Termoelectrica* nominal end user heat tariff



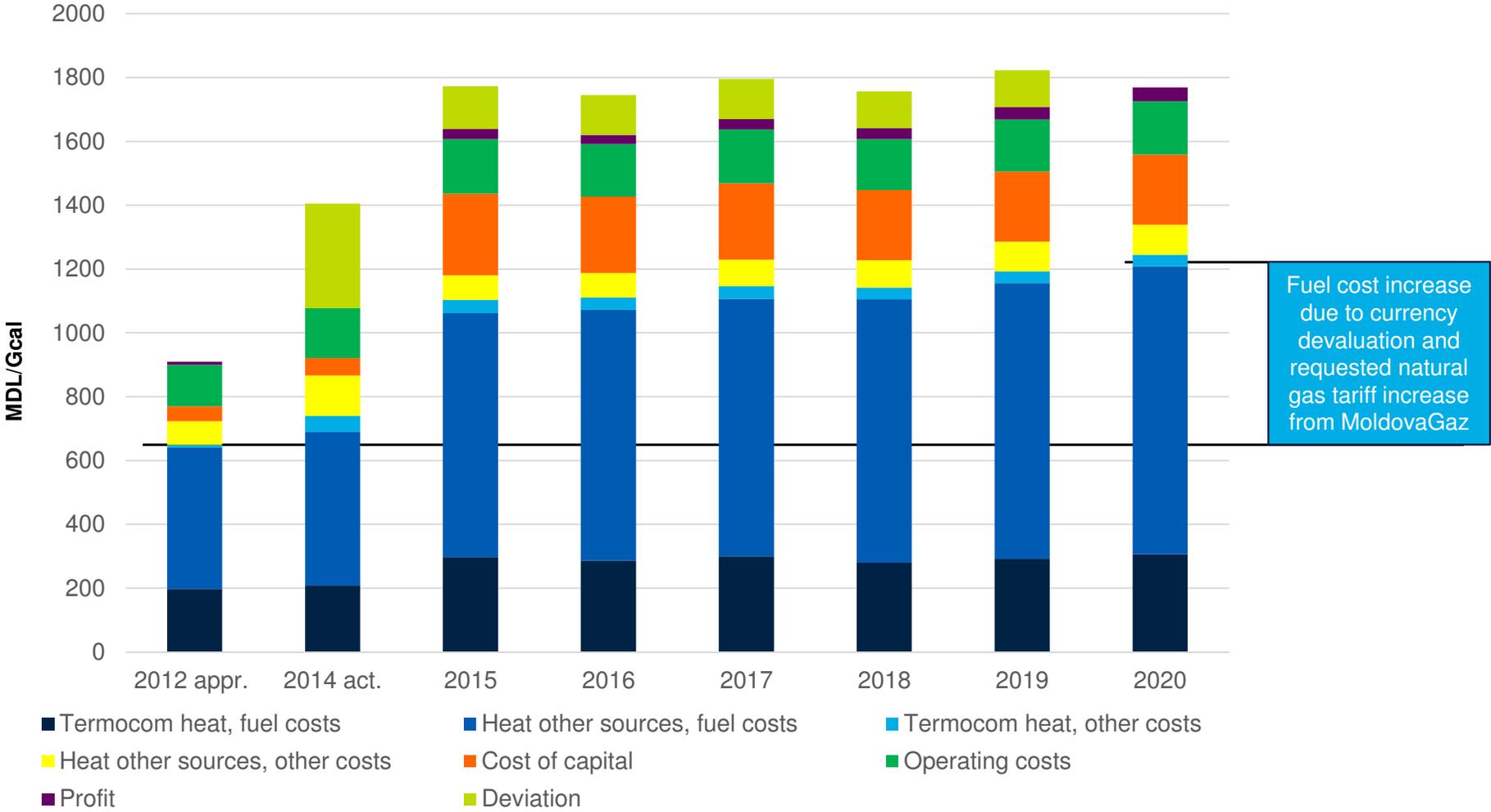
Movement in the exchange rate is the main driver of the estimated electricity tariff adjustments

RED Union Fenosa – Estimated electricity tariff development based on High Scenario



Gas price and movements in the exchange rate are the main drivers of the estimated heat tariff adjustments

Termoelectrica – Estimated heat tariff development based on High Scenario



Main finding: The energy sector has not been financially sustainable – further tariff increases are projected

- Financial status of companies has been deteriorating:
 - All companies analyzed, except for Union Fenosa, made a loss in 2013-2014.
 - Union Fenosa has accumulated a significant amount of receivables, based on an assumed revenue calculated based on tariffs according to regulation, but not approved by ANRE. The reported profit of the company is misleading and the situation is leading to cash flow issues for the company.
- Unsustainable status of the sector creates significant risks
 - In short to mid term, there is a risk for disruption of service due to inability to pay for bulk energy imports and for requiring a financial bail out
 - In long term, the sector operators cannot attract investments to expand and refurbish the infrastructure
- Tariff adjustment for electricity transmission and supply proposed by ANRE in July 2015 will improve the situation, but does not lead to financially sustainable situation.
 - Heat end user tariff needs to be adjusted to reflect current cost levels.
 - Significant accumulated losses in 2012-2015 for the companies may require additional tariff increases.
- The study estimates the minimum and maximum increases in the energy tariffs to range between a low and a high scenario (see table below).
 - The impact of the scenarios on population and on social assistance is analyzed in the following sections.

Estimated range of nominal tariff increase*

	2014	Low scenario		High scenario	
		2016	2020	2016	2020
Heat tariff projection (MDL/Gcal)	987	1,211	1,286	1,773	1,759
<i>Heat tariff projection (USD/Gcal)</i>	<i>71</i>	<i>65</i>	<i>63</i>	<i>96</i>	<i>86</i>
Electricity tariff projection (bani/kWh)	152	216	263	245	323
<i>Electricity tariff projection (cents/kWh)</i>	<i>11</i>	<i>12</i>	<i>13</i>	<i>13</i>	<i>16</i>

Recommendations to be considered on improving the tariff adjustment process

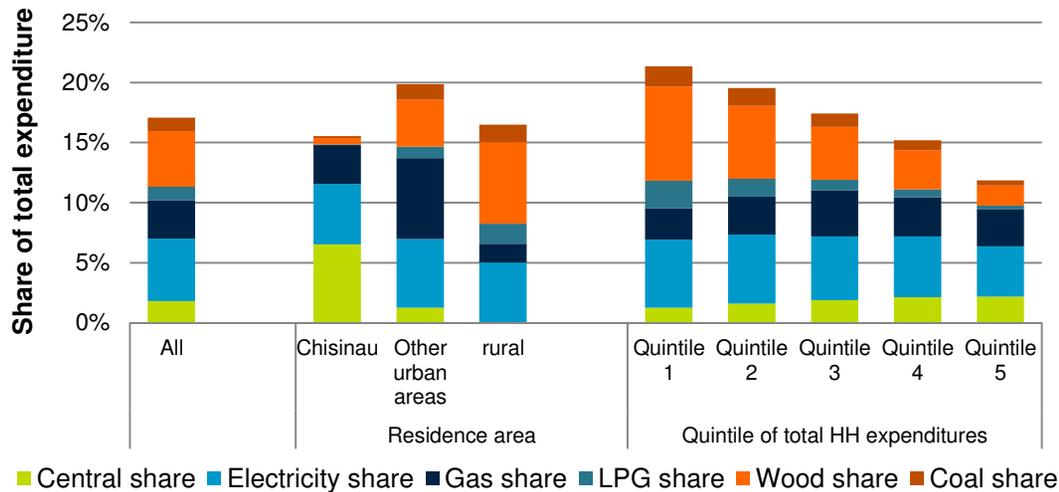
- Delay in ANRE's actions has led to significant financial impact and accumulation of regulatory deviation/losses. The following revisions to the tariff setting methodology may be considered:
 - An automatic pass through of costs for fuel and imported electricity to avoid repetition of a similar situation. Good examples of implementation include Kenya (electricity), India (fuels), and Indonesia (fuels).
 - To avoid a big one time increase, it is recommended to negotiate with the sector operators on dividing the inclusion of past deviation to the tariffs over a longer time period. Sector operators could be compensated for the delay.
 - Prior to beginning of the next regulatory periods in 2016-17, the tariffs including the base costs will be set again. A firm deadline for completing the review and setting the tariffs prior to the beginning of the new regulatory period should be set. To allow time for the regulatory review, the operators may be required to send their tariff applications e.g. one year in advance.
- Credibility of the regulatory framework and the regulator need to be restored rapidly. The current perception of lack of credibility and transparency that is voiced in the market increases the risk of service disruptions in the short and medium term, while discouraging capital investment in the energy infrastructure.
- Regulatory methodology for determining the regulated assets base value, depreciation and rate of return for investments need to be reviewed for clarity and consistency. Clear and credible rules can not only attract investments, but lower WACC, which leads to increased efficiency and cost reduction which can lower energy costs for the end consumers.
- Transfer to valuation of asset base and rate of return in real terms may contribute to moderate the sudden increase in tariffs caused by investments.
- Promote increase in operational efficiency of the operators without compromising service quality by providing incentives for operating cost reduction. Having a communication strategy on efficiency gains and service quality improvement by operators may help increase the willingness to pay.

DISTRIBUTIONAL IMPACTS OF TARIFF ADJUSTMENTS

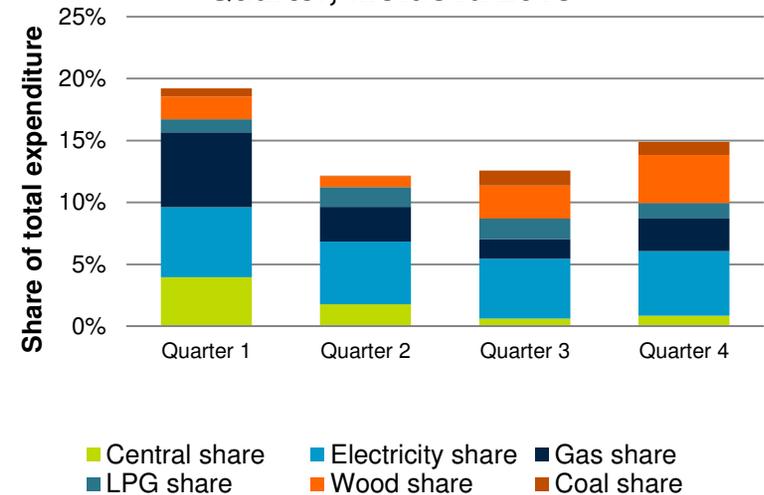
On average, energy already represents 17% of total expenditures for Moldovan households

- The poorest households in Moldova spend on average 21% of total expenditures on energy
- The spending pattern for energy or “energy mix” is very heterogeneous, with urban households spending 15% on utilities (central heating, gas and electricity) while rural households spend more on solid fuel (wood and coal)
- Energy consumption is highly seasonal with central heating and gas expenditures twice the annual average during the first quarter.
- The share of household resources spent on electricity remains rather constant across the year as few households rely on electricity for heating.
- Wood is often purchased ahead of the heating season, during the 3rd quarter.

Average Energy Expenditures by Residence and by Quintile of Total Expenditures, Moldova 2013



Current Energy Expenditures by Quarter, Moldova 2013

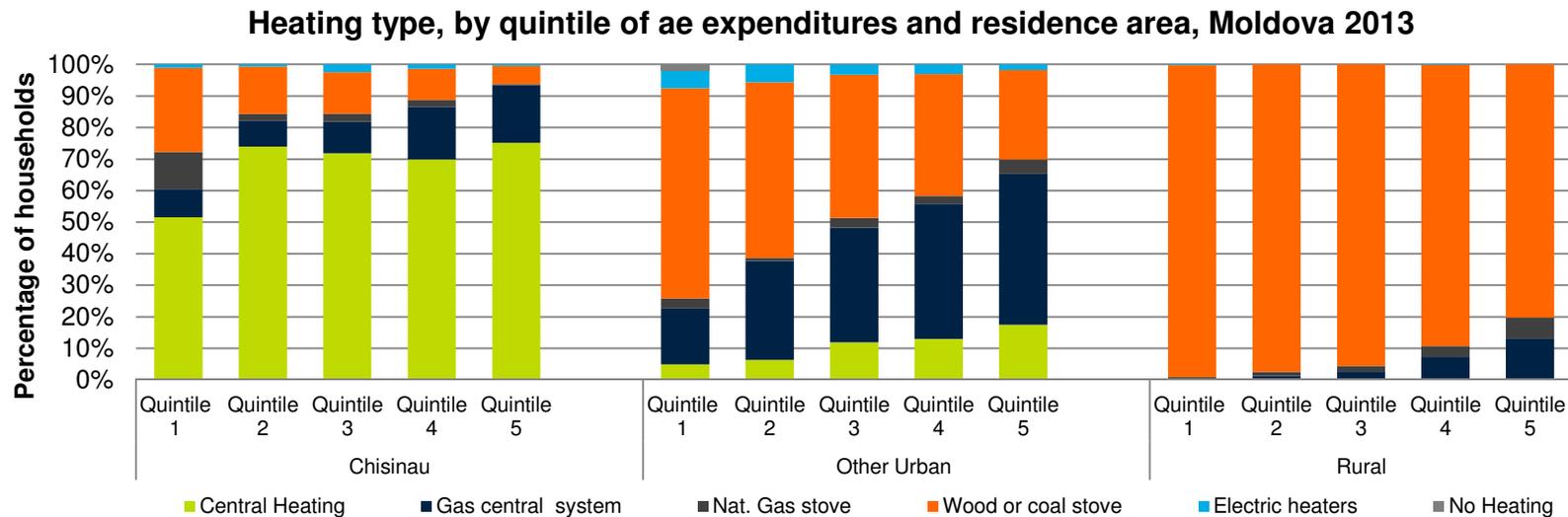


Heating sources vary by residence area and income group

Central Heating is only available in urban areas, and is the main heating source among most households in the capital city (72% in Chisinau and 57% in Balti), except the poorest category.

Gas use for heating increases with wealth, especially in urban areas outside Chisinau; there is also a slight income gradient in rural areas.

Wood is the main heating source in rural areas but also for urban poor, outside Chisinau*. Using electricity for heating is rare.



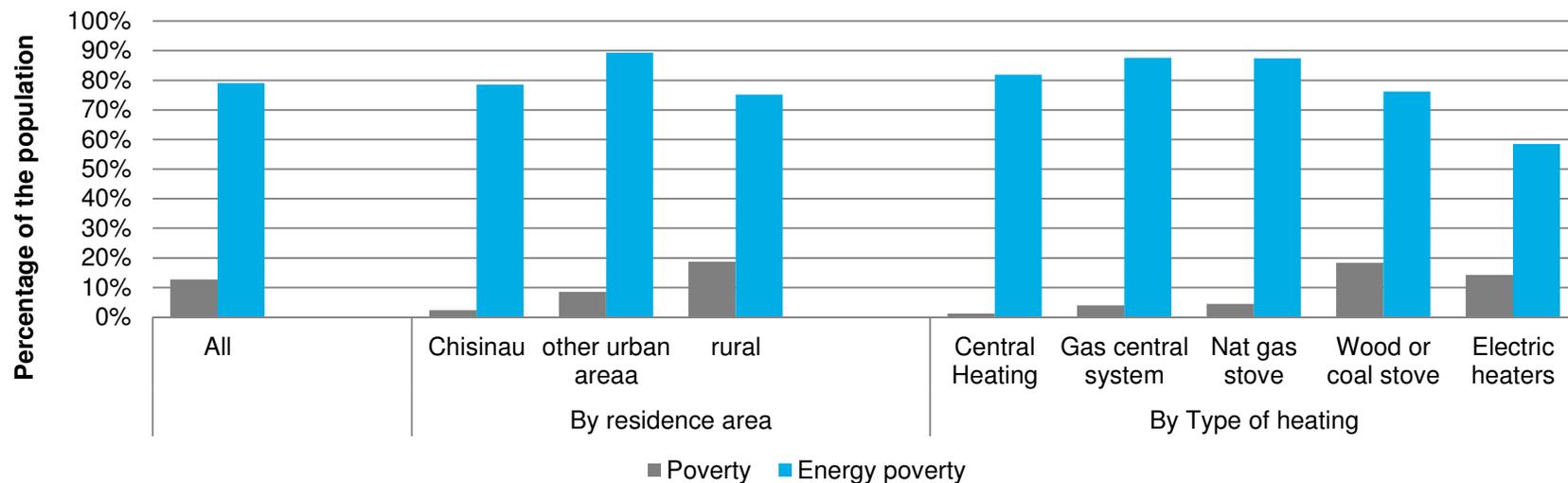
* Poorest category is too small to be significant in Chisinau

Energy affordability is an issue for most households

Most households in Moldova spend on average more than 10 % of their total expenditures on energy and 80% of the population is deemed energy poor according to this usual affordability threshold.

Rural households and wood stove users represent the most vulnerable categories, as 19% and 18% of the population respectively in these category are poor (compared to 12.7% nationally)

Poverty and Energy Poverty rates, Moldova 2013



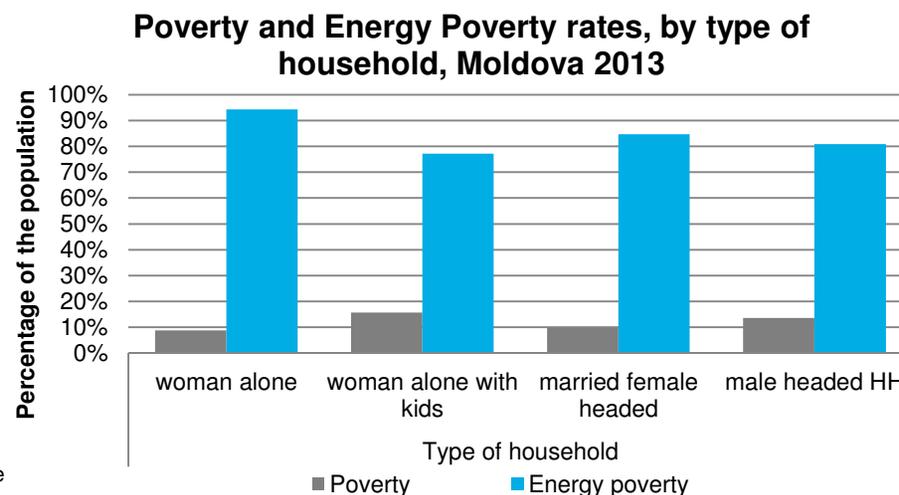
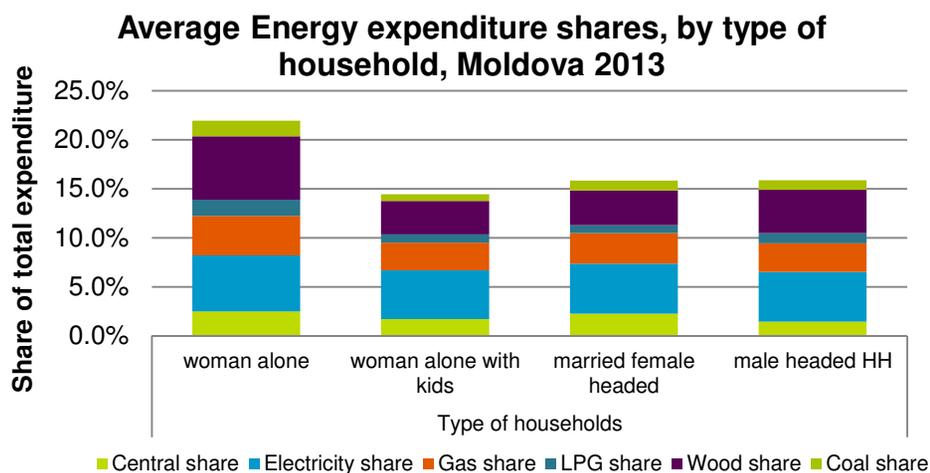
Data source: HBS 2013

Energy affordability is an issue particularly for vulnerable female headed households

Women living alone spend on average 22% of their total expenditures on energy. They are mainly widows (63 years old in average).

In addition, even though women living alone with kids (either divorced or widows) spend the same share of their budget on energy as the rest of the population, they are poorer (15.7% of them live under the poverty line) and thus more vulnerable to tariff increase.

These vulnerable groups of households with women living alone and women living alone with kids represent respectively 21 % and 6% of the households.



Scenario analysis of the distributional impact of energy tariff increases

Based on the scenario analysis of heat and electricity tariffs, the poverty impact of low and high scenarios was simulated. In addition, the analysis takes into account the gas tariff set by ANRE in July 2015 and its forecast increase.

Assumed tariff increases

	2014	Low scenario		High scenario	
		2016	2020	2016	2020
Heat tariff (MDL/Gcal) and increase compared to 2014 (%)	987	21%	30%	80%	78%
Electricity tariff (bani/kWh) and increase compared to 2014 (%)	152	42%	73%	61%	113%
Average consumer gas tariff (MDL/tcm) and increase compared to 2014 (%)	6096	25%	47%	25%	47%
Inflation compared to 2014 (%)	-	16%	47%	16%	47%

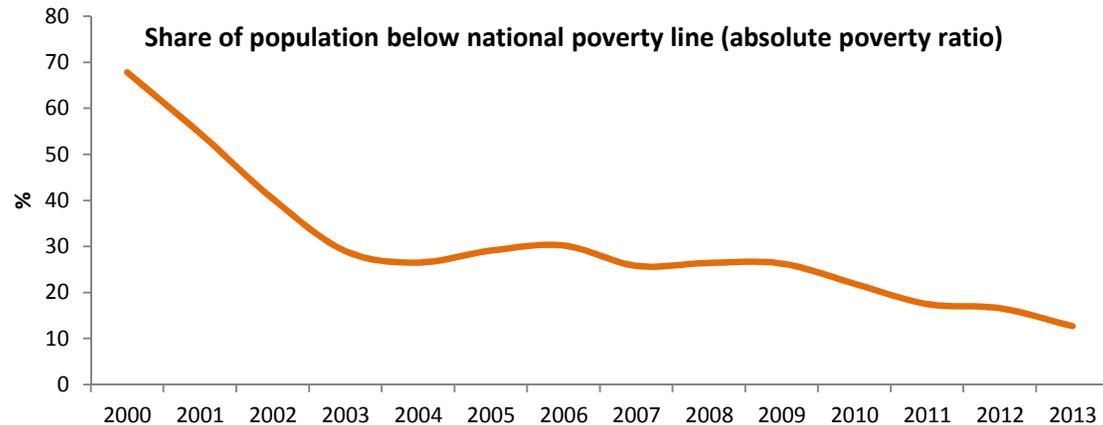
Methodology for the assessment of the impact of the energy tariff increase :

The increase in energy shares and poverty are calculated compared to baseline scenarios in a two-step approach:

1. 2016 and 2020 baselines are constructed using HBS 2013 households expenditures, and assuming a uniform economic growth according to World Bank estimates. The baseline scenarios assume that gas, heat and electricity tariffs remain at 2014 levels.
2. Low and high scenarios are based on the estimated range of energy tariff increase and the difference in expenditures is measured for each year compared to the baseline*.

Energy tariff increase would increase poverty moderately

Energy tariff reform is conducted in a context of declining poverty in Moldova.



Source: National Bureau of Statistics of the Republic of Moldova

In 2016, the poverty impact would reach by 1.1 and 1.9 percentage points respectively for the low and the high tariff scenarios, compared to the baseline with no tariff increase. This means a total of 38 000 to 64 000 additional poor in 2016, with a higher increase in rural areas (up to 2.3 percentage points). In the long term, the poverty impacts remain contained because of the economic growth (1 to 1.6 % percentage point increase in 2020). If household incomes remain constant (without economic growth), the poverty impacts would be higher in 2020 (1.7 to 3 percentage point, which means up to 100,000 additional poor).

	Low scenario		High scenario	
	2016	2020	2016	2020
Increase of the poverty rate compared to baseline (%-points)	+1.1%	+1.0%	+1.9%	+1.6%

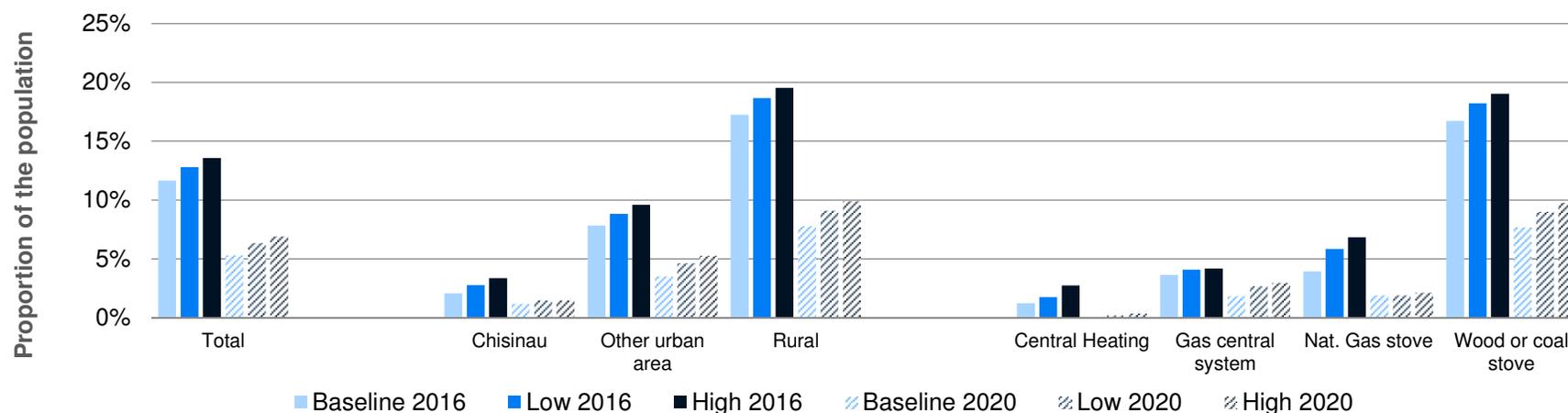
Energy tariff increase would increase poverty especially among rural population, whose main fuel is wood

Wood users are vulnerable to the electricity tariff increase, as a significant proportion of this category lives close to the poverty line. Poverty increase reaches 1.5 and 2.3 percentage points in 2016 for the low and high scenario respectively.

As a consequence, the increase in poverty is higher in rural areas even if wood is the main heating source.

Users of natural gas stoves are the most vulnerable to the gas tariff increase. For this group the increase in poverty reaches 2 and 3 percentage points for low and high scenario respectively (but note that this is a very limited category)*.

Simulated poverty share (%)



Note that the poverty rates for 2016 and 2020 are simulations intended to capture only the impacts of tariff increases, by comparing the yearly baselines with the high and low scenarios. They do not represent World Bank poverty forecasts which would depend on a plurality of other factors not taken into consideration here.

* Natural gas stove category too small for statistically significant results, as they represent only 2% of the households nationally

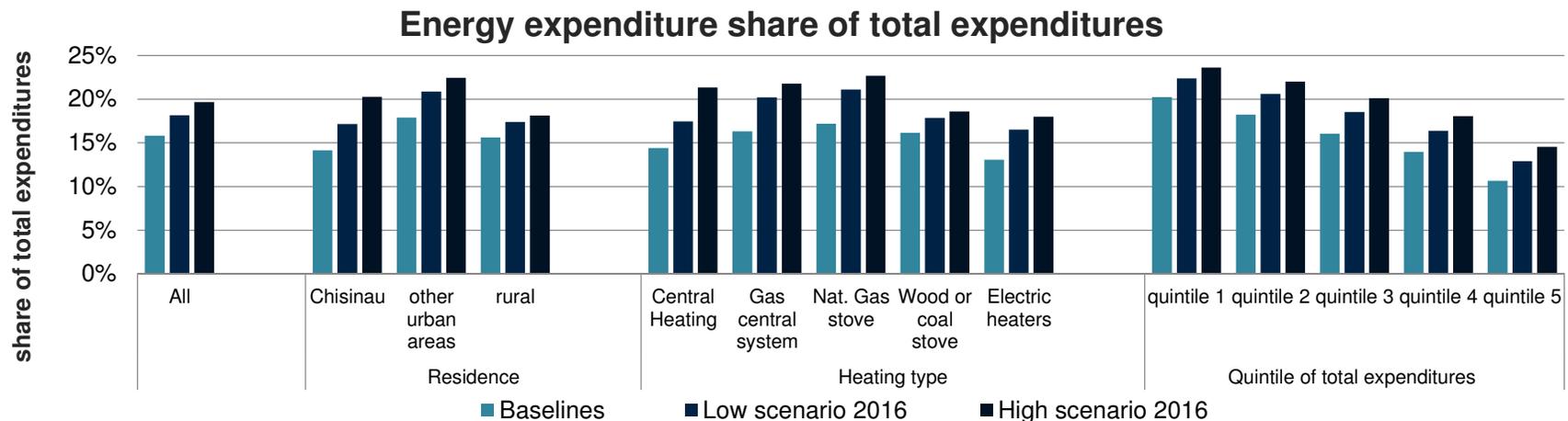
Energy tariff increase would increase the share of energy costs in total expenditures moderately

Energy share would reach on average 18 to 20 percent of total expenditures in 2016 depending on the tariff increase scenario, thus would increase by 2.3 to 3.8 percentage point compared to the baseline scenario for the same year.

Average energy expenditure share would reach 24% in 2016 for the poorest households for the high scenario.

By 2020, the share would decrease to 17 and 18 percent respectively for the low and high tariff scenarios assuming World Bank projection for economic growth. This means respectively a 3 and 4.6 percentage point increase compared to the baseline.

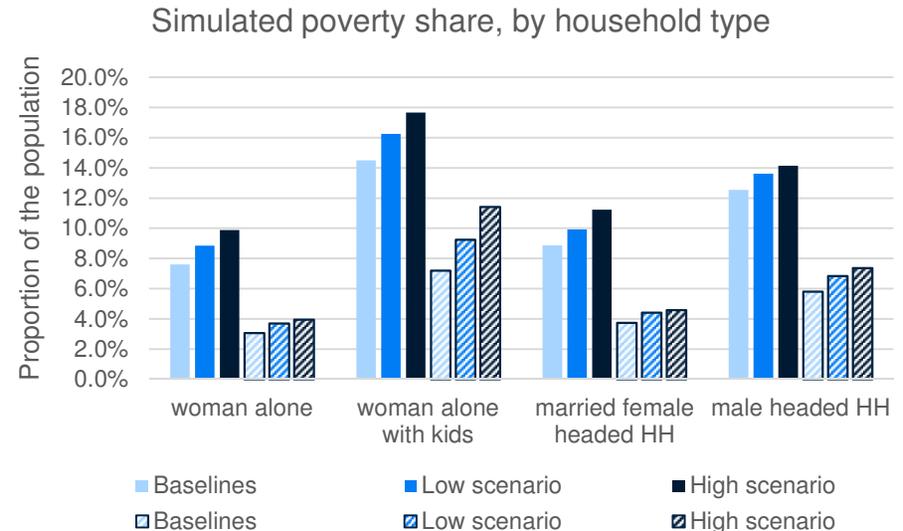
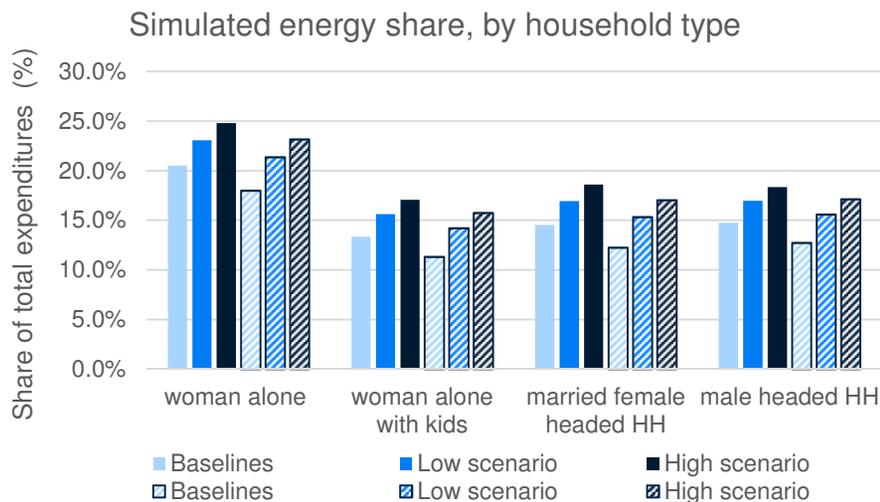
	Low scenario		High scenario	
	2016	2020	2016	2020
Energy share (%)	18.2%	16.7%	19.7%	18.3%
Energy share increase compared to baseline (percentage point)	2.3%	3.0%	3.8%	4.6%



Vulnerable female headed households would be more impacted by the tariff increase

The share of resources spent on energy would increase more for women living alone than for other types of households, and would reach 25% in 2016 for the high scenario, thus a 4 percentage point increase compared to the baseline.

More women alone with kids would become poor because of the tariff increase (4 percentage point increase in 2020 for the high scenario), because this category of household lives closer to the poverty line and is vulnerable to price shocks.



Main finding: Energy tariff increase would increase poverty and the share of energy costs moderately

- Energy tariff increases would increase the share of energy costs in total expenditures on average to 18-20% in 2016 which is 2.3-3.8 percentage point above the baseline.
- By 2020, assuming equal distribution of World Bank projection for economic growth, the energy share of total expenditures would decrease to 17-18%, which is 3-4.6 percentage points above the baseline.
- The increase in the energy share caused by the raise in tariffs is highest for households that use gas for heating under the low scenario, while it is highest for district heating users under the high scenario.
- In 2016, the poverty rate would increase by 1.1 percentage points in the low scenario and 1.9 percentage points in the high scenario compared to the baseline, due to increasing heat, electricity and gas tariffs.
- In 2020, the increase in poverty rate ranges between 1-1.5 percentage points. Without economic growth, the increase would reach 3 percentage points.
- The increase in poverty is highest among the population that already has a high poverty rate: rural population, women living alone and people who use wood or electricity for heating.

SOCIAL PROTECTION

Moldova has targeted social assistance programs that can help protect the poor from income and price shocks

- Two targeted social assistance programs, Ajutor Social and Heating Allowance, channel effectively social assistance to poor households.
 - Since 2009, the government of Moldova has launched two targeted cash transfers, Ajutor Social (AS) and Heating Allowance (HA). The programs target the poor well: about 80% of the AS and over 50% of HA benefits go to poorest 20% of population.
 - The effective coverage of the programs remains modest: in 2014 AS covered 3% of total population and HA about 7%. With the current income thresholds the coverage of HA can potentially be increased to 30 %.
 - Effective coverage of the poorest quintile by AS benefits declined between 2012-14 from 19% to 12%.
- Most social assistance benefits remain categorical, i.e. they are provided to certain groups of population (disabled, elderly, children) regardless of their welfare.
- Categorical benefits accounted for 1% of GDP whereas AS and HA accounted for 0.6% of GDP in 2014.
- The beneficiaries of AS and HA mostly reside in rural areas, which is consistent with the national poverty profile.
- The municipal heating benefits in Chisinau and Balti are important to complement the national programs.

Key characteristics of social assistance programs

- **Ajutor Social (AS)**
 - Uses the income and proxy-means test to identify the poor.
 - Benefit is provided during a year to fill out the gap between the household's income and a Guaranteed Minimum Income (GMI) threshold set annually by the law.
 - There are about 51,000 beneficiary households but with a perfect take-up (all eligible households apply and receive benefits) there would be 128,000 beneficiary households.
- **Heating Allowance (HA)**
 - Complements the AS to compensate the poor for increased cost of living during 5 months of heating season.
 - A flat monthly benefit of 250 MDL offered to all recipients of AS and to those households whose income is below 1.6 times the Guaranteed Minimum Income.
 - During 2014-15 heating season, there were 136,000 beneficiary households, but with a perfect take-up could cover 446,000 households.
- **Municipal heating benefits in Chisinau and Balti**
 - Have higher income eligibility threshold than the HA program.
 - Average monthly benefit paid during five months in Chisinau for gas, wood and coal users is 450 MDL and for central heating users 285 MDL. Average monthly benefit in Balti during five months is 200 MDL.
 - Despite high potential coverage benefits take-up is low: in Chisinau of 189,000 HHs that could qualify for benefits only 33,000 HHs receive them.
 - Application is cumbersome: high transaction and opportunity cost may discourage the poor to apply.

How could social assistance respond to increasing energy tariffs?

Effective coverage of targeted cash transfers must be expanded to offer a safety net to poor households and cushion price shocks, including those stemming from higher energy tariffs.

The most efficient means to offset the increase of energy expenses for the poor households are the existing targeted social assistance programs:

- Increasing electricity costs can be compensated through AS program
 - AS program benefits and most electricity expenses do not vary significantly throughout the year
- Increasing district heating and gas costs can be compensated through HA program
 - HA program benefits are delivered during heating season when households are mainly impacted by increasing costs of district heating and gas
- Improving the design, implementation and coordination of municipal heating benefits can further compensate increasing heating costs
 - This impact is not included in the analysis

Compensating increased energy costs – current impact

- Increase in energy costs do not automatically result in higher benefit and increased coverage of social assistance, because the level of benefits and the number of eligible households is determined by the defined Guaranteed Minimum Income, GMI.
- With increasing household income due to economic growth, the number of households receiving social assistance would decrease

Social Assistance Benefits with constant GMI

	2015	2016	2020
Income threshold for AS (MDL/month)	765	765	765
Number of HHs benefiting from AS	50,832	37,831	22,761
Number of HHs eligible for AS	127,826	95,131	57,237
Coverage by AS with current take-up (% of population)	4.3	3.2	2.1
Coverage by AS with perfect take-up (% of population)	10.8	8.2	5.4
Income threshold for HA (MDL/month)	1,224	1,224	1,224
Number of HHs benefiting from HA	136,466	101,474	47,640
Number of HHs eligible for HA	445,821	331,504	155,635
Coverage of HA with current take-up (% of population)	9.1	7.0	3.8
Coverage of HA with perfect take-up (% of population)	30.0	23.0	12.4

Source: Staff calculations based on HBS

Recommended adjustments to compensate energy cost increase

The following adjustments are recommended to social assistance programs to compensate for higher energy costs:

- **Increase in eligibility threshold**
 - The threshold for receiving AS (GMI) must be regularly revised to reflect increasing cost of living (including electricity cost). Likewise, the threshold for HA should be adjusted accordingly at 1.6xGMI.
 - The change in GMI should reflect increasing energy costs as part of overall increase in cost of living (inflation).
- **Increase in social assistance benefits per household**
 - The AS benefit size adjusts automatically with GMI growth as it fills the gap between the actual household income and GMI.
 - The HA benefit size should be revised in line with average increase in monthly heating cost per household during heating season.

The fiscal impact of recommended adjustments to social assistance

The fiscal impact of increasing social assistance has been estimated based on the following assumptions:

- Income thresholds and benefit size of AS and HA programs are adjusted in line with energy cost increases in low and high scenarios
- Current take-up is based on current ratio of actual beneficiaries to eligible households and is adjusted based on historical correlation of take-up and income threshold increase (100 MDL of benefit increase the take-up ratio by 1 percentage point)
- Perfect take-up assumes that all eligible households apply and receive benefits

	2015	Low scenario		High scenario	
		2016	2020	2016	2020
Income threshold for AS (MDL/month)	765	903	1,186	941	1,274
Average monthly AS benefit, MDL	697	823	1,117	835	1,169
Income threshold for HA (MDL/month)	1,224	1,444	1,897	1,506	2,039
Monthly HA benefit, MDL	250	548	811	683	1,119

The fiscal impact of compensating energy tariff increases through national social assistance programs

- With the adjusted GMI, the number of eligible households rises in 2016 and then declines as real income growth, based on WB forecast, starts to offset part of tariff increase.
- The total fiscal impact of AS and HA programs ranges from low to high scenario in 2016 between 0.7-2.2% of GDP and in 2020 between 0.5-1.7%.

	2015	Low scenario		High scenario	
		2016	2020	2016	2020
Number of HHs benefiting from AS	50,832	51,181	41,202	55,626	47,534
Number of HHs eligible for AS	126,796	127,666	102,775	138,753	118,569
Number of HHs benefiting from HA	136,466	154,536	126,545	164,115	145,788
Number of HHs eligible for HA	397,066	449,644	368,199	477,515	424,190
AS budget, current take-up, mIn MDL	425	506	552	558	667
AS budget, perfect take-up, mIn MDL	1,061	1,261	1,378	1,391	1,663
AS budget, current take-up, % of GDP	0.36	0.39	0.29	0.43	0.35
AS budget, perfect take-up, % of GDP	0.89	0.98	0.72	1.07	0.87
HA budget, current take-up, mIn MDL	171	390	392	509	519
HA budget, perfect take-up, mIn MDL	496	1,136	1,139	1,480	1,511
HA budget, current take-up, % of GDP	0.14	0.30	0.21	0.39	0.27
HA budget, perfect take-up, % of GDP	0.42	0.88	0.60	1.15	0.79
AS+HA budget, current take-up, % of GDP	0.50	0.69	0.50	0.82	0.62
AS+HA budget, perfect take-up, % of GDP	1.31	1.86	1.32	2.23	1.66

Main findings of social assistance analysis

- Moldova's two targeted social assistance programs, Ajutor Social and Heating Allowance, can help protect the poor from income shocks, including energy tariff increase, in a cost-effective manner.
- Municipal heating compensations have important complementarities to the national programs especially those for the urban poor.
- Growing tariffs will increase the need for social assistance. To protect the poor, adjustment of the income threshold, GMI, as well as HA benefit size are needed.
- Higher benefits may encourage enrollment, but effective outreach is required because the take-up of both national and municipal benefits is currently low. With improved coverage, the national programs could cover over 30% of the population.
- As a result of the social assistance, energy affordability for the poorest HHs receiving AS and HA would improve.
- Significant increases in benefits would drive up the budget of targeted programs. In the high case scenario assuming perfect take-up, the total fiscal cost of HA and AS would be more than 2 % of GDP in the period of most intensive tariff growth, 2016.
- To limit the fiscal cost of social assistance, it may be necessary to adjust categorical benefits, which currently present 1 % of GDP. In addition, tightening the proxy test of social assistance may help contain the cost and decrease benefits "leakage" to better-off households.
- Municipal benefits should be better linked with the national social assistance system to streamline administration, improve targeting accuracy and better contain fiscal cost of both national and municipal programs.

SUMMARY OF KEY FINDINGS

Energy tariffs need to ensure cost recovery to ensure security of supply and sustainable development of the sector

- Fundamental regulatory structures and billing performance are at a fairly good level:
 - Moldova has in place a fundamentally well structured regulatory system that is considered to be in principle adequate also by private sector operators
 - The electricity distribution service quality has improved significantly and there is good billing performance in both heat and electricity sectors
- Significant short to mid term risks are related to consumer tariffs for heat and electricity not covering all service production costs:
 - Risk of major financial bail out being required with significant fiscal implications
 - Risk of disruption of service due to inability to pay for bulk energy imports
- New electricity tariffs decided upon by ANRE in July cover fairly well current operating costs, but further actions are needed to ensure the long term development of the sector:
 - A long term plan on recovery of past accumulated debt needs to be reached
 - Without a credible long term plan, the sector operators cannot attract investments to expand and refurbish the infrastructure
 - Efficiency of the sector may deteriorate as the focus of the management is on short term financing and not on developing operations

Increasing energy tariffs will increase the demand for social assistance programs

- Tariff setting had ceased to work adequately
 - ANRE had not fulfilled its role in setting the tariffs in 2012-2014 and losses have accumulated.
 - There is potential to improve the tariff setting methodology to ensure further development and efficiency improvement in the energy sector
- Energy sector financial status is poor
 - All companies made losses in 2013-2014 due to significant cost increase after latest tariff approval
 - Union Fenosa does not report losses, but instead has increased its receivables
- The electricity tariff adjustment decided in July would be a first step in required direction
 - Electricity tariff increase by 30-37% depending on operator would cover fairly well current operating costs
 - Based on decided gas tariff, heat tariff would need to be increased by 21%
- Increasing tariffs will have an impact on the population and the economy
 - The poverty rate would be 1-1.5 percentage points higher in 2020 due to increasing heat, electricity and gas tariffs
 - The impact of increasing electricity costs is particularly high on the most vulnerable part of the population
 - District heating is predominantly used by the wealthiest part of the Moldovan population (the urban one).
 - Further analysis is needed to understand the broader impacts of tariff increases, and the way such reforms might be best communicated
- Social assistance programs may help protect the poor
 - Moldova's two targeted social assistance programs may help protect the poor from income shocks in a cost-effective manner
 - Municipal heating compensations have important complementarities to the national programs
 - The fiscal impact of the social protection programs may increase from 0.5% of GDP to over 2% in 2016 and 1.7% in 2020.

Based on scenario analysis, the electricity tariff increase by 2020 is estimated to be 73-113% and heat tariff 30-78%. Analysis also assumes 50% increase in gas tariff by 2020.



Due to tariff increases, the poverty rate is expected to be 1-1.5 %-points higher in 2020, a moderate increase compared to a scenario without tariff increases.



Increasing need for social assistance may lead to social program share of government budget to increase from 0.5% of GDP to 1.9-2.2% in 2016 and 1.3-1.7% in 2020.

However, this would require a significant increase in take-up of programs.

RECOMMENDATIONS FOR GOVERNMENT

Recommendations for immediate actions by government on tariff setting methodologies

- The credibility of the regulatory regime needs to be restored and the financial status of the utilities improved. Tariff adjustments are required for electricity supply, heat supply as well as heat and electricity generation.
- There should be automatic pass through of costs for fuel and imported electricity to ensure timely adjustment of tariffs to avoid further accumulation of losses/debt.
- Timely setting of tariffs and calculation of base costs at the beginning of a regulatory period should be ensured by starting the consultation process well in advance and determining a firm deadline for approval of tariffs.
- To avoid imposing a large impact on the population through big one-time increase, it is recommended that ANRE and Government negotiate for medium term adjustment of tariff to resolve the accumulated losses in a structured manner.
- Design a plan to communicate about the planned tariff adjustments, their reasons and available social assistance.

Recommendations on social assistance policies

- Improve the take-up of Ajutor Social and Heating Allowance programs as well as municipal benefits through better outreach to increase the coverage of the poorest population
- Increase the threshold for social assistance and maintain the adequacy of benefits in line with the increasing energy costs
 - Increase the Guaranteed Minimum Income in line with the increasing cost of living (including electricity costs)
 - Increase the Heating Allowance benefit size in line with increasing heating costs
- Prepare for the fiscal impact of increasing social assistance in the macroeconomic and fiscal management
 - Consolidate categorical benefits to create fiscal space for expanding the targeted transfers and discuss the implications with IMF

Recommendations for further analysis

- To improve the regulatory framework, the following areas should be analyzed
 - Regulatory rules for determining the regulated asset base value, depreciation and rate of return
 - Switching to valuation of asset base in real terms and real rate of return
 - Better incentivizing the operators to continuously increase efficiency without compromising the service quality
- The World Bank is planning to complement the analysis with qualitative work aiming at an initial exploration of:
 - The perceived quality of heat and electricity services, the acceptability of tariff increases; the expected impact and coping strategies adopted by households
 - The potential impact of heat and electricity tariff increases on small businesses, and their likely coping strategies
 - The expected impact of tariff increases on businesses, including developers, and their perceptions/decisions on connecting new developments to District heating if possible
- Such findings are expected to complement the existing quantitative assessment, even if by design they will be conducted on a much smaller scale
- Analyze how to further improve the effectiveness of the social assistance
 - Consider consolidation of categorical benefits and tightening proxy means-test to prevent “leakage” of benefits to better off households
 - Increase cooperation of municipal and national authorities on social assistance to analyze how to link municipal benefits to national social protection system and work towards further integration
- Analyze how to promote supply and demand-side energy efficiency to decrease the energy expenditures in the long-term

APPENDICES

- Appendix 1 – Detailed analysis of tariff setting methodologies
- Appendix 2 – Detailed scenario analysis and sensitivity analysis of heat and electricity tariffs
- Appendix 3 – Recommendations on tariff methodology and implementation
- Appendix 4 – Detailed analysis of relations of heating type and poverty
- Appendix 5 – Detailed analysis and conclusions on social protection
- Appendix 6 – Summary of scenario analysis

APPENDIX 1 – DETAILED ANALYSIS OF TARIFF SETTING METHODOLOGIES

Main principles of tariff methodologies provide a good basis for tariff design

All tariff setting methodologies are based on common principles:

- Reliable supply
- Efficient operation
- Financial sustainability of the operators

In addition, the following principles are stated:

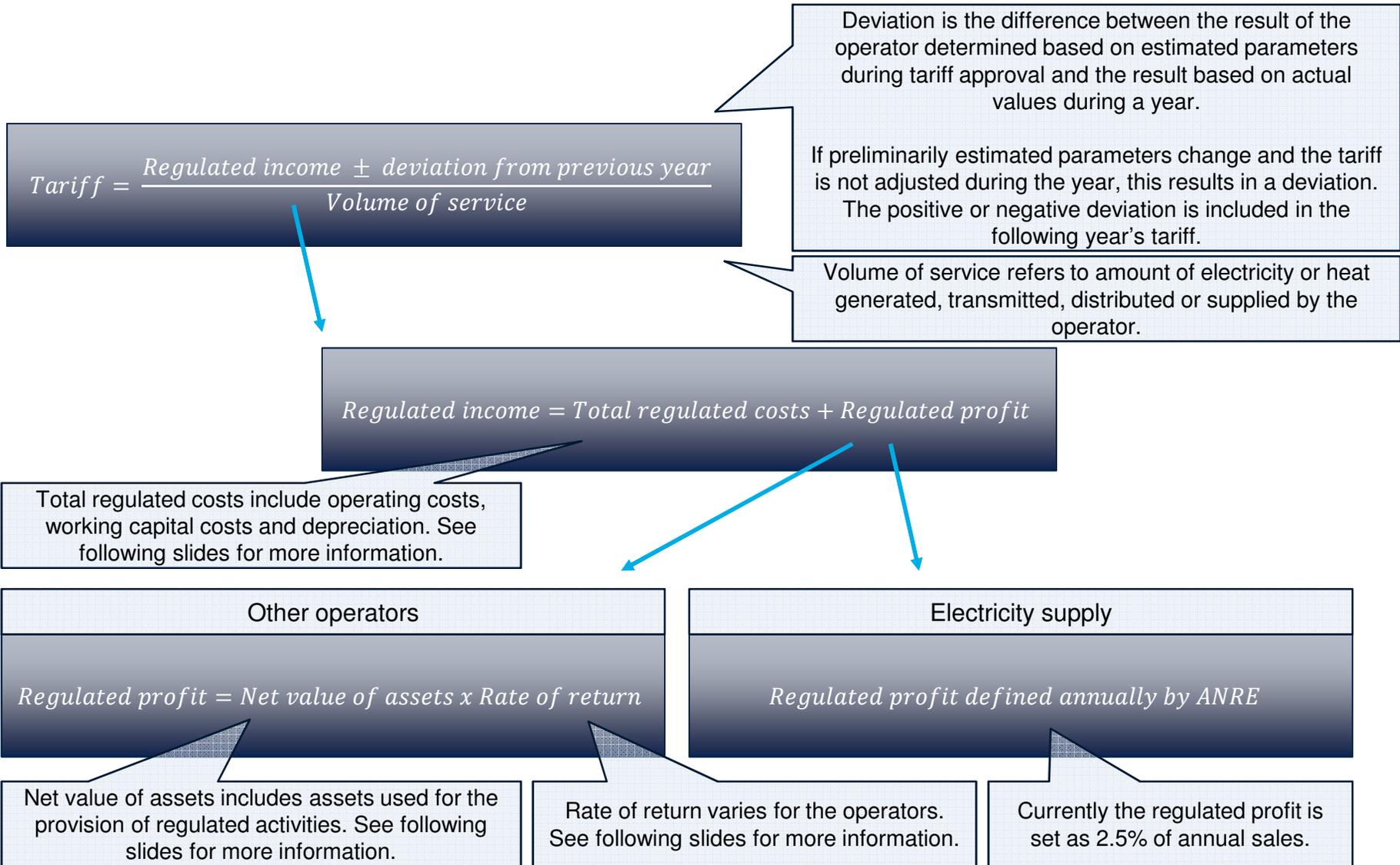
Heat supply
Electricity and heat generation
Electricity transmission

- Operator should be able to invest in the development and upgrading of the assets

Electricity distribution
Electricity supply

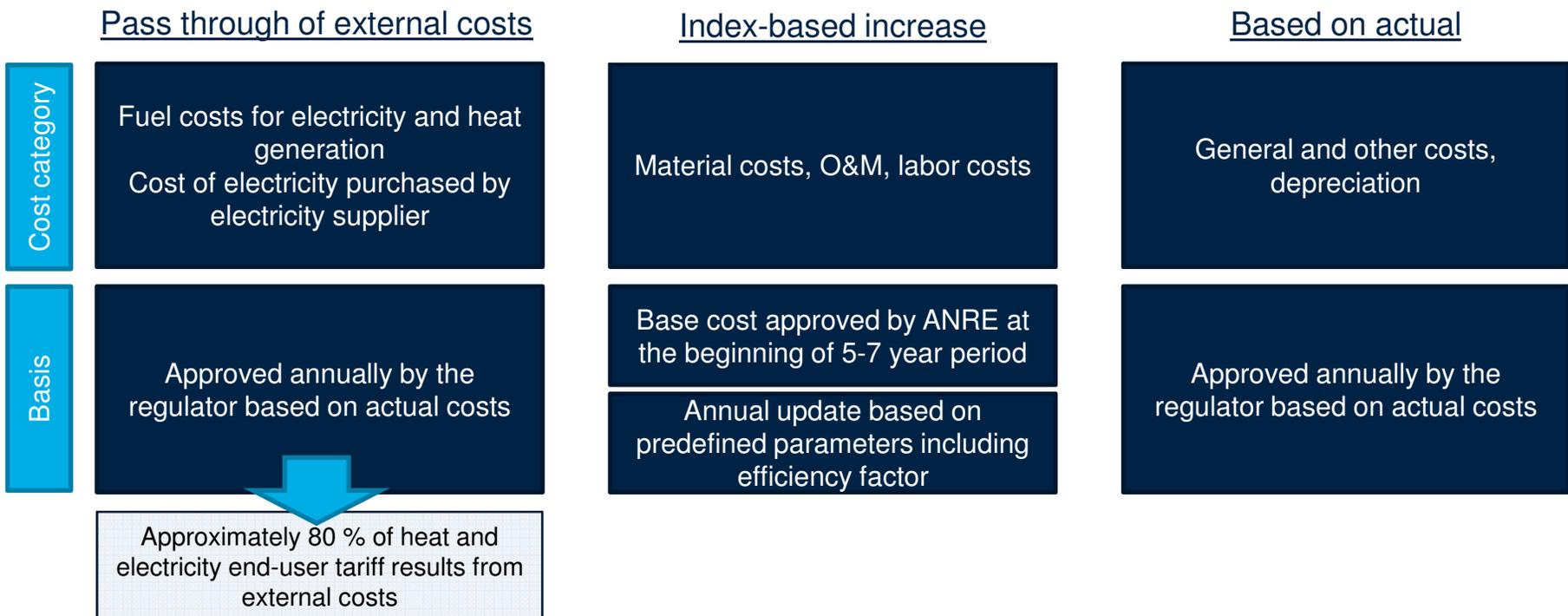
- Phasing out cross-subsidies
→ tariffs are equal for all consumers connected to the same voltage level

Tariffs follow a rate-of-return methodology



Most significant external costs are passed through and other operating costs are based on indexed growth

- The tariff setting methodologies have been approved for a specified time period
 - Electricity transmission, distribution and supply – 5 years
 - Electricity and heat generation – 7 years
- Operating costs are divided to three groups



Working capital costs are included in the tariff based on predetermined parameters

	Cost basis	Number of days	Interest rate
Electricity and heat generation	Sales	30	Short term loans in National Bank of Moldova
Electricity transmission		Not included in tariff	
Electricity distribution	Costs, not including depreciation	10	WACC as for assets
Electricity supply	Costs, not including depreciation	25	Average interest of loans in National Bank of Moldova
Heat supply	Sales, deducted with depreciation and regulated profit	Based on heat and gas payment patterns, number of days not defined	Short term loans in National Bank of Moldova

Tariff setting methodology includes incentives to reduce losses, operating costs and cost of imported power

All operators

- The regulatory framework includes an incentive for the operators to reduce operating costs.
 - Baseline of operating costs are set at the beginning of the regulatory period.
 - If the costs of the operator are higher, its profits are reduced.
 - If the costs of the operator are lower, its profits are increased.

Electricity distribution

- The regulatory framework includes an incentive for electricity distributors to reduce technical and commercial losses
 - The commercial losses taken into account at the beginning of the period is 2 % and this reduces gradually to 1 % at the end of the period.
 - The technical losses taken into account are based on a fixed value that is defined separately for each company. Technical losses of Union Fenosa are 10.5%.
 - If the actual losses are below the set level, the operator is still allowed to include the set value of losses in the tariff and can therefore earn more profit
- The regulatory framework includes a potential penalty for electricity distributors on insufficient quality level (see next slide)

Heat supply

- The regulatory framework includes a potential penalty for heat suppliers on insufficient quality level (see next slide)
- Losses in heat network are determined annually and the cost is directly passed to end-consumers → no incentive for the heat supplier to reduce losses
- Heat loss of Termocom is 22%

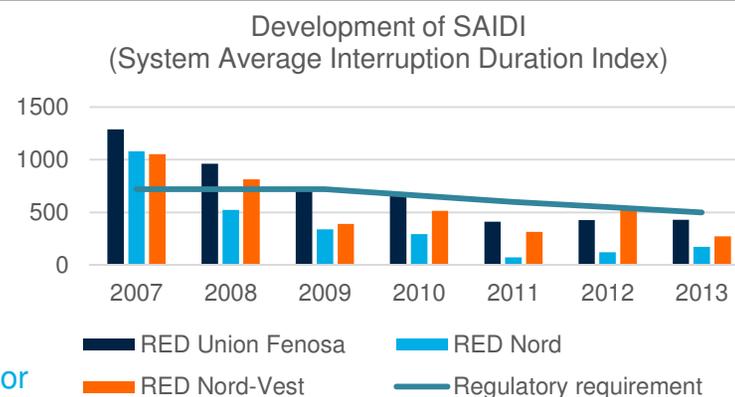
Electricity supply

- The regulatory framework includes an incentive for the power suppliers to reduce the cost of electricity purchased from non-regulated suppliers
 - The operator can get additional return when the power purchase price is lower than the price on previous year.

Electricity distributors can be penalized for inadequate quality of service

Electricity distribution

- The following indicators are followed for all electricity distribution companies and the quality of service has improved significantly
 - CAIDI (Customer Average Interruption Duration Index)
 - SAIDI (System Average Interruption Duration Index)
 - SAIFI (System Average Interruption Frequency Index)
- Insufficient quality level can lead to reductions in company sales
 - Maximum reduction is 5 % of income
 - ANRE determines case by case the penalty on an operator



Heat supply

- The district heating company tariffs may also be reduced in case of inadequate service quality
- Quality indicator
 - Temperature of the apartments must be above 18°C.
 - If the criteria is not met, consumers are eligible to have a reduction in their bill.
 - In practice, reductions in profits are applied rarely.

Other operators

- No quality parameters included in tariff setting

Regulated asset base is mainly based on book value of assets

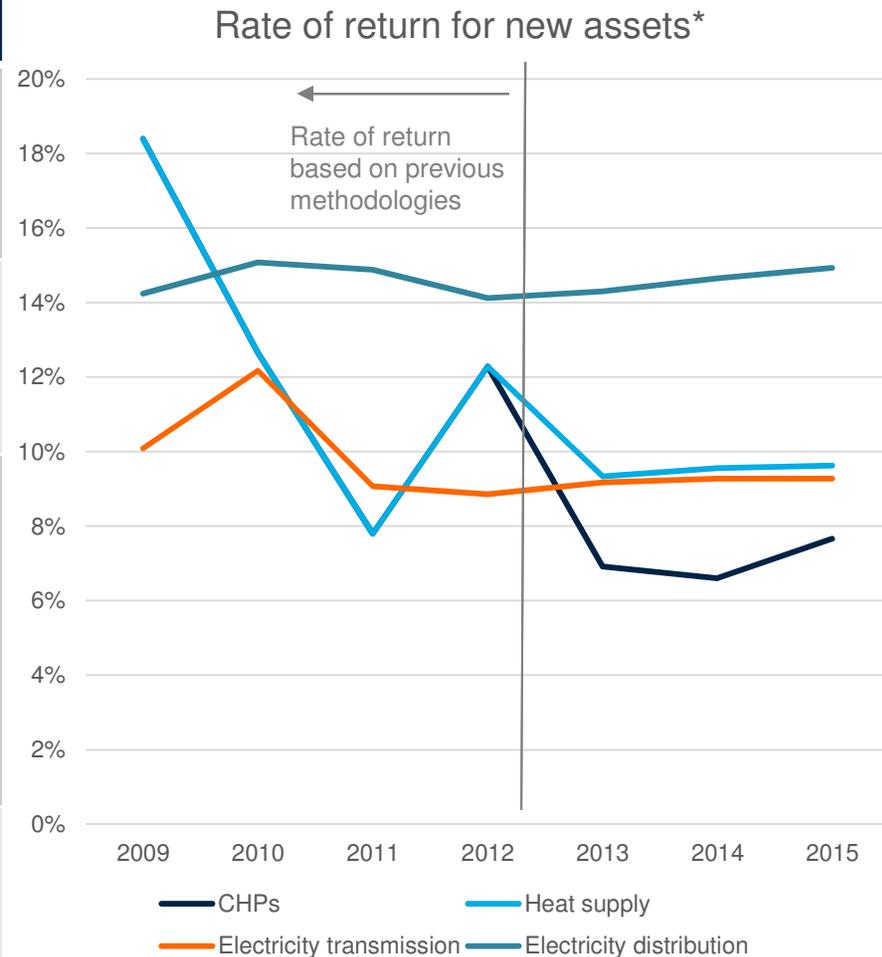
Existing assets	New assets
<p data-bbox="310 509 867 545">Value taken into account in tariff setting</p> <ul data-bbox="180 573 984 719" style="list-style-type: none"> • Electricity distribution – agreed asset value <ul data-bbox="275 613 949 678" style="list-style-type: none"> • Union Fenosa – depreciation of old assets by end of 2014 • Other operators – based on book values or agreement 	<p data-bbox="1224 509 1780 545">Value taken into account in tariff setting</p> <ul data-bbox="1094 613 1864 678" style="list-style-type: none"> • Actual investment expenditure deducted with annual depreciations
<p data-bbox="491 766 688 802">Rate of return</p> <ul data-bbox="180 834 961 980" style="list-style-type: none"> • Heat and electricity generation – no return • Electricity transmission and heat supply – Fixed rate; return must be used for investment • Electricity distribution - WACC 	<p data-bbox="1402 766 1600 802">Rate of return</p> <ul data-bbox="1094 850 1881 964" style="list-style-type: none"> • Heat and electricity generation – varies depending on whether equity or debt financing used • Other operators – WACC
	<p data-bbox="1331 1039 1671 1075">Approval of investments</p> <ul data-bbox="1094 1101 1881 1474" style="list-style-type: none"> • Companies submit their investment plan to ANRE at the end of each year. • ANRE should approve the investment within a month, but the negotiation often continues even until next summer. • At the beginning of the following year, the operators report on the actual investments done based on the approved investment plan. • The actual investments done by the end of year are taken into account in the tariff of the following year.

Rate of return is set separately for existing and new assets

	Interest rate – existing assets	Interest rate – new assets
Electricity and heat generation	No return – cost of debt included based on actual interest paid	Fixed to market rates
Transmission	Fixed rate, 5%	WACC
Electricity distribution	WACC same as for new assets	WACC
Electricity supply	Regulated return specified by ANRE separately, not based on asset value. Currently the regulated profit is set as 2.5% of annual sales.	
Heat supply	Fixed rate, 5%	WACC

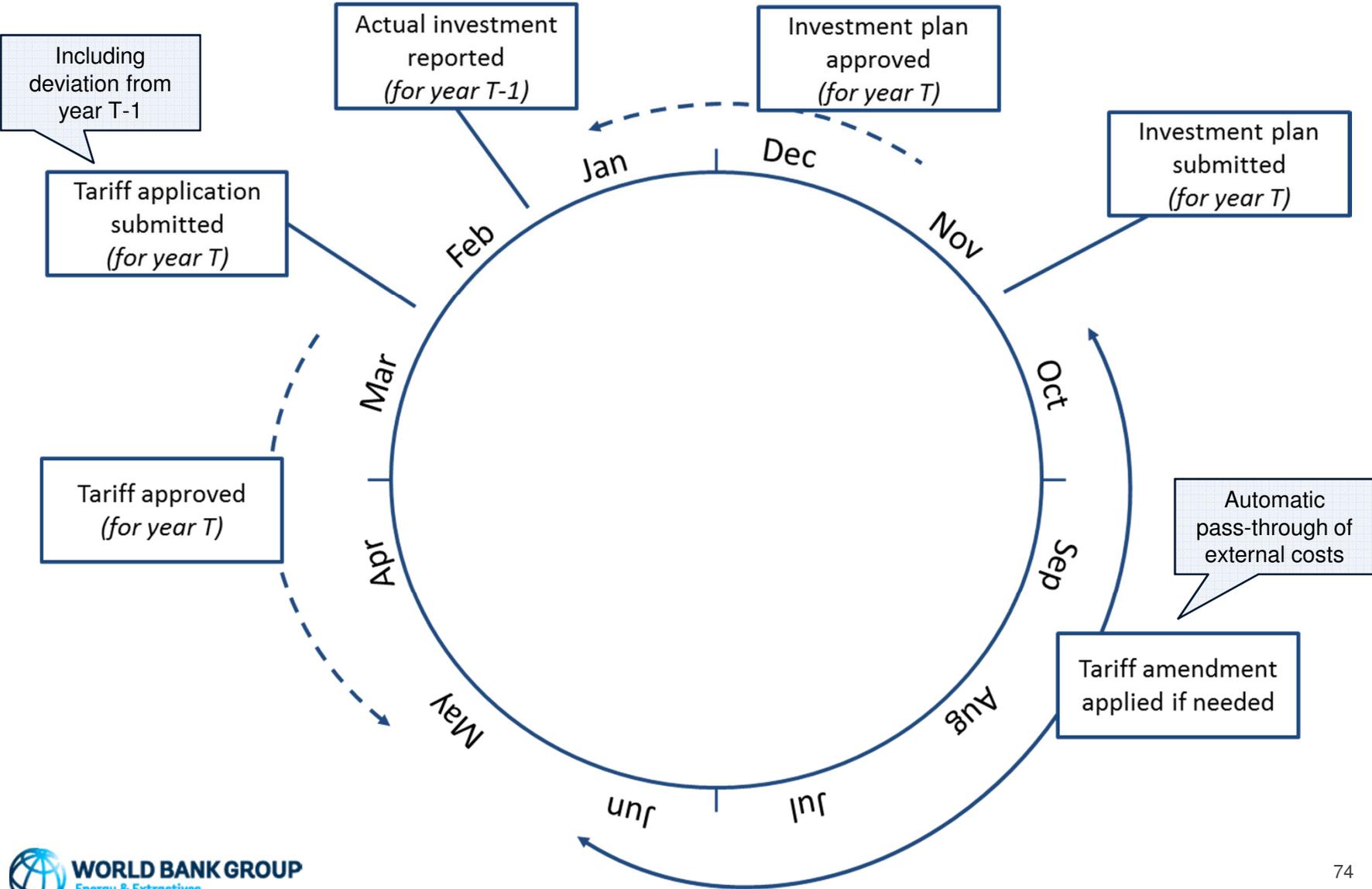
Rate of return parameters vary between the operators

	Definition of parameters for return on new assets
Electricity and heat generation	<ul style="list-style-type: none"> - Investment based on equity: 1 year treasury bond of Moldova - Investment based on debt: average interest in national Bank for more than 5 year loans (max. 5 points more)
Transmission	<ul style="list-style-type: none"> - Risk free rate: US government securities with 10 year maturity - Country risk: <6.75% - Debt/equity = 50%/50% - Cost of debt 8%
Electricity distribution	<ul style="list-style-type: none"> - Risk free: US gov securities with 10 year maturity - Country risk: <9% - Market risk premium: fixed value based on US market statistics - Industry-based systemic risk - Debt/equity = 35%/65% - Cost of debt: average rate of loans in foreign currency by national bank of Moldova
Heat supply	<ul style="list-style-type: none"> - Risk free: US gov securities with 10 year maturity - Country risk: <6.75% - Debt/equity = 65%/35% - Cost of debt 9.13%



*Source: ANRE

Tariffs can be amended throughout the year



Ten globally accepted principles of public utility rates

1. Effectiveness of yielding total revenue including a fair return with a socially desirable level of service and safety
2. Stability and predictability of revenue for utility companies
3. Stability and predictability of consumer rates
4. Discouraging wasteful use of services
5. Reflection of all private and social costs occurred for the provision of service (including externalities)
6. Fairness of rates in the apportionment of total costs of service among different consumers
7. Avoidance of discrimination in rates
8. Promotion of innovation and cost-effectiveness in the face of changing demand and supply patterns
9. Simplicity, understandability, public acceptability, and feasibility
10. Freedom from controversies as to proper interpretation

Tariff regulation is mainly well-defined and based on global good practices

Tariff design principle*	Compatibility with the principle in Moldova
Effectiveness of yielding total revenue including a fair return with a socially desirable level of service and safety	<ul style="list-style-type: none"> + Total revenue is determined effectively with a rate of return based on WACC included - No rate of return is set in the methodology for electricity supply and no detailed definition given for heat and electricity generation - WACC and asset valuation can be determined based on a more clear and consistent method ± Desirable level of service is determined for distribution of electricity and heat, no definition for other operators
Stability and predictability of revenue for utility companies	+ Methodologies are determined for 5 – 7 years
Stability and predictability of consumer rates	± Changes in operating costs may lead to sudden changes in consumer tariffs, but capital costs are included gradually
Discouraging wasteful use of services	<ul style="list-style-type: none"> + Electricity and heat are billed based on consumption and in principle total cost of production is covered - Customers cannot easily regulate their heat consumption
Reflection of all private and social costs occurred for the provision of service (including externalities)	± The tariffs cover in principle all costs of the operator, but unclear whether price indices reflect well the development of costs.
Fairness of rates in the apportionment of total costs of service among different consumers	<ul style="list-style-type: none"> + Distribution tariffs aim to take into account the difference in cost of service at different voltage levels - Cost allocation for heat and power is not based on global best practice
Avoidance of discrimination in rates	+ No cross-subsidization, same tariff for consumers with similar connection
Promotion of innovation and cost-effectiveness in the face of changing demand and supply patterns	- Tariff design does not include any specific features to promote cost-effectiveness or innovativeness
Simplicity, understandability, public acceptability, and feasibility	+ The structure of the tariff design is fairly simple
Freedom from controversies as to proper interpretation	<ul style="list-style-type: none"> + There are no major controversies in the methodologies - Timeline of tariff setting has not been defined clearly in the methodology and some methodologies lack detailed clarifications of some terms

*Source: Principles of Public Utility Rates, Bonbright, J., Danielsen, A., and Kamerschen A., 1988

APPENDIX 2 – GENERAL ASSUMPTIONS AND DETAILED SCENARIO ANALYSIS AND SENSITIVITY ANALYSIS OF HEAT AND ELECTRICITY TARIFFS

General assumptions in the energy tariff scenarios

- Annual operating costs included by ANRE in electricity and natural gas tariffs decided upon on July 18, 2015, are not yet available and therefore the future cost increase is estimated based on the total costs implied based on the tariffs
- The following factors were added to the baseline in different combinations to show their sensitivity for each scenario:
 - Commodity prices and exchange rate
 - Other operating costs
 - Deviation from past years (2012-2014)
 - Assumed deviation of Union Fenosa MDL 890 million
 - Assumed deviation of CET-2 MDL 26 million
 - Assumed deviation of RED Nord MDL 119 million
 - Assumed deviation of MoldElectrica MDL 165 million (Scenario 2) and 192 million (Scenario 4)
 - Assumed deviation of Termocom MDL 265 million (Scenario 2) and 745 million (Scenario 4)
 - Investments
 - Revaluation of assets
- Costs not included in the analysis
 - Debt accumulated to Termocom prior to 2012
 - Decommissioning and debt of CHP-1

Key assumptions used in the scenario analysis

Index	2015	2016	2017	2018	2019	2020
Natural gas price, MDL/tcm	7154	7352	7551	7725	8078	8442
MGRES price, bani/kWh	142.2	149.1	156.2	163.5	171.1	178.8
Romanian power price, bani/kWh					100.9	105.9
CPI	6.5%	5.5%	5.3%	5.3%	5.3%	5.3%
USD/MDL rate	18	18.5	19	19.5	20	20.5
GDP change, %	-2%	2%	4%	4%	4%	4%
New investments, MoldElectrica, mln USD			225	225		
New investments, Termocom, (IBRD Loan), mln USD		7.5	7.5	7.5	7.5	
Business as usual investments, MoldElectrica, mln MDL	210	210	210	210	210	210
Business as usual investments, RED Nord, mln MDL	100	100	100	100	100	100
Business as usual investments, RED Union Fenosa, mln USD	18.7	18.7	18.7	18.7	18.7	18.7
Business as usual investments, CHP-2, mln MDL	47.8	47.8	47.8	47.8	47.8	47.8
Business as usual investments, Termocom, mln MDL	65.1	65.1	65.1	65.1	65.1	65.1

Sources of the data used in the scenario analysis

Data	Source
Natural gas price	Moldovagaz estimate and WB Commodity markets outlook
Romanian power price	WB estimate based on European power prices
CPI	WB forecast
USD/MDL rate	WB forecast
GDP change %	WB forecast
MGRES price	company data
BAU investments	company data
New investments	WB

The constructed scenarios project a range of potential tariff levels

July tariff adjustment

- Tariffs as set by ANRE to be applied on July 1, 2015 and assumed inflation thereafter
- Heat tariff based on gas tariff as of July 1, 2015

Minimum tariff increase

- Adjustment of tariffs based on the projected natural gas and electricity import price as well as changes of currency exchange rate

Recover past deviation

- Adjustment of tariffs based on the projected natural gas and electricity import price as well as changes of currency exchange rate
- Past deviation divided to 2015-2019 tariffs

By the book including investments

- Implementation of the current methodology, including past deviation in 2015 and planned investments

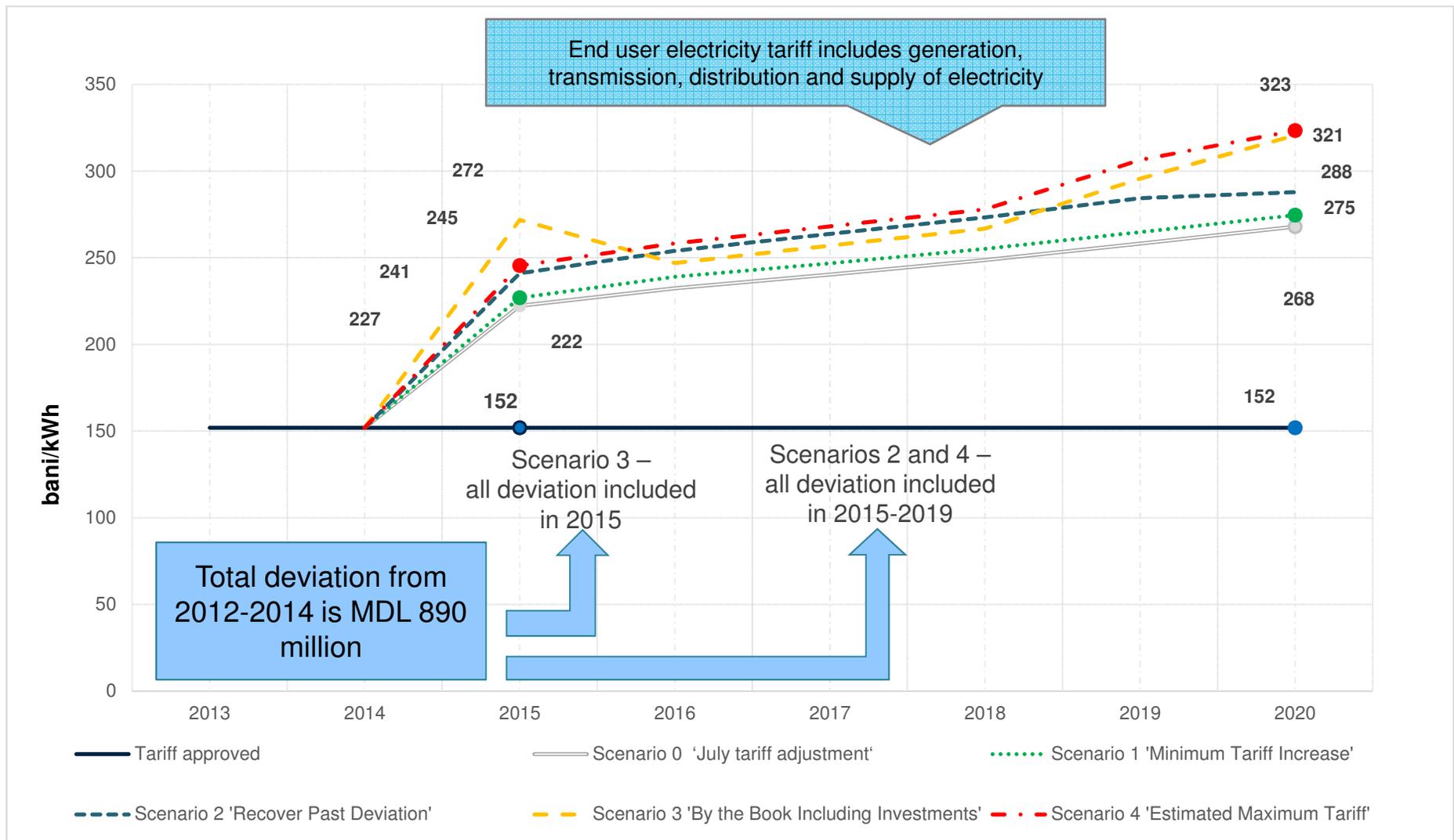
Estimated maximum tariff

- Estimated high value of all parameters
- Past deviation divided to 2015-2019 tariffs

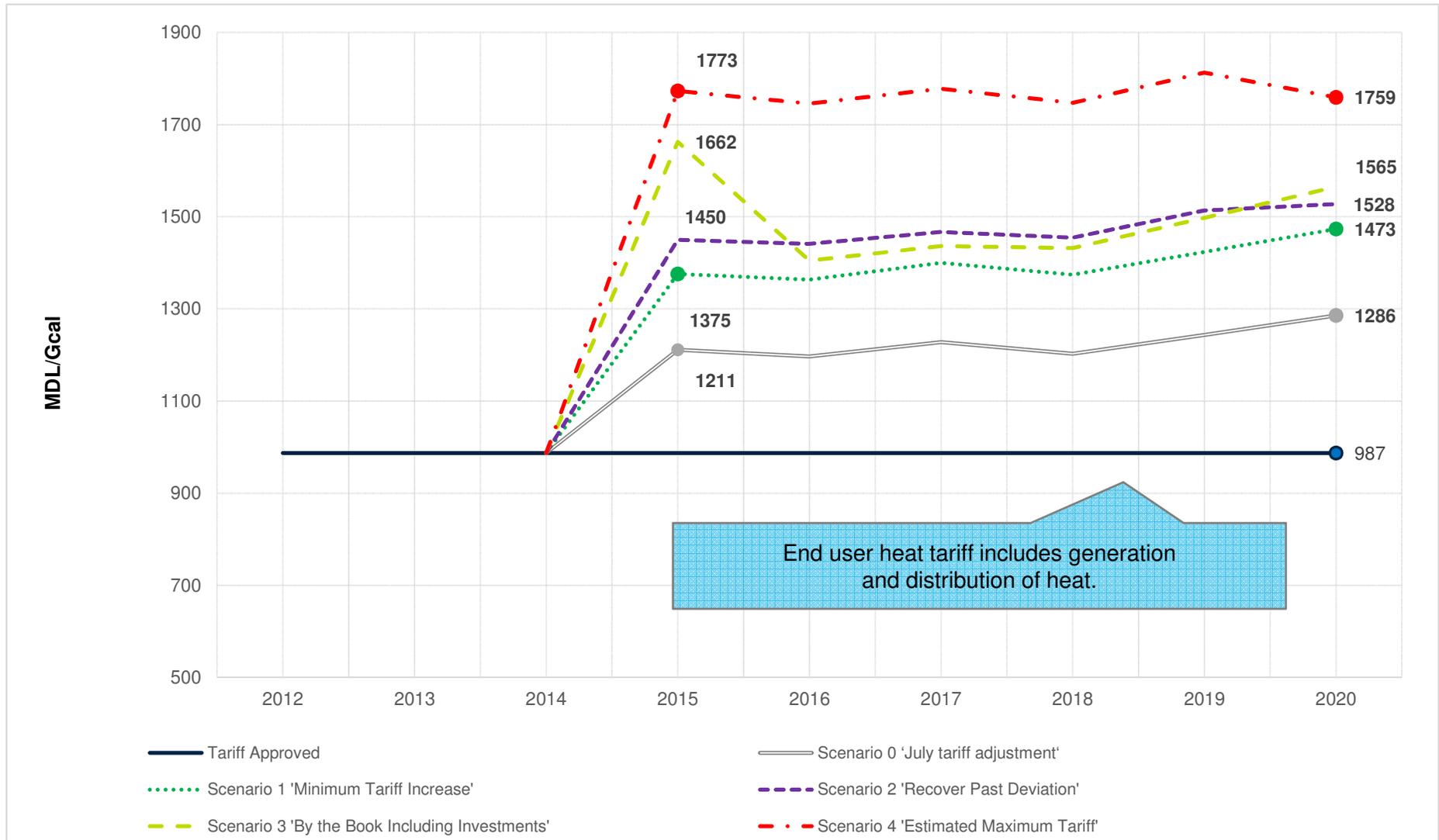
The following parameters were set for each scenario

	Scenario #	Commodity prices, exchange rate	Other operating costs	Deviation from past years	Investments	Revaluation of assets
Low scenario	Scenario 0 'July tariff adjustment'	Electricity: Tariff as of July 18, 2015				
		Heat: Gas tariff as of July 18, 2015	Heat: As approved in 2011	Heat: 0	Heat: BAU (annual average)	Heat: 0%
	Scenario 1 'Minimum tariff increase'	Passed through	As approved in 2011	0	BAU (annual average)	0%
	Scenario 2 'Recover past deviation'	Passed through	As approved in 2011 +indices	Split to 2015-2019	BAU (annual average)	0%
	Scenario 3 'By the book including investments'	Passed through	Actuals of 2011 +indices	All in 2015	Transmission line: 2019-2020, DH rehabilitation: 2017-2021	0%
High scenario	Scenario 4 'Estimated maximum tariff'	Passed through	Actuals of 2014 +indices	Split to 2015-2019, revaluation part included	Transmission line: 2019-2020, DH rehabilitation: 2017-2022	100%

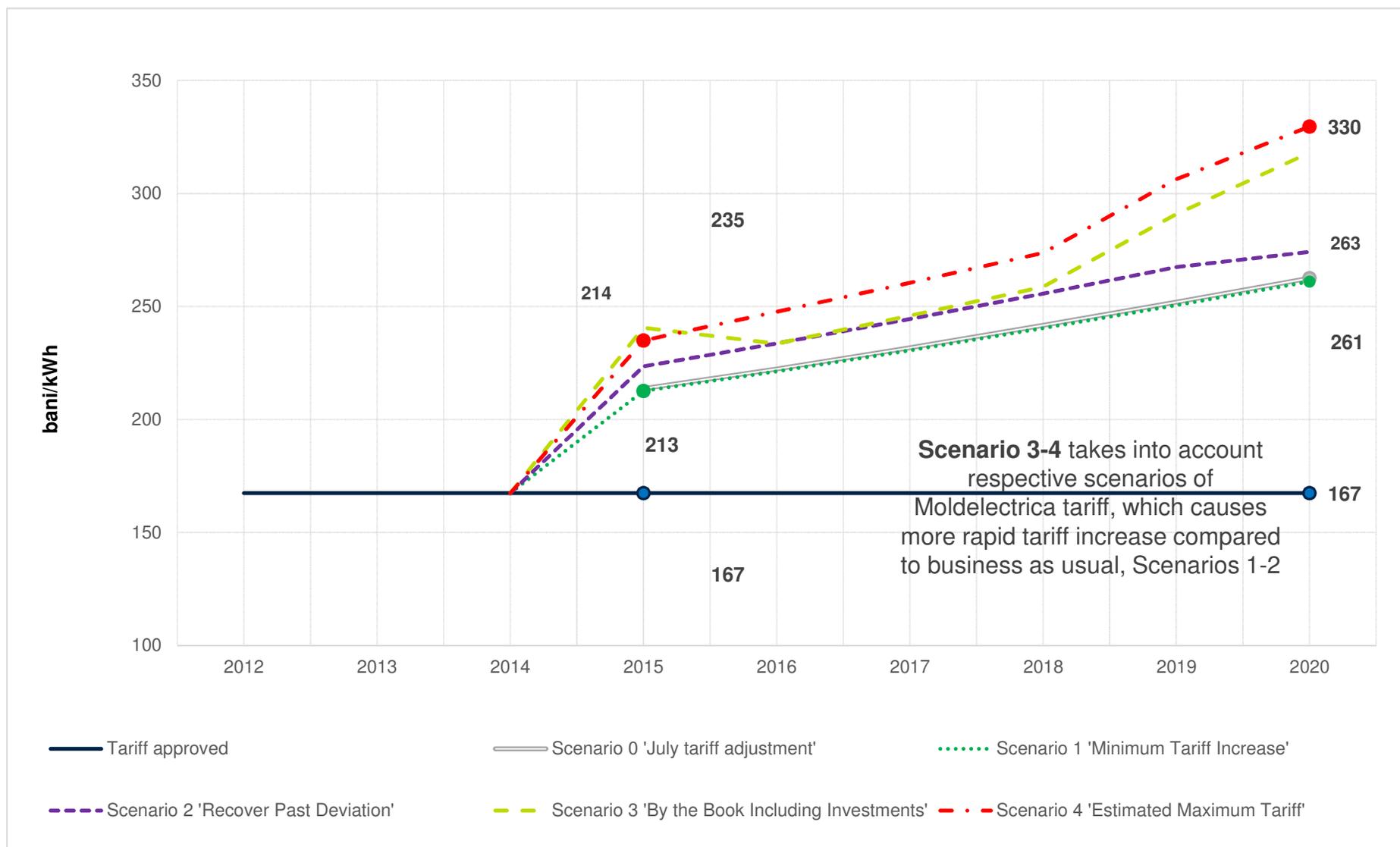
Based on Scenario 4, RED Union Fenosa nominal end user electricity tariff could be twice as high in 2020 compared to 2014



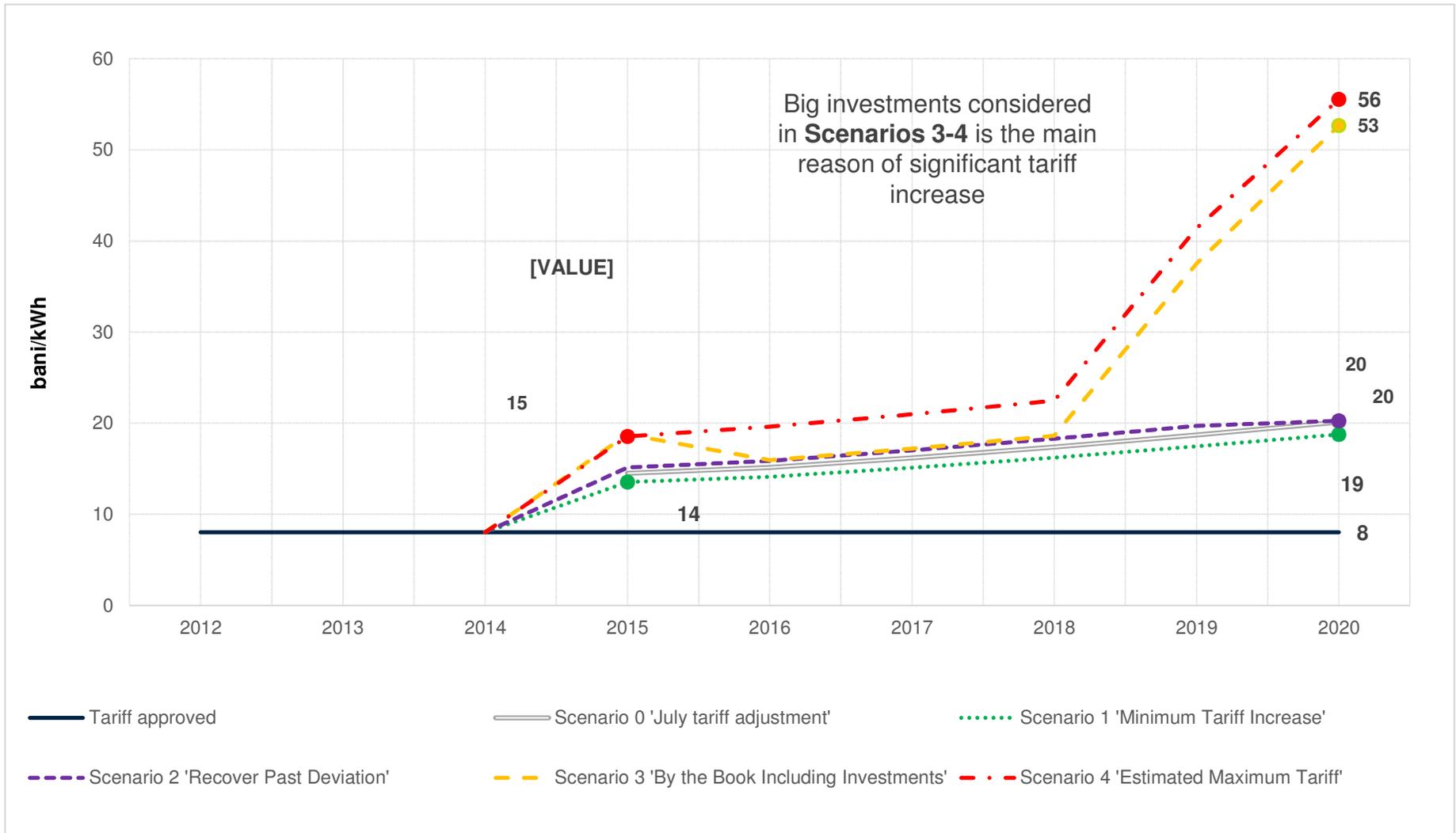
Based on Scenario 4, nominal end user heat tariff could be 80 % higher in 2020



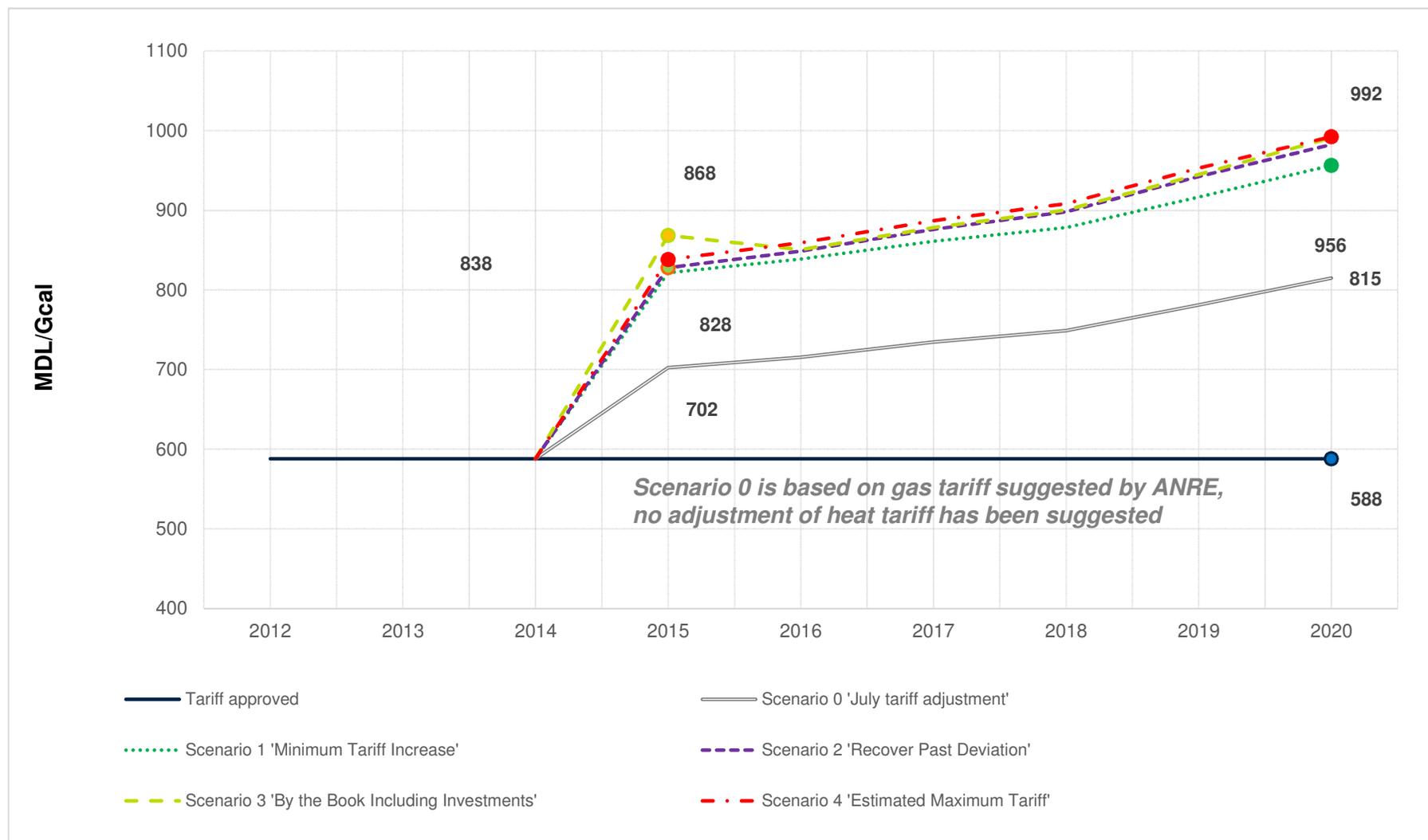
Based on Scenario 4, RED NORD end user electricity tariff could be twice as high in 2020



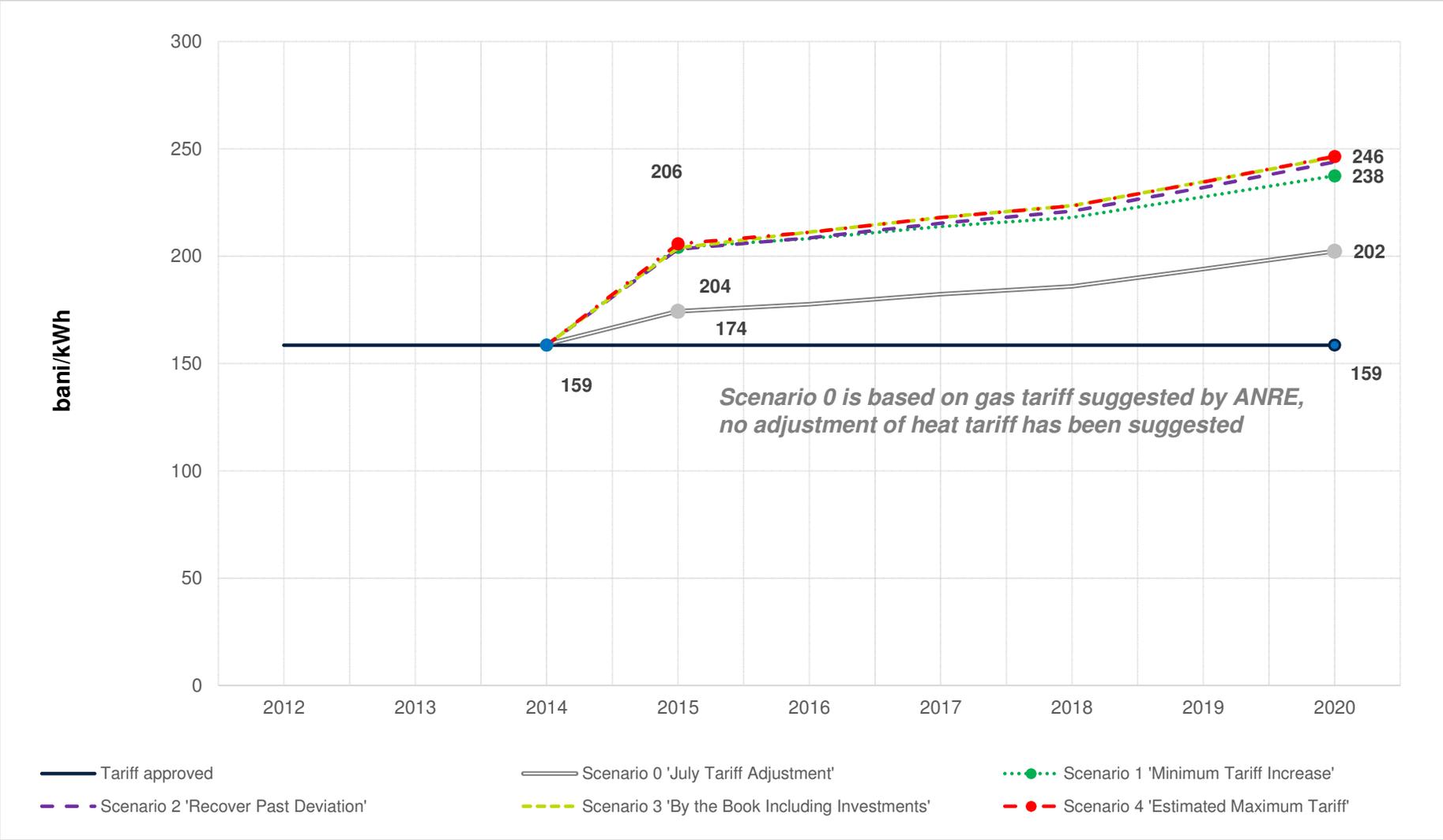
Based on Scenario 4, electricity transmission tariff could be almost seven fold in 2020 due to large investments



Scenarios 2-4 show an increase of more than 60 % in the heat generation tariff of CHP-2



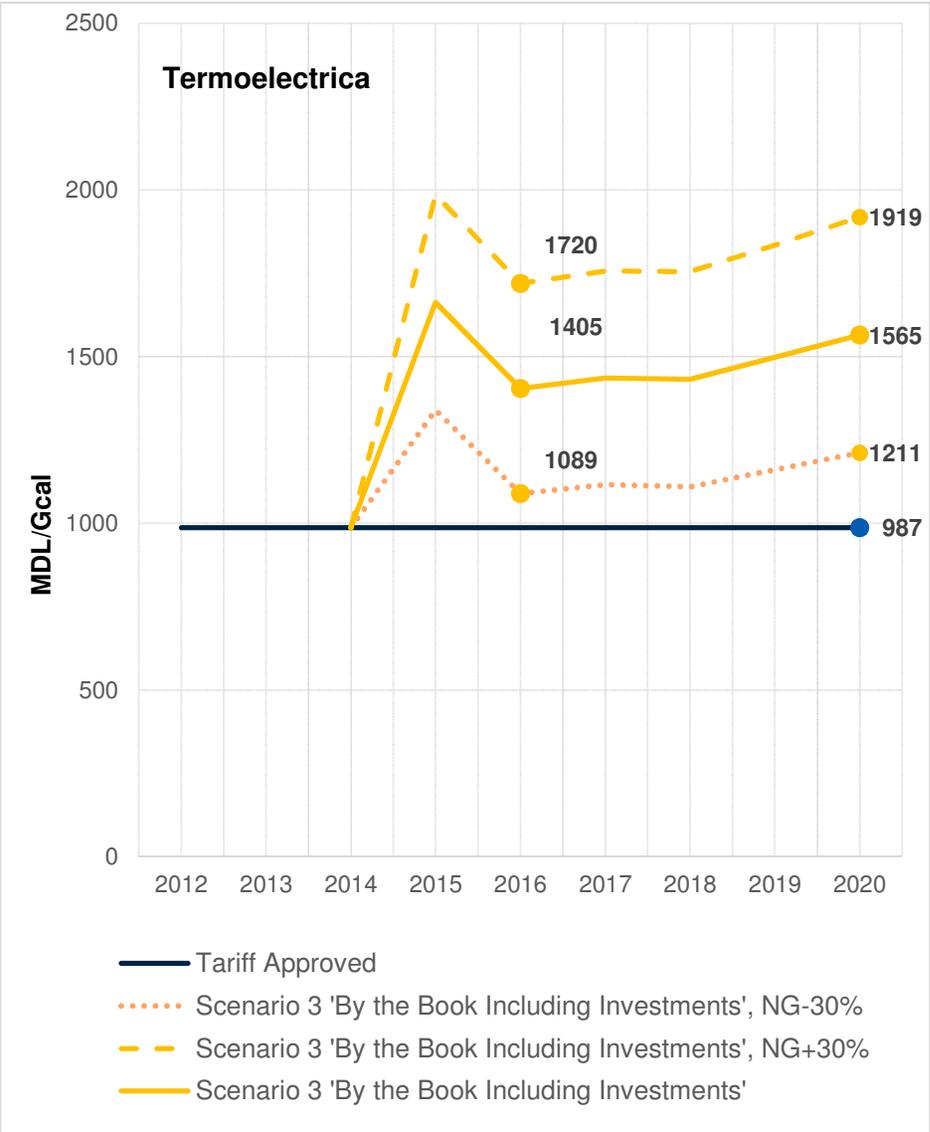
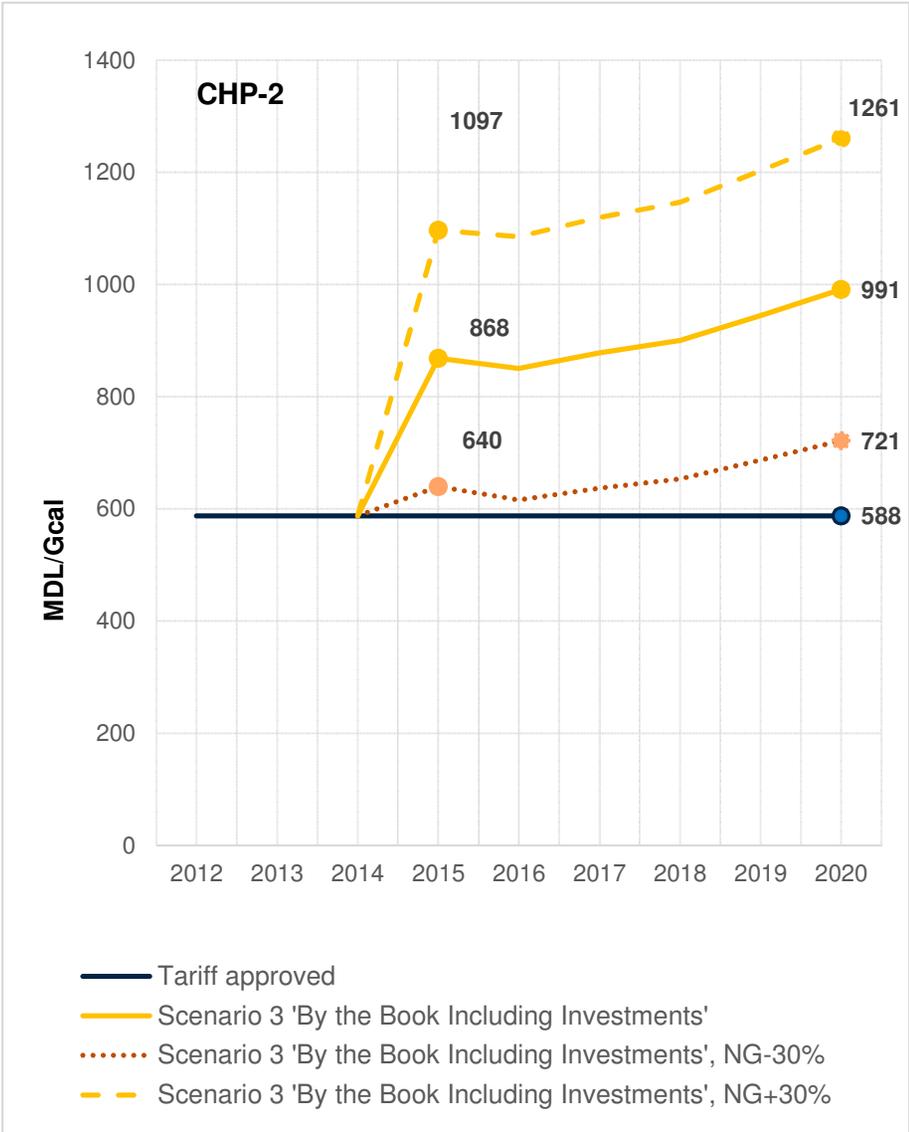
Scenarios 2-4 show an increase of more than 50 % in the electricity generation tariff of CHP-2



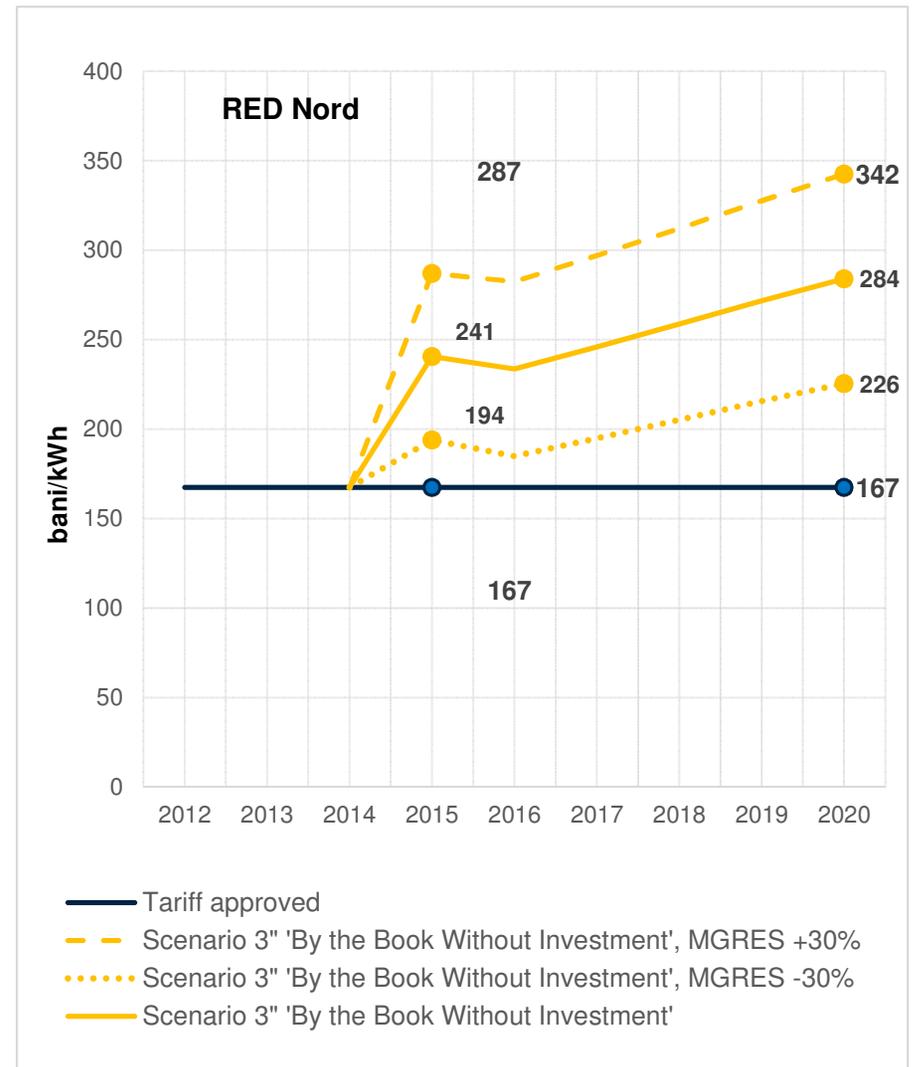
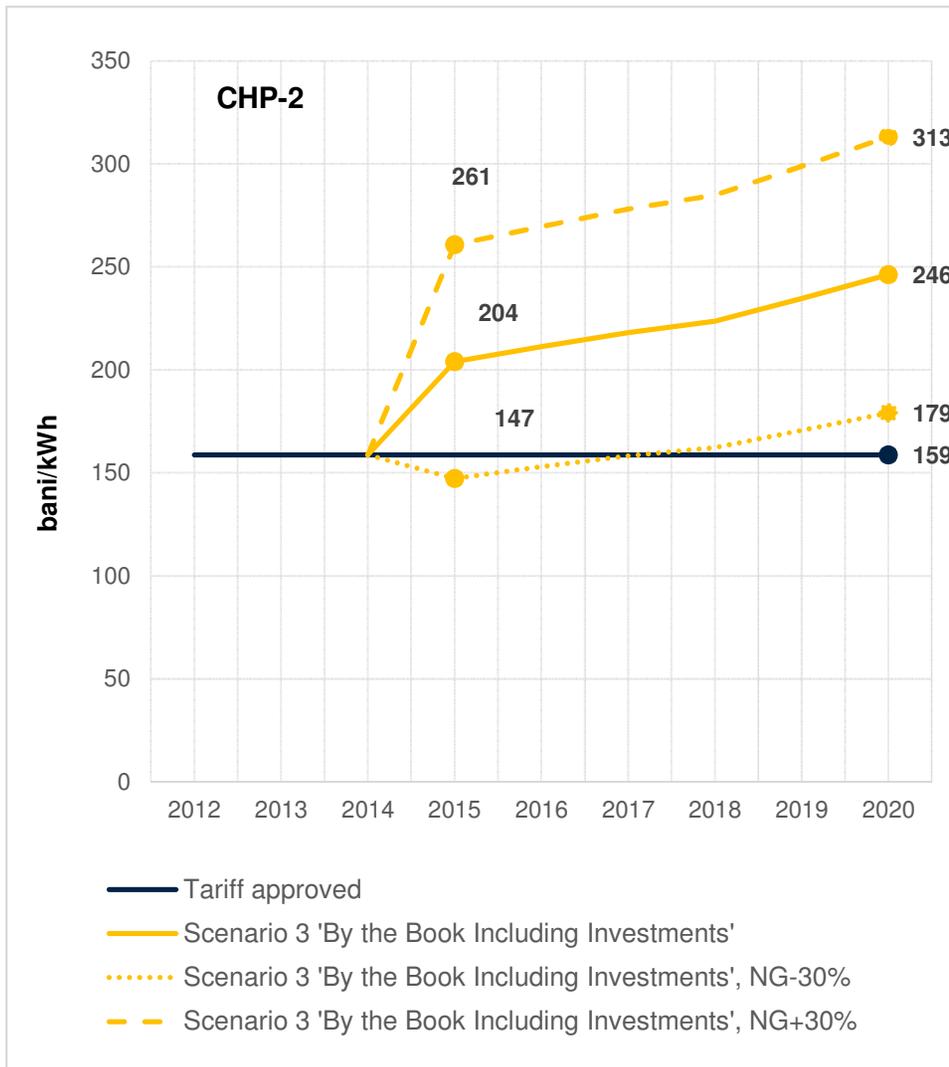
Sensitivity analysis for the main cost drivers were conducted

- Sensitivity analysis on heat end user tariff
 - Gas import price +/- 30 %
- Sensitivity analysis on electricity end user tariff
 - CHP-2 electricity generation tariff based on gas import price +/- 30 %
 - MGRES electricity import price +/- 30 % based on same change in gas tariff
 - Import all electricity from Romania in 2019 and 2020 based on 2017 price in Romanian power market and increase in line with 2017-2020 power price in European power markets and Romanian transmission cost

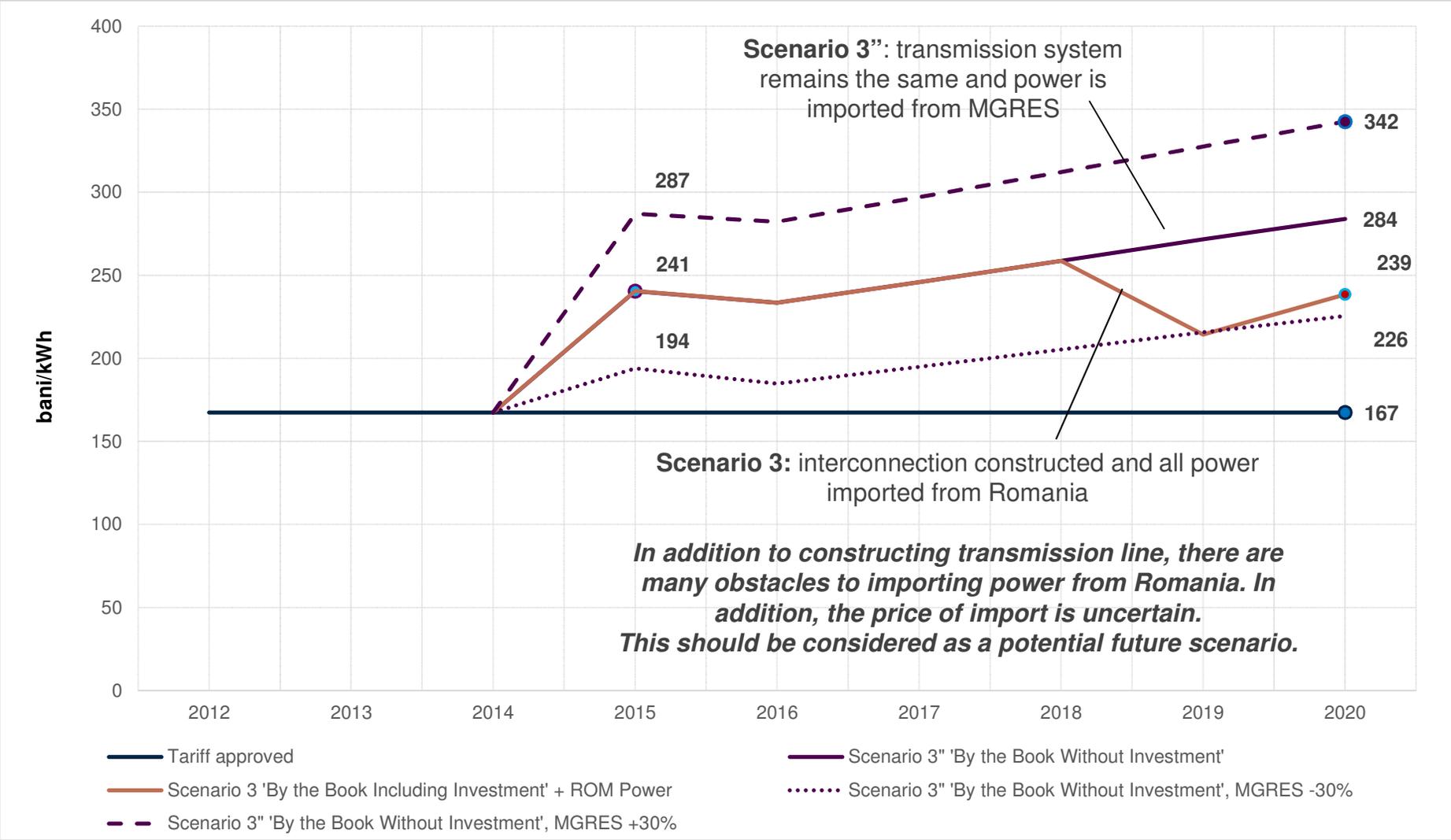
Gas price variation has a high impact on heat generation and end user tariffs



Gas price and electricity import price variations have a high impact on electricity generation and end user tariffs



Importing electricity from Romania would reduce the end user tariff by 16%



APPENDIX 3 – RECOMMENDATIONS ON TARIFF METHODOLOGY AND IMPLEMENTATION

Key areas for improvement in tariff setting

General good practice in tariff setting

Good practice in tariff setting in Moldova

Need to develop tariff methodology in Moldova

Need to develop tariff methodology implementation in Moldova

Attraction of capital with a fair return

Fair return determined and at acceptable level

Set rate of return for heat and electricity generation; Set asset value based on economic value (not accounting)

More regular updating of tariffs required

Socially desirable level of service and safety

Quality criteria set for electricity distribution

Set quality criteria for all operators

Should not limit investments that improve service quality

Reflection of all private and social costs occurred

Updated tariff levels close to cost recovery

Analyze how well price indices used reflect the actual cost drivers

All reasonable costs should be reflected in tariffs with update on a regular basis

Promotion of cost-effectiveness

Based on principle of minimal costs

Incentivize reduction of operating costs and improving quality; Long-term approval of investments

Should not limit cost-effective investments, should not limit paying for more qualified staff

Recommendations for improved tariff setting (1/2)

- General

- Approval process of cost changes that are based on external factors should be simple and fast; preferably automatic
 - Fuel price
 - Purchased electricity price
 - Currency exchange rate
- Regular updating of tariffs would lead to smaller one-time changes for consumers and improve financial sustainability of operators. This would also improve the efficiency of the economy as there would be an incentive to reduce energy consumption when gas prices are high.
- District heating and natural gas tariff revision should go in parallel, otherwise increasing the heat tariff may lead to disconnections from district heating system

Predictability,
capital attraction

Financial sustainability

Cost recovery and cost
effectiveness

- Operating costs

- All reasonable costs should be included in tariffs, e.g. there should be no limit to paying reasonably higher salaries to more qualified staff
- Alternative 1 – current method with base year alternative costs approved by ANRE
 - There seems to be need to change criteria for approving operating costs and follow changes in the market more carefully.
 - Analyze how well price indices reflect the cost development.
- Alternative 2 – stronger incentives for operators
 - Strengthen incentives to improve efficiency with reductions in operating costs as a benefit for the operator during a set period and after the set period given to the consumers through tariff reductions.
 - At the same time, strengthen incentives and penalties related to quality.
 - By strengthening the incentives, the close fit of price indices or scrutiny by the regulator would not be as relevant.

Cost recovery

Cost effectiveness

Quality improvement

Efficiency of regulation

Recommendations for improved tariff setting (2/2)

- **Service quality**
 - Set quality criteria for all operators
 - Especially if stronger incentives are set for quality improvement and operating cost reduction, the regulator needs to be able to follow the quality indicators set rigorously
 - **Rate of return**
 - Analyze how best to implement rate of return for electricity and heat generation
 - **Asset value**
 - Analyze, how to set regulated asset value based on economic value, i.e. real life time (not accounting), especially for new major investments
 - **Investments**
 - Investment plans could be done for a longer time perspective, e.g. for 5 years and in compliance with the country energy strategies, if available
 - Criteria for approving investments should be clarified
 - Should not limit reasonable investments that improve service quality
 - In the long-term, there should be a way to incentivize efficiency of investments
 - **Cost allocation**
 - Costs should be allocated between heat and power based on a global best practice. Recommended method could be alternative generation method as it is close to current practice.
-
- Quality improvement
- Private capital attraction
- Economical use of assets
- Cost-effective planning
- Investor credibility – capital attraction
- Quality improvement
- Cost effectiveness
- Optimal cost allocation

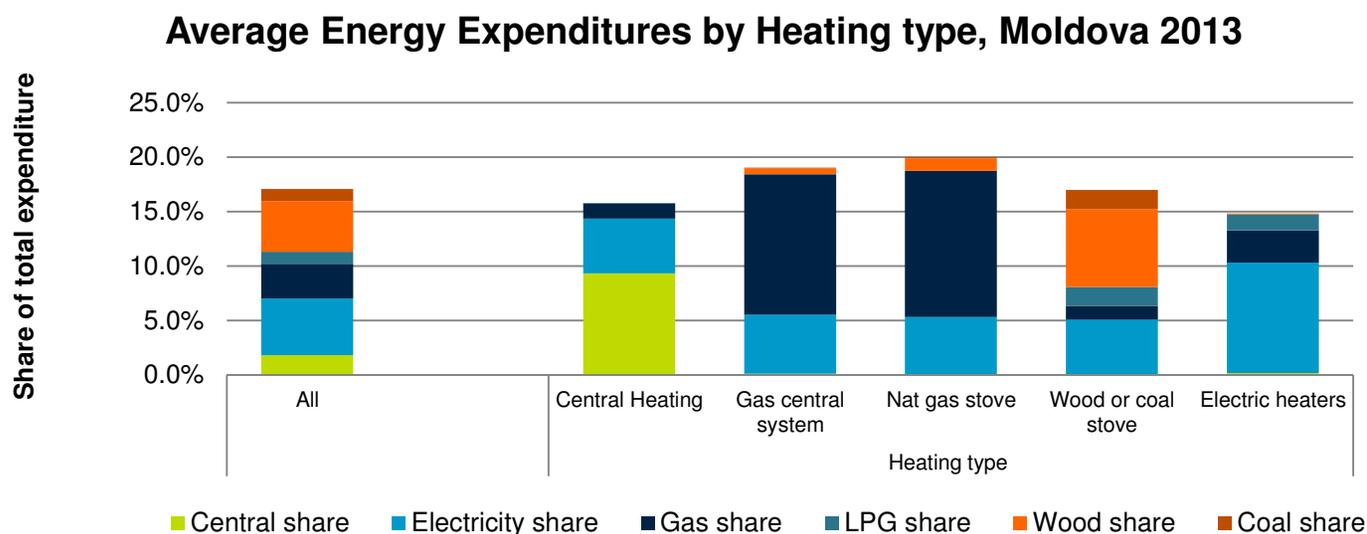
APPENDIX 4 – DETAILED ANALYSIS OF RELATIONS OF HEATING TYPE AND POVERTY

Gas users spend more on energy as a share of total expenditures

According to heating source:

The highest share of energy expenditures is observed among gas users for whom the average share reaches about 20% of total expenditures. Gas share alone represents about 13 % of total expenditure for gas users.

For the households heating with electric heaters, the electricity share alone reaches 10%, compared to the national average of 5%.



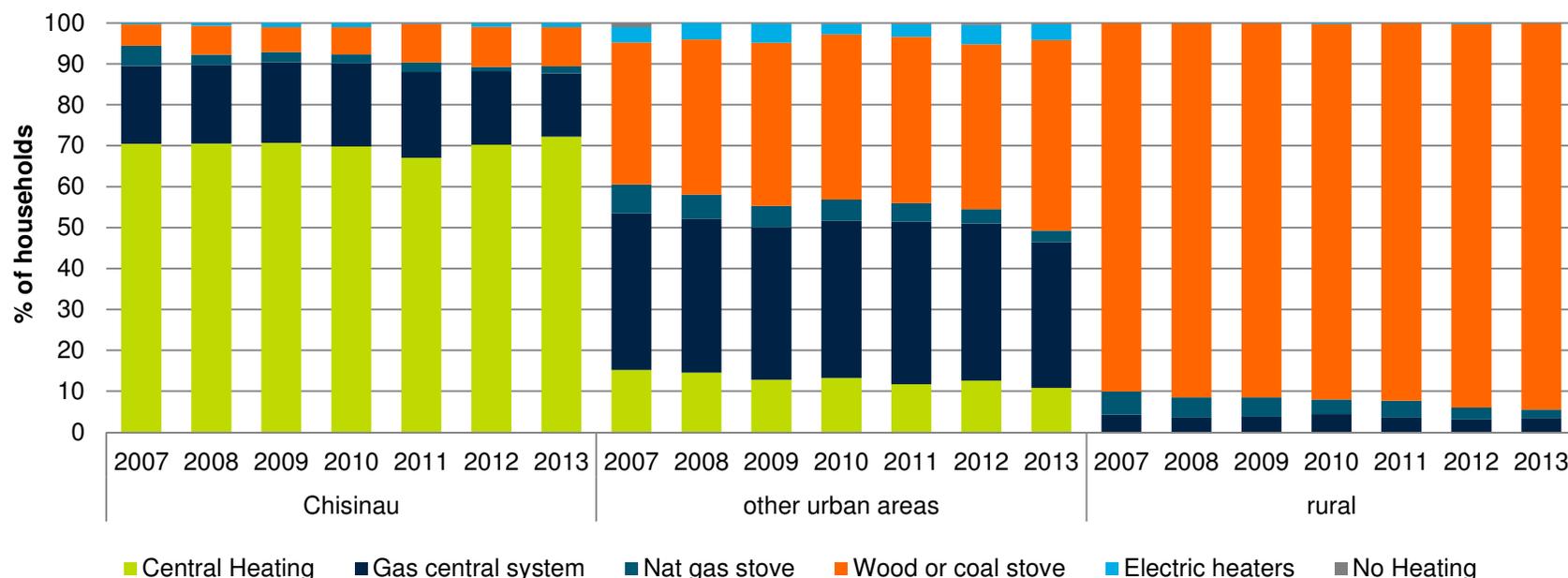
Share of district heating has remained stable in Chisinau and use of wood has increased in all areas

In Chisinau, the heating pattern remains fairly stable across the years, where central heating is the main heating source for about 70% of the households.

In other urban areas, a significant increase in wood stove use is observed (from 35% in 2007 to 47% in 2013) as a switch from gas use.

Even in rural areas, wood stove use is expanding (from 90 to 94%).

Main Heating Source in Moldova, 2007-2013



Methodology and assumptions for the impact analysis

I- Baselines for the simulations :

Baselines for years 2016 and 2020 assume a constant nominal tariff for gas, electricity and central heating since 2014. All other expenditures are extrapolated using households expenditures from 2013 Household Budget survey, assuming inflation and uniform private consumption growth as per World Bank projection (average annual private consumption growth 0.6% by 2016 and 2.6% by 2020). Also, electricity consumption is assumed to increase by 2% per year.

Poverty rate of baseline scenarios is calculated using the national poverty line, increased by the inflation.

II- Assumptions for impact of tariff increase, a low and a high scenario, for central heating, gas and electricity as in table below.

Both low and high tariff scenarios also use World Bank projection for economic growth, as well as inflation for all other expenditures than central heating, gas and electricity. Poverty is calculated using the national poverty line, increased by the inflation.

	2014	Low scenario		High scenario	
		2016	2020	2016	2020
Heat tariff (MDL/Gcal) and increase compared to 2014 (%)	987	21%	30%	80%	78%
Electricity tariff (bani/kWh) and increase compared to 2014 (%)	152	42%	73%	61%	113%
Average consumer gas tariff (MDL/tcm) and increase compared to 2014 (%)	6096	25%	47%	25%	47%
Inflation compared to 2014 (%)	-	16%	47%	16%	47%

We do not apply price elasticity for conservative estimates. In the long term, it is possible that demand side energy efficiency investments reduce consumption.

III- Increase in poverty is calculated in adjusting the welfare aggregate for each individual (total expenditures per adult equivalent) for the loss of purchasing power due to the energy tariff increase

APPENDIX 5 – ADDITIONAL DETAILS TO SOCIAL PROTECTION ANALYSIS

Heating Benefits Overview

Heating Benefit Programs, heating season 2013-2014

Key characteristics/data	National Heating Allowance	Chisinau Munic`l Compensation	Balti Munic`l Compensation
Benefit type	Cash	In-kind/cash	Cash
Targeting method	Income and proxy-means test	Income test	Income test*
Income eligibility threshold, MDL	1,088	2,000	1,500
Average monthly number of beneficiary households, including by type of service	100,289	30,378	5,473
district heating	--	23,288	--
hot water	--	3,874	--
natural gas, electricity, wood, coal used for heating	--	3,216	--
Average monthly size of benefit, MDL, including by type of service**	250***	--	200
district heating	--	285	--
hot water	--	517	--
natural gas, electricity, wood, coal used for heating	--	450	--
Budget spending FY2014, million MDL	107	60	6****

Source: Staff estimates based on administrative data

* The benefit is granted to pensioners and the disabled, considering the level of their social benefits. No other/household`s income is checked. Some of these categories (i.e. disabled) are eligible for benefit regardless of their income.

** In Chisinau compensation for district heating and hot water is 40% of the household`s bill, the actual amounts are estimates based on admin data

***Ajutor Social beneficiaries receive the HA as a top-up hence the overall size of their cash transfer is larger

****allocations in Nov 2013

Design features of municipal heating benefits

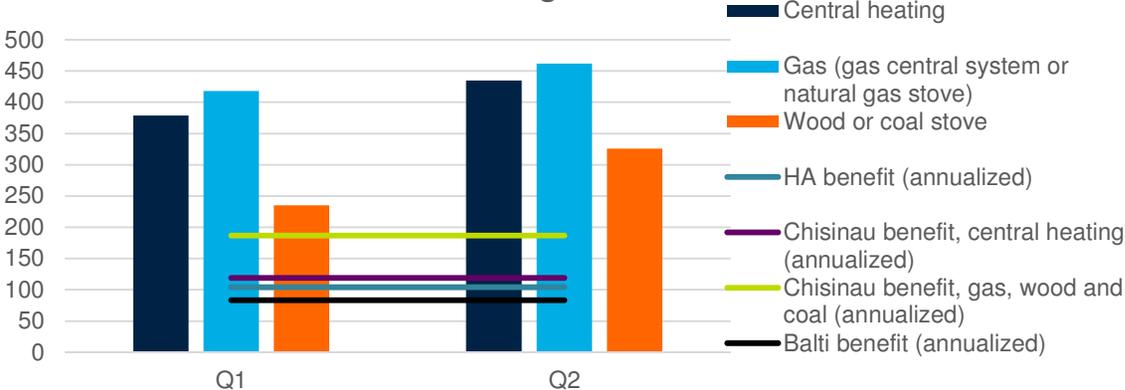
Key features	“+”	“-”
Higher income threshold than in national HA program	potentially better coverage of the urban poor to complement the national HA benefit;	benefits targeting accuracy may suffer as only formal income is included (not even overall household income in Balti`s case).
Discount on certain energy expenses	benefit directly linked to particular energy consumption; benefit size adjusts to changes in energy cost and consumption; no need to collect cash;	in-kind benefits are not fungible which constrains the poor households` flexibility in meeting various stringent needs.
Direct settlement with providers	may decrease scope of arrears of residential consumers;	may affect transparency of the scheme.
Administration outside of the national social protection system		cumbersome application and less effective outreach; prevents monitoring and more efficient use of overall country SP resources.

Challenges of the municipal heating benefits

Although it is not possible to analyze the poverty performance of municipal benefits because they are not reported in HBS, analysis of available data and design suggests that:

- Despite high potential coverage benefits take-up is low: in Chisinau of 189,000 HHs that could qualify for benefits only 33,000 HHs receive them;
- More than half of all Chisinau HHs using district heating or gas and about 80 percent of those heating with wood/coal would qualify for the benefit;
- Benefits may be poorly targeted as only formal income is included which may not reflect the total HHs income.
- Application is cumbersome: high transaction and opportunity cost may discourage the poor to apply;
- Lack of coordination with national benefits prevents more efficient use of public resources and benefit administration;
- Eligible households are larger than non-eligible ones and they have higher average monthly expenditures for district heating and gas per household (not per capita though); moreover, the distribution of benefits may have larger coverage gaps among the poorest households using solid fuels.

Average monthly expenditures by households in Quintile 1 and 2 and heating benefits, MDL



Adjusting Heating Allowance to compensate increased district heating and gas costs

- Higher benefit may encourage more HHs to enroll for HA; yet, the gap between effective and potential coverage of HA is even higher than that of AS and must be reduced via effective rural outreach and better coordination with municipal benefits;

Increase in energy costs and adjusted HA benefit size

	Low scenario		High scenario	
	2016	2020	2016	2020
Increase in energy cost (without electricity) per winter month, MDL	298	561	433	869
Adjustment in monthly HA benefit, MDL	548	811	683	1119

Parameters of Targeted Social Assistance Benefits with adjusted GMI and HA benefit size

	2015	Low scenario		High scenario	
		2016	2020	2016	2020
Income threshold for HA, MDL	1,224	1,444	1,897	1,506	2,039
Number of HHs benefiting from HA	136,466	154,536	126,545	164,115	145,788
Number of HHs eligible for HA	397,066	449,644	368,199	477,515	424,190
Coverage by HA (current), % of population	9.2	10.4	8.6	11.1	9.8
Coverage by HA (perfect), % of population	26.8	30.4	25.2	32.2	28.6
HA budget, current take-up, mln MDL	171	390	392	509	519
HA budget, perfect take-up, mln MDL	496	1,136	1,139	1,480	1,511
HA budget, current take-up, % of GDP	0.14	0.30	0.21	0.39	0.27
HA budget, perfect take-up, % of GDP	0.42	0.88	0.60	1.15	0.79

Source: Staff calculations based on HBS

Adjusting Ajutor Social to compensate increased electricity cost

- With adjusted GMI, the number of eligible households rises in 2016 and then declines as real income growth starts to offset part of tariff increase;
- Nonetheless, the take-up of eligible households must improve which requires concerted implementation efforts to enroll more eligible population;
- Average benefit increase is higher than the average increase in monthly cost of electricity, but at the same time other costs of living increase as well. As the GMI increases in line with increasing cost of living, the affordability would not change.
- Higher take-up requires additional budget that may exceed 1% of GDP; tightening the proxy test may help contain the cost and decrease benefits “leakage” to better-off households

Parameters of Targeted Social Assistance Benefits with adjusted GMI

	2015	Low scenario		High scenario	
		2016	2020	2016	2020
Income threshold for AS, MDL	765	903	1,186	941	1,274
Number of HHs benefiting from AS	50,832	51,181	41,202	55,626	47,534
Number of HHs eligible for AS	126,796	127,666	102,775	138,753	118,569
Coverage by AS (current), % of population	4.3	4.4	3.6	4.6	4.1
Coverage by AS (perfect), % of population	10.7	10.8	8.9	11.5	10.2
Average monthly AS benefit, MDL	697	823	1,117	835	1,169
AS budget, current take-up, mln MDL	425	506	552	558	667
AS budget, perfect take-up, mln MDL	1,061	1,261	1,378	1,391	1,663
AS budget, current take-up, % of GDP	0.36	0.39	0.29	0.43	0.35
AS budget, perfect take-up, % of GDP	0.89	0.98	0.72	1.07	0.87

Source: Staff calculations based on HBS

Detailed recommendations on social assistance policies

- Improve the take-up of AS and HA programs to increase the coverage of the poor by national benefits through design and implementation measures
 - Introduce mandatory annual revision of the income threshold (GMI) by CPI growth to maintain its real value and make further adjustments over the budget year, as necessary to address acute income shocks such as significant energy tariff increases
 - Streamline eligibility for rural self-employed and households without workable members
 - Better outreach by local social assistants
 - Better coordination with municipal benefits
- Increase the coverage of the poor and targeting accuracy of municipal benefits
 - The national and municipal programs should be coordinated better to improve their performance and to manage fiscal pressure on local budget
 - Incremental cost of covering the urban poor with national benefits is high, hence municipal benefits are important complementarity
 - The potential coverage of municipal benefits is high but the targeting accuracy and take-up can be significantly improved
 - Streamline administration by linking municipal benefits to national social protection system to reduce paper work (MIS, cross-checks with registries), to prevent overlap and enhance take-up through referrals, to reduce abuse (expand mandate of the Social Inspection), and to better manage municipal budgets` fiscal risks
- Maintain adequacy of benefits:
 - HA will have to raise while AS benefit will adjust through higher income threshold
 - Municipal programs may offer higher benefits for lower income and larger households through offering higher compensation at lower income threshold and an increment for the third and above household member
- Contain fiscal cost:
 - Proxy means-test may need to tighten to prevent high “leakage” of benefits to better off households
 - The increased benefits could cost the budget over 2% of GDP in 2016. Therefore categorical benefits` consolidation is needed to reallocate budget resources to targeted transfers
 - Linking of the municipal and national programs is needed to avoid overlap and to ensure complementarity of benefits (e.g. for the households eligible for both national HA and municipal benefits the local budget can pay the difference between the two). This would require a lot of changes in benefits delivery.

APPENDIX 6 – SUMMARY OF SCENARIO ANALYSIS

Summary of tariff scenarios, their impact on poverty and mitigation through social protection

	2014	Low scenario		High scenario	
		2016	2020	2016	2020
Heat tariff (MDL/Gcal) and increase compared to 2014 (%)	987	21%	30%	80%	78%
Electricity tariff (bani/kWh) and increase compared to 2014 (%)	152	42%	73%	61%	113%
Average consumer gas tariff (MDL/tcm) and increase compared to 2014 (%)	6096	25%	47%	25%	47%
Change in poverty rate compared to baseline for that year (pct-points)		1.1%	1.0%	1.9%	1.6%
Change in energy share compared to baseline for that year (pct-points) assuming no change in social protection		2.3%	3.0%	3.8%	4.6%
Program budget with current take-up (million MDL)	596	896	944	1067	1186
Program budget with current take-up (% of GDP)	0.5%	0.7%	0.5%	0.8%	0.6%
Program budget with perfect take-up (million MDL)	1557	2397	2517	2871	3174
Program budget with perfect take-up (% GDP)	1.3%	1.9%	1.3%	2.2%	1.7%

Ajutor Social + Heating Allowance

Social protection – program specific impact

	2015	Low scenario		High scenario		
		2016	2020	2016	2020	
Ajutor Social	<u>Impact with current income threshold</u>					
	Number of households with current take-up	50,832	37,831	22,761	37,831	22,761
	Number of eligible households	127,826	95,131	57,237	95,131	57,237
	<u>Impact with recommended adjustment to social assistance program</u>					
	Number of households with current take-up	50,832	51,181	41,202	55,626	47,534
	Number of eligible households	126,796	127,666	102,775	138,753	118,569
Average benefit with modified income threshold (MDL/month)	697	823	1,117	835	1,169	
Heating Allowance	<u>Impact with current income threshold</u>					
	Number of households with current take-up	136,466	101,474	47,640	101,474	47,640
	Number of eligible households	445,821	331,504	155,635	331,504	155,635
	<u>Impact with recommended adjustment to social assistance program</u>					
	Number of households with current take-up	136,466	154,536	126,545	164,115	145,788
	Number of eligible households	397,066	449,644	368,199	477,515	424,190
Average monthly benefit (for 5 months)	250	548	811	683	1,119	

Assumptions related to social protection estimates

	2014	Low scenario		High scenario	
		2016	2020	2016	2020
<u>No change in social assistance programs</u>					
Income threshold for Ajutor Social	765	765	765	765	765
Income threshold for Heat Allowance	1,224	1,224	1,224	1,224	1,224
<u>Adjustments in social assistance programs based on energy tariff increases</u>					
Income threshold for Ajutor Social	765	903	1,186	941	1,274
Income threshold for Heat Allowance	1,224	1,444	1,897	1,506	2,039