BELARUS HEAT TARIFF REFORM AND SOCIAL IMPACT MITIGATION

February 2015

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Outline

- District heating sector in Belarus
- Background of the project
- Main findings and recommendations
  - Why is reform necessary
  - What are the impacts of tariff increases
  - How to implement the reform

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DH sector at a glance

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District heating service coverage

- 61% of the population and 81% of urban households in Belarus rely on district heating for heat supply.

Heating Source	Overall	Urban	Rural
DH	61%	81%	14%
Individual gas boilers	15%	11%	23%
Individual stoves (coal, peat and firewood)	24%	8%	63%

Source: Belarus census data

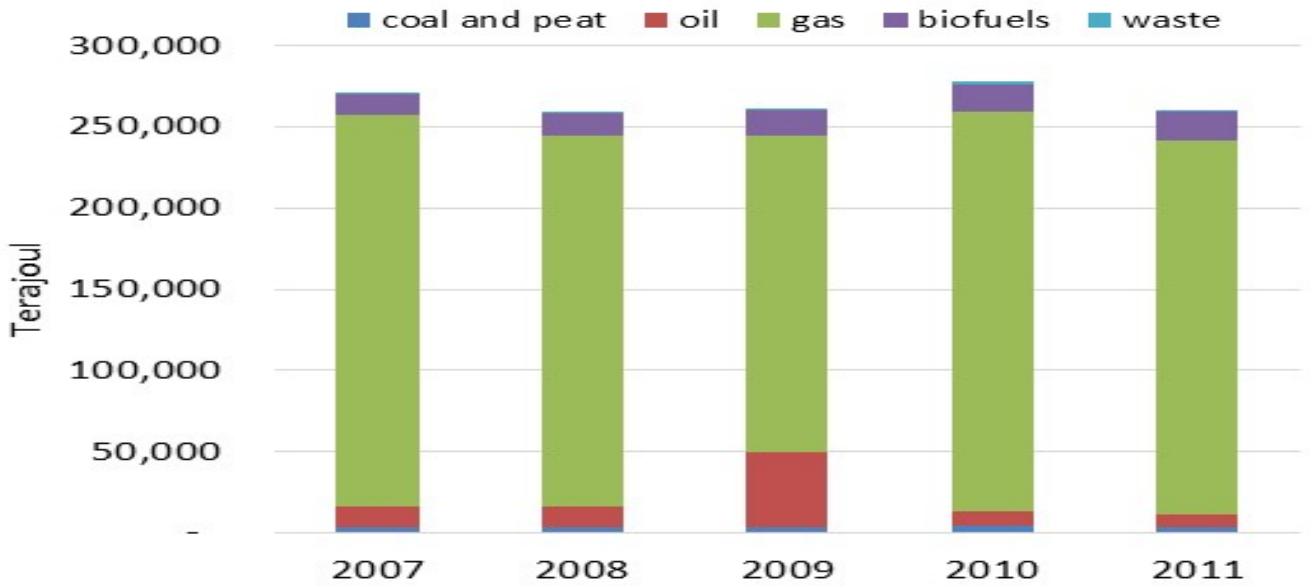
District heating service providers

- The main providers of district heating (DH) services are:
  - Belenergo State Production Association (SPA)
    - Belenergo is a vertically integrated, state-owned company which provides DH and electricity services in big cities of Belarus
  - ZhKHs
    - ZhKHs are municipally owned housing authorities which provide a number of municipal services including DH
    - ZhKHs provide DH services in rural areas and smaller towns not covered by Belenergo
  - Less than 1% of DH demand is met by small private district heating companies

Source: Belenergo, ZhKH

Historical heat production

- Natural gas (mostly imported from Russia) is used to produce the majority of DH generation
  - The DH sector consumed approximately 8 billion m^3 of natural gas annually—40% of the country's natural gas consumption.



Heat Production by Source

Source: IEA.org, access January, 2014

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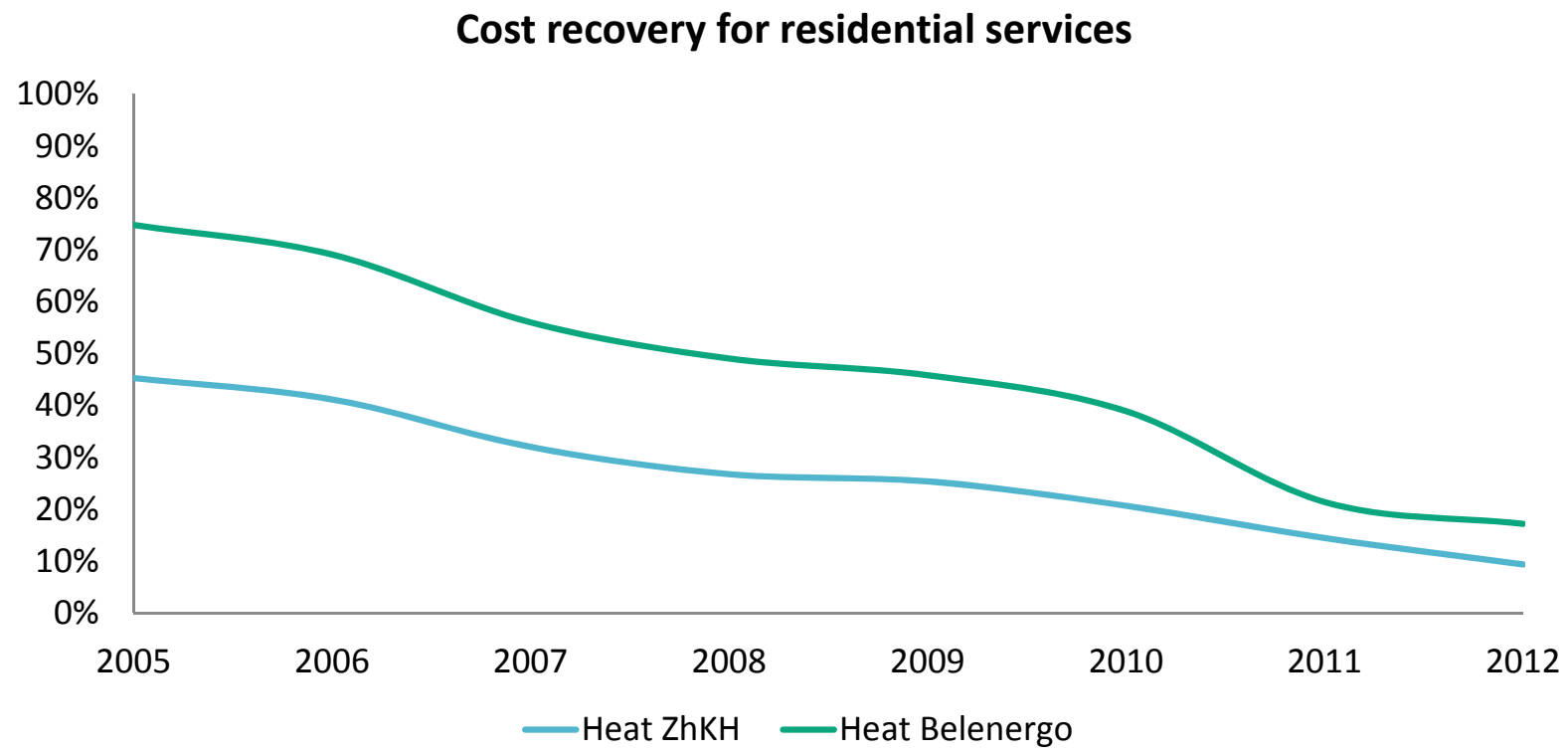
Cost recovery has declined



Source: Ministry of Economy, ZhKH, World Bank Staff estimation

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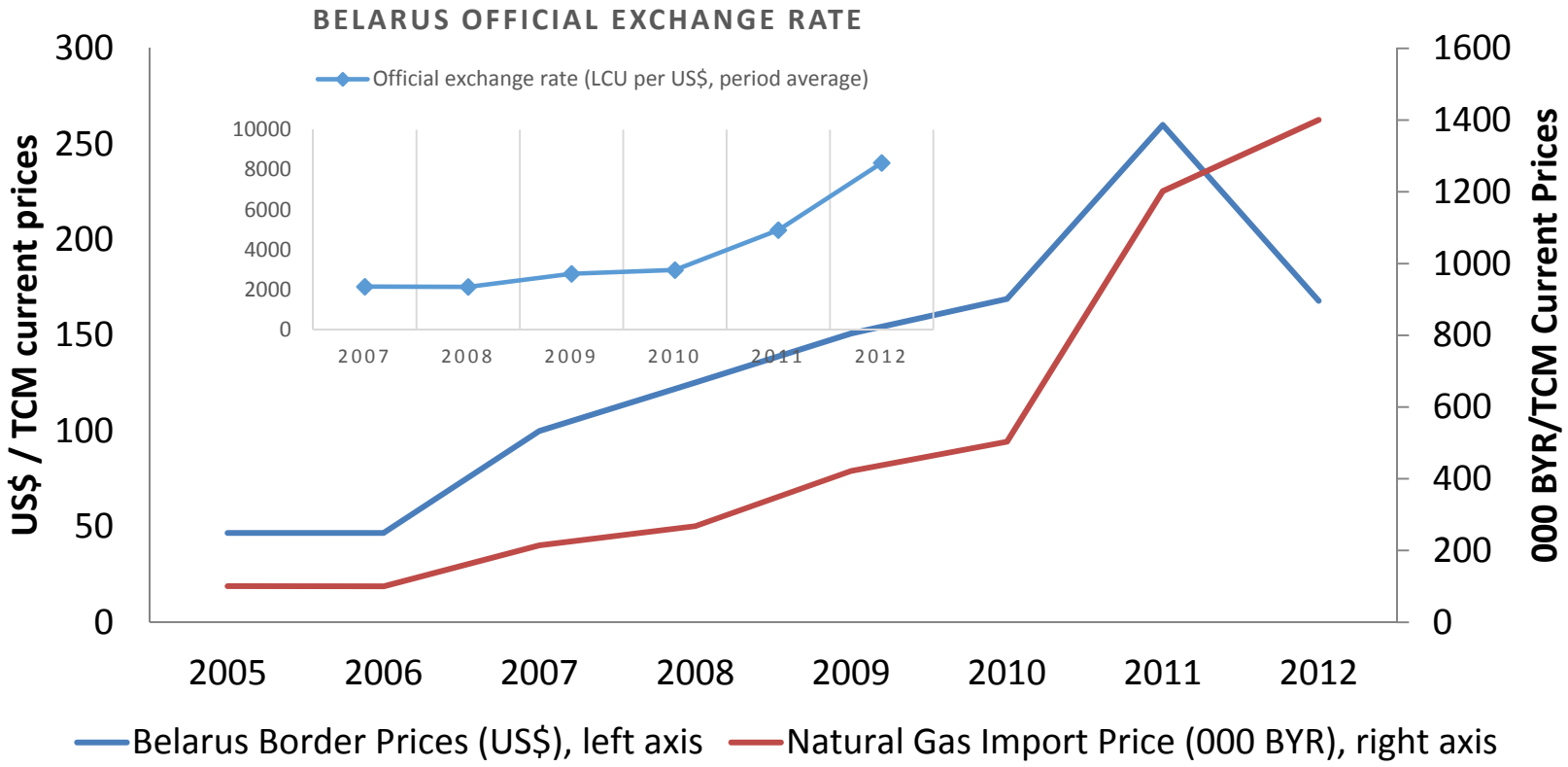
Because of increasing input costs

- Gas price increases and exchange rate devaluation have increased input costs



Source: World Bank DECPG

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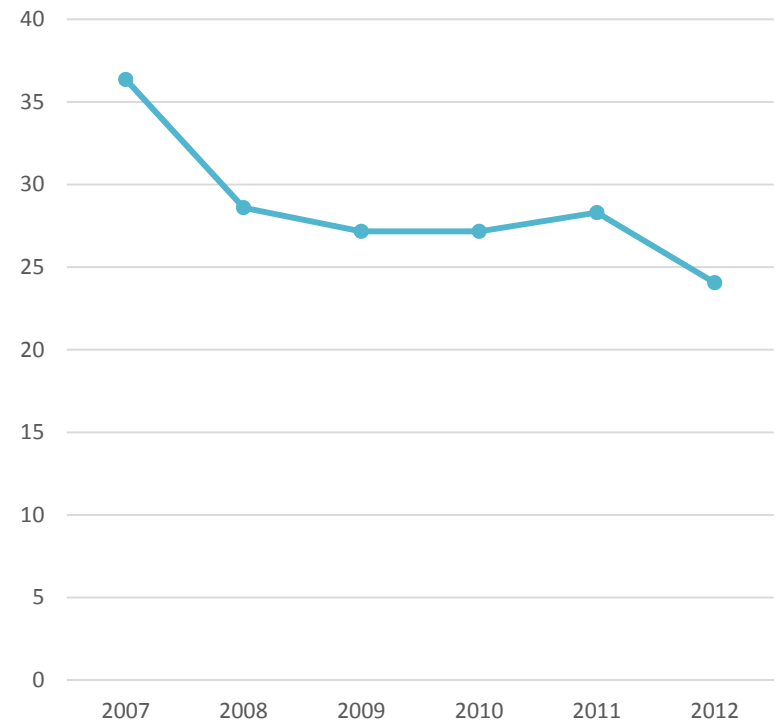
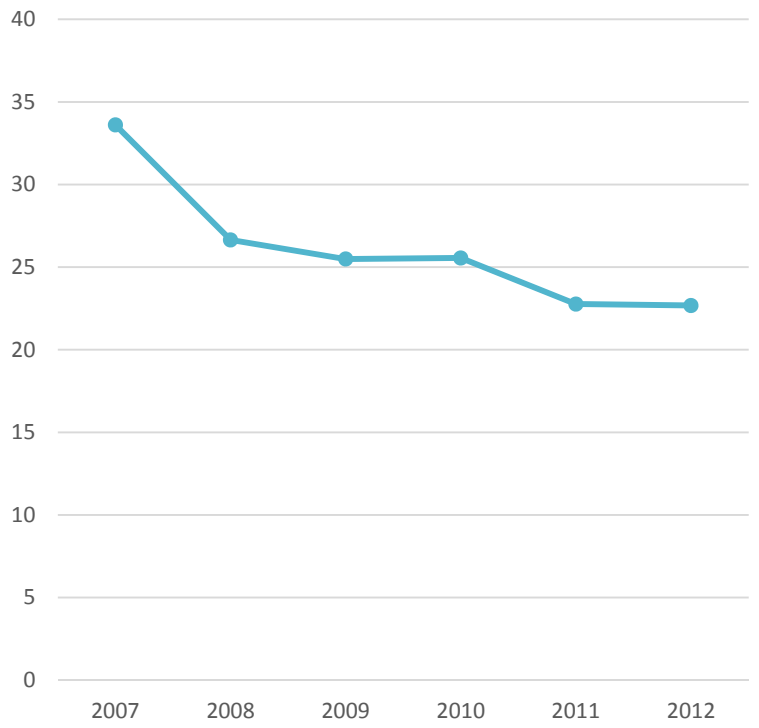
And decreasing real tariffs

Heat – ZnKH residential tariff (2007 local currency)



Heat – Belenergo residential tariff (2007 local currency)



Source: Ministry of Economy

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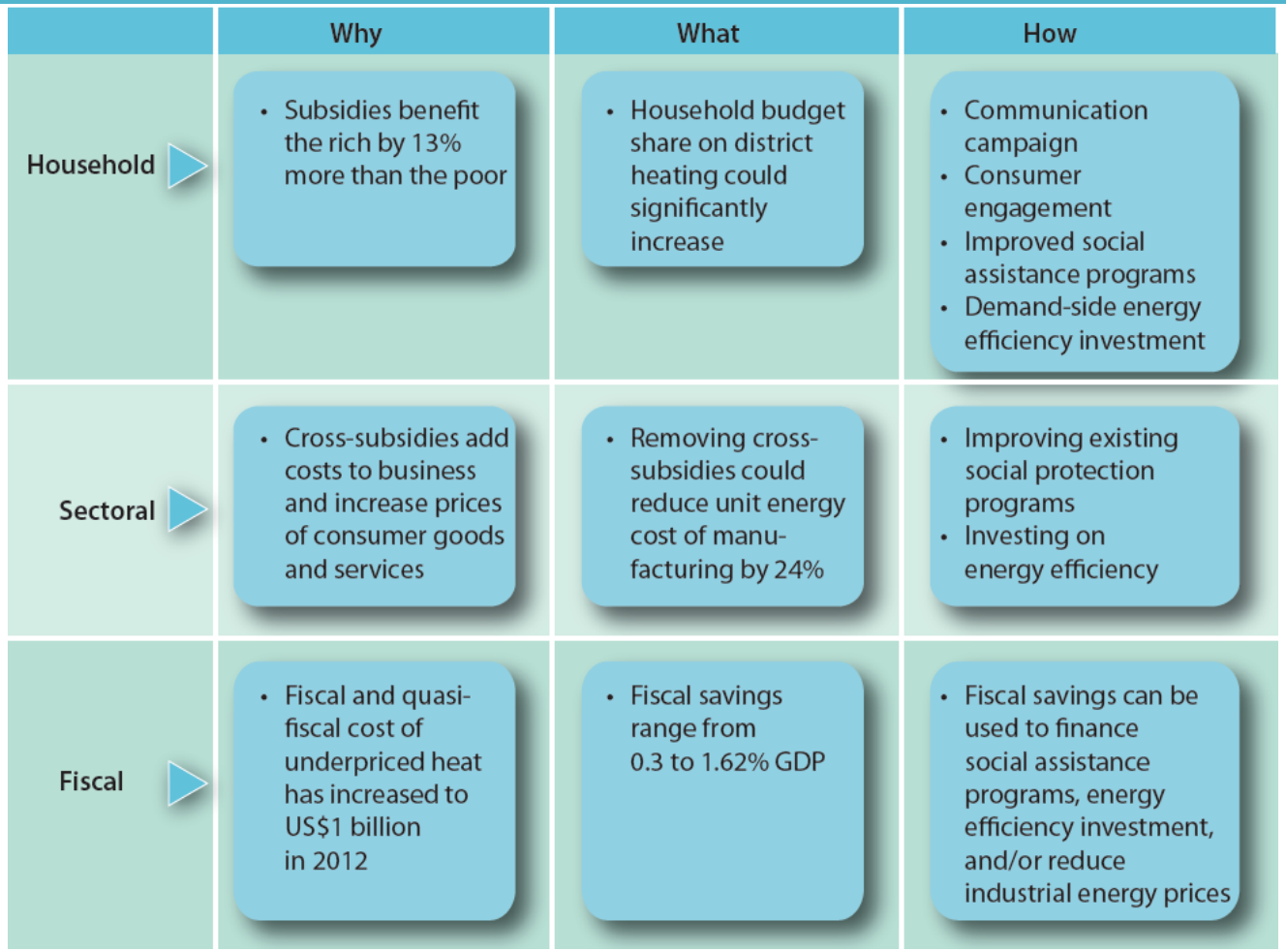
Project Background

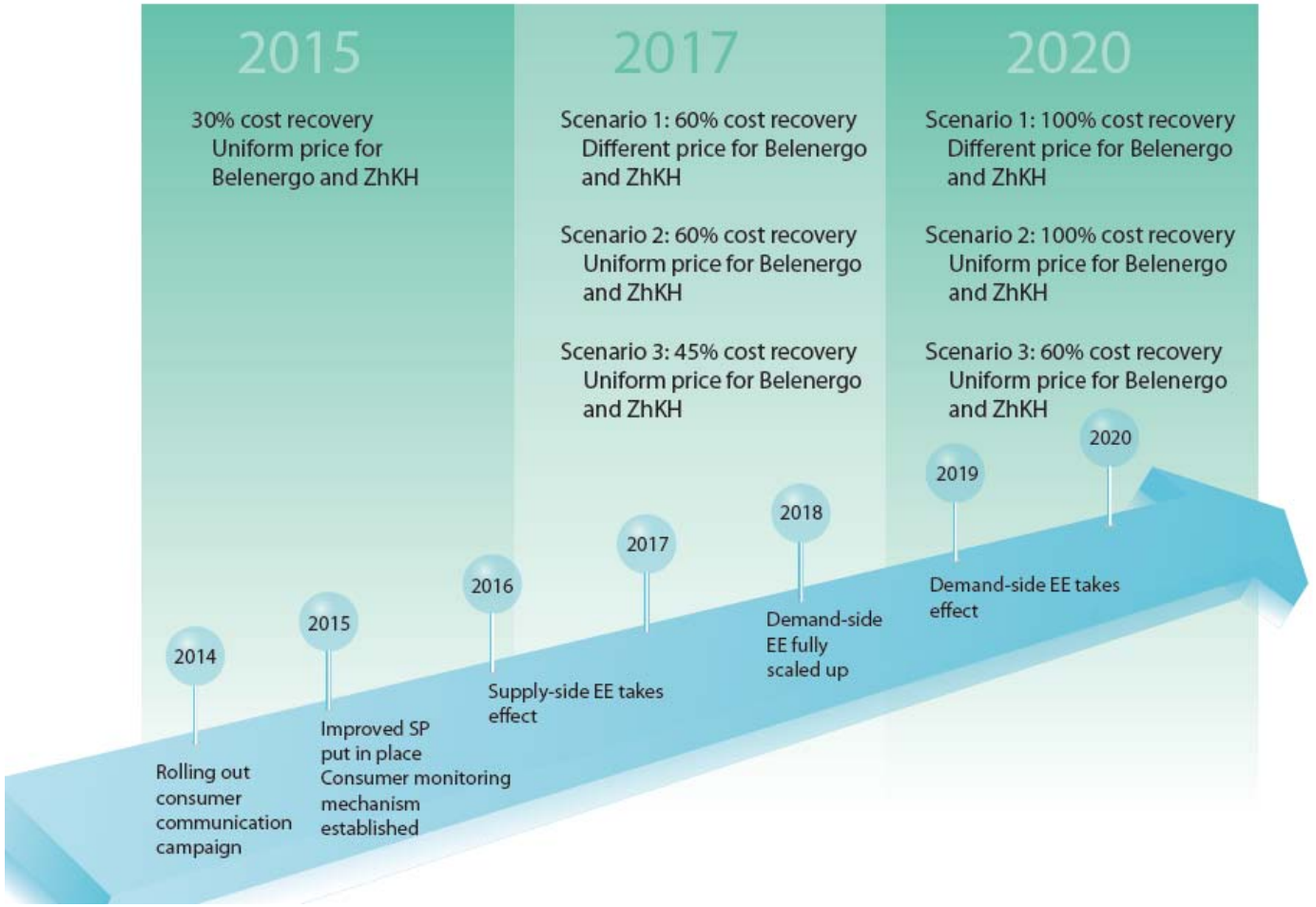
- Objectives
  - Support the Government of Belarus to formulate heat tariff reform strategies
  - Recommend measures to mitigate adverse social impacts of tariff increases on households (HHs)
- Joint Working Group
  - Belarusian Government
    - Representatives from ministries of Finance, Economy, Energy, Housing and Utilities, and Social Protection
  - World Bank Team
    - MFM, Poverty, Social Protection, Energy, Social Development, Communication

Main findings and recommendations: Complex reform with multiple impacts



	Why	What	How
Household	• Subsidies benefit the rich by 13% more than the poor	• Household budget share on district heating could significantly increase	• Communication campaign • Consumer engagement • Improved social assistance programs • Demand-side energy efficiency investment
Sectoral	• Cross-subsidies add costs to business and increase prices of consumer goods and services	• Removing cross-subsidies could reduce unit energy cost of manu-facturing by 24%	• Improving existing social protection programs • Investing on energy efficiency
Fiscal	• Fiscal and quasi-fiscal cost of underpriced heat has increased to US$1 billion in 2012	• Fiscal savings range from 0.3 to 1.62% GDP	• Fiscal savings can be used to finance social assistance programs, energy efficiency investment, and/or reduce industrial energy prices

A path towards a modern heat sector



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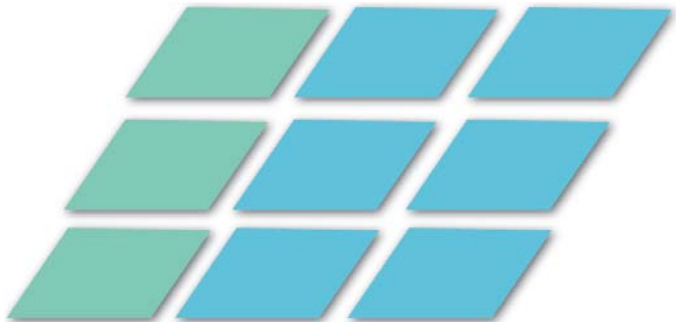
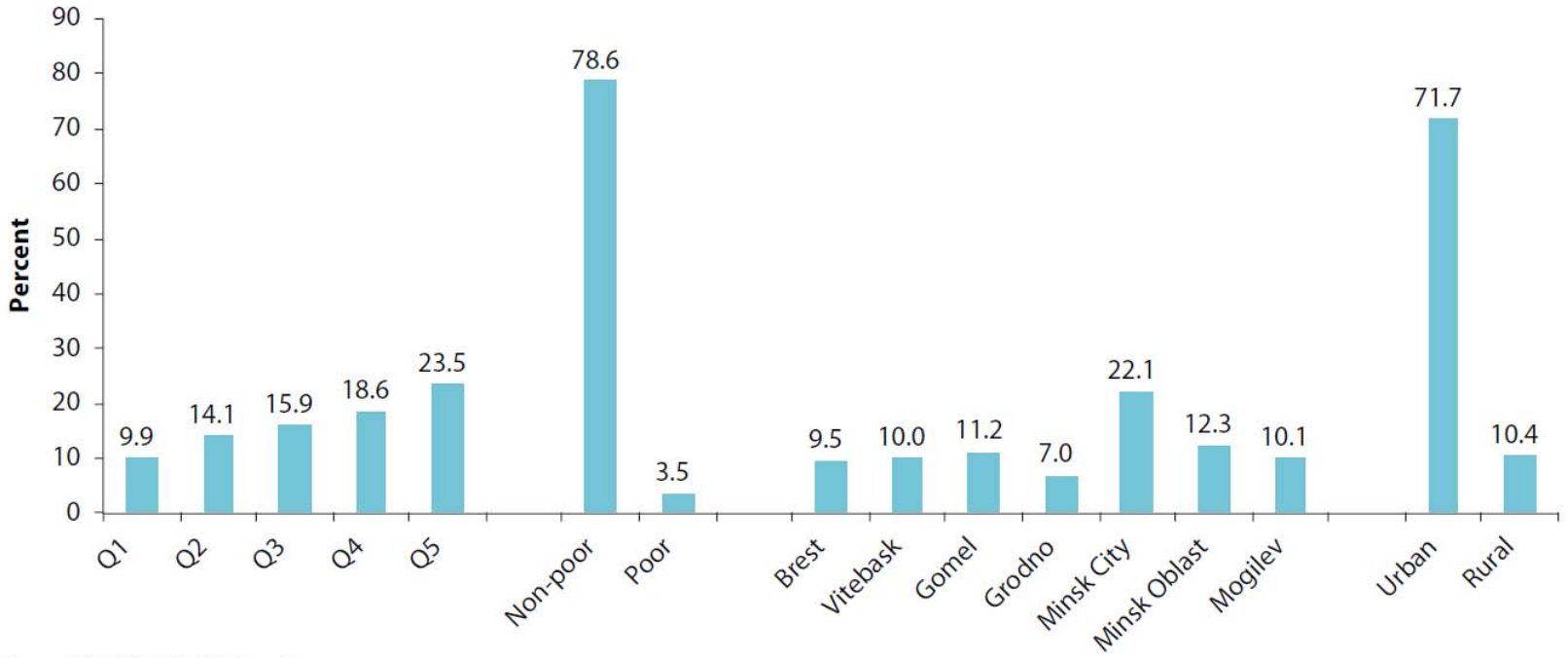
Why is reform necessary?



Subsidies are non-targeted and benefit the rich more than the poor

Distribution of HH heating subsidies



Source: Calculation based on HBS 2012 and data from Ministry of Economy

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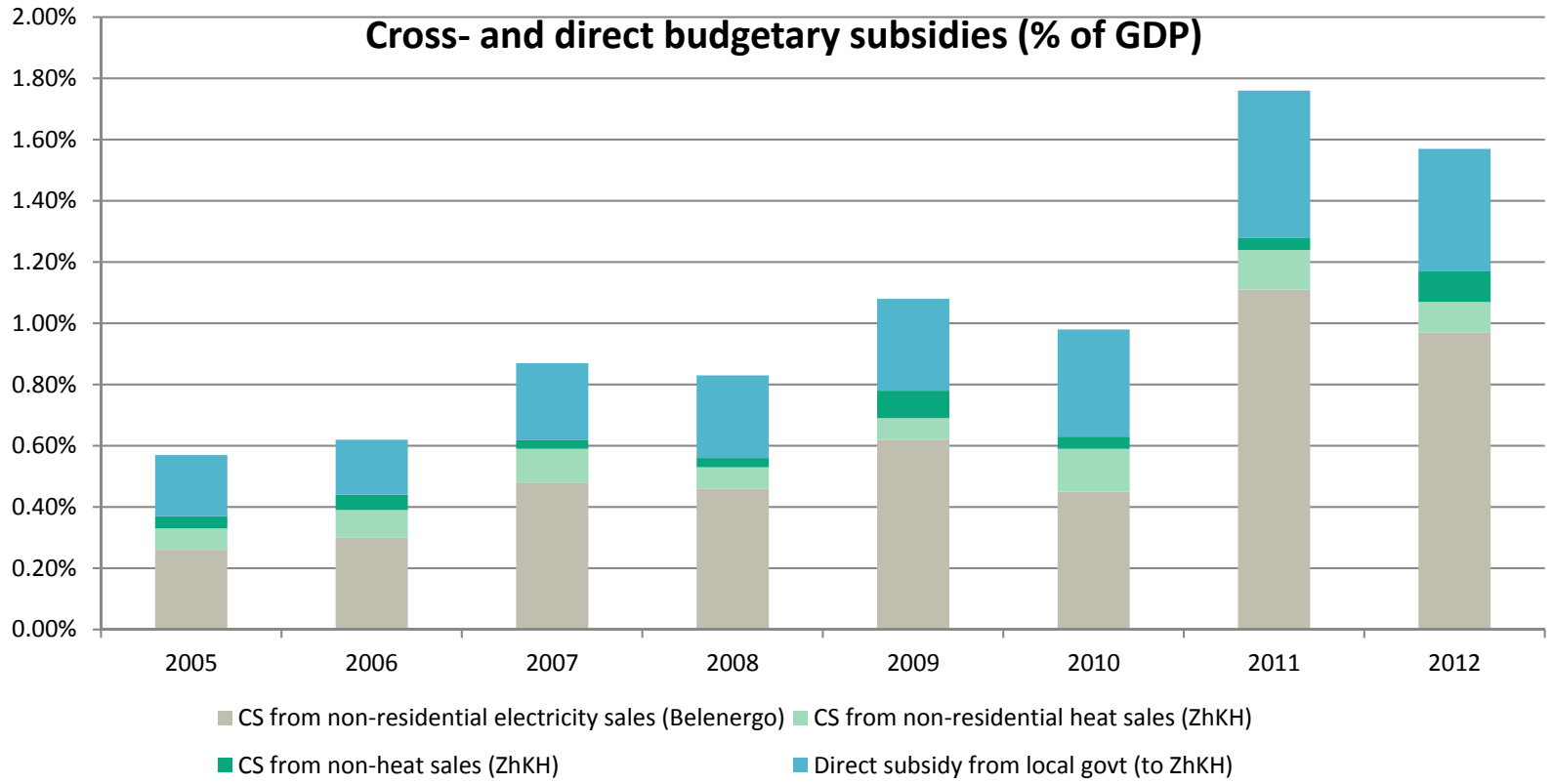
Also the fiscal and quasi-fiscal cost of subsidies has increased

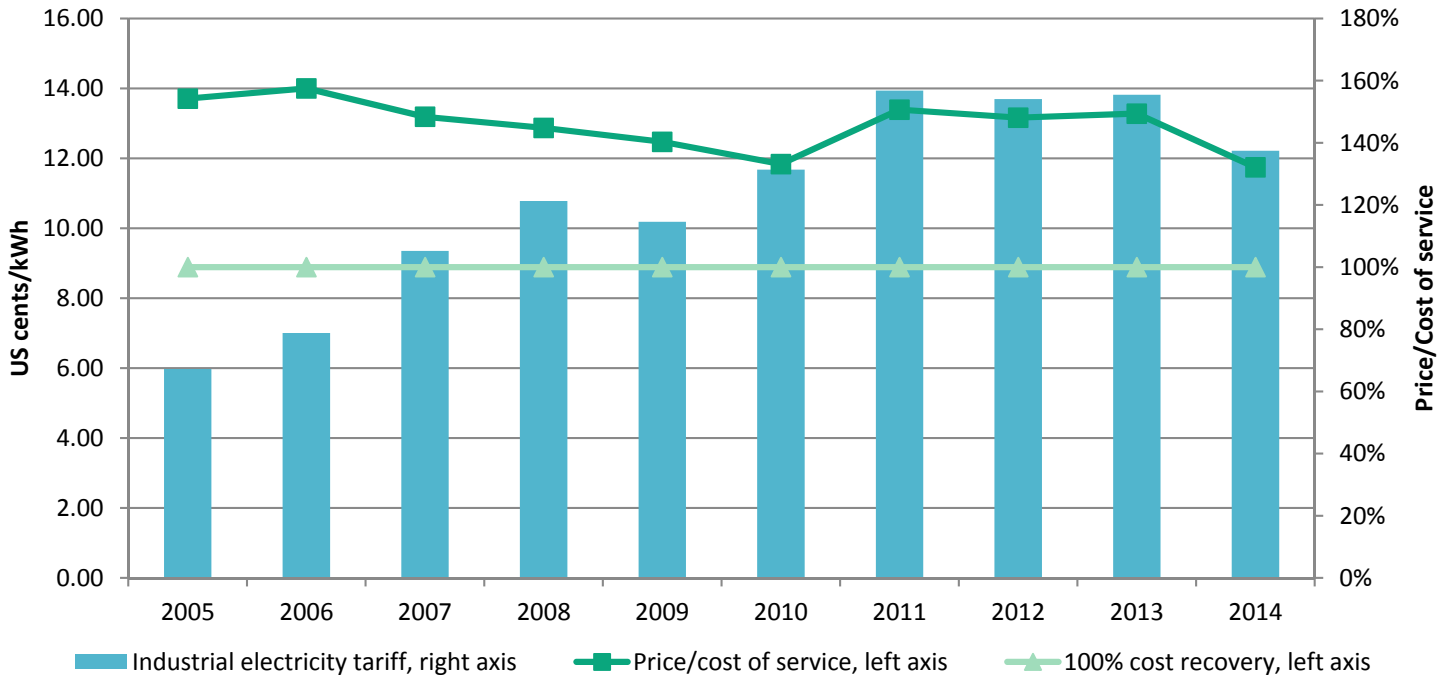
- ZhKH accounts for about 40%; Belenergo for 60%



Source: Ministry of Energy, Ministry of Housing and Utilities, and World Bank staff calculation

Cross-subsidies add costs to business

- Industrial electricity prices are, on average, **150%** of cost of service to subsidize underpriced residential heat



Source: Ministry of Economy

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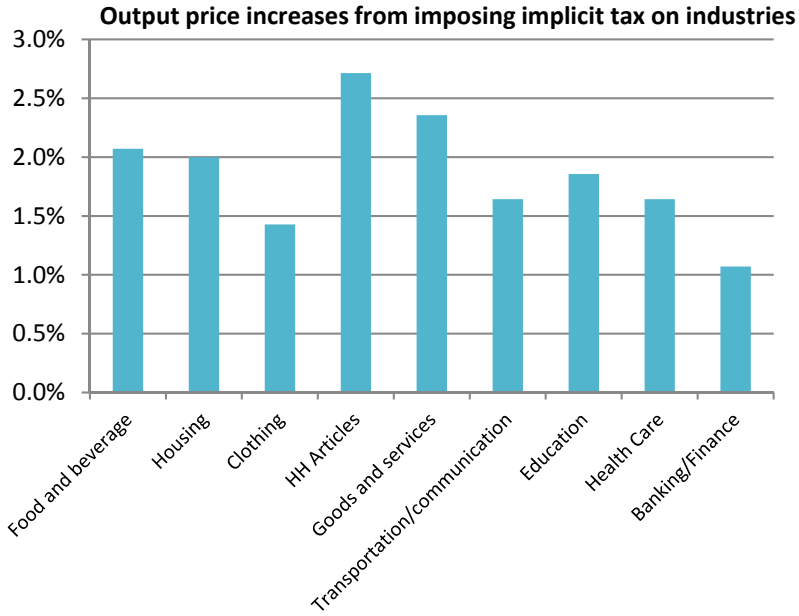
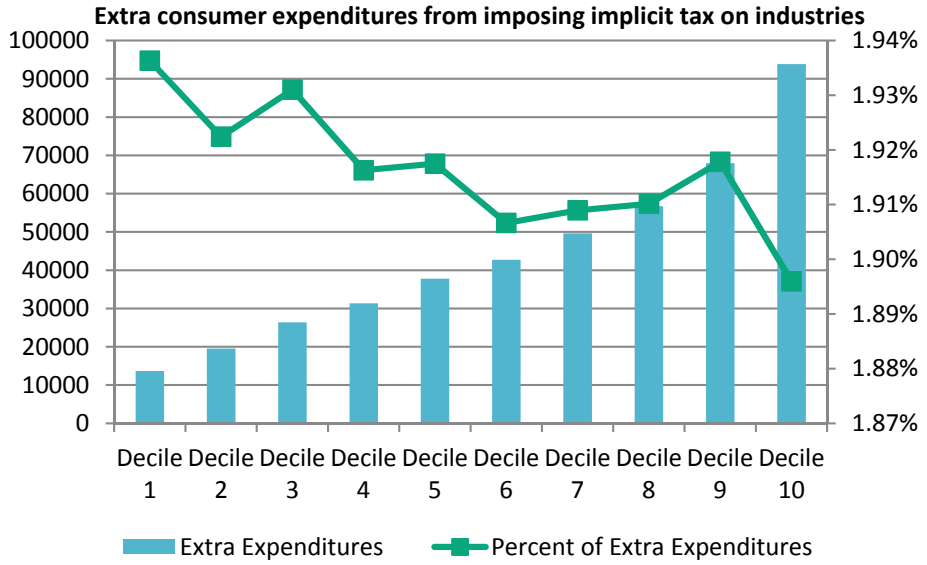
… and increase prices of consumer goods and services

- An implicit tax on industrial electricity use increases prices of key consumer products by 1-3%
- The tax burden on consumer products is modestly regressive





Source: Calculation based on HBS 2012 and Belarus input-output data 2009

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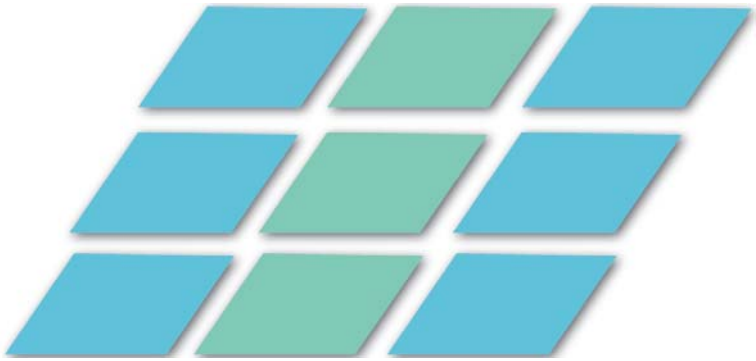
What are the impacts of tariff increase?



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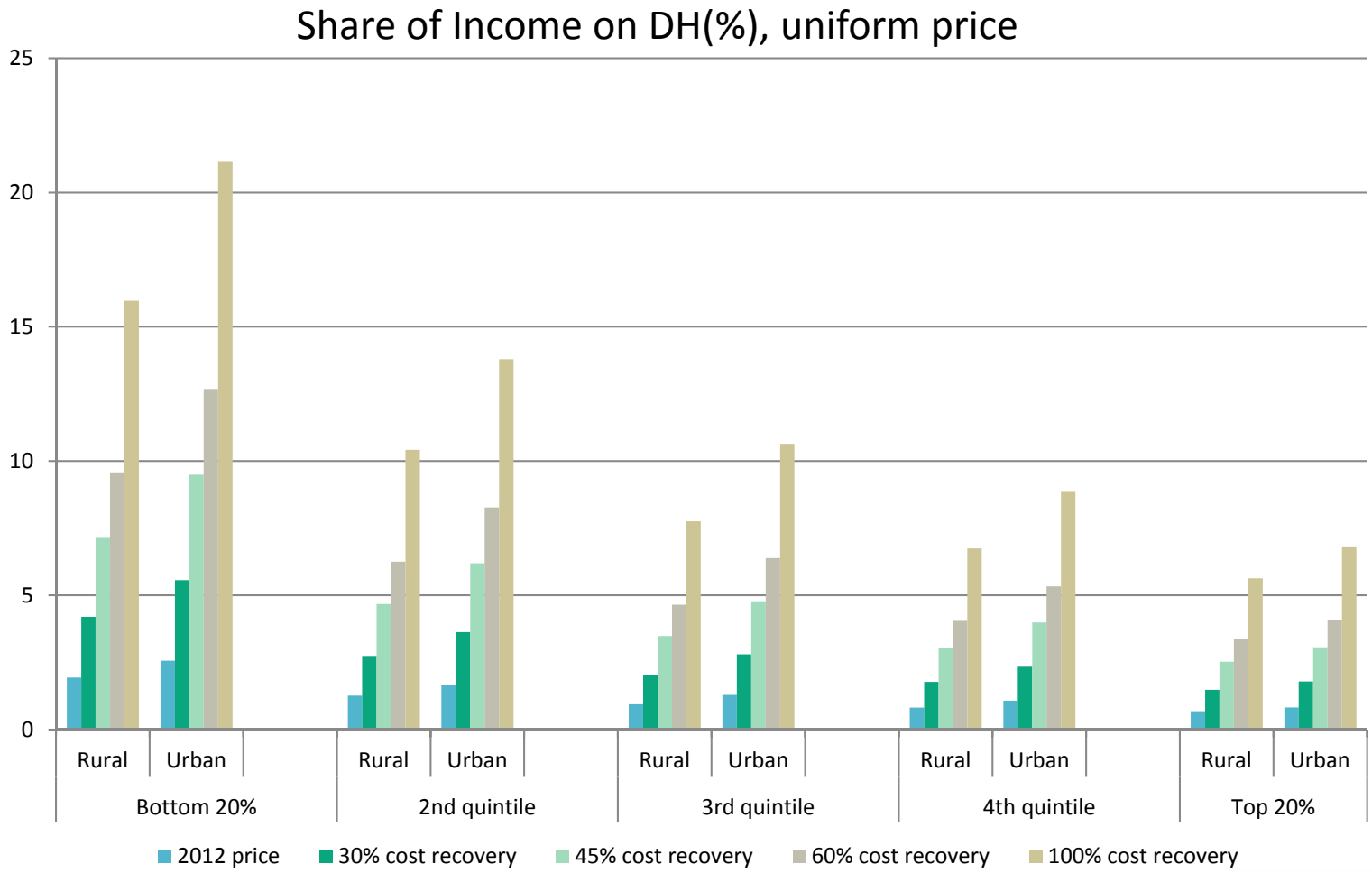
Under uniform price regime the most affected are the urban poor who are connected to DH



Source: Simulation based on HBS 2012

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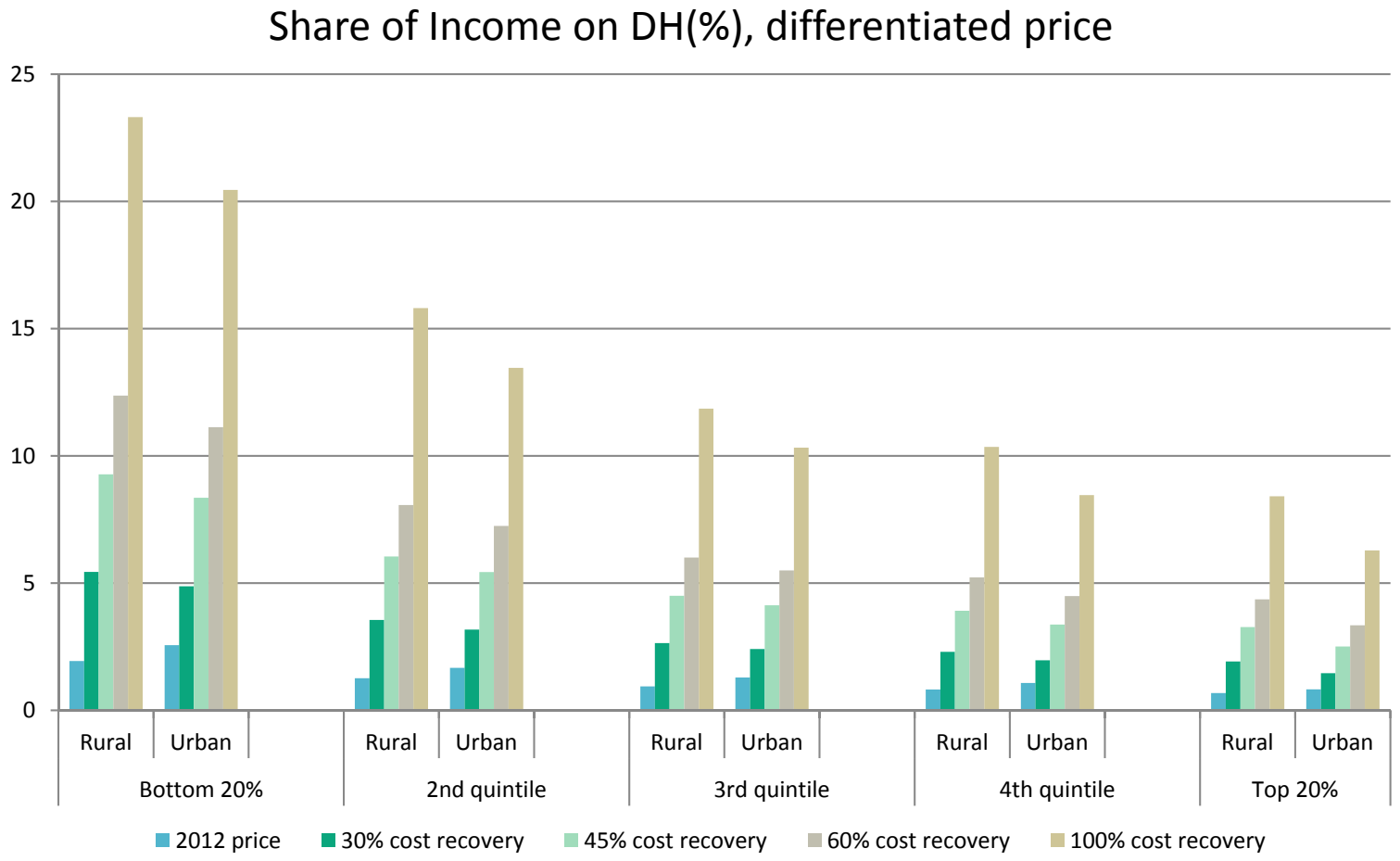
Under differential price regime, rural poor who are connected to DH are more vulnerable



Source: Simulation based on HBS 2012

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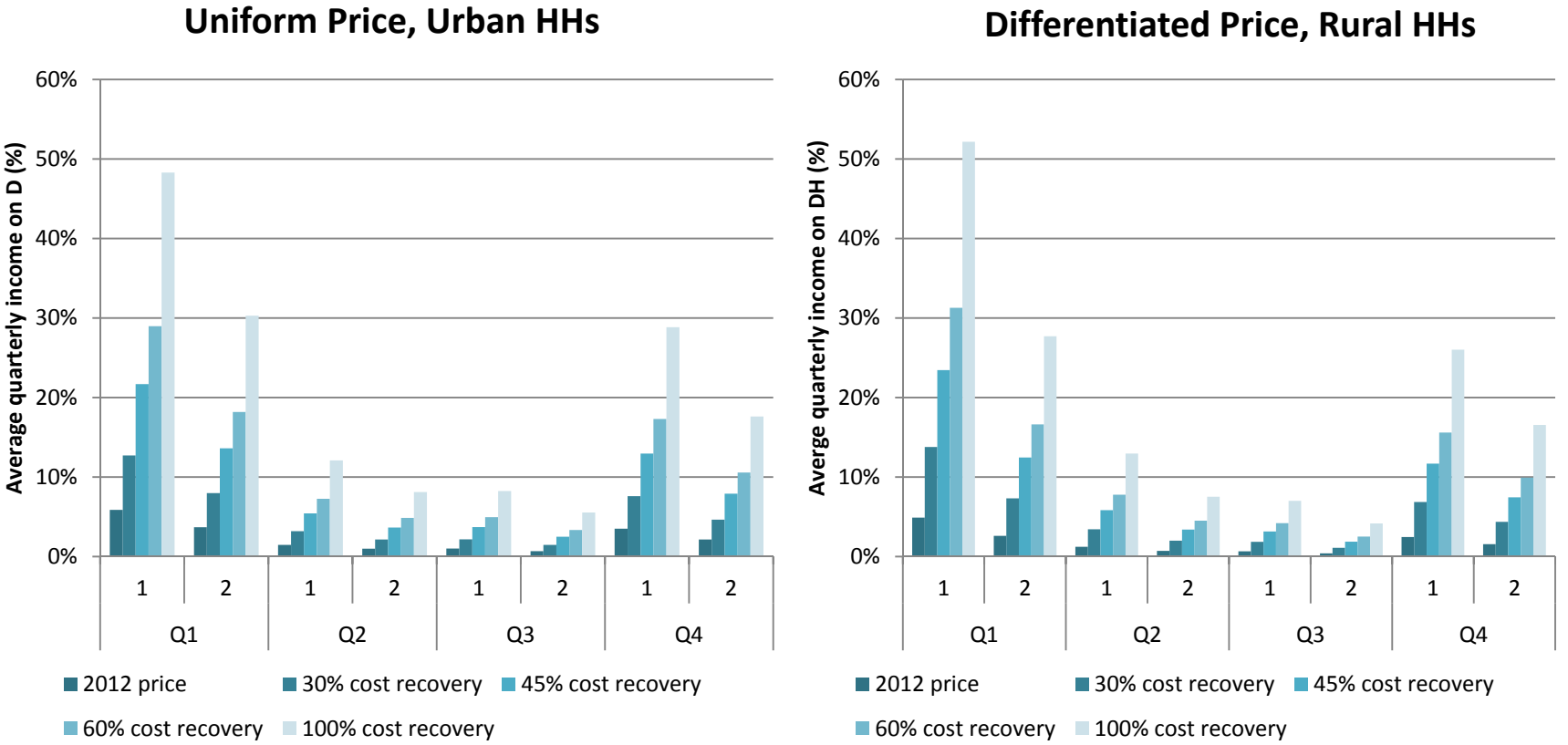
Impact will be the highest during Q1 and Q4

Share of average quarterly income on DH, bottom 40% HHs connected to DH



Note: The number 1 below each graph refers to the HHs in the bottom 20% income quintile; the number 2 refers to the HHs in the 2rd income quintile,; Q1-Q4 refers to quarter 1 – quarter 4.

Source: Simulation based on HBS 2012

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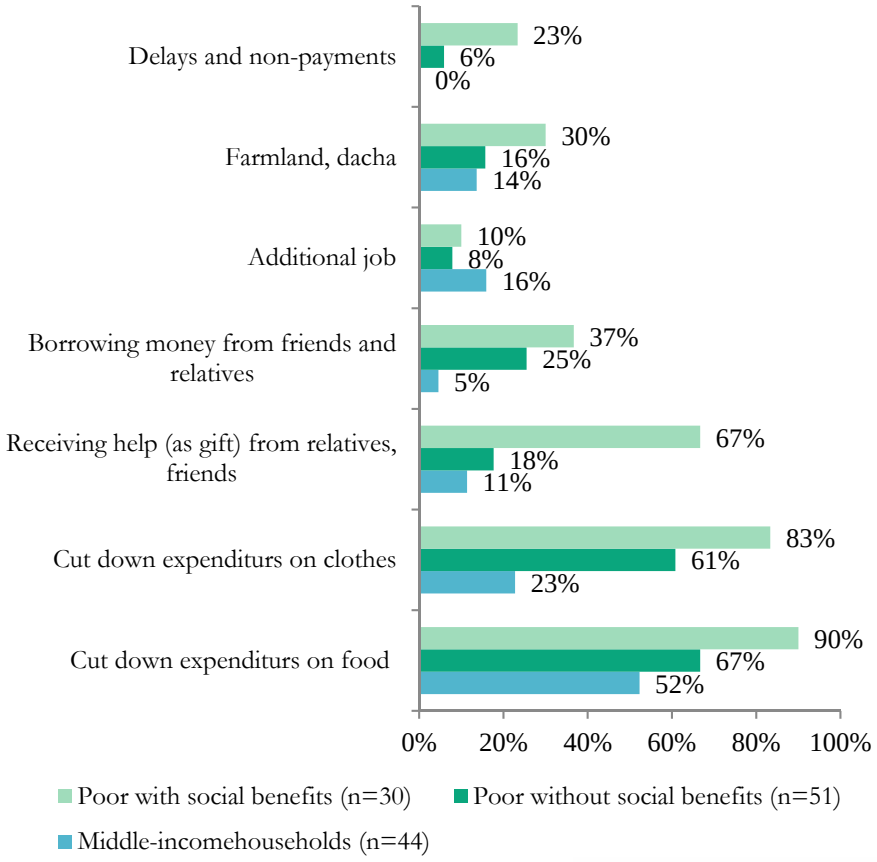
Reducing expenditures on food and clothes is the most common coping strategy

- How did HHs cope with DH tariff increase
  - **Reducing expenditure on other consumption, mainly food and clothes,** is used as a main coping mechanism to deal with increased tariffs during winter months
- Perceived ability to control bills
  - Majority of the HHs connected to DH are **unable to control their heating consumption**
  - In case of overheating focus group discussion participants prefer to open windows rather than report to service providers, in order to avoid conflict with neighbors

Source: Focus Group Discussion, February-March 2014

Coping strategies to deal with high payments of DH tariffs



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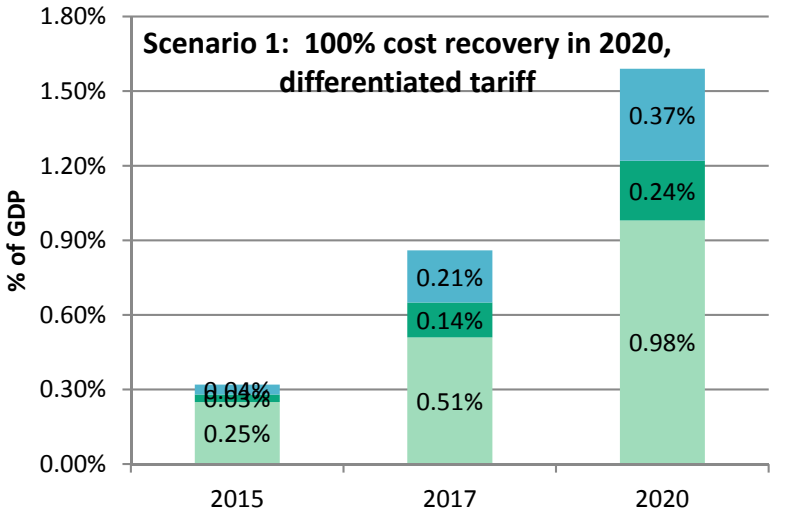
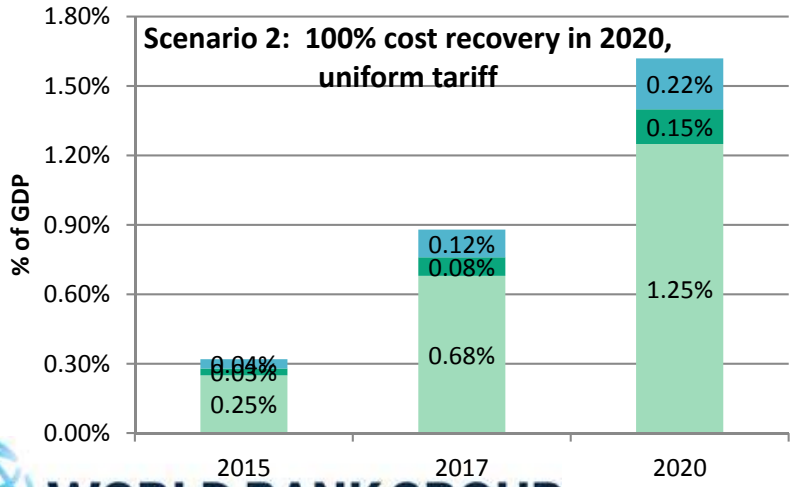
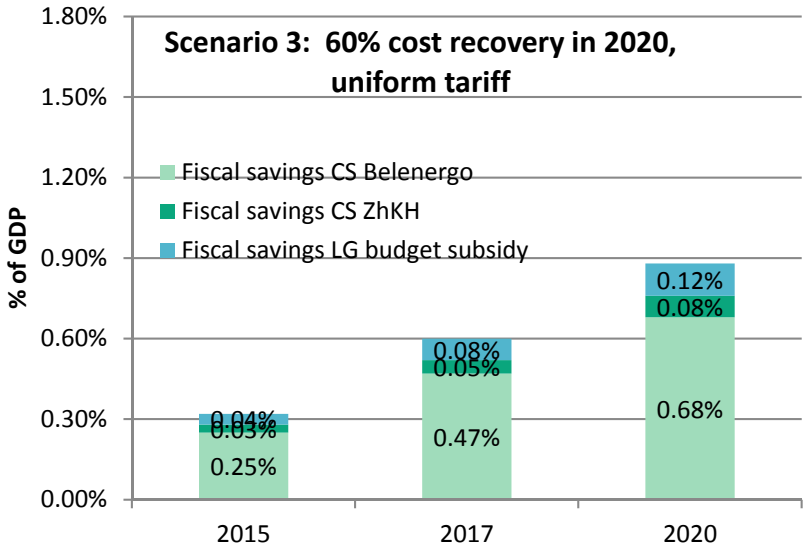
The tariff increase will generate fiscal savings







- Total fiscal savings and the revenue of ZhKH and Belenergo would increase over time
- The distribution of savings depends on the scenario
  - Under scenario 1, Belenergo residential heat sales will become profitable

Source: World Bank Staff Estimation

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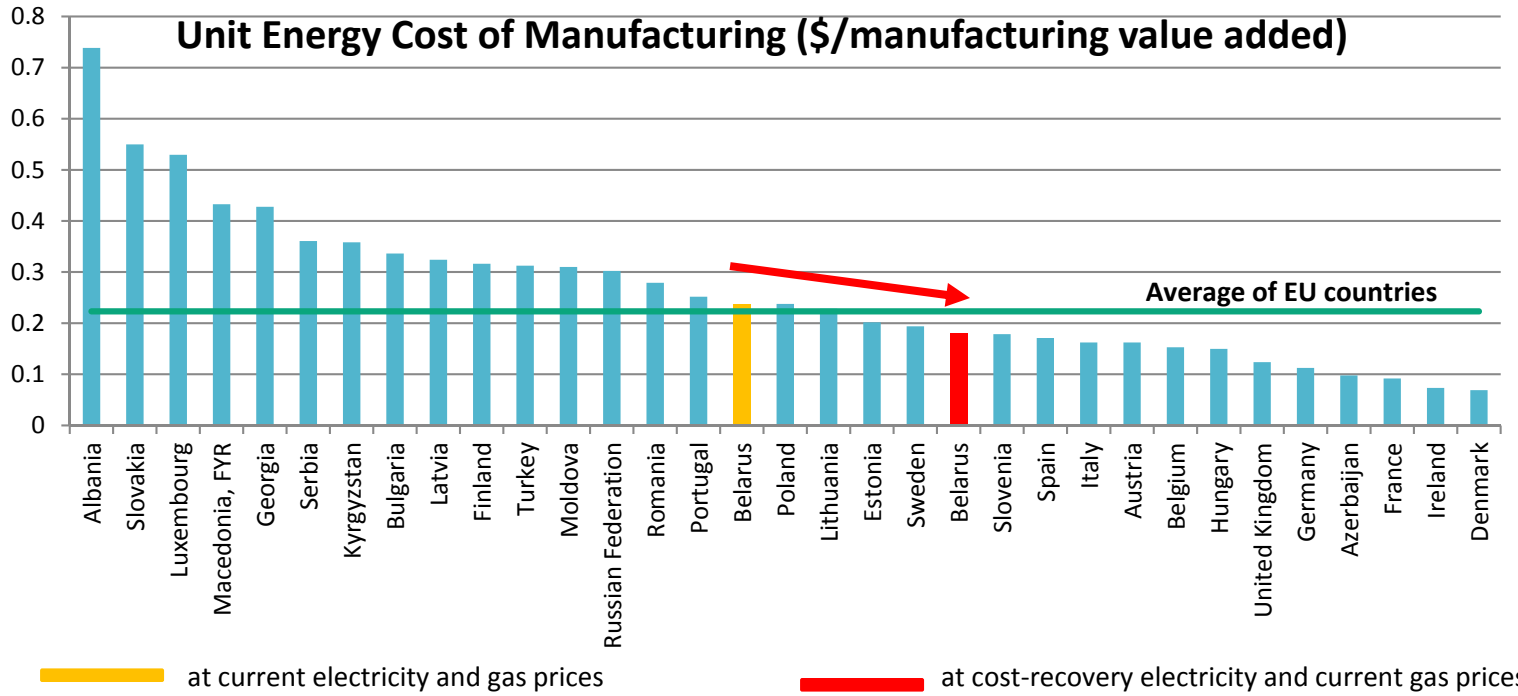
Reducing cross-subsidies could improve industry competitiveness

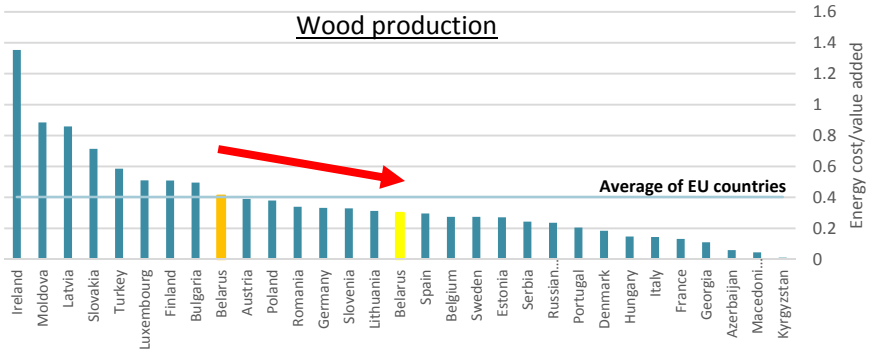
- Average energy cost of manufacturing could be reduced by 24%

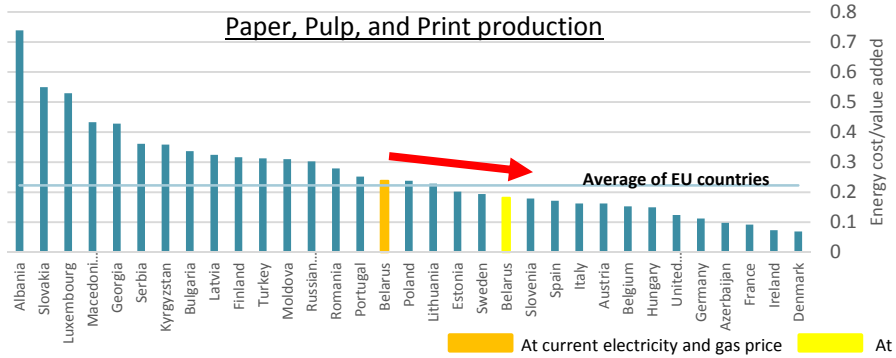


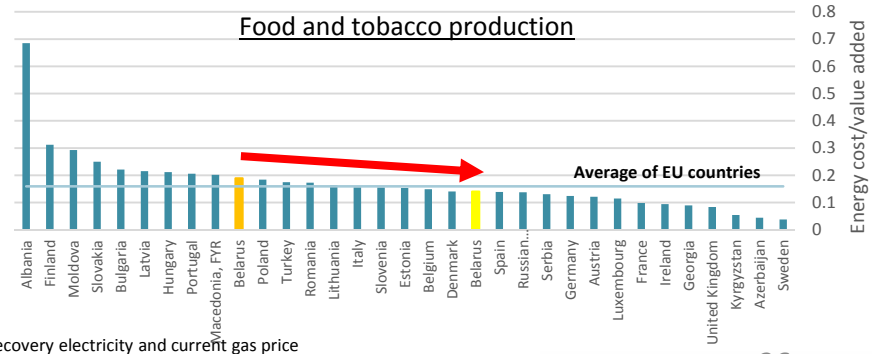
Source: Calculation based on IEA World Energy Statistics and Balances , ERRA Tariff , Eurostat and UNIDO Industrial Statistics Databases (2009)

Reducing cross-subsidies could improve business competitiveness, especially for the wood, food, textile, and paper industries

- Unit energy cost of wood, food, textile and paper industries would be reduced by between 25 to 28%, respectively







At current electricity and gas price At cost recovery electricity and current gas price

Source: Calculation based on IEA World Energy Statistics and Balances , ERRA Tariff , Eurostat and UNIDO Industrial Statistics Databases (2009)

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How to implement tariff reform

Communication and consumer engagement

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HHs perceptions on reform of DH tariffs

- Perceptions on DH tariffs and service providers
  - **Little knowledge** on how tariffs are determined and how bills are calculated

- Attitudes towards increasing DH tariff
  - **Low awareness** of tariff reform and the cross-subsidization system
    - Usually HHs learn about tariff increase only after receiving the bill
  - **Limited public support** and **understanding** of the rationale for tariff reform

Source: Focus Group Discussion, February-March 2014

Factors which would increase acceptance of DH tariff reform:

- **Corresponding increase of salaries and other benefits**, i.e. pensions and social assistance
- **Improved sector efficiency**
  - Adopting new technologies and modernizing equipment to reduce cost of heat supply
  - Enhancing clarity and transparency of heating bills to increase trust in service providers
- **Introduction of individual metering**

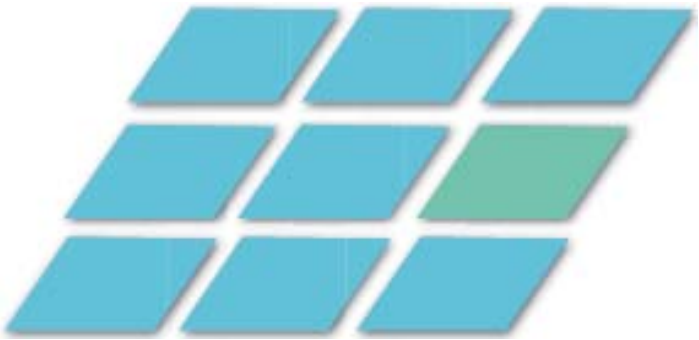
Source: Focus Group Discussion, February-March 2014

Implement strategic communication

- Develop a comprehensive communication strategy
  - Hold public forums to explain why a tariff increase is needed and how the amount is determined; encourage public discussion and debate on the proposed tariff reform.
  - Address consumers' key concerns related to tariff increases, i.e., transparency and effectiveness in the heating sector
  - Present tariff reform as a commitment to improve social economic welfare, for example, by increasing energy security and making utility services sustainable
  - Explain the inefficiency of the current subsidy system which does not benefit those who need support the most
  - Explain the social protection mechanisms and energy efficiency investment implemented to mitigate the negative social impact of tariff increases
  - Prepare utilities and local authorities to communicate effectively with customers
- Use consumers' preferred channels of communication to convey information about utility services
  - These include utility bills, national and local mass-media, tenant meetings, hotlines, information boards, and internet.
  - The channels and messages should be selected to reach audiences of diversified age, gender, location, occupation, and income, as well as recipients of targeted social assistance.

How to Implement Tariff Reform

Improve Social Protection Mechanisms



Improve the social protection system

- Existing social assistance system is not sufficient to mitigate the impact of tariff increase on the poor
  - Existing social assistance benefits are categorical, skimpy, poorly targeted, with only 22% received by the poorest quintile
  - The only poverty-targeted benefits--GASP--have low coverage
    - Only 1.4% of total population covered
    - Short-term income support (6 months of the year)
    - Budget is 0.08% of GDP

Options for improving social protection system

1. Link the mitigation measures to the existing poverty-targeted cash transfers program:
   - expand GASP
   - top up GASP
     - Linked to energy payments and heating seasons
2. Re-introduce and refine the H&U subsidy benefit:
   - "old" program that existed until 2010
   - refined "new" benefit
     - Progressive income-related thresholds
       - HHs from the 1st, 2nd and 3rd decile to be compensated for the expense above 10%, 15%, and 20% of their income, respectively
3. Level pay plan
   - Allow customers to average annual energy costs over a 12-month period.

Comparison of SP: performance and budget

		Benefit coverage		Targeting accuracy		Budget per year, % GDP	
		2015	2017	2015	2017	2015	2017
Expand GASP (20% of population)	1st decile	52	51	42	41	0.43	0.36
	2nd decile	48	52	21	24	0.22	0.22
	3rd – 10th deciles	12	12	37	35	0.38	0.31
	Total	20	20	100	100	1.03	0.89
Expand GASP (10% of population) + Top up GASP (10% of population)	1st decile	100	100	59	59	0.26	0.25
	2nd decile	81	83	20	23	0.09	0.10
	3rd – 10th deciles	2	2	21	18	0.09	0.08
	Total	20	20	100	100	0.44	0.43
Old H&U benefit	1st decile	5	21	48	25	0.002	0.01
	2nd decile	1	10	15	12	0.001	0.01
	3rd – 10th deciles	1	5	37	63	0.002	0.03
	Total	1	7	100	100	0.005	0.05
Refined H&U benefit	1st decile	27	61	84	60	0.012	0.04
	2nd decile	3	18	12	16	0.002	0.01
	3rd – 10th deciles	0	3	5	25	0.001	0.02
	Total	3	10	100	100	0.014	0.07

Source: World Bank staff estimation based on HBS2012

Comparison of SP: poverty impact

		Total population		1st decile		2nd decile	
		2015	2017	2015	2017	2015	2017
National poverty line	Before transfers	1.8	4.3	18.2	42.4	0	0
	Expand GASP	0.9	2.1	8.6	20.6	0	0
	Top up GASP	0.8	1.6	8.02	15.91	0	0
	Old H&U benefit	1.8	4.1	18.1	41.4	0	0
	Refined H&U benefit	1.8	3.9	17.5	38.9	0	0

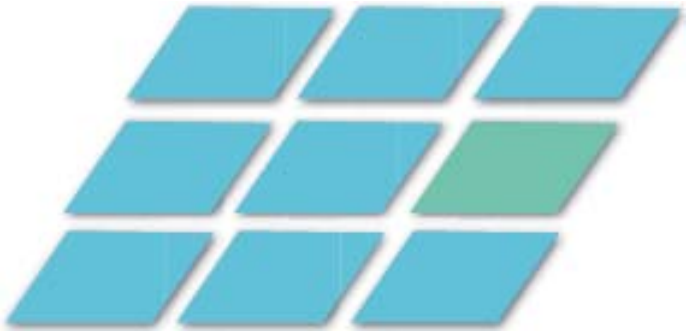
		Total population		1st decile		2nd decile	
		2015	2017	2015	2017	2015	2017
H&U poverty rate (H&U costs greater than 15% of total incomes per year)	Before transfers	1.1	5.9	5.3	18.9	1.4	7.7
	Expand GASP	0.8	4.1	3.1	8.3	0.9	3.8
	Top up GASP	0.5	3.5	0.8	2.5	0.6	1.9
	Old H&U benefit	1.0	4.9	4.9	16.0	1.4	6.1
	Refined H&U benefit	0.5	3.5	0.7	1.3	0.5	3.9

Source: World Bank staff estimation based on HBS 2012

Note: National poverty line in November 2012: BYR 880,030 per capita per month.; Welfare indicator: Total income per capita

How to Implement Tariff Reform

Energy Efficiency Measures



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Supply-side energy savings measures

- Replace low efficiency boilers with modern ones
- Converting from natural gas boilers to boilers using domestic renewable fuels
- Replace steam with hot water boilers
- Replace network parts that have high losses with pre-insulated pipes
- Reduction of the network dimension and optimization of the network routes

Source: Case studies of three DH systems: Baranovichi, Volkovysk, Starye Dorogi

Economic assessment of supply-side EE measures

- Feasibility and pay-back time of supply-side EE measures usually depend on the details and parameters of DH system
- Typical EE measures in case study towns are presented below

	Investment cost (000 USD)	Reduction of gas use (000 m3)	Economic rate of return	Net present value (US$ million)
Replacement of base load NG boilers	522	569	49%	1
Replacement of peak load NG boilers	522	119	4%	-0.17
Replacement of base load NG boilers with wood biomass boilers	8.5	5,303	13%	1.49

Source: Case studies of three DH systems: Baranovichi, Volkovysk, Starye Dorogi

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Source: Case studies of three DH systems: Baranovichi, Volkovysk, Starye Dorogi

Demand side EE measures

Suggested demand-side EE measures are targeted at saving heat in existing buildings:

- Window replacement (double or triple panel glass windows)
- Insulation of external walls
- Roof insulation
- Installation of thermostatic valves in flats (apartment-level heat metering)
- Installation of house level heat substation (ITP) (building-level heat metering)

Costs and energy saving potential (overall building space heating consumption):

EE measure	Unit	Unit cost (USD)	Potential energy saving (%)
Window replacement			
Double pane windows	m2	100	18%
Triple pane windows	m2	150	26%
External wall	m2	65	30%
Roof insulation	m2	30	6%
Radiator thermostatic valves	piece	40	5%
House level heat substation (ITP)	piece	15 000	15%

Source: World Bank Staff Estimation based on energy audits in case study towns

Economic assessment of demand-side EE measures under current tariff levels

- Suggested EE measures are not economically feasible under current tariff levels
- Wall and roof insulation investments have longest paybacks ; IRRs <discount rate

EE measures	Investment (whole building) (USD)	Simple payback (years)	EIRR (%)	NPV (USD)
Window replacement				
Double pane windows	62 480	70.5	10.6	49 253
Triple pane windows	93 720	73.2	10.8	74 298
External wall	157 625	106.7	13.3	130 717
Roof insulation	31 170	105.5	13.2	25 821
Radiator thermostatic valves	7 176	29.1	3.7	-4 427
House level heat substation (ITP)	15 000	20.3	0.2	-7 347
Total Investment	367 171	75.4	-11	242 610

Source: World Bank Staff Estimation based on energy audits in case study towns

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EE impact on HHs energy costs

- Supply-side EE will result in 9% reduction of the energy costs of an average HH
- Implementation of both supply and demand-side EE measures could reduce energy cost for an average HH by 41-46%

			Before EE Measures			After Supply-side EE Measures			After supply and demand-side EE Measures		
			2015	2017	2020	2015	2017	2020	2015	2017	2020
Heat consumption of an average HH	Gcal/y		9.2	9.2	9.2	9.2	9.2	9.2	5.9	5.9	5.9
Heating cost of an average HH	USD	Scenario 1 (Belenergo)	156	220	367	142	200	334	92	130	217
		Scenario 1 (ZhKH)	156	403	672	130	336	559	84	218	364
		Scenario 2	156	312	519	136	272	453	88	177	177
		Scenario 3	156	234	312	136	204	272	88	132	
Reduction of heating cost of an average HH	%	Scenario 1 (Belenergo)				9%	9%	9%	41%	41%	41%
		Scenario 1 (ZhKH)				17%	17%	17%	46%	46%	46%
		Scenario 2				13%	13%	13%	43%	43%	43%
		Scenario 3				13%	13%	13%	43%	43%	43%

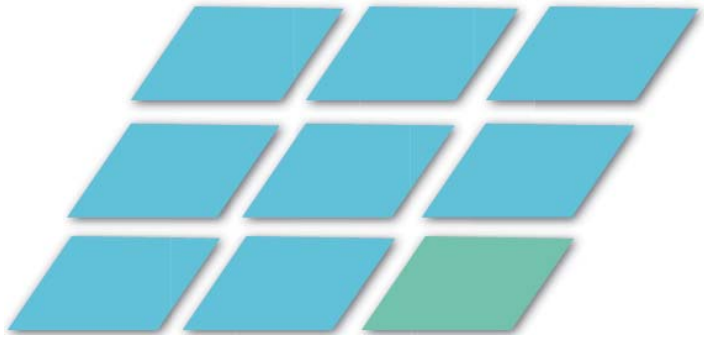
Source: World Bank Staff Estimation based on energy audits in case study towns

EE program targeted at low-income HHs can provide long-term support to DH affordability

- Preferential loan or grant to low-income HHs to improve demand-side EE
- Examples:
  - Brazil end-use EE program
    - Investment costs covered by utilities or shared with HHs
      - In the latter case, utilities offer financing schemes, including rebates and monthly payment
    - Eligibility determined by consumption levels and enrollment in other SP schemes
  - US Weatherization Assistance Program
    - Investment costs are covered by state grants
    - Eligibility: mainly based on income levels, using thresholds defined according to the national poverty guidelines

How to Implement Tariff Reform

Financing Mechanisms and Sequencing



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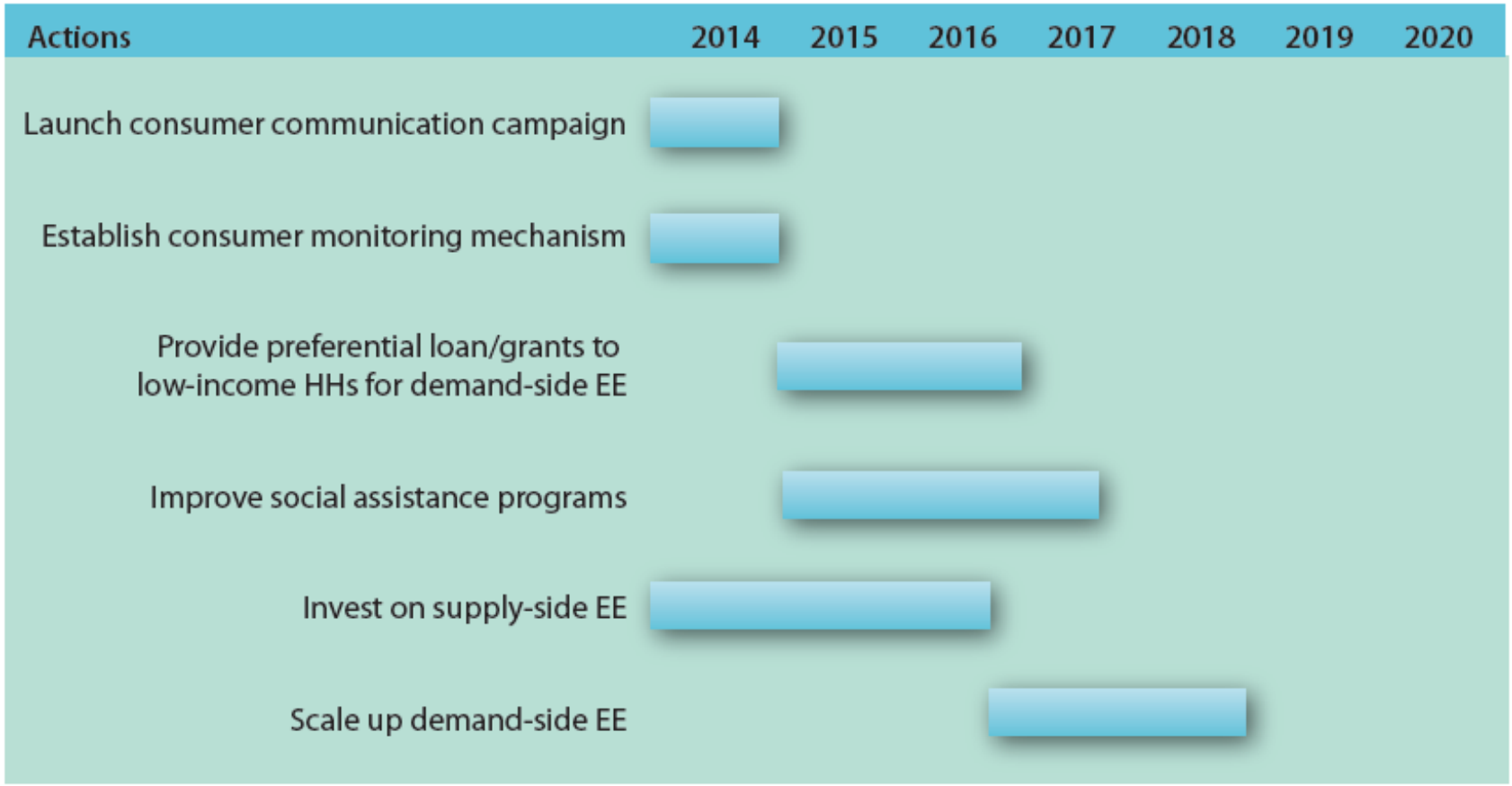
Reform packages with positive fiscal savings

Year	Fiscal Savings (US$ bln)			Budget of Social Protection (US$ bln)		EE Grant (US$ bln)	Industry Rebate (US$ bln)	Net Fiscal Savings (US$ bln)
	Total	Local budget	Industry CS					
2015	0.15	0.02	0.13	refined H&U	0.01	0.12		0.02
2016	0.15	0.02	0.13	refined H&U	0.01	0.12		0.02
2017	0.29 ~0.41	0.04 ~ 0.1	0.25~0.31	refined H&U + Expand GASP	0.30			0~0.11
				refined H&U + Expand +top up GASP	0.19			0.09 ~0.21
2020	0.42~0.76	0.06~0.18	0.37~0.59				0.37~0.59	0.06~0.18

Note: Fiscal savings in 2017 and 2020 reflect the range under three tariff increase scenarios.
Source: World Bank staff estimation.

A recommended roadmap



Note: The start of the bar shows when to launch the proposed action; the end of the bar indicates when the activity will take effect to mitigate the adverse impact of tariff increase.