



Saudi Arabia's Energy Economy: The Impact of 2018's Energy Price Reforms

Anwar Gasim and Mohammad Al Dubyan

21/02/2019

Quick Facts About Saudi Arabia

- **GDP:** 2.58 trillion Saudi Riyals (SR) as of 2017 (about 75.19 trillion JP¥)
 - One fifth of GDP for the entire Middle East and North Africa (MENA) region
 - Member of the G20
 - GDP per capita of 79 thousand SR (about 2.3 million JP¥)
- **Population:** 32.6 million as of 2017
 - 20.4 million Saudis and 12.2 million expats
 - 50% of total population under 30 years of age
- **Energy:** Saudi Arabia plays an important role in global energy markets
 - Largest exporter of crude oil
 - One of the largest energy consumers in MENA
 - One of the highest CO2 emissions in MENA

Vision 2030

- In April 2016, Saudi Arabia announced **Vision 2030**, a strategic plan with three pillars:
 - A vibrant society
 - A thriving economy
 - An ambitious nation
- Programs were launched as part of Vision 2030, each of which include:

Saudi Vision 2030

PIF Program

National Transformation
Program

Fiscal Balance Program

Privatization Program

Initiative

Initiative

Initiative

Initiative

Initiative

Initiative

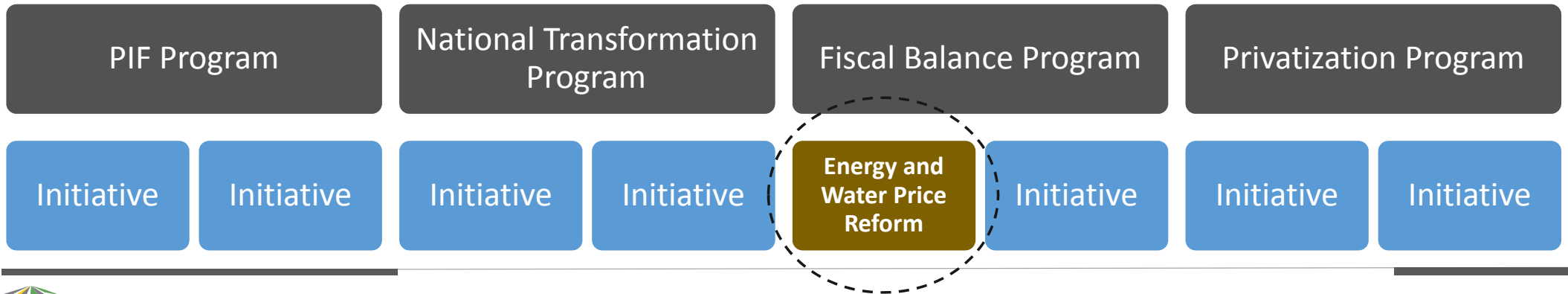
Initiative

Initiative

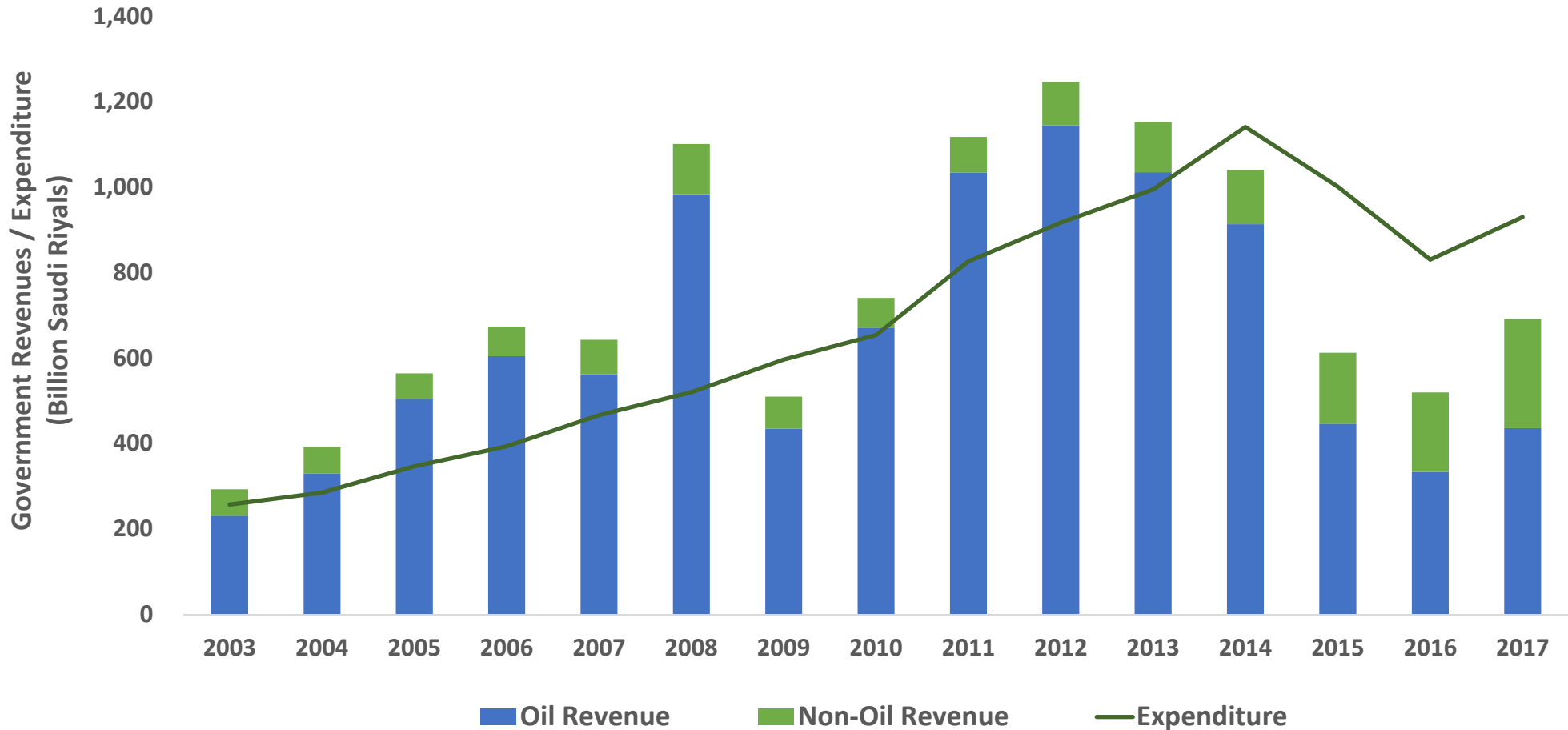
Vision 2030

- In April 2016, Saudi Arabia announced **Vision 2030**, a strategic plan with three pillars:
 - A vibrant society
 - A thriving economy
 - An ambitious nation
- Programs were launched as part of Vision 2030, each of which include:

Saudi Vision 2030



Government Revenues and Expenditure



Fiscal Balance Program

- Reliance on oil revenues is not a sustainable fiscal strategy.
- The main goal of the Fiscal Balance Program is **to achieve a balanced budget by 2023**. This requires:
 - A sustainable fiscal strategy
 - A more efficient government
 - A broader base of revenues
- To broaden revenues, the following reforms (or initiatives) have been implemented:
 - Energy and water price reform
 - Expat levies
 - VAT implementation (5%)

Implicit Energy and Water Subsidies

- The Kingdom has been providing electricity, fuel, and water to domestic consumers at low administered prices.
 - Significantly lower than export prices
 - Implicit subsidies (foregone revenues from selling at international prices)
- Energy and water subsidies are regressive:
 - Higher income households benefit most
 - Lower income households account for only ~30% of total subsidies
- Energy and water subsidies also:
 - Encourage wasteful consumption
 - Limit the incentive to invest in energy efficiency
 - Lead to a welfare loss for the economy

Energy Price Reform in 2018: Gasoline and Residential Electricity

Type	Prices Before Jan 1, 2018		Prices Starting Jan 1, 2018		% Change
	SR/Liter	JP¥/Liter	SR/Liter	JP¥/Liter	
<u>Gasoline</u>					
91 Gasoline	0.75	21.9	1.37	40.00	+83%
95 Gasoline	0.90	26.28	2.04	59.57	+127%
<u>Electricity</u>					
	SR/kWh	JP¥/kWh	SR/kWh	JP¥/kWh	
0-2000 kWh	0.05	1.46	0.18	5.26	+260%
2001-4000 kWh	0.10	2.92	0.18	5.26	+80%
4001-6000 kWh	0.20	5.84	0.18	5.26	-10%
6001+ kWh	0.30	8.76	0.30	8.76	0%

Modelling Saudi Energy Demand Using STSM

- The **Structural Time Series Model (STSM)** was used to model energy demand in Saudi Arabia. KAPSARC has so far modelled:
 - *Annual residential electricity demand*
 - *Annual gasoline demand*
 - *Annual aggregate industrial energy demand*
- Unlike other econometric approaches, the STSM can incorporate a **stochastic trend**.
 - This results in more realistic energy demand models
 - Accounts for the impact of potentially non-linear exogenous factors
- KAPSARC has a project that uses the STSM to study energy demand for different sectors of the Saudi economy.
 - Project Title: **Modeling Final Energy Demand in Saudi Arabia Using the STSM**

Energy Price Reform: Impact on Social Welfare

- **Welfare economics** looks at how different policies lead to gains/losses to market participants.
- Three key groups:
 - Consumers (**consumer surplus** measures their well-being)
 - Producers (**producer surplus**, similar to profits, measures their well-being)
 - Government (**government revenues** measures their well-being)
- Energy price reform leads to:
 - Consumer surplus loss
 - Producer surplus gain
 - Government revenue gain

We calculated these using the estimated STSMs for each sector

Total surplus gain = (producer surplus gain + increase in government revenues) – consumer surplus loss

Energy Price Reform: Impact on Social Welfare

- Energy consumption is associated with several negative external costs, such as greenhouse gas (GHG) emissions.

Gasoline consumption is associated with:	Electricity consumption is associated with:
GHG emissions (0.4 SR/liter or 10.9 JP¥/liter)	GHG emissions (43.5 SR/MWh or 1270.5 JP¥/MWh)
Air pollution (0.1 SR/liter or 3.3 JP¥/liter)	Air pollution (3.6 SR/MWh or 105.2 JP¥/MWh)
Congestion (0.6 SR/liter or 18.1 JP¥/liter)	
Accidents (1.2 SR/liter or 36.3 JP¥/liter)	

- Energy price reform delivers a reduction in these negative external costs. The total welfare gain is therefore given by:

Total welfare gain = total surplus gain + reduction in negative externalities

Energy Price Reform: Impact on Social Welfare

- KAPSARC's analysis reveals the following **annual gains in total surplus**:
 - **Gasoline price reform**: 1.6 billion SR
 - **Electricity price reform**: 3.2 billion SR
 - **Total**: 4.8 billion SR (0.14 trillion JP¥)

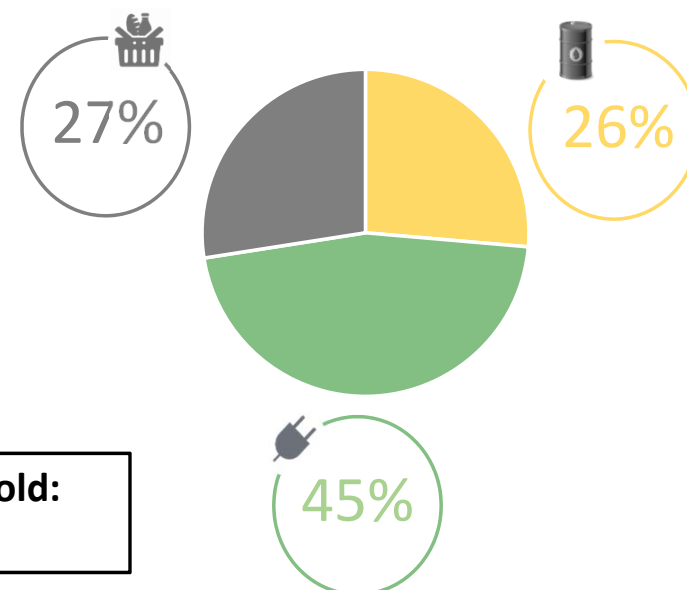
- Including the **annual reduction in negative externalities**, the annual net welfare gain is found to be:
 - **Gasoline price reform**: 8.9 billion SR
 - **Electricity price reform**: 3.9 billion SR
 - **Total**: 13.8 billion SR (0.40 trillion JP¥)

Energy Price Reform: Impact on Government Revenues

- It is important to focus on the impact of price reform on the government and its revenues.
- Energy price reform in 2018 led to the following increases in government revenues according to KAPSARC estimates:
 - **Gasoline:** 25.1 billion SR
 - **Electricity:** 16.7 billion SR
 - **Total:** 41.8 billion SR (1.22 trillion JP¥)
- Revenues for the Saudi government in 2017 totaled 692 billion SR (20.21 trillion JP¥).
 - Electricity and gasoline price reform together delivered an annual revenue gain of 6%

Citizen's Account

- The government aims to protect the minimum energy consumption needs of households with lower income.
- **Citizen's Account:** A program that compensates lower- to middle-income households for the negative impacts of reforms.
- The Citizen's Account provides compensation for:
 - **Gasoline price reform**
 - **Electricity price reform**
 - **Other reforms** such as VAT + indirect effects



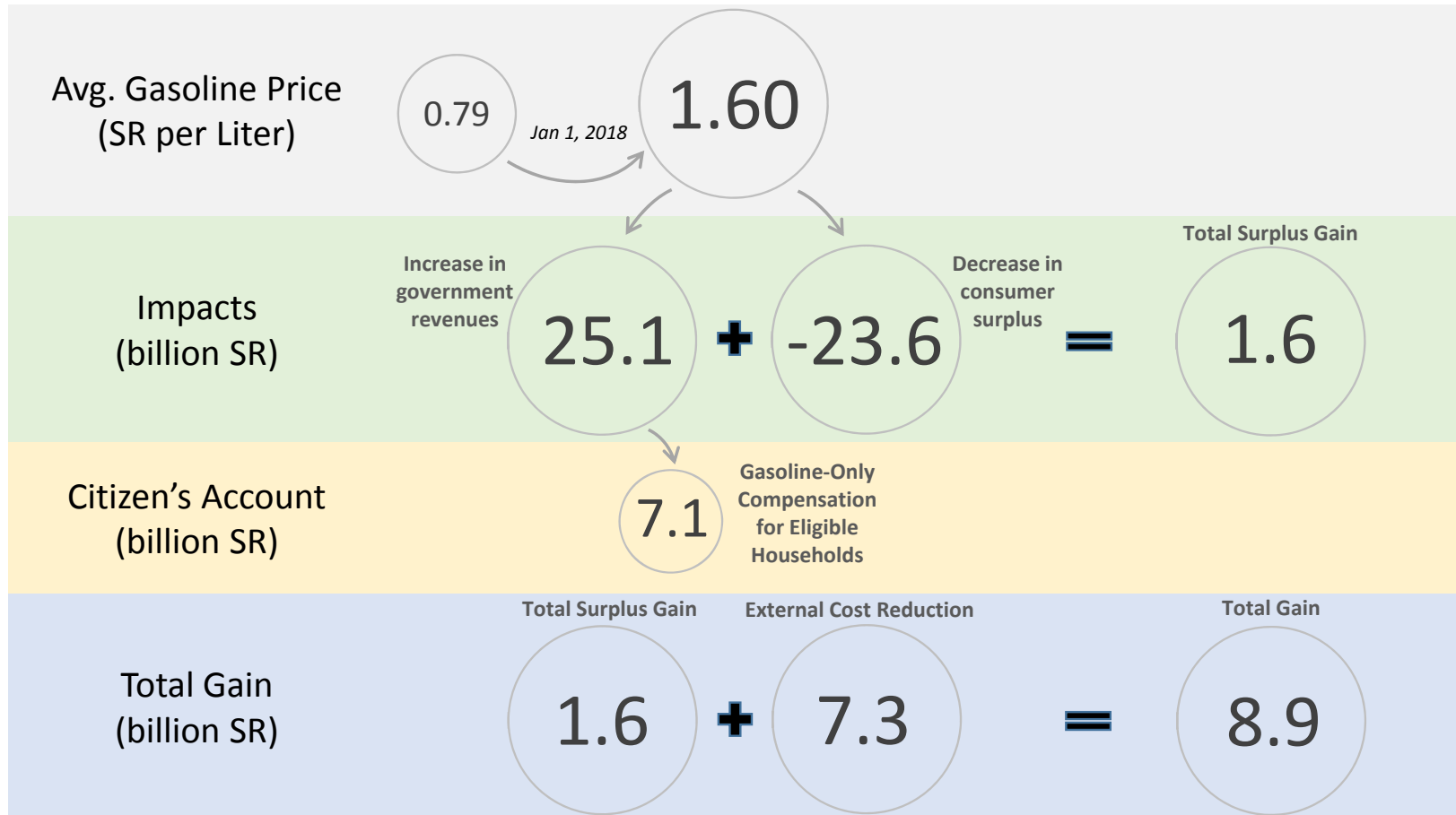
Median monthly cash transfer to eligible household:
~930 SR per month (27,175 JP¥)

Citizen's Account

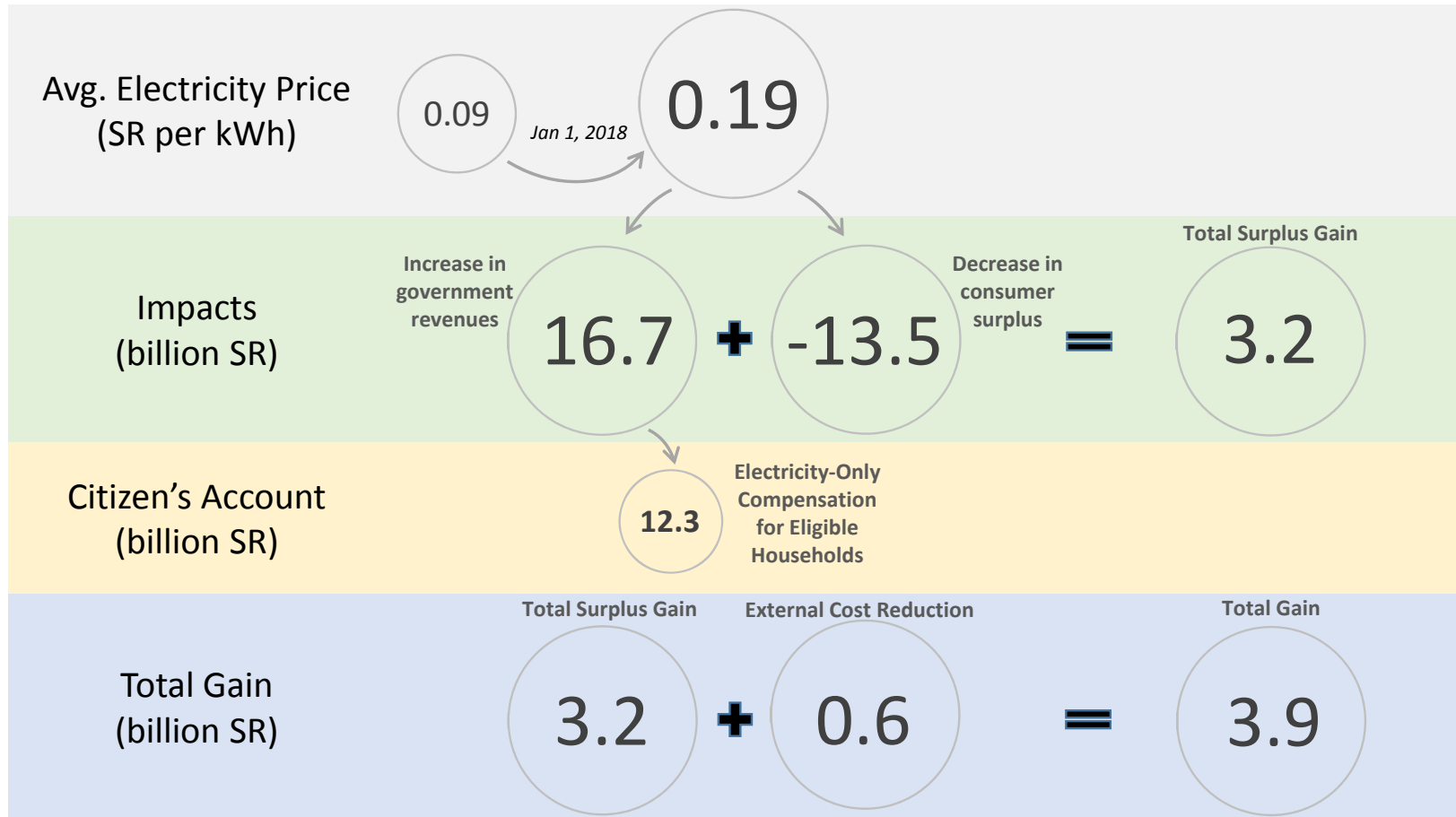
- Annual increase in government revenues due to gasoline and electricity price reform:
 - 41.8 billion SR (1.22 trillion JP¥)
- Total annual compensation for households:
 - **Gasoline compensation:** 7.1 billion SR
 - **Electricity compensation:** 12.3 billion SR
 - **Total:** 19.4 billion SR (0.57 trillion JP¥)
- Net gain for the government:
 - 22.4 billion SR (0.65 trillion JP¥)

Month	Total Cash Transfer to Households (Billion SR)	Number of Beneficiaries (million persons)
Dec	2.0	10.6
Jan	2.1	11
Feb	2.2	11.6
Mar	2.2	11.9
Apr	2.3	12.2
May	2.4	12.3
Jun	2.4	12.5
Jul	2.3	11.9
Aug	2.3	12.0
Sep	2.3	12.0
Oct	2.4	12.1
Nov	2.4	12.3
Total	27.3	

Summary: Gasoline Price Reform in 2018



Summary: Electricity Price Reform in 2018



Conclusions

- Energy price reform has delivered numerous benefits to the Saudi economy.
 - Total annual welfare gain: 13.8 billion SR (0.40 trillion JP¥)
 - This estimate is a lower bound, since it overlooks redistributive welfare gains
 - These welfare gains will continue to accumulate over the coming years
- Energy price reform will continue gradually up to 2023.
 - Gasoline and electricity prices for households expected to be revised quarterly
 - Upcoming plans for industrial fuel price reform
- There are also plans for water price reform.
 - Implementation has been slow due to issues with the water system infrastructure
- KAPSARC aims to continue expanding its research on energy demand in Saudi Arabia.