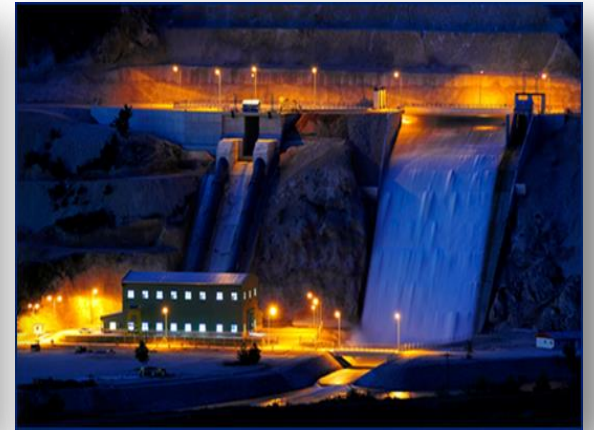
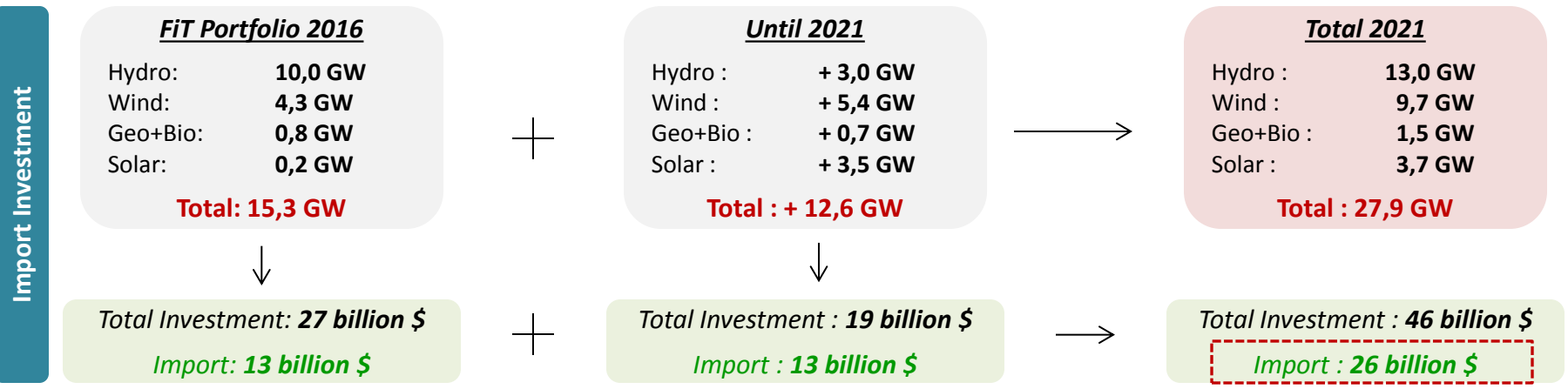


# Analysis of Turkish Green Economy Garanti Bank



# Feed-in tariff reduces natural gas import by 25 billion \$ until 2030

Import Analysis	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Feed-in Tariff Plants Generation (TWh)	47,5	56,1	64,1	71,0	76,9	82,0	82,0	82,0	82,0	82,0	82,0	82,0	82,0	82,0	82,0	1.135,4
- Feed-in Tariff Eligible	47,5	55,7	63,3	68,7	71,5	67,1	66,1	60,2	51,5	43,2	34,5	25,8	17,8	11,0	5,1	689,0
- Feed-in Tariff Non-Eligible	0,0	0,4	0,8	2,3	5,4	14,9	15,8	21,8	30,5	38,8	47,5	56,1	64,1	71,0	76,9	446,5
Production by CCGTs	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Equivalent CCGT Production (TWh)	40,4	47,7	54,5	60,4	65,4	69,7	69,7	69,7	69,7	69,7	69,7	69,7	69,7	69,7	69,7	965,1
Average Net Electrical Efficiency	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%
Natural Gas Consumption (bcm)	8,1	9,6	10,9	12,1	13,1	14,0	14,0	14,0	14,0	14,0	14,0	14,0	14,0	14,0	14,0	193,3
Natural Gas Price (\$/1000 m3)	220	220	250	275	280	280	280	280	280	280	280	280	280	280	280	270
<b>Natural Gas Saving (bn \$)</b>	<b>1,8</b>	<b>2,1</b>	<b>2,7</b>	<b>3,3</b>	<b>3,7</b>	<b>3,9</b>	<b>3,9</b>	<b>3,9</b>	<b>3,9</b>	<b>3,9</b>	<b>3,9</b>	<b>3,9</b>	<b>3,9</b>	<b>3,9</b>	<b>3,9</b>	<b>52,7</b>



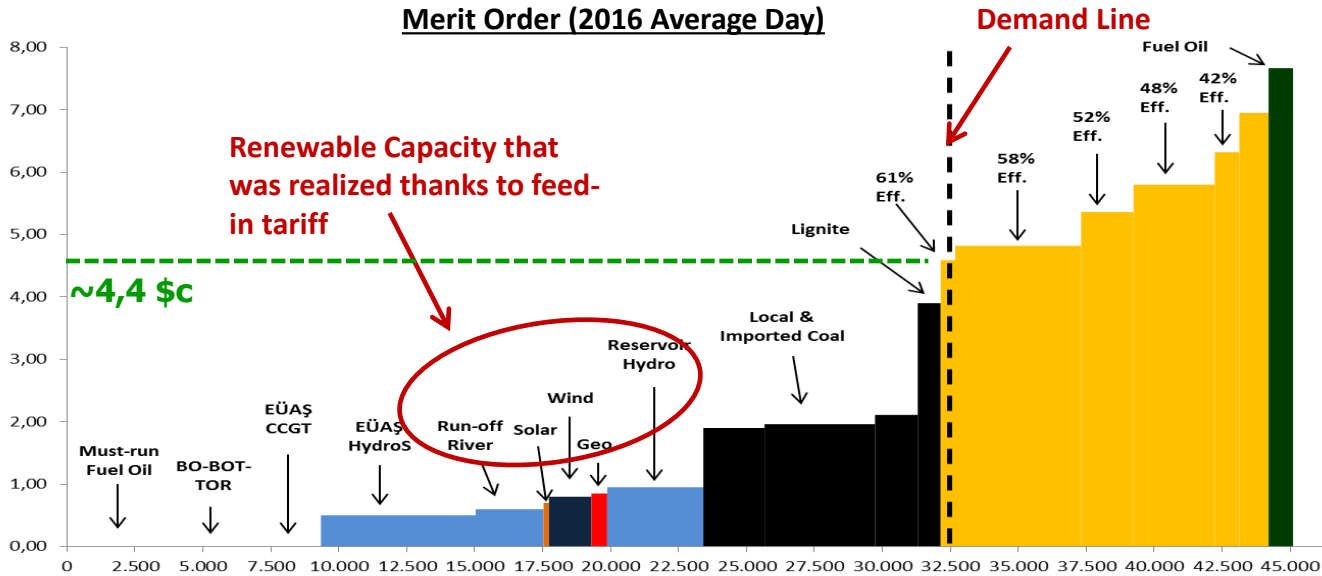
If these upcoming investments are not realized, Turkey may face supply security problems after 2023.



Besides,

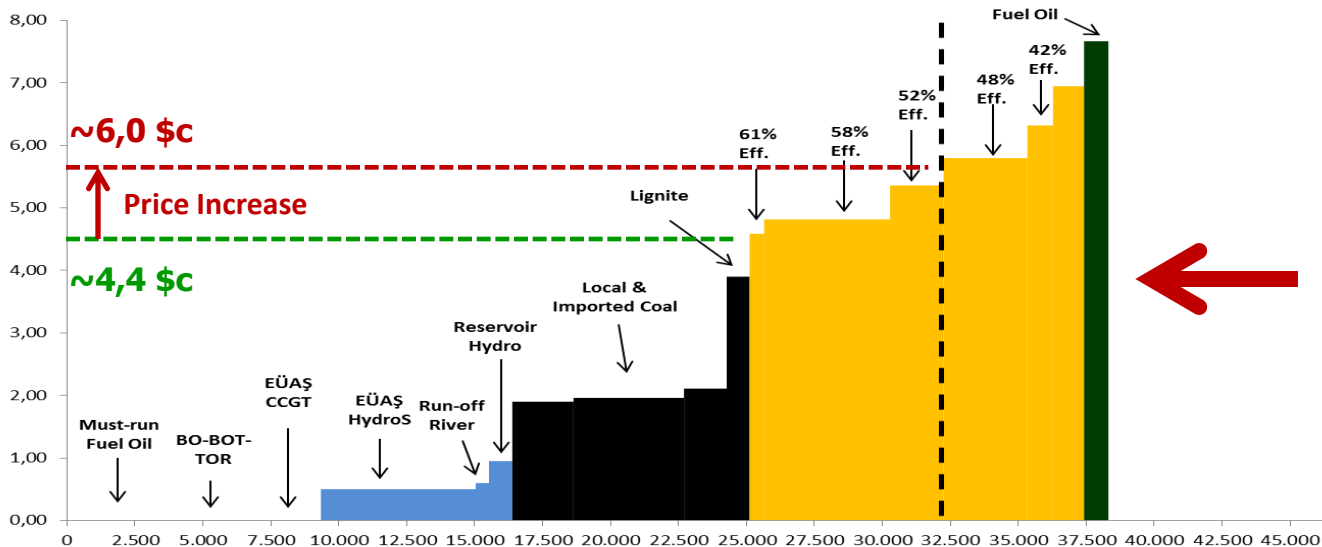
- (1) Natural gas import decreased 8 billion \$ in last 5 years thanks to renewable power plants.
- (2) In addition to natural gas saving, until 2030 these plants will offset 35 million tons CO<sub>2</sub> emission per year (~550 million tons CO<sub>2</sub> in total) and reduce Turkey annual emission by 8%. These plants will also have a 17% contribution to Turkey's target to reduce GHG emissions by 250 million tons in 2030.

# Without renewables electricity prices would have been higher



Without renewables, the number of hours in which low efficiency CCGTs are marginal plants would increase

→ Electricity prices would have been higher



Positive effect of ~15.000 MW feed-in tariff portfolio on 2016 electricity prices:  
+ 1,6 \$/kWh.

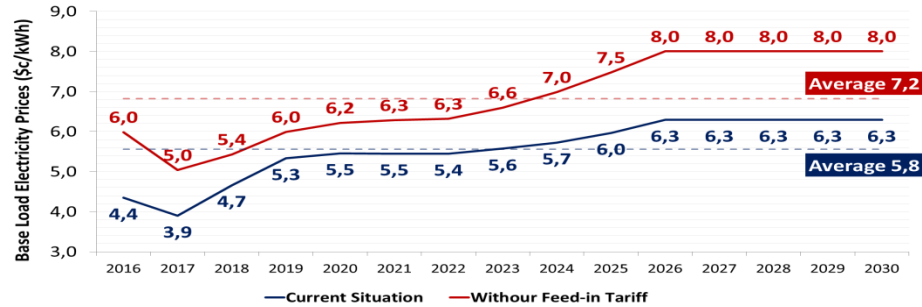
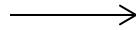
(Total electricity bill saving in 2016: ~2,5 billion \$)

# Feed-in tariff reduces electricity bill of end users by 50 billion \$ until 2030

Electricity Cost Without Feed-in Tariff

Without feed-in tariff

Renewable investments would not have been realized



Prices would have been ~1,4 \$c/kWh higher in average



Electricity Cost Analysis	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Total Consumption (TWh)	276	288	301	316	332	348	364	382	399	417	436	454	472	491	510	5.786
Consumption Indexed to Spot Prices	50%	50%	50%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	90%
Current Situation - Spot Prices (\$c/kWh)	4,4	3,9	4,7	5,3	5,5	5,5	5,4	5,6	5,7	6,0	6,3	6,3	6,3	6,3	6,3	5,8
Without FiT - Spot Prices (\$c/kWh)	6,0	5,0	5,4	6,0	6,2	6,3	6,3	6,6	7,0	7,5	8,0	8,0	8,0	8,0	8,0	7,2
<b>Additional Cost (bn\$)</b>	<b>2,3</b>	<b>1,6</b>	<b>1,2</b>	<b>1,0</b>	<b>2,5</b>	<b>2,9</b>	<b>3,2</b>	<b>3,9</b>	<b>5,0</b>	<b>6,3</b>	<b>7,4</b>	<b>7,7</b>	<b>8,1</b>	<b>8,4</b>	<b>8,7</b>	<b>70,2</b>

Feed-in Tariff Cost

Feed-in Tariff Cost Analysis	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Feed-in Tariff Portfolio (TWh)	47,5	55,7	63,3	68,7	71,5	67,1	66,1	60,2	51,5	43,2	34,5	25,8	17,8	11,0	5,1	689,0
Average Tariff (\$c/kWh)	7,9	8,1	8,2	8,3	8,3	8,5	8,5	8,5	8,5	8,6	8,7	8,7	8,8	8,7	8,8	8,4
Gross FiT Cost (bn\$)	3,8	4,5	5,2	5,7	6,0	5,7	5,6	5,1	4,4	3,7	3,0	2,2	1,6	1,0	0,4	57,8
Production Imbalance	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Imbalance Cost (bn\$)	0,3	0,4	0,4	0,5	0,5	0,5	0,4	0,4	0,4	0,3	0,2	0,2	0,1	0,1	0,0	4,6
Spot Prices (\$c/kWh) - 60 \$ LT oil scena	4,4	3,9	4,7	5,3	5,5	5,5	5,4	5,6	5,7	6,0	6,3	6,3	6,3	6,3	6,3	5,6
Feed-in Tariff Income (bn\$)	2,1	2,2	3,0	3,7	3,9	3,7	3,6	3,4	2,9	2,6	2,2	1,6	1,1	0,7	0,3	36,8
<b>FiT Cost (bn\$) - 60 \$ LT oil scenario</b>	<b>2,0</b>	<b>2,7</b>	<b>2,6</b>	<b>2,5</b>	<b>2,5</b>	<b>2,5</b>	<b>2,4</b>	<b>2,2</b>	<b>1,8</b>	<b>1,4</b>	<b>1,1</b>	<b>0,8</b>	<b>0,6</b>	<b>0,3</b>	<b>0,2</b>	<b>25,6</b>

Electricity Bill Saving +70 billion \$



Feed-in Fariff Cost -25 billion \$



Royalty Fee Payments +5 billion \$



Net Benefit 50 billion \$

# Analysis of Turkish Green Economy Garanti Bank

