Electricity consumption and crypto-mining in Georgia: What is the link?

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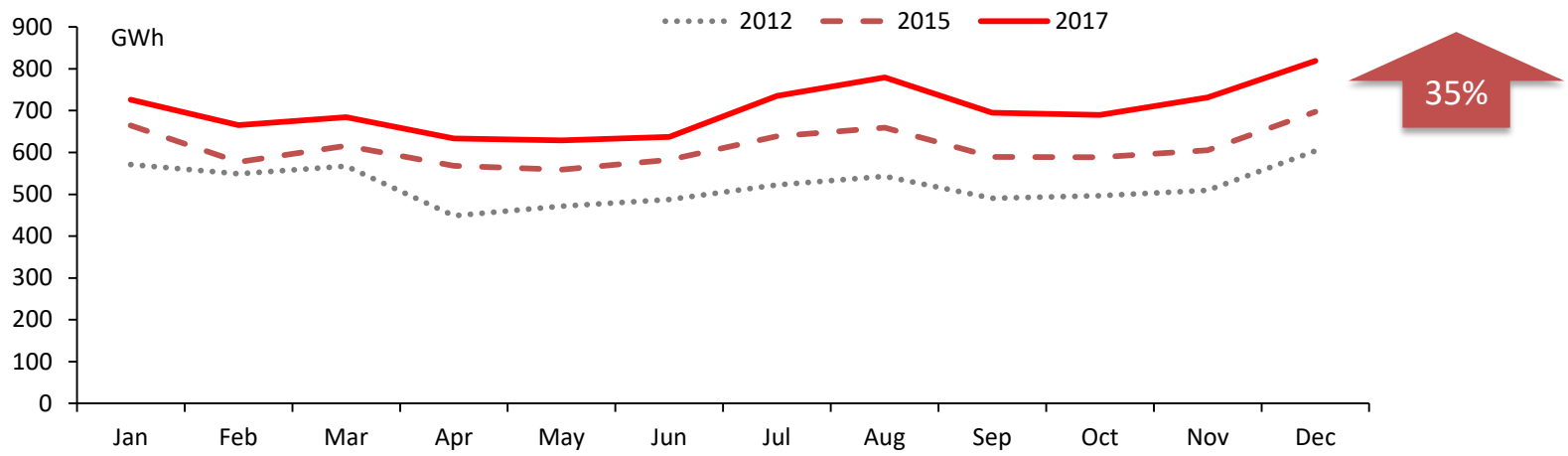
Significant increase in electricity consumption in Georgia

Electricity consumption*



* Electricity supplied by the distribution companies Telasi, Energopro and Kakheti; direct consumers and Abkhazia not included

- Annual consumption (excl. direct consumers and Abkhazia) increased from 6,262 GWh in 2012 to 8,427 GWh in 2017 (increase: 2,165 GWh)

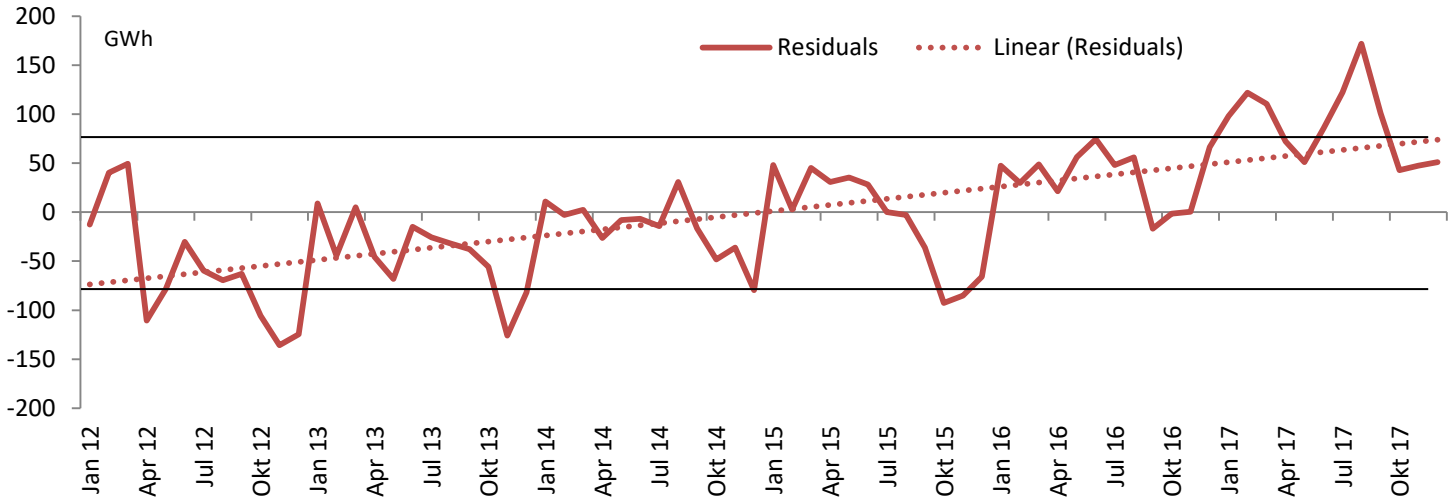
Electricity consumption can typically be well explained by temperature and GDP

	Coefficients	P-value
Intercept	-194	0.20
Temperature (KARS)	-1.0	0.49
GDP	0.2	0.00
Seasonality	8,892	0.00

- A simple model that uses temperature, seasonality and economic development can explain about two-thirds of the variation of monthly electricity consumption
- Despite the acceptable fit, the model only captures a limited fraction of the consumption increase

Note: we tested various model specifications (using different time periods, incl. manufacturing and/or tourism). In all specifications we find an increase in the unexplained part over time. The presented specification has the advantage of being relatively parsimonious, plausible coefficients and still explaining the data quite well.

Significant share of increase cannot be explained



Unexplained electricity consumption in Dec 2017: **140 GWh**

R^2=65%

- Unexplained electricity consumption per year (2017): **1,680 GWh**
- Hence, more than **78% of the consumption increase** since 2012 cannot be explained by a simple regression model

Can this be due to crypto-mining?

- Georgia provides a very favourable environment for crypto-mining
- And crypto-mining is very electricity intensive

By the Numbers

Countries that have more or less favorable conditions than the global average

	Average Power Price/MWh	Renewable Capacity Penetration	Average Internet Speed Mbps	Ease of Doing Business	Average Temp in Celsius
Argentina	$93.5	34%	16	117	15.4
Austria	$149.0	74%	30	22	8.5
Australia	$129.0	29%	26	15	22.5
Canada	$61.30	70%	70	18	-4.9
Chile	$99.70	41%	35	55	8.6
China	$89.47	34%	64	78	7.6
Georgia	$47.41	75%	20	9	7.3
Iceland	$35.50	100%	146	23	3.7
Japan	$170.6	27%	78	34	11.9
Netherlands	$126.0	26%	81	32	11.6
Paraguay	$55.70	99%	7	108	24.3
Russia	$47.47	18%	37	35	-3.7
South Korea	$109.1	6%	133	4	12.5
Sweden	$121.5	65%	87	10	4.1
Switzerland	$43.70	82%	79	33	7.5
U.K.	$164.8	36%	52	7	10
U.S.	$107.8	20%	77	6	9.3
Uruguay	$195.3	44%	22	94	18.4

Source: Bloomberg New Energy Finance

Bloomberg

Electricity consumption due to crypto-mining

Miners	Capacity 2017	Note
BFDC Georgia (previously Bitfury)	~ 40 MW	Tbilisi facility established in 2015, corresponds to ESCO data and Bitfury financial data [official ESCO data for May-Jul 2018 imply 42 MW]
Georgia Servers (previously Bitfury)	~ 20 MW	Gori facility established in 2014, corresponds to ESCO data [official ESCO data for May-Jul 2018 imply 22 MW]
Spotcoin	~ 1 MW	
Golden Fleece	~ 1 MW	

Source: based on interviews and internet research

- Total mining capacity of in 2017 was 65 MW – corresponding to around 570 GWh of annual electricity consumption

26% of increase due to crypto-mining

2,165 GWh
increase in electricity consumption 2012-2017

22% (485 GWh) of the increase due to GDP

78% (1,680 GWh)
not explained by simple model

34% (570 GWh)
related to crypto-mining

66% (1,110 GWh)
remains unexplained

22% of increase

26% of increase

51% of increase

Conclusion

- Strong increase in electricity consumption from 2012 to 2017 (+35%)
- About half of the increase can be explained, while the other half not
- Factors driving electricity consumption
  - 22% of increase can be explained by GDP increase
  - At least 26% of increase can be linked to crypto-mining

→ Crypto-mining is an important driver of electricity consumption

→ At the same time: other important known and unknown factors

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Own estimation of mining-related electricity consumption

- **Method:** Multivariate regression in which the unexplained part of the model constitutes the electricity consumption of crypto-mining
- **Time span**: January 2012 – December 2017; monthly data
- **Explanatory variables used for regression:** GDP, temperature and seasonality
- **Regression*:**

$$Electricity\_Consumption = ß_0 + ß_1 * GDP + ß_2 * Temperature + ß_3 * Seasonality + e$$

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