Sofiyska voda experience in the implementation of circular economy principles

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10.04.2018
Water and sanitation sector in the context of circular economy
WWTP Kubratovo
Sludge recovery
Energy production and efficiency
Drinking water supply
- Water sources and river catchments
- 4 Drinking water production plants (capacity 1 145 000 m3/day)
- 64 reservoirs
- 16 drinking water pump stations
- 35 chlorination station
- 250 hydrophore installations
- 4 000 km drinking water network

Sewerage and waste water treatment
- 1 600 km sewerage network
- 4 sewerage pump stations
- 1 urban waste water treatment plant
  - Capacity -1.3 mln. Population equivalent
  - More than 400 000 m3/day treated waters
  - 120 000 t/yearly sludge generated
- 1 local wastewater treatment plant
WATER AND SANITATION SECTOR IN THE CONTEXT OF CIRCULAR ECONOMY
Sludge treatment line (Stabilization)

- Gravity thickeners for excess activated sludge
- Mechanical thickeners
- Anaerobic digesters (methane tanks)
  - 4 methane tanks x 7000 m³
  - Mesophilic digestion (35-40°C)
  - 15 - 19 days overtime
**Sludge treatment line**  
(Dewatering)

- **Belt filter presses**
  - 5 pcs.
  - 15 - 30 m³/h
  - 22 - 28% dry matter content in dewatered sludge

- **Limming**
  - Add CaO before the process of recovery in agriculture

Graph showing generated and recovered sludge from 2012 to 2016.
Continuous Sludge quality tracking on following parameters

- **General** - pH; humidity; Nitrogen; Phosphorous; Mercury; Calcium; Magnesium

- **Heavy metals** - chromium, copper, zinc, cadmium, lead;

- **Microbiological** - Salmonella sp.; E.coli (coliforms); Clostridium perfringens; viable Helminth eggs

Legal National framework Sludge utilization ordinance
SLUDGE RECOVERY
**Energy production**

- Double membrane gasholder - 970 m³
- Cogeneration installation
- 3 cogeneration units
- 1063 kW electricity per co-generator
- 1088 kW heat per co-generator
- Capacity - 35 000 - 39 000 m³/day of biogas
ENERGY PRODUCTION AND EFFICIENCY

TENDENCY IN ELECTRICITY CONSUMPTION AND ELECTRICITY SELF-SUFFICIENCY OF SWWTP OVER YEARS

Energy Consumption
Ratio
Energy Production and Efficiency

Technological improvements to reduce energy consumption

- New Heat Recovery System from CHP exhaust gases
- New blowers - efficient alternative to the old Russian Blowers
- Integrated STAR System software from Kruger for efficient Blower operation control
Our dream for Sofia - to reach an energy independent water supply system
THANK YOU FOR YOUR ATTENTION!