International Association of Water Service Companies in the Danube River Catchment Area

IAWD

Danube Learning Partnership

Rising Costs vs. Poor Efficiency:

Challenges & Opportunities to (de-)energize water utilities

Danube Water Forum

June 29, 2022

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- **Context:** How much energy are we talking about (snapshots from selected countries)
- **Context:** Energy prices dynamics
- **Context:** Policy, regulatory and utility-level solutions sought
- **The Paradox:** High NRW typically goes hand in hand with low EE – selected examples
- **Going Forward:** Energy efficiency combined with broader water efficiency and energy management
- **Suggestions going forward:** institutional level, utility level, association level

CONTEXT

Relevance of the topic for the target countries
State before the energy crisis (2020)
Country: Bulgaria

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- NRW – 62%
- Distribution losses per mains length – 22 m3/km/day
- Distribution losses in m3 per property – 190 m3/property/y

- Average electricity cost 2020 – 0.097 USD/kWh
- Portion of electricity costs in running costs (DW) – 20%

- Electricity use for production and distribution per m3 water produced – 0.69 kWh/m3
- WWT energy consumption per m3 wastewater treated – 0.48 kWh/m3 (2)

Total Electricity Consumption by WSS Utilities 618 GWh

Relevance of the topic for the target countries
State before the energy crisis (2020)
Country: Albania

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- UBP Albanian Hub: NRW - 70%, Distribution losses- 61.4%
- Distribution losses per mains length – 89.7 m3/km/day
- Metering Ratio (%) – 79.6%

- Energy costs in the WWS sector accounts for about 30% of the O&M costs
- Average electricity cost 2020 – 0.107 USD/kWh

- Electricity use for production and distribution per m3 water produced – 0.69 kWh/m3
- WWT energy consumption per m3 wastewater treated – 1.45 kWh/m3

Total Electricity Consumption by WSS utilities 200 GWh

Relevance of the topic for the target countries
State before the energy prices (2020_
Country: Kosovo

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- NRW – 55%
- Distribution losses per mains length – 29.5 m3/km/day (2)
- Distribution losses in m3 per property – 207.5 m3/property/y (2)

- Portion of the energy costs in operating costs 18%
- Average electricity cost 2020 – 0.074 USD/kWh (2)

- Electricity use for production and distribution per m3 water produced – 0.43 kWh/m3
- Electricity use for production and distribution per m3 – 0.94 kWh/m3

Relevance of the topic for the target countries
State before the energy crisis (2020)
Country: Ukraine

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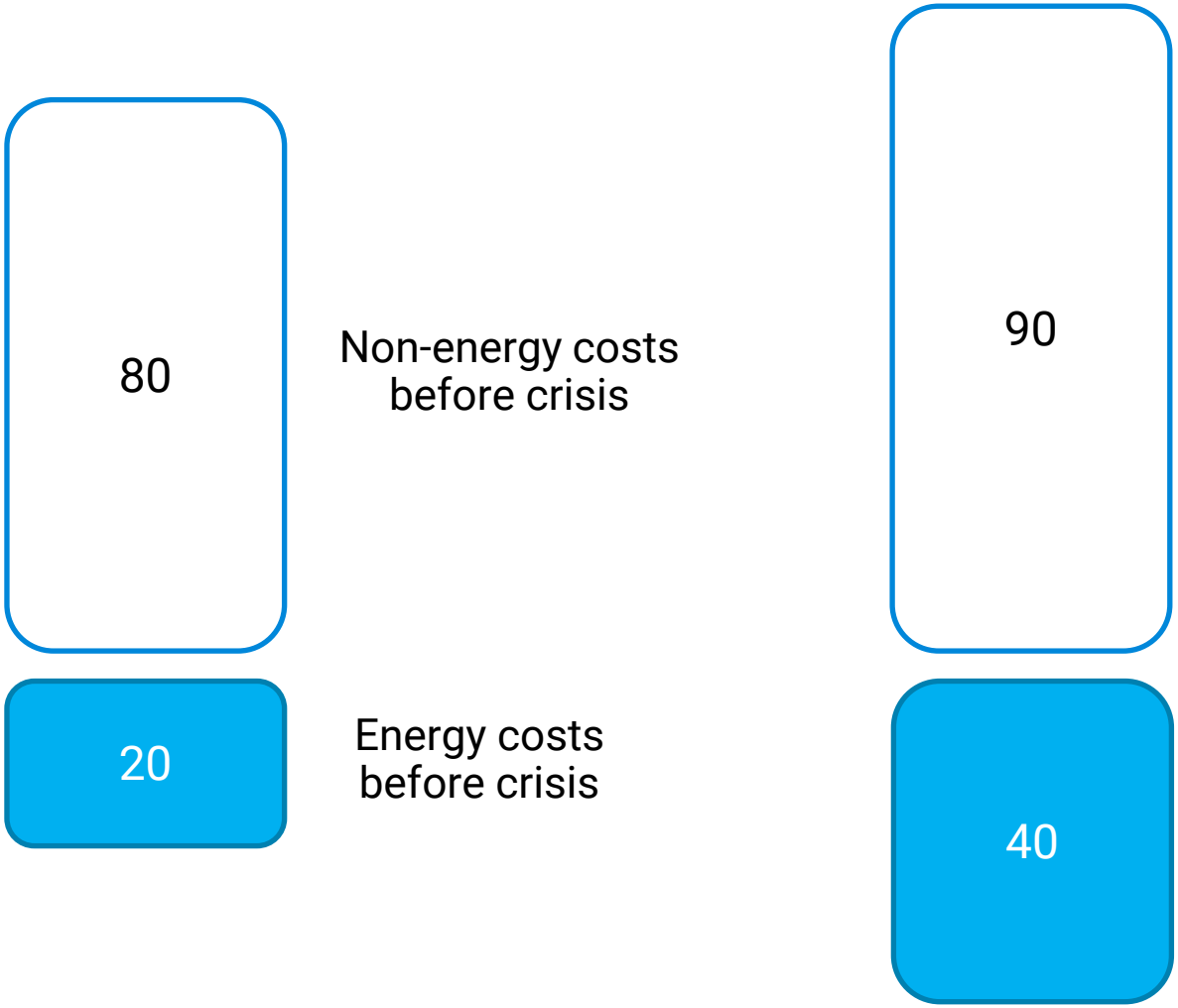
- NRW – 35% 2020
- Distribution losses per mains length – 29.8 m3/km/day (2)
- Distribution losses in m3 per property – 61.2 m3/property/y (2)

- Average electricity cost 2020 – 0,084 USD/kWh
- Portion of electricity costs in running costs – 24%

- Electricity use for production and distribution per m3 water produced – 0,83 kWh/m3
- Electricity Consumption for WW treatment per m3 WW treated – 0,59 kWh/m3

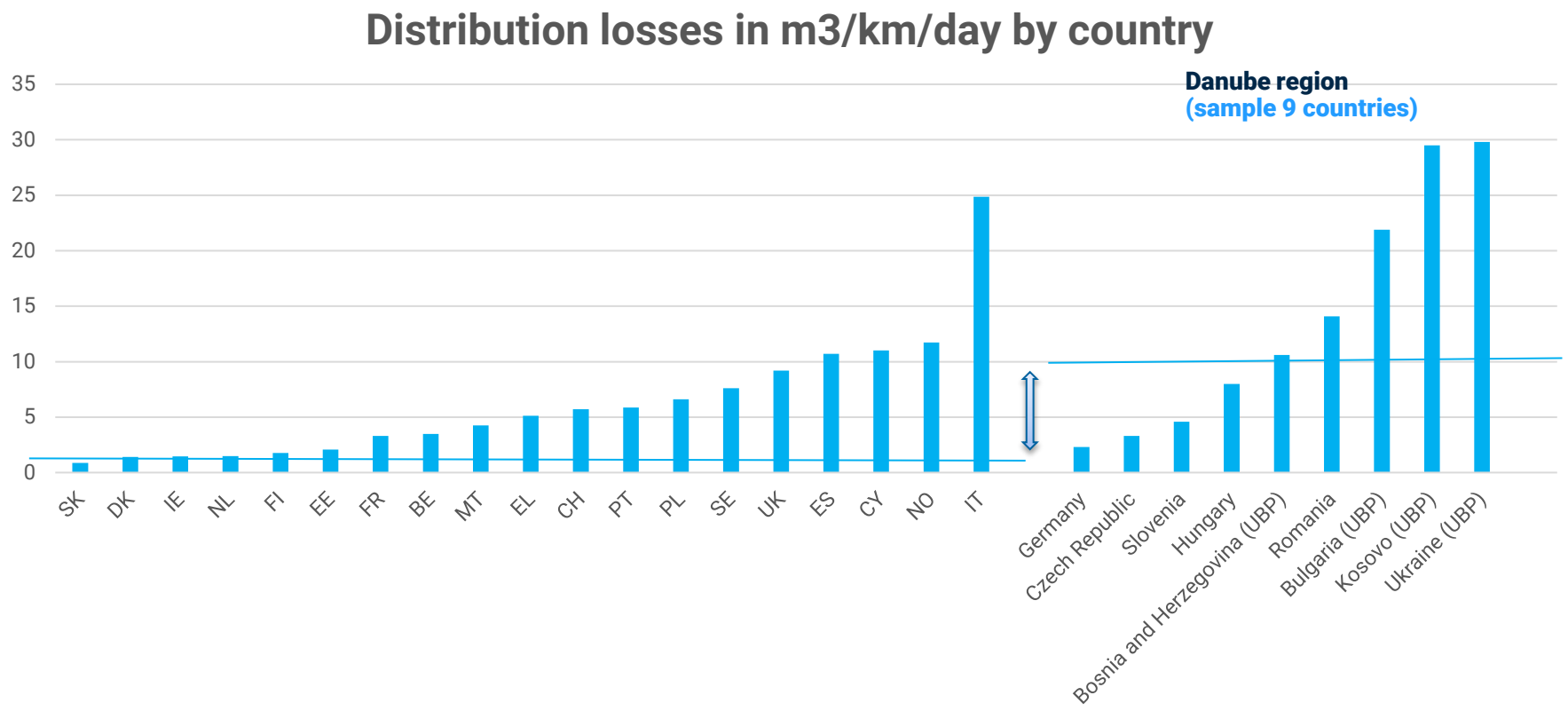
Total Electricity Consumption by WSS sector 3 242 GWh

Energy as % of Total Opex



40/130 = 30.7%

Summary NRW in the Region



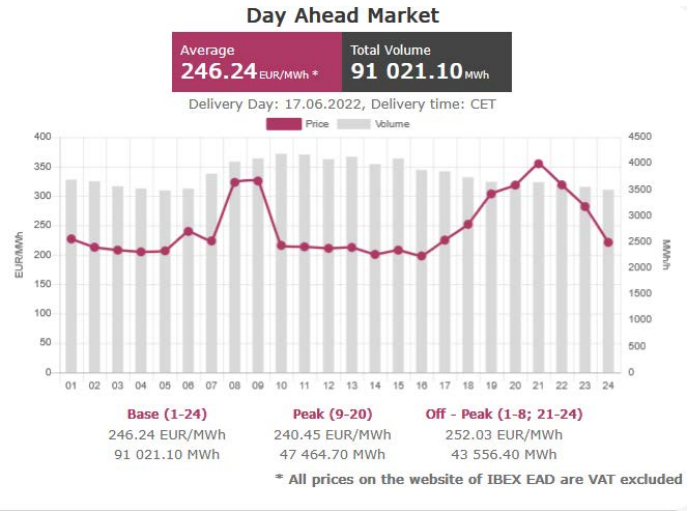
S: EurEau and Utility Benchmarking Program

Electricity Price Dynamics

Bulgaria last year (energy only)

EUR 0.04 – 0.06 per KWh

Bulgaria now



Albania last year (end price incl. distribution)

11 LEK per KWh

Albania now

18.8 LEK per KWh (EUR 0.16)

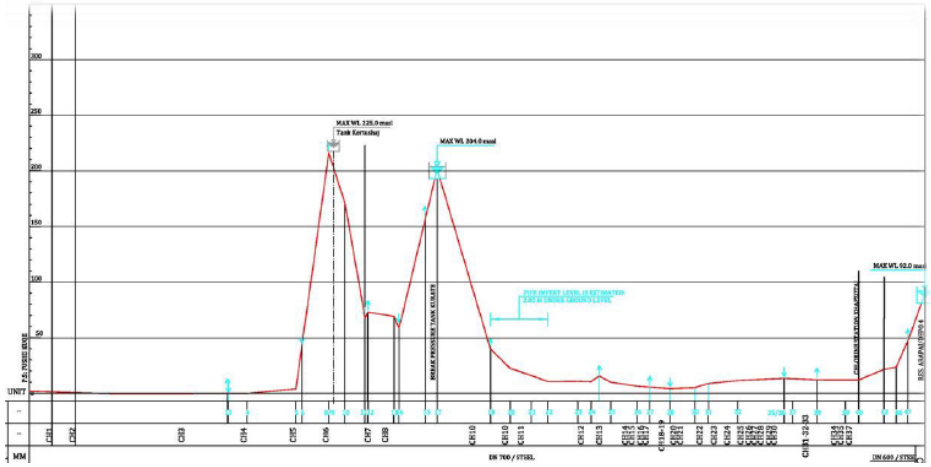
Electricity Price Dynamics

- **Policy and regulatory level:**
  - Subsidize utilities for the difference in the energy costs (Bulgaria)
  - Partial subsidy for overall O&M costs (Albania)
  - Setting price limits
  - Keeping electricity tariffs low specifically for water (Kosovo)
  - Ban on electricity distribution companies to disconnect water utilities for bad debt (Ukraine)
- **Utility level:**
  - On-site energy generation – PV solar

Time for Energy Efficiency Programs at Scale?

THE PARADOX

Example 1 (SEE Utility)

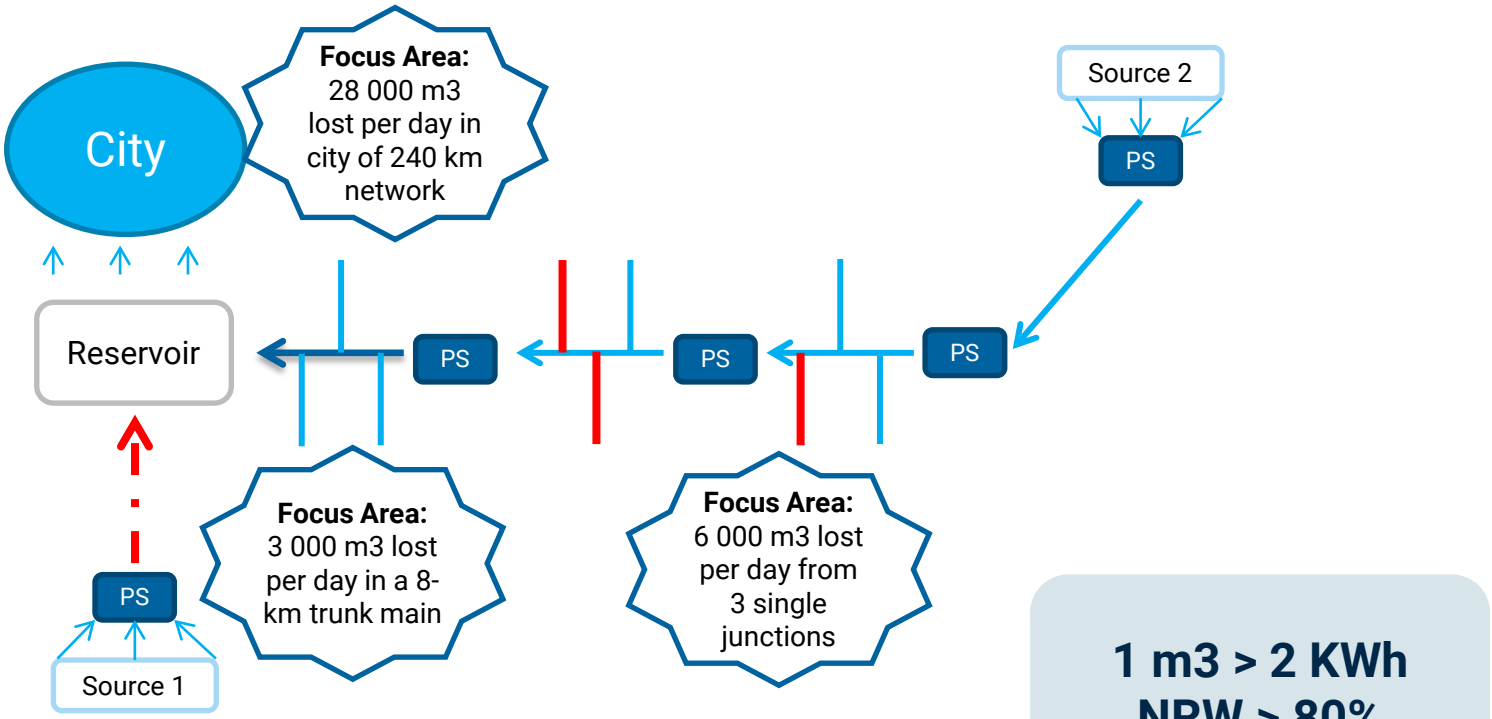


Key Figures

- 7 boreholes
- 12 horizontal pumps (7 working & 3 stand-by) with installed capacity of 5 MW
- 40-km transmission main DN 700 (45-year old)
- 47 connections to the transmission main (village areas)
- Outflow at PS: 750 – 800 l/s at 31-32 bars
- Water flow to reservoir at city: 500 l/s
- **NRW > 80%**
- **Identified & studied measures**

Example 2 (SEE Utility)

OPEX savings potential based on NRW reduction & energy savings



1 m3 > 2 KWh
NRW > 80%

The Paradox: High Energy Intensity Often Goes Hand in Hand with VERY HIGH NRW

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- **Vicious circle**: high energy consumption → high OPEX → low CAPEX → limited opportunities to implement EE projects
- Poorer utilities → institutional instability (politicians tempted to replace water managers more frequently)
- High OPEX for energy → Low OPEX for salaries…
- Technical (hydraulic) reasons: High NRW → Low Pressure → Switch another pump on

Not necessarily the norm - there are exceptions

GOING FORWARD

Broader Re-think of Energy Efficiency

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Water Efficiency

Energy Efficiency

Energy Management

All EE/EM Options on the Table

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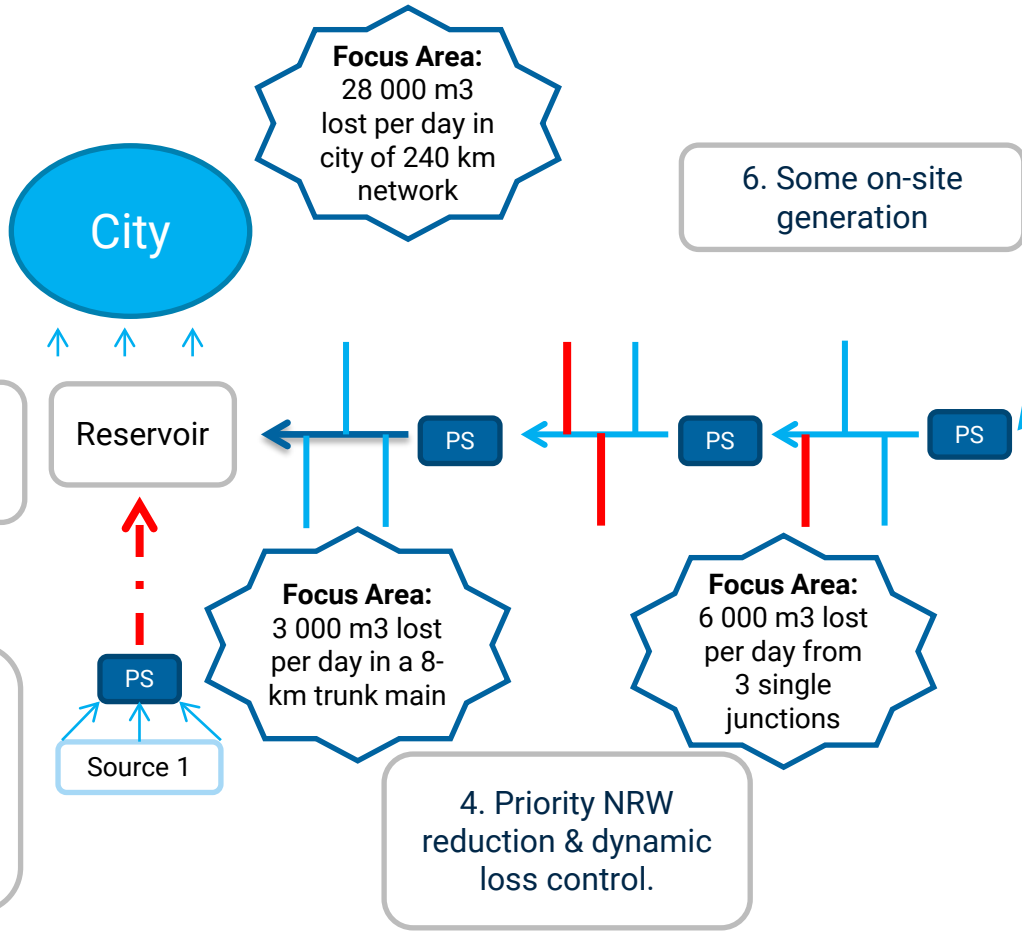
1. Does the city need 50 000 m3/d long term? Demography and industry changes? NRW reduction potential?

3. If this source is more energy intensive, can we stop it or at least keep it for the villages?



6. Some on-site generation

5. EE at pump & motor level (once flow & pressure requirements have been optimized)

7. Use tank level for demand-response balancing

2. If this source is less energy intensive, can we not pump more from here?

4. Priority NRW reduction & dynamic loss control.

ENABLERS

Why Are EE Not Happening at Scale?

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- **Money:** Donor money, IFIs, pre-accession funds, cohesion funds, state, municipal and utility budgets, targeted programs like Resilience & Recovery Program, etc.
- **Expertise in Energy:** Qualified local, regional and international experts; most big water utilities have “chief energy officer” (of some sort)

Motivation of utility managers and key exerts to identify & implement EE projects.

Funding & guarantee mechanisms broadly available but not quite applicable for private sector involvement in PBC/ESCO-type contracts.

National procurement legislation: what is possible between conventional procurement and concessions.

Expertise for pump management is there but what about energy trading and load balancing.

Complexity

Developing the Enablers

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Institutional Level

Local Institutions
- In the long run EE might be more important than network rehab
- EE is sexy and appealing for graduates

Country-level Institutions
- Investment drivers vs. funding sources: compliance vs. asset renewal vs. efficiency
- EE as utility managers' incentive
- Feasible contractual models

IFIs and Donors
- Project identification vs. project structuring
- Private sector is not construction and consulting only
- Empowering local & in-house experts

Utility Level

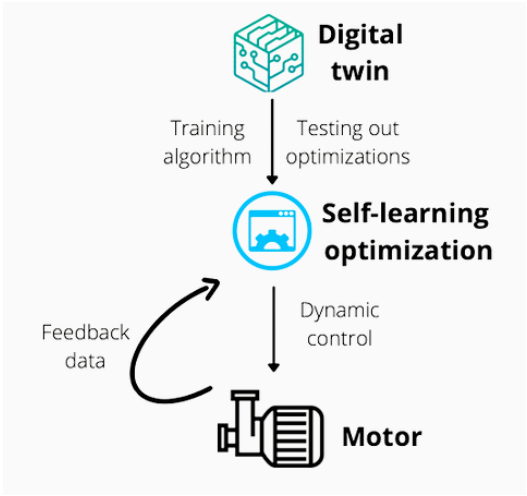
- Utility-wide average KPIs are good but supply-system statistics are the actionable level of information
- There is money around for EE projects for all types of project structures – audits, PBCs, other. These funds are up for applications.
- The role of the Energy Managers
- O&M vs. construction and installation
- Opportunity for revenue generation and new business models (CHPs, on-site solar, demand management, other)

Association Level

- Systematic data collection, trend analysis and insights generation
- Channel to donors and IFIs
- Expert support to policy makers
- Bypass the short-term political hassle
- Open support to private vendors & promotion of healthy business models
- Combination of technical and administrative capacity
- Tackle complexity through continuous multi-faceted dialogue

THE POSITIVE EXAMPLES

Selected Really Good Examples



Thank you

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