

# Strengthening Tajikistan's Electricity Supply through Energy Efficiency

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- Assess current electricity supply–demand balance in Tajikistan*
- Project electricity demand up to 2030*
- Quantify energy efficiency impacts (EE) under the difference analyzes.*
- Analyse multiple EE scenarios across key sectors*

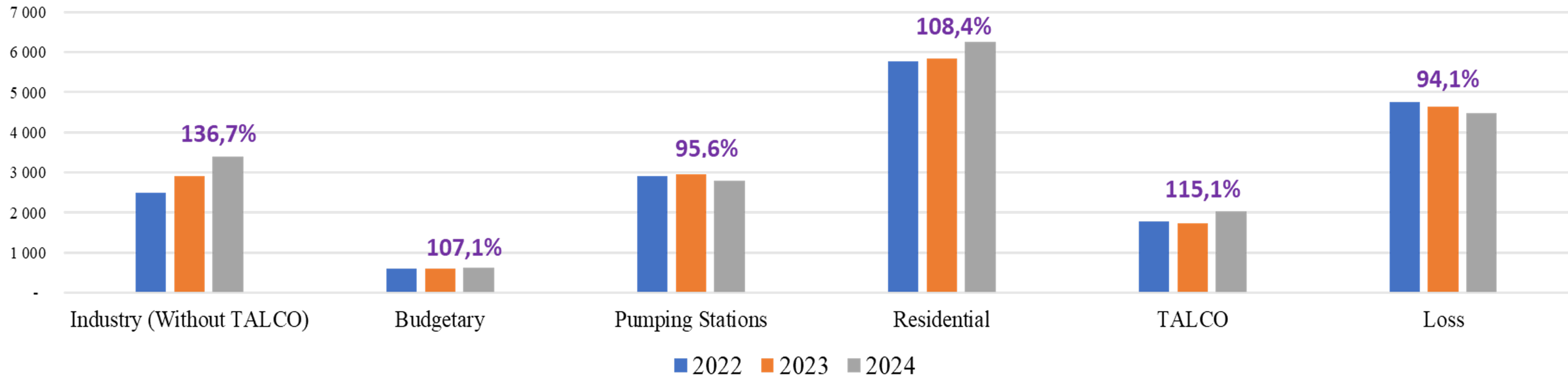
*“The study provides a comprehensive assessment of electricity demand, identifies efficiency potentials, and supports informed policy and investment decisions.”*

- *Electricity demand projection and scenario-based assessment tool*
- *Time horizon: 2024–2030 (annual resolution)*
- *Sectoral coverage: industry, agriculture (pumping), households, public sector*
- *Focus on demand-side efficiency, not generation expansion*
- *Inputs aligned with national macroeconomic projections*

*This tool allows for scenario-based analysis of electricity demand and efficiency interventions, providing data-driven insights for policy and investment planning.”*

- Installed capacity exceeds 6,000 MW (2025)
- Electricity generation increased from 17.4 to 22.4 TWh (1991–2024)
- 95% hydropower – strong seasonal dependency
- Consumption growth exceeds production growth (2022–2024)

*“Despite high hydropower capacity, seasonal and winter shortages remain a challenge. Consumption growth outpaces production, highlighting the need for additional capacity or diversification.”*



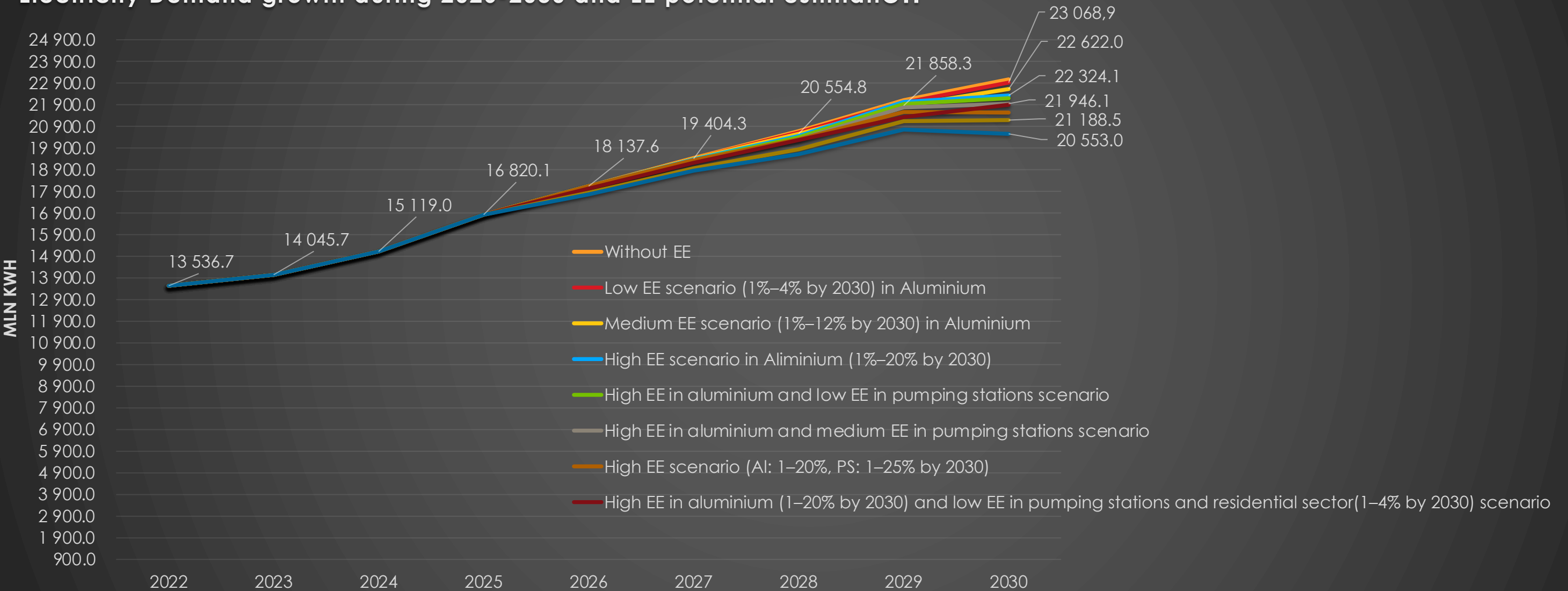
- *Rapid growth in residential connections (urban areas) **Numbers based on the inputs.***
- *Industrial demand surge (especially aluminum sector)*
- *Expansion of pumping stations in agriculture*
- *Growth of electric vehicles and charging infrastructure*
- *Limited incentives for efficient electricity use*

*“The electricity demand is increasing due to urbanization, industrial expansion, modernization of agriculture, and adoption of electric vehicles. Efficiency measures are still insufficient.”*

## Electricity Demand growth during 2026-2030 and EE potential estimation

Years	Without EE	Low EE scenario (1%–4% by 2030) in Aluminium	Medium EE scenario (1%–12% by 2030) in Aluminium	High EE scenario in Aluminium (1%–20% by 2030)	High EE in aluminium and low EE in pumping stations scenario	High EE in aluminium and medium EE in pumping stations scenario	High EE scenario (Al: 1–20%, PS: 1–25% by 2030)	High EE in aluminium (1–20% by 2030) and low EE in pumping stations and residential sector (1–4% by 2030) scenario	High EE in aluminium (1–20% by 2030) and medium EE in pumping stations and residential sector (1–12% by 2030) scenario	High EE scenario (Al: 1–20%), pumping stations and residential sector: (1–25-35% by 2030) scenario
<b>2022</b>	13 536,7	13 536,7	13 536,7	13 536,7	13 536,7	13 536,7	13 536,7	13 536,7	13 536,7	13 536,7
<b>2023</b>	14 045,7	14 045,7	14 045,7	14 045,7	14 045,7	14 045,7	14 045,7	14 045,7	14 045,7	14 045,7
<b>2024</b>	15 119,0	15 119,0	15 119,0	15 119,0	15 119,0	15 119,0	15 119,0	15 119,0	15 119,0	15 119,0
<b>2025</b>	16 820,0	16 820,1	16 820,1	16 820,1	16 820,1	16 820,1	16 820,1	16 820,1	16 820,1	16 820,1
<b>2026</b>	18 137,6	18 137,6	18 137,6	18 137,6	18 137,6	18 137,6	18 137,6	18 020,0	17 843,0	17 755,2
<b>2027</b>	19 433,9	19 404,3	19 404,3	19 374,7	19 344,1	19 344,1	19 344,1	19 222,4	18 965,3	18 852,3
<b>2028</b>	20 682,5	20 618,7	20 554,8	20 459,0	20 397,2	20 304,4	20 304,4	20 259,4	19 830,3	19 617,8
<b>2029</b>	22 099,6	21 996	21 858,3	22 030,7	21 937,0	21 781,0	21 562,5	21 323,4	21 138,8	20 750,7
<b>2030</b>	23 068,9	22 919,9	22 622,0	22 324,1	22 198,1	21 946,1	21 536,5	21 895,7	21 188,5	20 553,0
<b>Saving</b>		148,9	446,8	744,7	870,7	1 122,8	1 532,4	1 173,2	1 880,4	2 515,9
<b>Growth 2030/2025</b>	6 248,9	6 099,8	5 801,9	5 504,0	5 378,0	5 126,0	4 716,4	5 075,6	4 368,4	3 732,9
	<b>37,2%</b>	<b>36,3%</b>	<b>34,5%</b>	<b>32,7%</b>	<b>32,0%</b>	<b>30,5%</b>	<b>28,0%</b>	<b>30,2%</b>	<b>26,0%</b>	<b>22,2%</b>

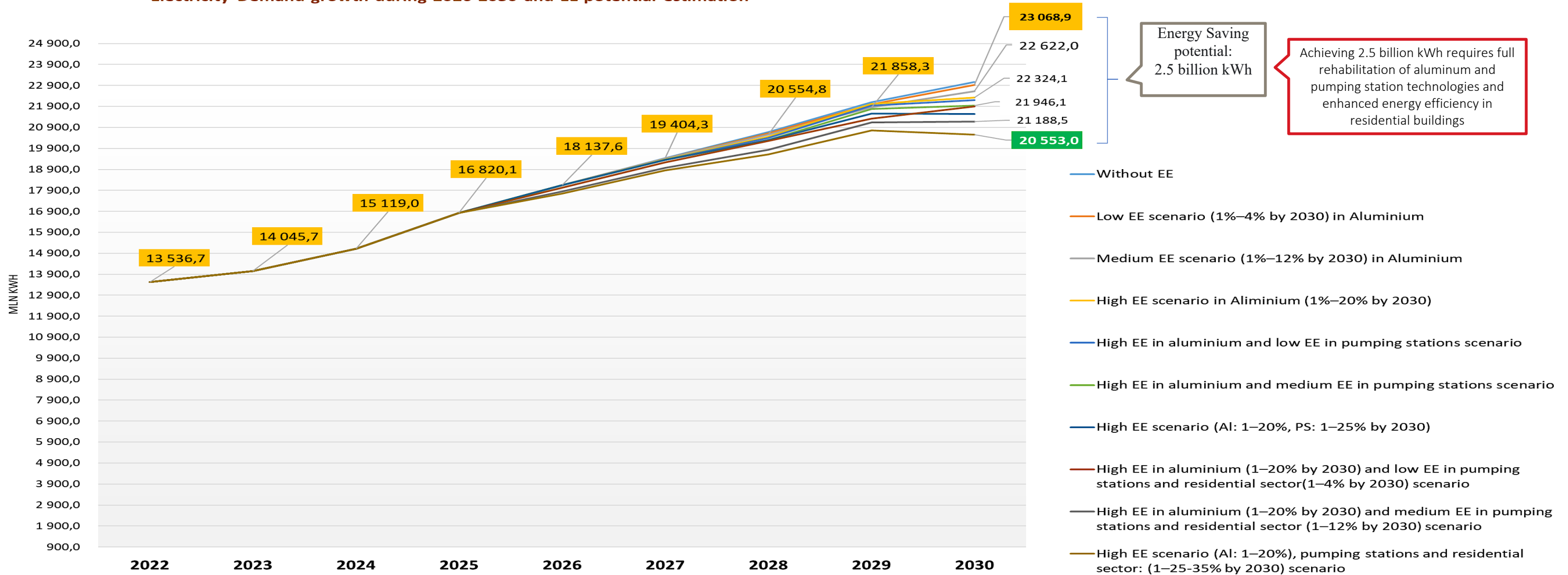
## Electricity Demand growth during 2026-2030 and EE potential estimation



- *Baseline: No additional energy efficiency measures*
- *EE Scenario 1: Efficiency improves from 1% (2026) to 5% (2030)*
- *EE Scenario 2: Efficiency improves from 1% to 7%*
- *EE Scenario 3: Efficiency improves from 1% to 10%*
- *Extended scenarios up to 15%, 20% and 25% efficiency gains*

*“Energy efficiency improvements can significantly reduce electricity demand growth. Even small gains in efficiency have cumulative effects over time.”*

Electricity Demand growth during 2026-2030 and EE potential estimation



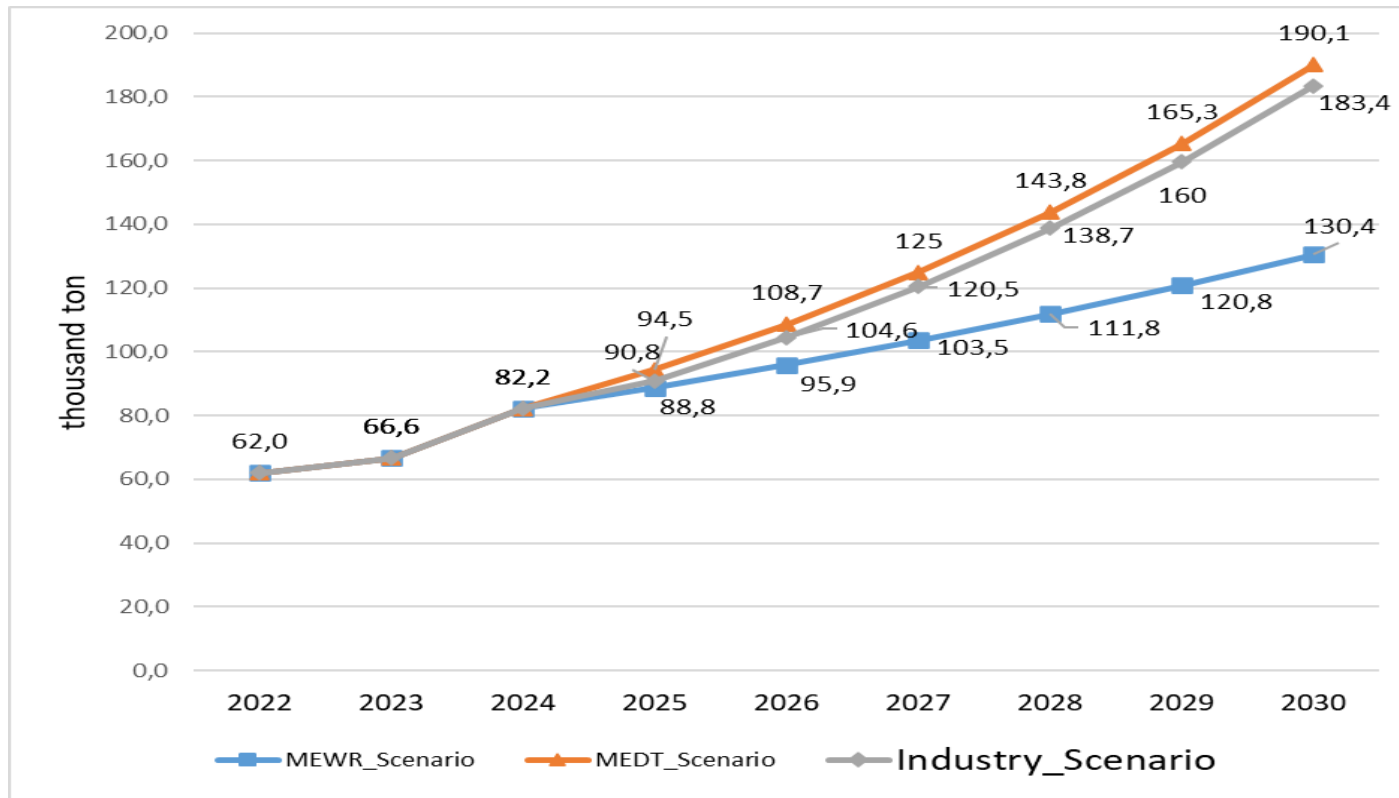
- *Electricity demand without EE reaches ~23.1 TWh by 2030*
- *Demand increases by ~53% compared to 2024*
- *Energy efficiency can offset up to 1.8 TWh annually by 2030*
- *EE measures reduce need for new generation capacity*

*Implementing energy efficiency measures not only slows demand growth but also reduces the need for costly new generation and improves reliability during peak winter periods.”*

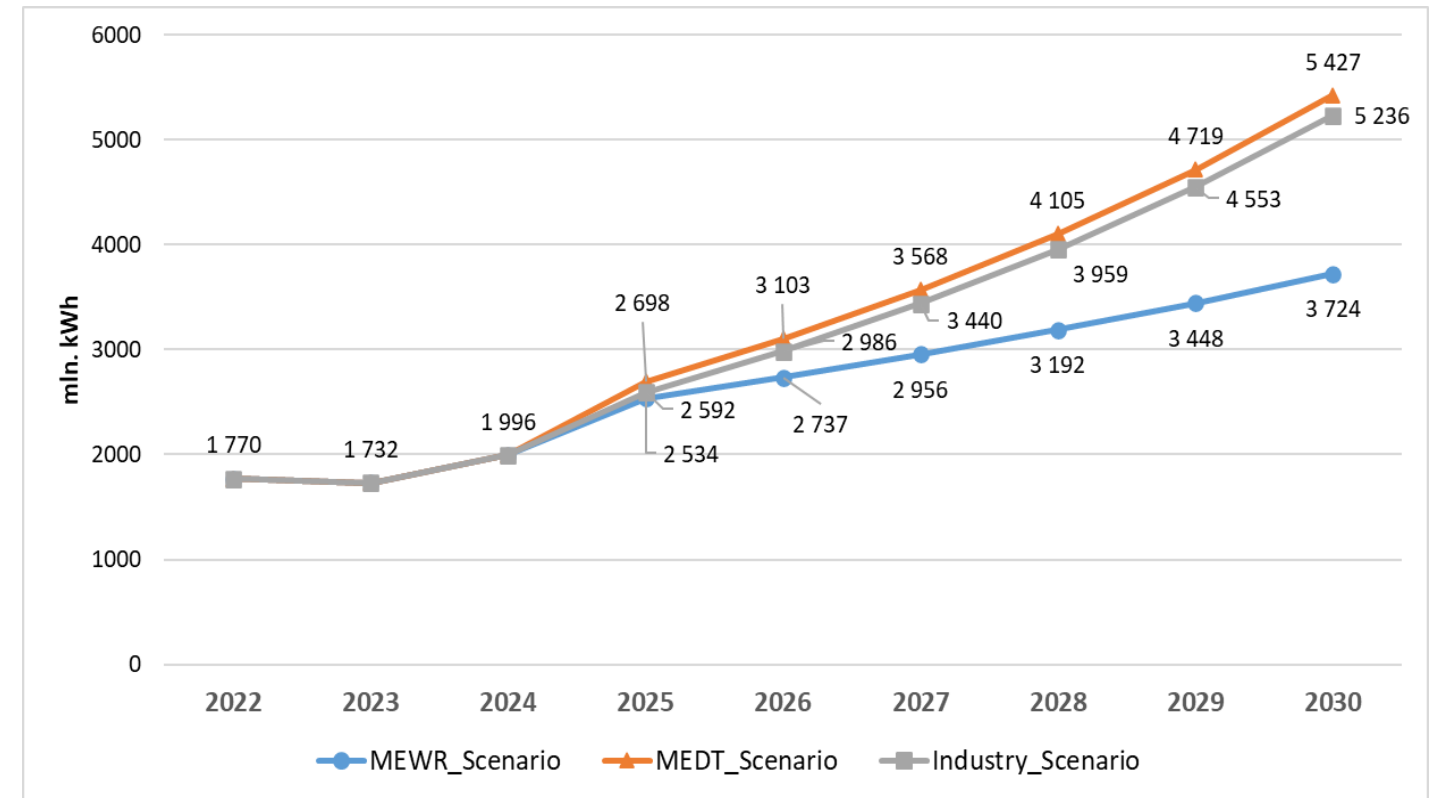
- TALCO consumed ~2.0 TWh in 2024 ( $\approx 13\%$  of national demand)
- Production projected to more than double by 2030
- Three demand scenarios: MEDT, Industry, MEWR
- Without EE: demand up to 5.4 TWh by 2030
- Energy audit indicates up to 22% annual saving potential

*“The aluminum sector is a major electricity consumer. Implementing energy efficiency measures could significantly reduce demand growth and system stress.”*

Projection of Aluminum Production till 2030



Electricity consumption for Aluminum Production Scenarios

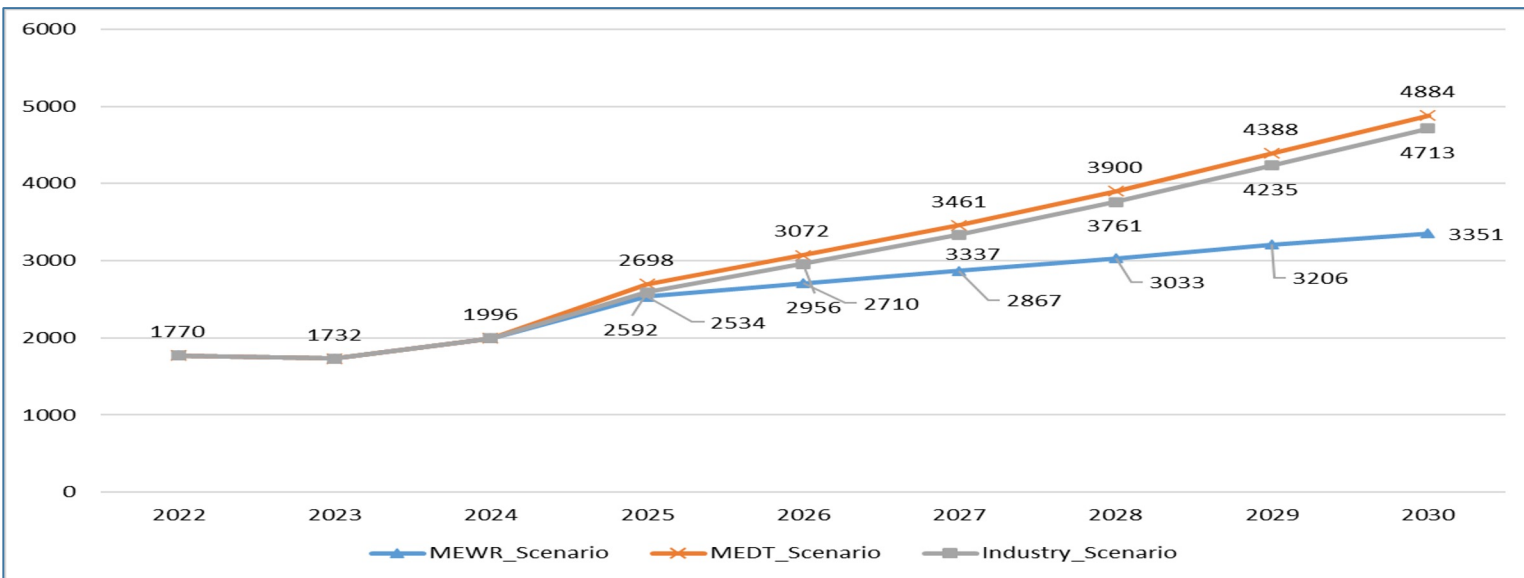


*Without energy savings, TALCO's electricity demand in 2030 is projected at 5,427 million kWh (21.9% of total demand) under MEDT, 5,236 million kWh (21.3%) under Industry, and 3,724 million kWh (16.1%) under MEWR scenarios*

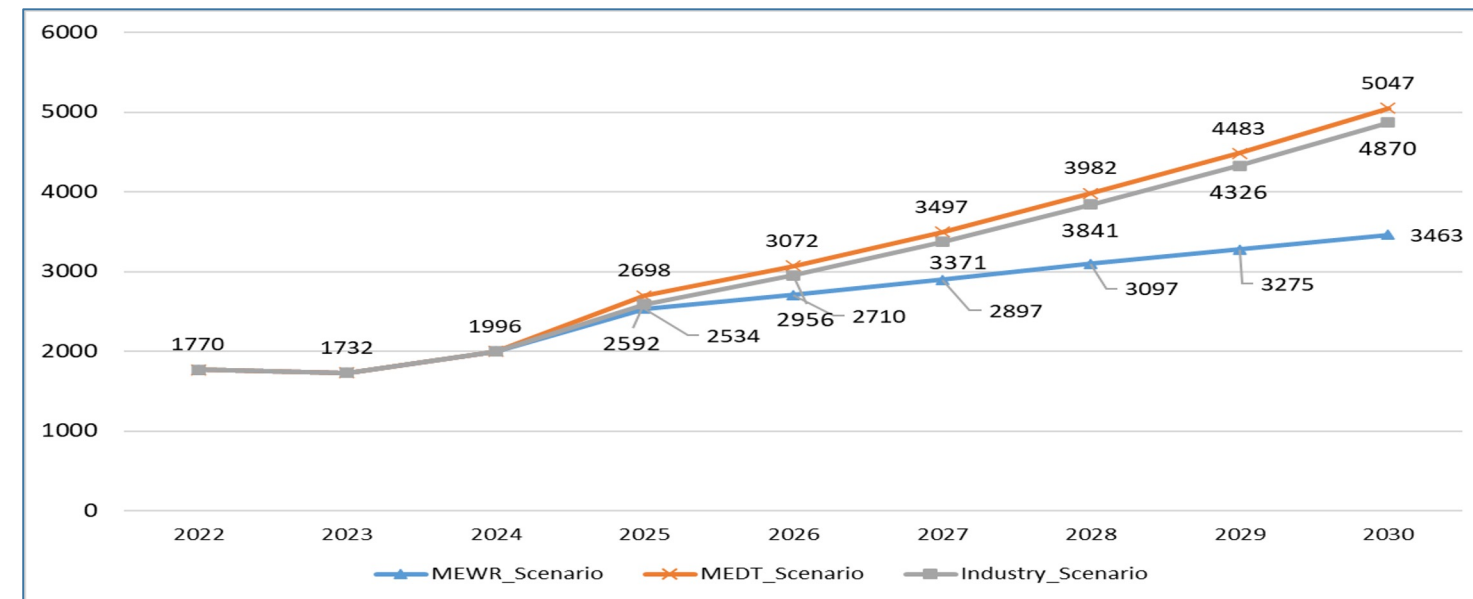
- 5% EE by 2030: savings up to 270 million kWh/year*
- 7% EE by 2030: savings up to 380 million kWh/year*
- 10% EE by 2030: savings up to 540 million kWh/year*
- Requires replacement of 25–50% of production technologies*
- High priority for targeted investment programs*

*“Significant energy and cost savings are possible through targeted efficiency improvements, but substantial investment in technology upgrades is required.”*

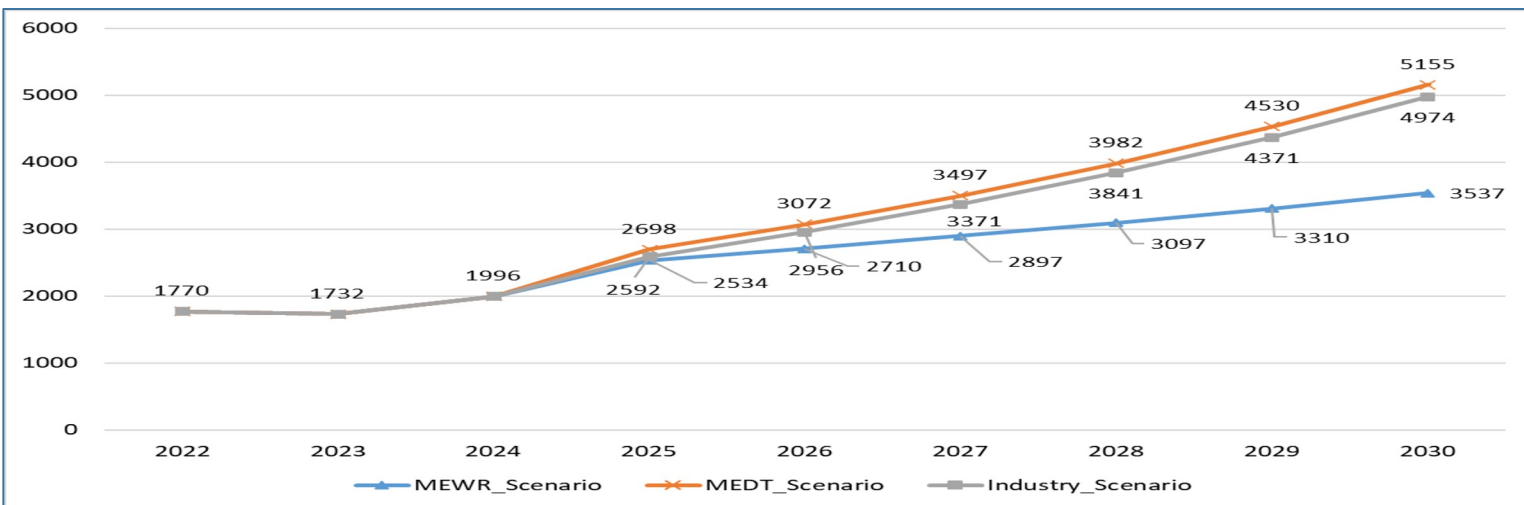
Total consumption with EE (from 1% to 7%).



Total consumption with EE (from 1% to 10%)



Total consumption with EE (from 1% to 5%)



Energy Saving potential under the MEWR scenario:  
**373 million kWh in 2030**

Upgrading 50% of TALCO's equipment by 2030 can save  
**373 million kWh**

# Electricity Demand growth during 2026-2030 and EE potential estimation in Aluminium industry

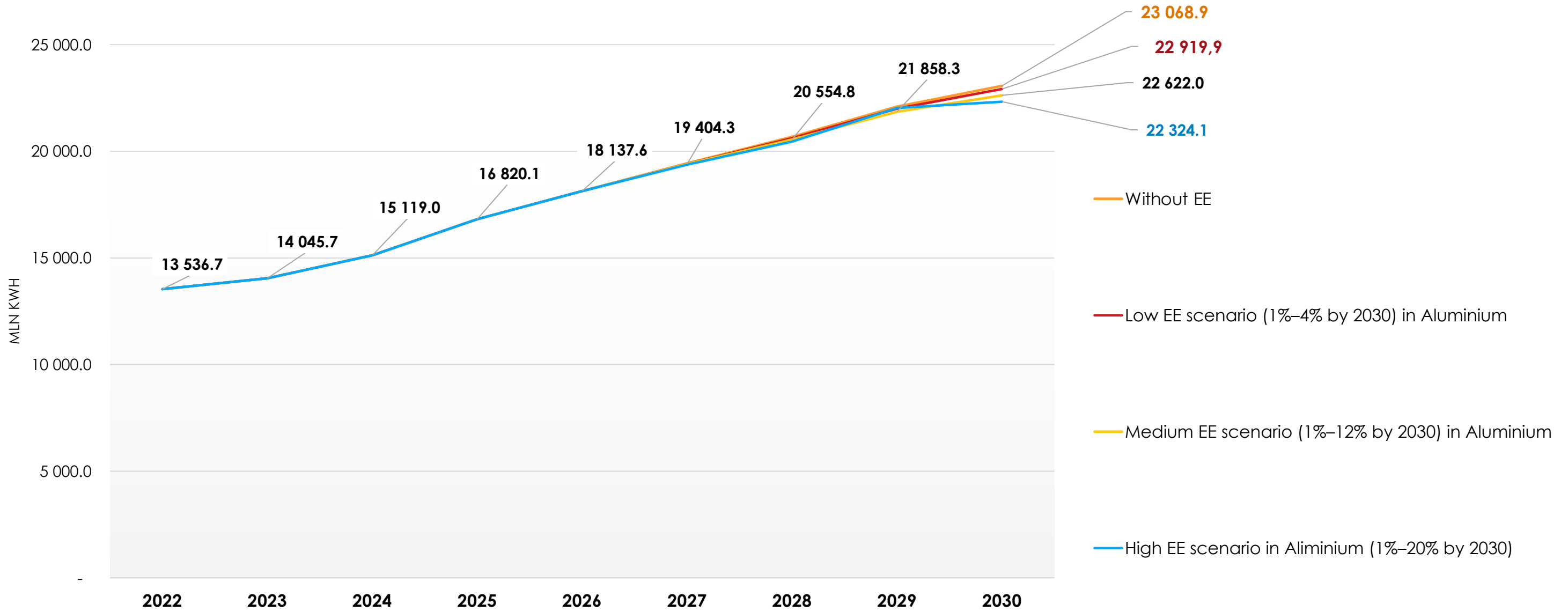
Years	Without EE	Low EE scenario (1%–4% by 2030) in Aluminium	Medium EE scenario (1%–12% by 2030) in Aluminium	High EE scenario in Aliminium (1%–20% by 2030)
2022	13 536,7	13 536,7	13 536,7	13 536,7
2023	14 045,7	14 045,7	14 045,7	14 045,7
2024	15 119,0	15 119,0	15 119,0	15 119,0
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2030	23 068,9	22 919,9	22 622,0	22 324,1
Saving	-	148,9	446,8	744,7

**Low EE scenario (1%–4% by 2030) in Aluminium.** The energy saving potential in 2030, under the Low EE scenario (1%–4% by 2030) is estimated at 148,9 million kWh. To achieve this target based on low EE scenario, it will be necessary to replace or rehabilitate approximately 20% of the existing technologies of the aluminum company.

**Medium EE scenario (1%–12% by 2030) in Aluminium.** The energy saving potential in 2030, under the 1% to 12% energy saving scenario, is estimated at 446,8 million kWh. To achieve this target based on medium EE scenario, it will be necessary to replace or rehabilitate 60% of the existing technologies of the aluminum company.

**High EE scenario in Aliminium (1%–20% by 2030).** The energy saving potential in 2030, under the 1% to 20% energy saving scenario, is estimated at 744,7 million kWh. To achieve this target based on high EE scenario, it will be necessary to replace or rehabilitate 100% of the existing technologies of the aluminum company.

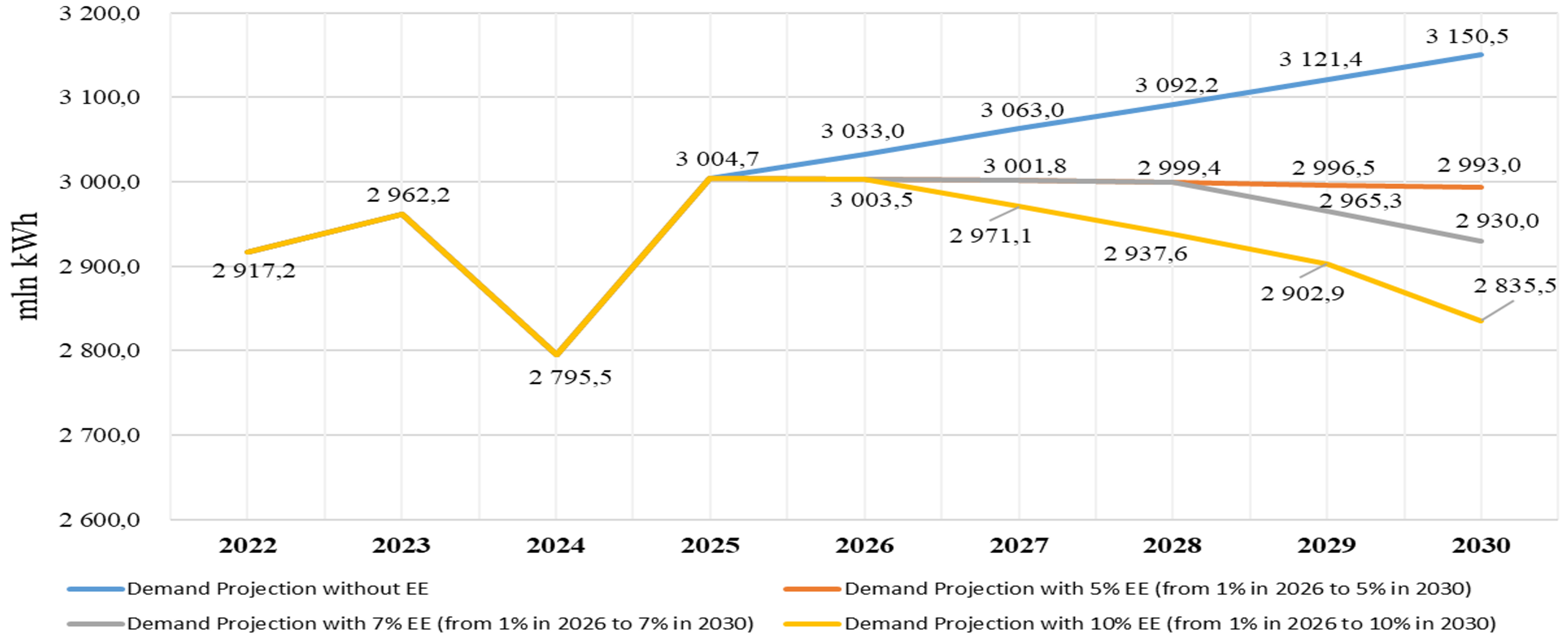
# Electricity Demand growth during 2026-2030 and EE potential estimation in Aluminium industry



- Electricity demand reaches ~3.15 TWh by 2030 (without EE)*
- 12.7% increase compared to 2024*
- One of the most energy-intensive public sectors*

*“Modernization of pumping stations and implementation of energy efficiency measures could significantly reduce losses and electricity demand growth.”*

# Pumping Stations Electricity Demand Projection during 2026-2030



- 5% EE by 2030: savings ~10 million kWh/year*
- 7% EE by 2030: savings ~220 million kWh/year*
- 10% EE by 2030: savings ~315 million kWh/year*
- Requires rehabilitation of 20–40% of pumping stations*

*“Targeted energy efficiency measures in pumping stations can deliver substantial energy savings with relatively low investment and rapid returns.”*

- Energy efficiency is the cheapest 'new' energy source*
- Industry and agriculture dominate saving potential*
- Even moderate EE (5–10%) significantly improves supply balance*
- Delays or avoids costly generation investments*

*“Energy efficiency measures provide high impact at low cost, improving reliability and reducing investment needs across key sectors.”*

- Prioritise EE investments in TALCO and pumping stations*
- Introduce market-based electricity pricing signals*
- Establish a national energy efficiency agency*
- Leverage IFI financing for EE retrofits*
- Combine EE with targeted renewable solutions (off-grid solar)*

*“Strategic policies and targeted investments are key to maximizing energy efficiency, ensuring cost-effective electricity supply, and integrating renewables.”*

- Energy efficiency is central to energy security in Tajikistan*
- Large, realistic savings achievable by 2030*
- Next step: detailed cost-benefit and financing analysis*
- Preparation of bankable EE investment programs*

*“Implementing energy efficiency measures is not only feasible and cost-effective but also strategically aligned with international climate goals. Focus now on detailed planning and financing to turn potential into actionable projects.”*



# *Thank you for your attention*

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