

REGIONAL ENERGY REVIEW · ANNUAL

Turkic States Energy Outlook **2026**

Capacity, consumption, prices, reform and integration across the Turkic bloc — with an independent 2030/2035 demand & capacity projection.

Members: Türkiye · Azerbaijan · Kazakhstan · Uzbekistan · Kyrgyzstan

Observers: Turkmenistan · Hungary · TRNC

Foreword

The Turkic bloc is, on paper, the world's ~13th-largest economy and a top-three energy supplier — yet no one publishes a single, comparable picture of its electricity systems.

Capacity sits in one ministry's report, tariffs in another's decree, demand in a third's plan — each in a different currency, vintage and definition. This Outlook is our attempt to close that gap: one cut-off date, one currency basis, one set of definitions, across all eight member and observer systems — from Türkiye's EU-synchronized exchange to Turkmenistan's subsidised peg.

The figures are drawn entirely from public sources. Where a number is uncertain we say so; where our own projection diverges from an official plan, we show both rather than reconcile them. It is written for the investors, lenders and regulators who must compare these systems on the metrics that actually price risk.

We will refine this Outlook each year. Corrections and challenges are welcome.

UzEnergyNews — Editorial

Eurasia's Energy & Market Intelligence · June 2026

UzEnergyNews · Regional Outlook — the first single-source comparison of electricity capacity, consumption, prices, market reform and cross-border integration across the Organization of Turkic States (OTS). *Members: Türkiye, Azerbaijan, Kazakhstan, Uzbekistan, Kyrgyzstan · Observers: Turkmenistan, Hungary, TRNC · June 2026.*

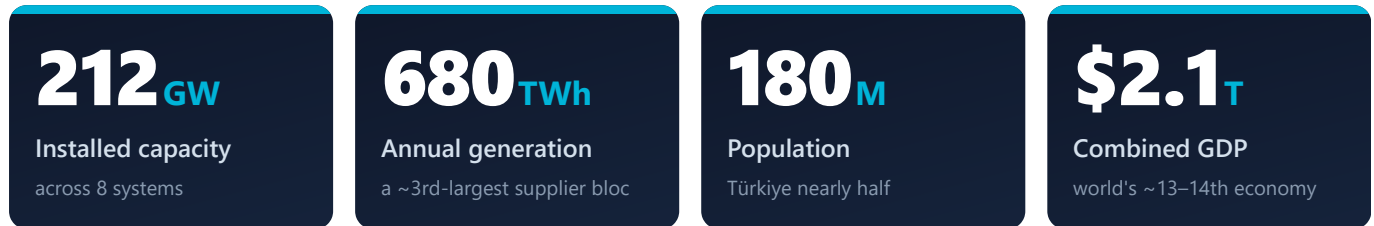
The Organization of Turkic States spans one of the most diverse and fastest-changing energy landscapes in Eurasia — from coal-heavy Kazakhstan and gas-dependent Turkmenistan to hydro-reliant Kyrgyzstan, nuclear-led Hungary, and a Türkiye approaching 62% renewable capacity. Together the bloc operates roughly **212 GW** of installed capacity and generates about **680 TWh** annually for a population of about **180 million**. This outlook compares the members and observers across the metrics that matter to investors, lenders and regulators.

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The bloc at a glance

Eight electricity systems, one bloc — the headline weight of the Organization of Turkic States.



THE EIGHT SYSTEMS

Türkiye 122.5 GW ~4,010 kWh/cap 7.7¢ resid. Hydro / Gas / RE · 62% RE	Kazakhstan 26.7 GW ~5,700 kWh/cap 7.2¢ resid. Coal
Uzbekistan 25.8 GW ~2,420 kWh/cap 6.1¢ resid. Gas 55%	Hungary ~17 GW ~5,080 kWh/cap 12.0¢ resid. Nuclear + Solar
Azerbaijan 9.7 GW ~2,550 kWh/cap 4.9¢ resid. Gas 80%	Turkmenistan ~6.9 GW ~3,200 kWh/cap 0.7¢ resid. Gas 100%
Kyrgyzstan ~3.5 GW ~2,640 kWh/cap 1.9¢ resid. Hydro 90%	TRNC ~0.45 GW n/a kWh/cap 12.7¢ resid. Fuel oil 94%

Figures are the report's structural cut-off (installed capacity & generation end-2025; tariffs live FX). Residential tariff in US cents/kWh, VAT-inclusive. Full detail in §1–§4.

Executive summary

Five findings define the Turkic electricity bloc in 2026:

1. **A two-speed market.** Türkiye and Hungary run liberalized, cost-reflective, EU-adjacent systems; the Central Asian members and Turkmenistan remain subsidy-heavy and mid-reform. Whether Uzbekistan, Kazakhstan and Kyrgyzstan reach cost recovery without social backlash is the defining question of 2026–2030.
2. **Gas-to-renewables, with a Rosatom nuclear flank.** The fossil-heavy systems (Uzbekistan, Azerbaijan, Turkmenistan, Kazakhstan) are pivoting to solar and wind, driven by gas scarcity and export economics as much as by climate, while five of the eight (Türkiye, Hungary, Uzbekistan, Kazakhstan, Kyrgyzstan) are building or negotiating nuclear, overwhelmingly with Rosatom.
3. **Türkiye is the bloc's hinge.** It became a net electricity exporter in 2024 and is the only physical bridge to the EU market (ENTSO-E, 650/500 MW). Akkuyu nuclear and the Nakhchivan corridor extend that role.
4. **Integration is the unrealized prize.** Two natural flow axes exist: east–west (Central Asian surplus to Europe via the Caspian corridor) and north–south (CASA-1000, Uzbekistan–Afghanistan). Yet cross-border trade remains far below potential: the political framework is strong, the physical infrastructure early-stage.
5. **A tariff chasm.** Residential prices span from Turkmenistan's subsidised ~0.7¢/kWh to the TRNC's (Turkish Republic of Northern Cyprus) ~12.7¢, while non-household tariffs stretch further still, reaching Hungary's deregulated ~35¢, the EU's highest. The spread mirrors the divide between subsidy-driven and cost-reflective pricing policies.

One-line picture: a politically aligned, physically fragmented bloc of ~212 GW and ~180 million people, pivoting from gas to renewables-plus-nuclear — where the largest near-term opportunities are Uzbekistan and Kazakhstan, the most bankable are Türkiye and Azerbaijan, and regional integration is the long-dated optionality.

Yönetici Özeti

Türk dünyası elektrik bloğunu 2026'da tanımlayan beş bulgu öne çıkıyor.

- 1. İki vitesli bir piyasa yapısı var.** Türkiye ve Macaristan serbestleşmiş, maliyeti fiyata yansıtan ve Avrupa Birliği'ne (AB) komşu sistemler işletiyor. Orta Asya ülkeleri ile Türkmenistan ise hâlâ sübvansiyon ağırlıklı ve reform sürecinin ortasında. Özbekistan, Kazakistan ve Kırgızistan'ın toplumsal tepki doğurmadan maliyet bazlı fiyatlamaya geçip geçemeyeceği, 2026–2030 döneminin belirleyici sorusudur.
- 2. Sistemler gazdan yenilenebilir kaynağa geçiyor; nükleer tarafında ağırlık Rosatom'da.** Fosil yakıt ağırlıklı sistemler (Özbekistan, Azerbaycan, Türkmenistan, Kazakistan) güneş ve rüzgâra yöneliyor. Bu yönelişi iklim hedefleri kadar gaz kıtlığı ve ihracat geliri de besliyor. Sekiz sistemden beşi (Türkiye, Macaristan, Özbekistan, Kazakistan, Kırgızistan) nükleer santral kuruyor ya da görüşmelerini sürdürüyor; bu projelerin büyük bölümü Rosatom ile yürüyor.
- 3. Türkiye bloğun bağlantı noktasıdır.** Ülke 2024'te net elektrik ihracatçısı konumuna geçti ve AB pazarına tek fiziksel köprü durumunda (ENTSO-E üzerinden 650/500 MW). Akkuyu nükleer santrali ve Nahçıvan koridoru bu rolü genişletiyor.
- 4. Entegrasyon henüz değerlendirilmemiş bir fırsattır.** İki doğal akış eksenini bulunuyor: doğu–batı ekseninde Orta Asya'nın elektrik fazlası Hazar koridoruyla Avrupa'ya, kuzey–güney ekseninde ise CASA-1000 hattıyla Özbekistan üzerinden Afganistan'a aktarılabilir. Buna karşın sınır ötesi ticaret potansiyelinin çok altında kalıyor; siyasi çerçeve güçlü olsa da fiziksel altyapı henüz erken aşamada.
- 5. Tarifeler arasında büyük bir uçurum var.** Mesken elektrik fiyatları Türkmenistan'ın sübvansiyonlu yaklaşık 0,7 ¢/kWh düzeyinden Kuzey Kıbrıs Türk Cumhuriyeti'nin (KKTC) yaklaşık 12,7 ¢ düzeyine kadar uzanıyor. Mesken dışı tarifelerdeki açıklık daha da büyük; Macaristan'ın serbest piyasadaki yaklaşık 35 ¢ değeri AB'nin en yüksekini oluşturuyor. Bu açıklık, sübvansiyon odaklı fiyatlamaya politikaları ile maliyeti fiyata yansıtan politikalar arasındaki ayrımı gösteriyor.

Tek cümlelik görünüm: Yaklaşık 212 GW kurulu güce ve yaklaşık 180 milyon nüfusa sahip bu blok, siyasi olarak hizalı ancak fiziksel olarak parçalı bir yapı sergiliyor ve gazdan yenilenebilir kaynak ile nükleer bileşimine geçiyor. En büyük kısa vadeli fırsatlar Özbekistan ve Kazakistan'da, yatırıma ve finansmana en elverişli pazarlar Türkiye ve Azerbaycan'da; bölgesel entegrasyon ise uzun vadeli bir opsiyon değeri taşıyor.

1. Bloc snapshot — the three-metric scorecard

IN BRIEF

- ▶ **212 GW** capacity · **~180M** people · **~\$2.1T** nominal GDP (PPP ~\$5.9T) — together the bloc ranks as the world's ~13th–14th economy.
- ▶ Structural extremes: Kazakhstan the highest per-capita (~5,700 kWh, coal-heavy), Turkmenistan the lowest tariff (~0.7¢), Hungary and TRNC the dearest (EU-exposed).
- ▶ Cost of capital diverges sharply — investment-grade Kazakhstan, Hungary and Azerbaijan (CRP ~2–3%) vs Türkiye and Uzbekistan (Ba3, ~4.7%) vs Kyrgyzstan (B3, ~8.4%).

Country	Installed (GW)	Per-capita (kWh)	Residential (US¢/kWh)	Dominant source
Türkiye	122.5	~4,010	~7.7	Hydro/Gas/RE (62% RE)
Kazakhstan	26.7	~5,700	~7.2	Coal
Uzbekistan	25.8	~2,420	~6.1	Gas (55%)
Azerbaijan	9.7	~2,550	~4.9	Gas (80%)
Turkmenistan	~6.9	~3,200	~0.7	Gas (100%)
Kyrgyzstan	~3.5	~2,640	~1.9	Hydro (90%)
Hungary	~17	~5,080	~12.0	Nuclear+Solar
TRNC	~0.45	n/a	~12.7	Fuel oil (94%)

Three patterns stand out: Kazakhstan combines the highest per-capita consumption (heavy industry, cold climate, cheap coal) with a high-carbon fleet; Turkmenistan has the lowest tariff (~0.7¢ at the official peg, reflecting deep gas subsidy and limited transparency); and the highest tariffs sit at the import-dependent, EU-exposed systems — Hungary and TRNC (residential ~12–13¢, but Hungary's deregulated non-household reaches the EU's dearest at ~27–35¢).

Economic scale

The bloc is an economic as well as an energy weight. Combined, the five OTS members produce roughly **\$2.1–2.3 trillion** in nominal GDP — equivalent to the world's ~13th–14th-largest economy (Spain/Mexico scale), the basis for the Organization's self-description as a single "14th-largest economy" and "third-largest energy supplier." On a purchasing-power basis the five-member total is ~\$5.9 trillion, materially higher. Income spans an order of magnitude — from Hungary and Türkiye (~\$18,000–26,000 per capita) to Kyrgyzstan (~\$3,000) — which maps directly onto the electricity-demand headroom analysed in §3 and §9.

Country	Nominal GDP 2025 (\$bn)	GDP per capita (\$)	GDP per capita, PPP (\$)
Türkiye	1,565	18,200	45,600
Kazakhstan	303	14,900	40,900
Hungary	248	25,800	48,600
Uzbekistan	133	3,580	11,900
Turkmenistan	~83 [est.]	~12,000 [est.]	21,200
Azerbaijan	76	7,300	25,100
Kyrgyzstan	16	2,984	8,012
TRNC	~7 [est.]	~17,500 [est.]	n/a
OTS-5 members	~2,090	—	~5,900 (total)

Source: IMF WEO 2025; PPP per-capita World Bank 2024. The "14th-largest economy" claim is the five OTS members on a nominal basis; observers (Hungary, Turkmenistan, TRNC) are additional. Turkmenistan's nominal GDP is IMF official-peg-based (the parallel rate is far lower); TRNC is from national statistics (GNI basis), outside IMF/World Bank coverage.

Sovereign risk and cost of capital. For lenders and equity investors, the rating divide matters as much as economic size — it sets the cost of capital that flows into every energy project's WACC. Three members are **investment-grade** — Kazakhstan (Baa1), Hungary (Baa2) and Azerbaijan (Baa3) — with country-risk premia of ~2–3% and the cheapest financing. Türkiye and Uzbekistan sit one notch below at Ba3 (~4.7% CRP) but offer the largest, most liquid markets; Kyrgyzstan (B3, ~8.4%) carries materially higher financing costs; Turkmenistan and TRNC are unrated.

Country	Moody's rating	Country risk premium	Sovereign CDS (5-yr)
Kazakhstan	Baa1 (investment grade)	2.07%	117 bps
Hungary	Baa2 (investment grade)	2.46%	146 bps
Azerbaijan	Baa3 (investment grade)	2.85%	n/a
Türkiye	Ba3	4.66%	285 bps
Uzbekistan	Ba3	4.66%	n/a
Kyrgyzstan	B3	8.41%	n/a
Turkmenistan	unrated	n/a	n/a
TRNC	not rated	n/a	n/a

Source: Damodaran (NYU Stern, ctryprem) on Moody's local-currency sovereign ratings, January 2026; CRP = equity country-risk premium; CDS = 5-year sovereign credit default swap spread. Investment grade = Baa3 and above. "Cyprus" in rating databases (A3) is the Republic of Cyprus — not TRNC, which is unrated.

2. Installed capacity & generation mix

IN BRIEF

- ▶ ~212 GW splits four ways: RE-scaling **Türkiye** (62% renewable), coal-bound **Kazakhstan**, the gas-heavy Caspian (UZ/AZ/TM), hydro **Kyrgyzstan** and nuclear **Hungary**.
- ▶ Net exporters (Türkiye, Azerbaijan, Turkmenistan) vs structurally short systems (Kazakhstan, Kyrgyzstan, Hungary, Uzbekistan) — the core logic of intra-bloc trade.
- ▶ Grid losses span ~5% (Hungary) to ~13–15% (Uzbekistan); nameplate ≠ available capacity across the ageing thermal fleets.

Total installed capacity is ~212 GW, but the composition could hardly be more varied:

- **Türkiye (122.5 GW)** — the bloc's largest and most diversified system. Renewables reached 76.3 GW (62.3%) by end-2025: hydro ~32.5 GW, solar 25.1 GW, wind 14.8 GW; gas ~24 GW and coal ~20.6 GW make up the thermal base. Akkuyu (nuclear) is not yet in the capacity statistics.
- **Kazakhstan (26.7 GW)** — coal-dominated (~13 GW), with gas ~6.7 GW and hydro ~3.1 GW. Renewables stand at 3.5 GW and a +26 GW build-out is planned to 2035. Note: nominal capacity materially exceeds *available* capacity given an ageing fleet.
- **Uzbekistan (25.8 GW)** — gas 55%, coal 19%, hydro 11%, solar 11%, wind 2%. A defined transition path takes gas to 15% and coal to 0% by 2055, with solar+wind rising to ~67% (total RE ~85%).
- **Azerbaijan (9.7 GW)** — gas ~80% (7.9 GW), hydro 1.4 GW, with Masdar/ACWA solar and wind now scaling.
- **Turkmenistan (~6.9 GW)** — almost entirely gas; no diversification, low transparency (capacity per EIA 2023).
- **Kyrgyzstan (~3.5–4.0 GW)** — hydro ~90% (Toktogul 1,440 MW), exposed to drought-driven deficits.
- **Hungary (~17 GW)** — nuclear backbone (Paks, ~2 GW, ~42% of generation) plus a fast solar build (9+ GW). Paks II adds two reactors in the 2030s.
- **TRNC (~0.45 GW)** — fuel-oil thermal (Kıb-Tek + AKSA Kalecik), >94% fossil.

Capacity caveat: nameplate capacity ≠ available capacity, especially across the older thermal fleets (KZ, KG, TM). Comparisons should footnote this.

Generation & demand (2025, structural cut-off). Bloc output totals ~680 TWh:

Country	Generation (TWh)	Demand (TWh)	Net position
Türkiye	363	361	Net exporter (since 2024)
Kazakhstan	118	120	Net importer (~–2, from Russia)
Uzbekistan	~80	~84	Net importer
Hungary	38	~48	Net importer (~22% of demand)
Turkmenistan	~32	~27	Net exporter (AF/IR)
Azerbaijan	28	~25	Net exporter
Kyrgyzstan	15	18	Net importer (winter deficit)
TRNC	~2.4	~2.4	Isolated island

The divide between net exporters (TR, AZ, TM) and structurally short systems (KZ, KG, HU, UZ) is the core logic of intra-bloc trade. **2030 demand targets** are official only for Türkiye (455 TWh), Uzbekistan (117–121 TWh) and Hungary (~60 TWh); others publish capacity targets but no firm demand projection.

Grid losses & customers. Network losses and the customer base vary widely:

Country	T&D losses (%)	Electricity customers (m)
Türkiye	~ 11.1 (transmission 2.1 + distribution 8.99, 2024)	50.7
Azerbaijan	7.6	~2.7
Kazakhstan	~6–7 (transmission ~5.6; regional distribution 9–17)	~8–9
Uzbekistan	~ 13–15 (transmission 2.7 + distribution 12.5)	~8
Kyrgyzstan	>11 technical (40–50 incl. non-technical in places)	~1.5
Turkmenistan	~12 (WB 2014; no current figure)	n/a
Hungary	~5–7	~5.5
TRNC	n/a	~0.35

High distribution losses in Uzbekistan, Kyrgyzstan and Turkmenistan reflect ageing networks. Kazakhstan's own grid losses and station own-use open a wide gross-to-final gap — which is why its ~5,700 kWh gross per-capita drops to ~5,000 on a final-consumption basis (§3). Türkiye's distribution loss fell to 8.99% in 2024, a marked improvement. *(Loss definitions differ — technical-only vs technical+non-technical.)*

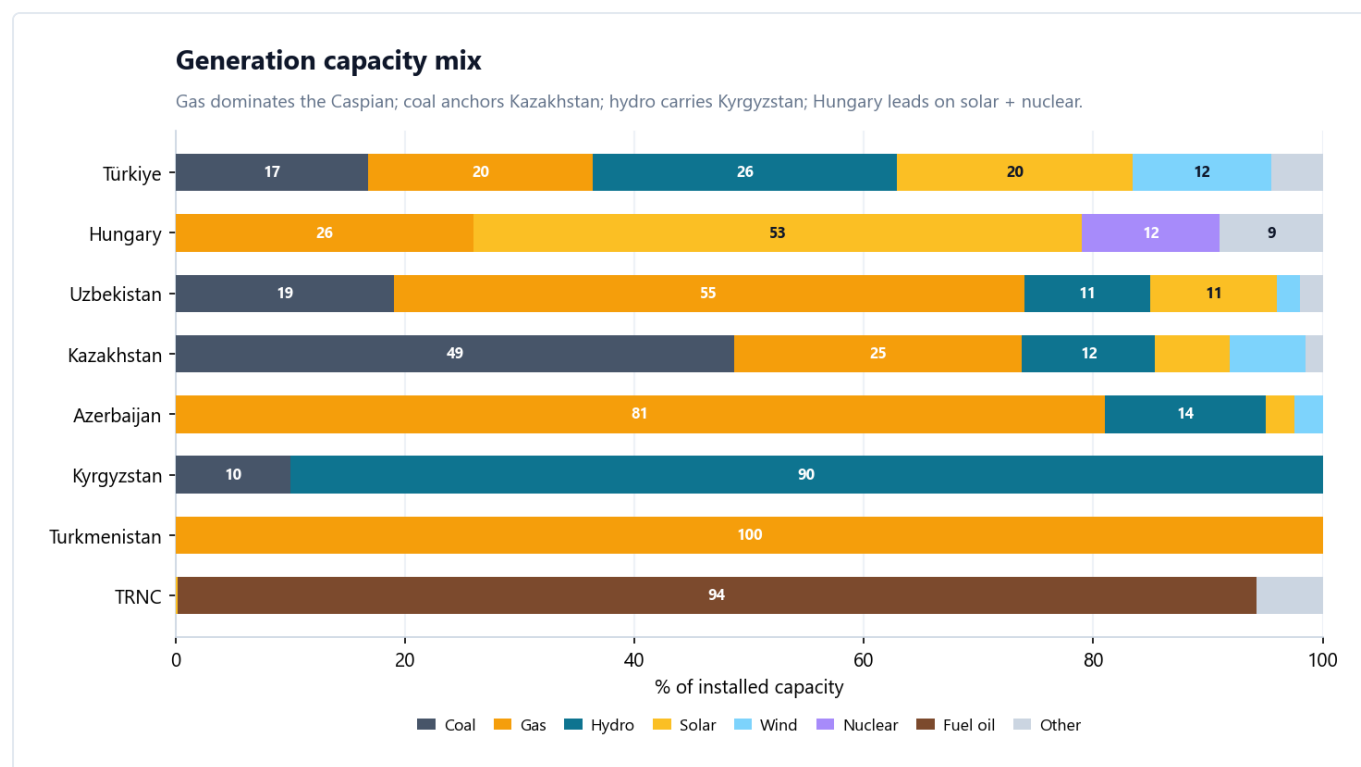


Figure — Generation capacity mix (% of installed): gas dominates the Caspian, coal anchors Kazakhstan, hydro carries Kyrgyzstan, Hungary leads on solar + nuclear.

3. Demand drivers — consumption, population, EV & heating

IN BRIEF

- ▶ Per-capita consumption spans ~3× — Kazakhstan ~5,700 kWh (≈ EU-27) down to Uzbekistan ~2,420 — driven by heavy industry and cheap power, not income.
- ▶ Central Asia sits well below half the OECD average: the demand headroom that industrialization, EVs and heat electrification will unlock.
- ▶ EVs are the fastest-emerging load (**Türkiye ~17%** of new-car sales; Uzbekistan the regional hub), while gas-dominated heating caps near-term heat electrification.

Consumption per head (gross, 2024–25) ranges almost three-fold across the bloc: **Kazakhstan ~5,700 kWh** (industrial, cold) and Hungary ~5,080 kWh (developed economy) at the top; Türkiye ~4,010; Turkmenistan ~3,200; then a cluster of Kyrgyzstan ~2,640, Azerbaijan ~2,550 and Uzbekistan ~2,420, where large or lower-income populations pull the average down.

Benchmarks for context: EU-27 ~5,500–5,800 kWh/capita (gross), OECD ~7,500 kWh. On a gross basis Kazakhstan (~5,700) is level with the EU-27 — though on a final-consumption basis (excluding the bloc's high grid losses) it drops to ~5,000, below the EU. Either way, Kazakhstan consuming as much electricity as the EU on less than half the income per head is the clearest sign of the region's energy-intensity problem: cost-below tariffs blunt efficiency incentives, heavy industry and crypto mining are electricity-hungry, and electric heating is rising — while EU demand has fallen since the 2022 energy crisis. Türkiye is ~73% of the EU level; the other Central Asian members sit well under half the OECD average — a direct measure of the demand-growth headroom that industrialization, EVs and heat electrification will unlock.

Population (~180 million total). Distribution is highly uneven — Türkiye alone is nearly half the bloc, while Uzbekistan is the fastest-growing member.

Population and projected growth to 2035

Türkiye is nearly half the bloc; Uzbekistan grows fastest (38→43m); Hungary and Azerbaijan are flat.

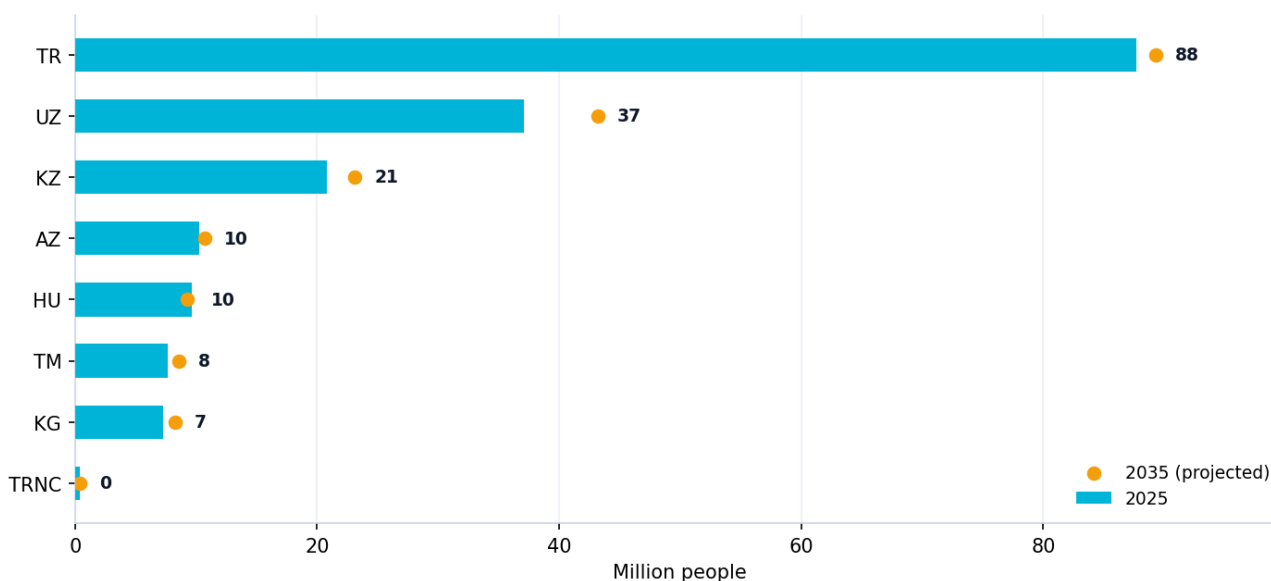


Figure 1 — Population by country (2025 bars) and projected 2035 level (points). Türkiye dominates; Uzbekistan grows fastest (37→43m); Hungary and Azerbaijan are flat.

Two structural factors will shape future electricity demand:

- **Heating fuel.** Natural gas dominates household heating in five systems (TR, AZ, UZ, TM and HU — Hungary has the EU's highest gas-heating share at ~54%), which limits near-term electrification of heat. Kazakhstan and Kyrgyzstan rely on coal and Soviet-era district heating — an air-quality and efficiency liability, but also the bloc's largest heat-electrification headroom. TRNC heats with electricity + LPG (no piped gas), giving it structurally high per-capita power demand.
- **Electric vehicles.** Türkiye leads adoption (~17% of new-car sales in 2025; Europe's 4th-largest BEV market, on Togg and Tesla). Uzbekistan is Central Asia's EV hub (EVs/hybrids over half of 2024 car imports, ~85% Chinese brands). Kyrgyzstan's fleet grew 14× in three years to ~15,000; Hungary passed 100,000 BEVs; Azerbaijan and Kazakhstan are early-stage; Turkmenistan is negligible. EV uptake is the fastest-emerging new load across the bloc, and a leading indicator of where grid reinforcement will be needed.

4. Retail tariffs

IN BRIEF

- ▶ Final electricity prices span **~50×** — from Turkmenistan's subsidised ~0.7¢ to Hungary's deregulated ~35¢ commercial.
- ▶ The spread is structural: subsidy-driven regimes (Turkmenistan, Kyrgyzstan) vs cost-reflective ones (Hungary, TRNC, Türkiye).
- ▶ Uzbekistan, Kyrgyzstan and Kazakhstan are mid-transition toward cost recovery — the bloc's defining reform test.

Converted to a common US¢/kWh basis at live FX (full detail and sources in the companion tariff dataset):

Customer	UZ	TR	KZ	AZ	TM	KG	HU	TRNC
Residential	6.1	7.7	7.2	4.9	0.7	1.9	12.0	12.7
Industrial	9.2	12.6	8.8	6.2	1.8	3.8	27.0	26.2
Commercial	8.2	15.9	8.8	7.4	1.8	4.5	35.2	26.2

VAT-inclusive except KZ ($\times 1.16$); Hungary's residential figure is the regulated band, while its industrial/commercial values are Eurostat non-household band proxies (bands ID 2,000–20,000 MWh and IB 20–500 MWh, 2025-S2, all taxes included) — among the EU's highest, since Eurostat bands track consumption size rather than sector. On a VAT-excluded basis (businesses recover VAT) Hungary's effective cost is ~21.6¢ industrial / ~28.1¢ commercial. Turkmenistan at the official peg (≈ 0.14 ¢ at the parallel rate, $\sim 1/5$ of the official figure); tier thresholds differ by country. The wide Türkiye residential-to-commercial gap (7.7→15.9¢) is partly a tax effect — residential VAT is 10% versus 20% for commercial/industrial. The overall spread — from Turkmenistan's heavily subsidised ~0.7¢ to Hungary's deregulated ~35¢ commercial (TRNC ~26¢ next) — reflects the bloc's split between subsidy-driven and cost-reflective regimes. Uzbekistan, Kyrgyzstan and Kazakhstan are all mid-transition toward cost recovery.

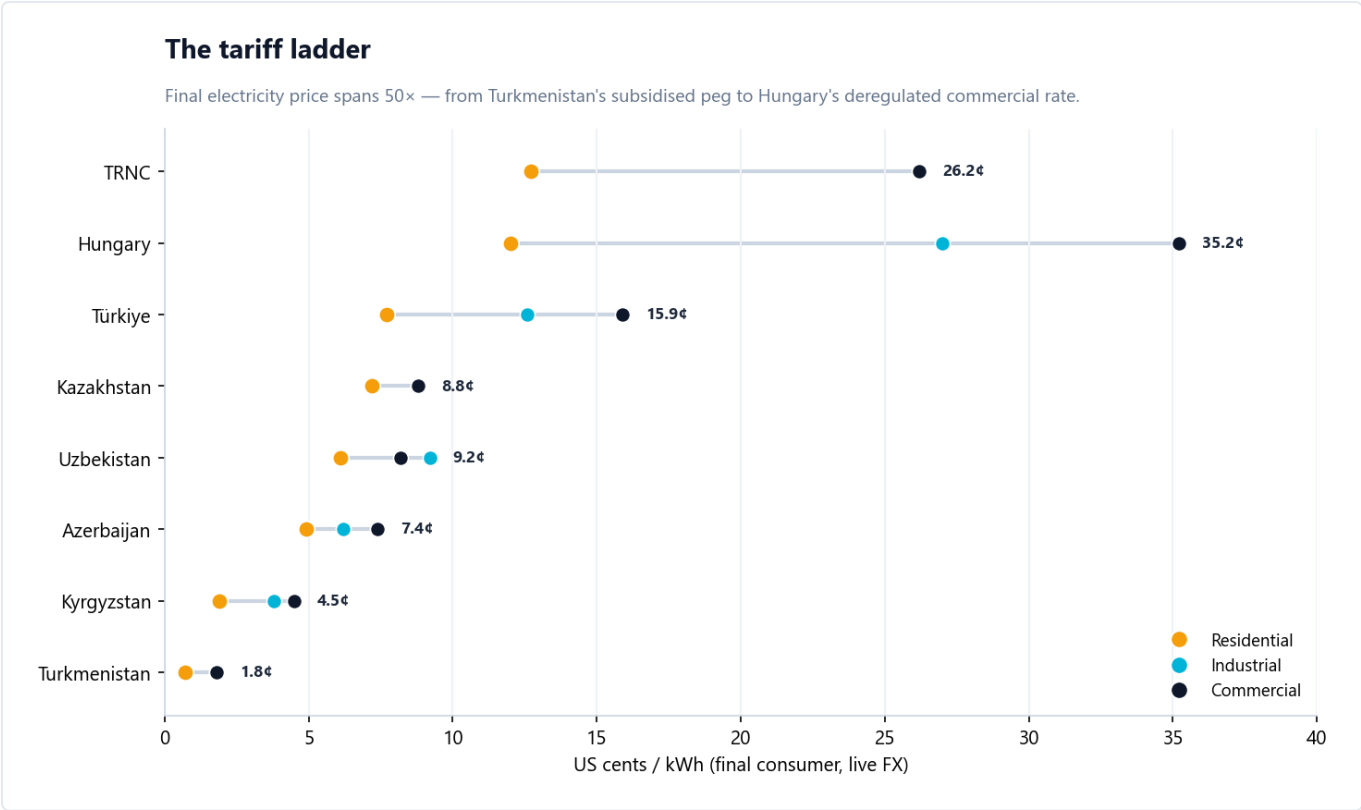


Figure — The tariff ladder: final electricity price spans 50× across the bloc, from Turkmenistan's subsidised peg to Hungary's deregulated commercial rate.

5. Market structure & reform

IN BRIEF

- ▶ Two regulatory worlds: liberalized exchanges (**Türkiye**/EPIAŞ, **Hungary**/HUPX) vs vertically-integrated state utilities (Azerbaijan, Kyrgyzstan, Turkmenistan, TRNC).
- ▶ Uzbekistan is the most active reformer — unbundled 2019, independent regulator EMDRA 2023, a 2024 market law; Türkiye the most mature.
- ▶ DSO structure ranges from 21 (Türkiye, Kazakhstan) down to single integrated utilities (Azerbaijan, Turkmenistan, TRNC).

The bloc splits into two regulatory worlds — EU-style liberalized exchanges (Türkiye, Hungary) at one end, vertically-integrated state utilities (Azerbaijan, Kyrgyzstan, Turkmenistan, TRNC) at the other — with Uzbekistan and Kazakhstan mid-transition. The institutional map:

Country	Ministry	Regulator	Transmission (TSO)	Wholesale / single-buyer	DSOs	Market model
Türkiye	ETKB	EPDK (independent)	TEİAŞ	EPIAŞ exchange (no single-buyer)	21	Liberalized exchange
Kazakhstan	Min. of Energy	KOREM + ministry (no independent regulator)	KEGOC	KOREM spot; Settlement Centre (RE only)	21	Hybrid wholesale
Uzbekistan	Min. of Energy	EMDRA (2023)	NEGU	Uzenergosotish (2024)	14	Single-buyer, transitioning
Azerbaijan	Min. of Energy	AERA + Tariff Council	Azerenerji	Azerenerji	1 (Azerishiq)	Vertically integrated, state
Kyrgyzstan	Min. of Energy	State energy regulator	NESK	—	4	Vertically integrated, state
Turkmenistan	Min. of Energy	none	Türkmenenergo	Türkmenenergo	Integrated	Vertically integrated, state
Hungary	Min. of Energy	MEKH (independent)	MAVIR	MVM Next (HUPX exchange)	6	Liberalized exchange (EU)
TRNC	Econ./Energy Min.	none [tbc]	Kıb-Tek	Kıb-Tek	1	Vertically integrated, state

Generation: state holdings dominate in KZ (Samruk-Energy), AZ (Azerenerji ~90%), TM/TRNC (Kıb-Tek + AKSA Kalecik IPP); competitive in TR (EÜAŞ ~20% + private) and HU. Source: IEA country profiles, national regulators/ministries, ENTSO-E, KEGOC/MAVIR, 2026.

Reform highlights:

- **Uzbekistan** — the bloc's most active reformer: unbundled Uzbekenergo (2019), independent regulator (EMDRA, 2023), single-buyer via Uzenergosotish, a 2024 market law targeting a liberalized wholesale market by 2026, and ongoing transfer of distribution to private operators with a –50% loss mandate.
- **Türkiye** — the most mature market: a liberalized wholesale exchange (EPIAŞ), independent regulator (EPDK), competitive generation and a quarterly retail tariff mechanism.
- **Kazakhstan** — single-buyer model with KEGOC as system operator; gradual tariff reform toward cost recovery and a large capacity build-out.
- **Azerbaijan** — state-dominated (Azerenerji/Azerishiq) with tariff setting by the Tariff Council; renewables opened to IPPs.
- **Kyrgyzstan** — state-owned, subsidised; a medium-term tariff policy raises prices toward cost by 2030.
- **Turkmenistan** — fully state-controlled, opaque; last public tariff schedule dates to 2017.
- **Hungary** — EU-integrated market with regulated residential ("rezsicsökkentés") and deregulated commercial/industrial supply.

6. Cross-border trade & integration

IN BRIEF

- ▶ Two natural flow axes — east–west (Caspian surplus toward Europe) and north–south (CASA-1000 to Afghanistan/Pakistan).
- ▶ Flagships: the Caspian "Green Corridor" HVDC (first cable ~2032), CASA-1000 (~75% complete), and Türkiye as the only physical bridge to the EU (ENTSO-E, 650/500 MW).
- ▶ Strong political framework (OTS Energy Programme 2023–27), early-stage physical infrastructure — the bloc's long-dated optionality.

The bloc sits on two natural flow axes — an **east–west** axis (Central Asian surplus toward Türkiye and Europe) and a **north–south** axis (KG/TJ/UZ surplus toward Afghanistan/Pakistan):

- **Central Asian Power System (CAPS)** — the Soviet-era synchronous ring now coordinated by UZ–KZ–KG; **Tajikistan reconnected (partially) in June 2024**, full sync expected H1 2026. The Jan 2022 region-wide blackout (three capitals affected) underlined a structural capacity/balancing deficit — the region exports in summer but runs short in winter.
- **CASA-1000** — KG/TJ hydro surplus to Afghanistan/Pakistan; **1,300 MW**, ~75% complete (Oct 2025), official target end-2026 but a possible World Bank extension to 2028. North→south flow.
- **Caspian "Green Corridor"** — UZ–KZ–AZ toward Europe via sub-sea HVDC (~1,195 km, ~525 kV, 1.3→4 GW); CESI feasibility began Jan 2026, on the EU PCI list. First cable ~2032 at earliest. Orta Asya→Europe.
- **Azerbaijan–Türkiye / Nakhchivan** — current 75/40 MW; a planned 400 kV, ~1 GW expansion (Zangezur corridor) under construction. A **four-country green corridor** (TR+AZ+GE+BG, MoU 4 Apr 2025) targets carrying Caspian green power into the EU via Türkiye.
- **Türkiye–EU (ENTSO-E)** — synchronous since 2011; **650 MW (EU→TR) / 500 MW (TR→EU)** via Bulgaria and Greece. Türkiye is the only physical bridge between the bloc and the EU electricity market.
- **Uzbekistan–Afghanistan** (Surkhan–Pul-e-Khumri 500 kV, 245 km) — under construction since Sep 2025, target Apr 2027, ~6 TWh/yr to Afghanistan.
- **OTS energy cooperation** — an Energy Cooperation Programme (2023–2027) is in force; the Caspian green corridor is its flagship. Uzbekistan hosts the 6th Turkic Energy Summit in 2026. Strong political framework, early-stage physical infrastructure.

7. Renewables, nuclear & investment

IN BRIEF

- ▶ Investment concentrates in renewables — Uzbekistan 27 GW/~40% by 2030, Kazakhstan +26 GW, Türkiye ~7 GW/yr — financed by ADB/World Bank/EBRD and Gulf IPPs.
- ▶ A **Rosatom-led nuclear wave**: five systems building or negotiating (Akkuyu first power 2026, Paks II ~2032, Jizzakh, Kazakhstan 2034–36).
- ▶ Common thread: Western (Siemens) equipment blocked by sanctions — deepening Rosatom dependence and slipping timelines.

Investment is concentrated in renewables and, in two cases, nuclear: - **Uzbekistan** — 27 GW RE / ~40% of output by 2030; ACWA Power, Masdar and Volitalia building multi-GW solar/wind; first nuclear (Rosatom VVER-1000 + SMRs) under construction. - **Kazakhstan** — +26 GW to 2035; renewables and gas to displace ageing coal. - **Azerbaijan** — Masdar/ACWA solar and wind scaling post-COP29. - **Türkiye** — adding ~7 GW/yr almost entirely renewable; Akkuyu nuclear phasing in. - **Hungary** — Paks II nuclear plus rapid solar; the bloc's decarbonization frontrunner by share. - **Kyrgyzstan** — new hydro and renewables to close a structural deficit.

Development banks (ADB, World Bank/IFC, EBRD, AIIB) and Gulf IPPs are the primary financiers across Central Asia.

Nuclear — a Rosatom-led wave. Five of the bloc's systems are building or negotiating nuclear, overwhelmingly with Russia's Rosatom: - **Türkiye — Akkuyu** (4×1,200 MW VVER): Unit 1 ~99% complete, first power targeted **2026** (slipped from 2023 on sanctions/Siemens equipment issues). Second plant (Sinop) eyeing KEPCO/US; third (Thrace) eyeing China. - **Hungary — Paks II** (2×1,200 MW VVER): construction permit Nov 2025, first concrete Feb 2026, online **~2032** — the EU's first VVER-1200, on a €10bn Russian loan. - **Uzbekistan — Jizzakh** (2×VVER-1000 + 2×RITM-200N SMR, >2,100 MWe): first concrete **Mar 2026**; the world's first land-based RITM-200N SMR customer; ~14% of demand when complete (~2029–35). - **Kazakhstan** — Oct 2024 referendum (**70% yes**); Rosatom selected for plant 1 (2×VVER-1200, online 2034–36), CNNC (China) for plants 2–3. - **Kyrgyzstan** — in talks with Rosatom for a small/medium modular plant (110–440 MW), driven by its hydro-deficit crisis.

Azerbaijan, Turkmenistan and TRNC have no nuclear programme. A common thread: Western equipment (Siemens) was blocked by sanctions on both Akkuyu and Paks II, deepening Rosatom dependence and slipping timelines.

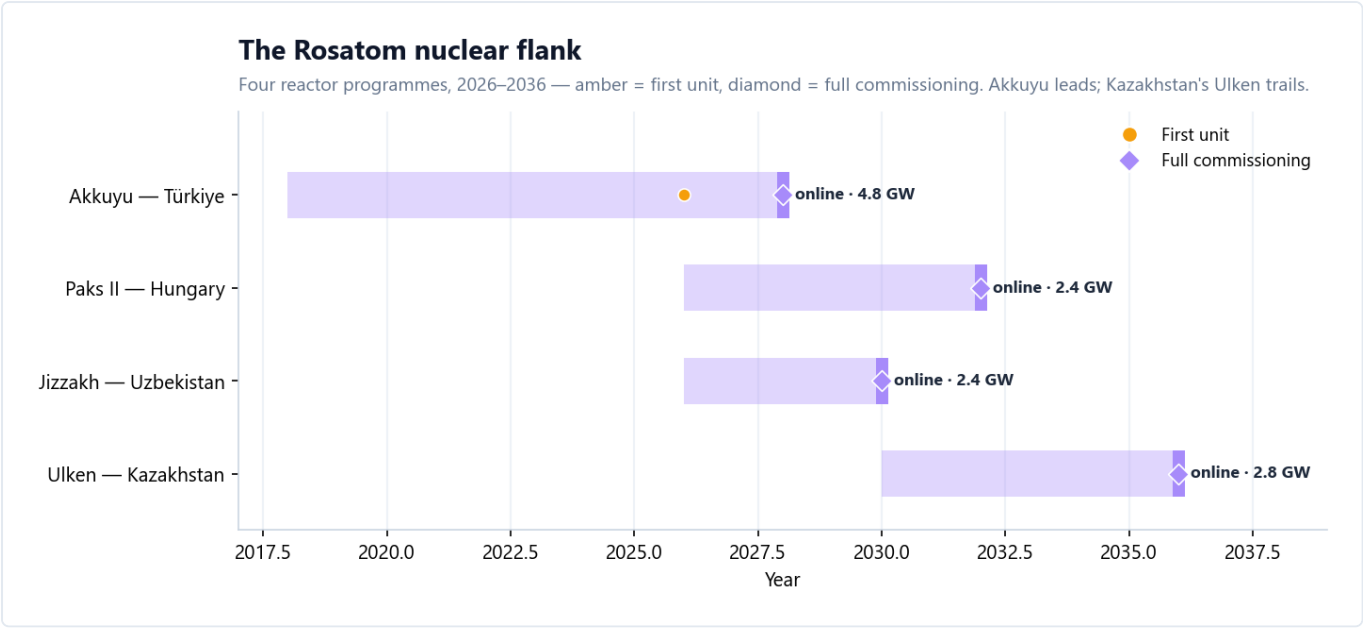


Figure — The Rosatom nuclear flank: four reactor programmes, 2026–2036. Akkuyu leads; Kazakhstan's Ulken trails.

8. Emissions, efficiency & climate targets

IN BRIEF

- ▶ Power carbon intensity spans an order of magnitude — Kazakhstan ~604 (coal) and TRNC ~650–750 (fuel oil) gCO₂/kWh highest; Kyrgyzstan ~153 and Hungary ~213 cleanest.
- ▶ Türkiye is the only member below the EU on energy intensity; Turkmenistan (~3.8×) and Uzbekistan (~2.8×) the least efficient.
- ▶ Net-zero clusters at 2050–2060 — but **Azerbaijan and Turkmenistan set none**, and TRNC sits outside the UNFCCC.

Carbon intensity & emissions

The bloc's power systems span an order of magnitude in carbon intensity:

Country	Power carbon intensity (gCO ₂ /kWh)	Per-capita CO ₂ (tCO ₂ , total)	Energy intensity vs EU
Kyrgyzstan	~153 (hydro 78%)	1.6	1.8×
Hungary	~213 (nuclear+solar)	4.1	1.2×
Türkiye	~395	5.9	0.85× (below EU)
Azerbaijan	~431 (gas)	3.9	1.7×
Uzbekistan	~473 (gas)	3.8	2.8×
Turkmenistan	~490 (gas; far higher on a lifecycle basis)	10.8	3.8× (least efficient)
Kazakhstan	~604 (coal)	13.9 (highest)	2.2×
TRNC	~650–750 (fuel oil) [est.]	~5.4 (proxy)	n/a

Kazakhstan and TRNC are the most carbon-intensive (coal / fuel oil); Kyrgyzstan and Hungary the cleanest (hydro / nuclear+solar). On energy intensity, **Türkiye is the only member below the EU average**, while Turkmenistan (~3.8×) and Uzbekistan (~2.8×) are the least efficient — Kazakhstan's ~2.2× is the efficiency problem behind its EU-level per-capita consumption (§3). The bloc's Central Asia + Caucasus power sector emits ~239 Mt CO₂/yr (Ember). *(Operational intensity understates gas systems' true footprint — Turkmenistan and Uzbekistan have high methane leakage.)*

Climate targets (NDC & net-zero)

Country	NDC target	Net-zero	RE target
Türkiye	–41% vs BAU (2030)	2053	120 GW wind+solar (2035)
Hungary	–55% vs 1990 (EU NDC)	2050	≥30% RE (2030)
Kazakhstan	–15%/–25% vs 1990	2060	15→30% generation
Uzbekistan	–35% intensity vs 2010	2060	40% generation (2030)
Kyrgyzstan	–16%/–44% vs BAU	2050	hydro-led
Azerbaijan	–35% vs 1990 (2030)	none set	30→35.5%
Turkmenistan	–20% intensity vs 2010	none	none
TRNC	not a UNFCCC party	—	—

Net-zero clusters at 2050–2060 (Türkiye earliest at 2053; Kazakhstan and Uzbekistan at 2060); **Azerbaijan and Turkmenistan have set no net-zero target**, and TRNC sits outside the UNFCCC framework. *Caveat: NDC baselines are heterogeneous (BAU / 1990 / intensity-2010) — a single "%" ranking would mislead.*

9. Outlook to 2030/2035 — demand, per-capita & capacity

IN BRIEF

- ▶ Our own projection: bloc demand grows **~45%** to 2035 (685 → ~992 TWh), with nearly 90% from Türkiye, Kazakhstan and Uzbekistan.
- ▶ Convergence is a Türkiye/Kazakhstan story — Türkiye (~6,030 kWh) overtakes the EU-27, Kazakhstan (~7,010) nears the OECD average.
- ▶ Nominal abundance ≠ firm adequacy: Türkiye's 227 GW is RE-heavy; Kyrgyzstan and Turkmenistan in deficit — storage, flexibility and interconnection bind, not nameplate.

This is the only section built on UzEnergyNews's own projection model rather than compiled figures. Method: electricity-to-GDP elasticities (ϵ) derived from each country's 2010–2024 history (log-log regression), applied to IMF GDP and UN population projections, with an electrification adder (EV + heat). Three scenarios (Low / Base / High); official national plans shown as a reference line. Full model and data: [tools/tdt-projeksiyon/](#).

Electricity demand (TWh)

Country	2025	2030 (Base)	2035 (Base)	2035 range (Low–High)	Official 2035 ref.
Türkiye	361	441	538	463–638	510 (UEP)
Kazakhstan	120	141	162	146–182	152 (LCGP)
Uzbekistan	84	117	137	127–145	137 (GET)
Azerbaijan	25	28	31	28–35	—
Kyrgyzstan	18	25	33	28–39	—
Turkmenistan	27	31	36	33–39	—
Hungary	48	50	52	50–55	60
TRNC	2.4	2.7	3.1	2.9–3.4	—
Bloc	~685	~836	~992		

Baseline = the \$2 actual 2025 demand, so the projection starts from observed consumption rather than a plan figure.

The bloc's electricity demand grows ~45% over 2025–2035 (685 → ~992 TWh, ~3.8%/yr) — and nearly 90% of that increase comes from Türkiye, Kazakhstan and Uzbekistan (Türkiye alone ~58%). Our Base case for Türkiye and Kazakhstan runs ~5–6% above their official 2035 plans: we read those plans as mildly conservative, since Türkiye's EV uptake (~17% of new-car sales and climbing fast) already outpaces the 2023 UEP assumptions. Hungary is the reverse — our model sits below the official 60 TWh because its historical decoupling ($\epsilon \approx 0.35$) is unusually strong, whereas the official plan implies a re-coupling via Paks II and heat/EV electrification. Where model and plan diverge, both are shown rather than reconciled.

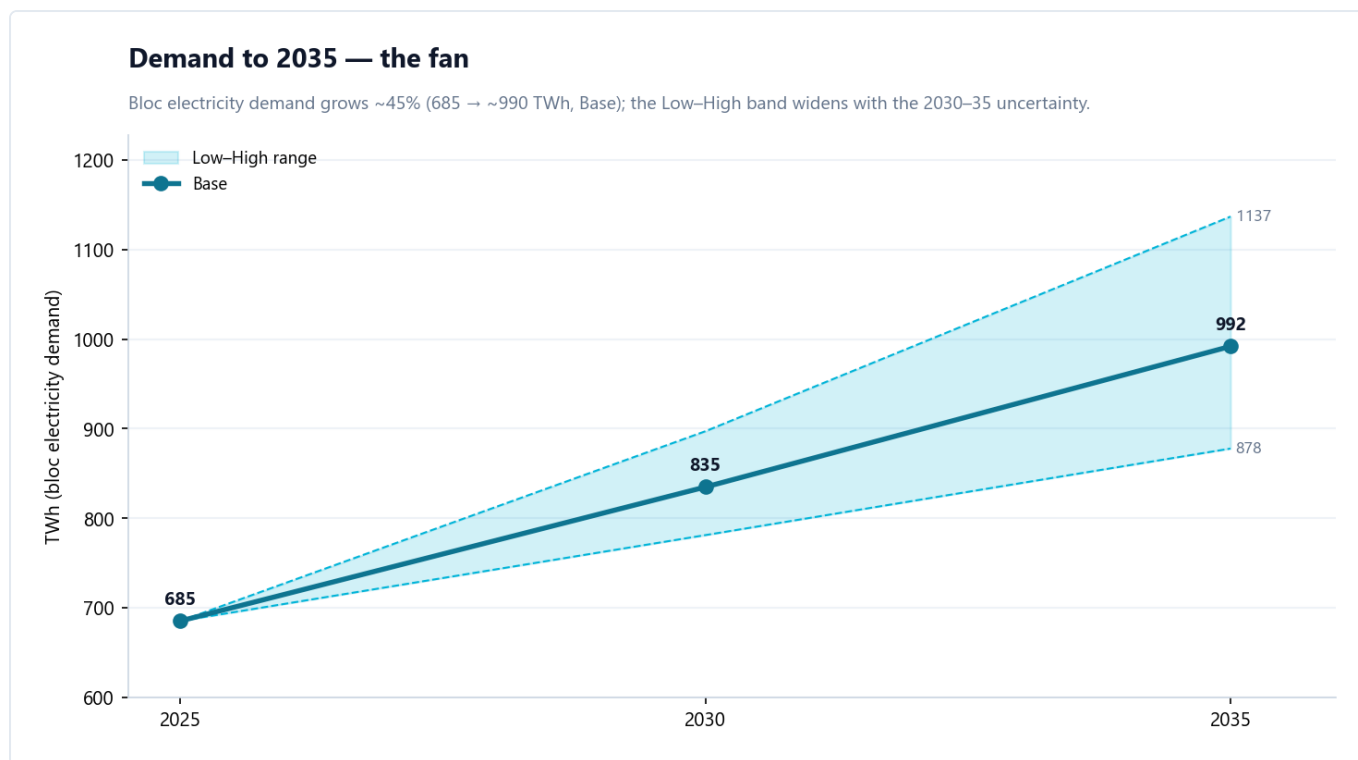


Figure 2 — Electricity demand to 2035 (Base case with Low–High scenario range; amber dot = 2025 baseline).

Per-capita consumption (kWh)

By 2035, **Türkiye (~6,030 kWh) overtakes the EU-27 (~5,500–5,800) and Kazakhstan (~7,010) approaches the OECD average (~7,500)** — while Uzbekistan and Azerbaijan (~2,900–3,170) remain below half the EU level. Convergence is a Türkiye/Kazakhstan story; the growth headroom is in Central Asia, where industrialization, EVs and heat electrification have barely begun.

Per-capita electricity consumption — convergence to 2035

Türkiye overtakes the EU-27; Kazakhstan approaches the OECD; Central Asia stays below half the EU level. (TRNC omitted — data-limited.)

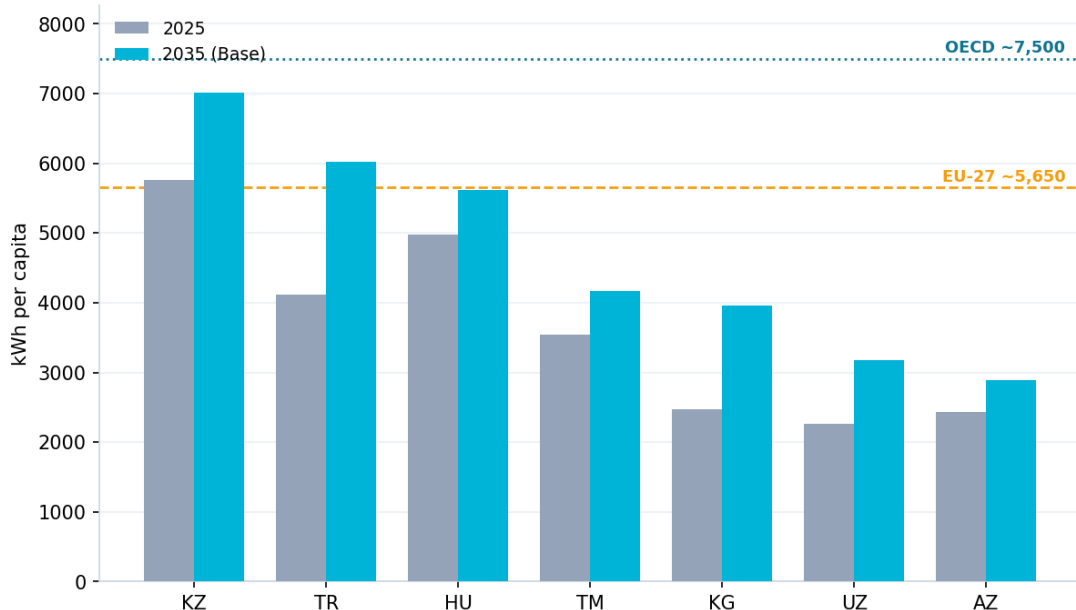


Figure 3 — Per-capita consumption: convergence to 2035 against EU-27 (~5,650) and OECD (~7,500) benchmarks. TRNC omitted (data-limited).

Capacity adequacy — the gap analysis

Translating Base demand into peak load (country load factors) and adding a 15% reserve margin gives the firm-capacity requirement, set against announced build-out:

Country	2035 firm need (GW)	Announced build-out (GW)	Status
Türkiye	126	227 (UEP)	Ample nameplate — but ~65% variable RE; firm margin tight
Kazakhstan	34	38	Adequate by 2035 — but tight in 2030 (LCGP concedes a ~6 GW gap)
Uzbekistan	30	29–35	Adequate if build-out delivers; RE-heavy
Azerbaijan	8	16	Comfortable
Kyrgyzstan	8	7.5	Deficit — structural winter shortfall
Turkmenistan	8.5	8	Deficit — flat gas fleet, rising demand
Hungary	11	25	Comfortable (Paks II + solar)
TRNC	0.7	0.5	Tight — isolated island, no import link

Two findings stand out. First, **nominal abundance is not firm adequacy**: Türkiye's 227 GW nameplate dwarfs its ~126 GW firm need, but a 65%-renewable fleet delivers far less firm capacity at peak — so the binding constraint becomes storage, flexibility and interconnection, not nameplate megawatts. This is the quantitative case behind the bloc's "integration prize." Second, the independent model reproduces the systems' own stress signals: it flags Kazakhstan as tight near-term — its LCGP concedes a ~6 GW gap by 2030, closed only by the 2035 build-out — and puts both Kyrgyzstan and Turkmenistan in outright deficit. Independent methods arriving at the systems' own conclusions.

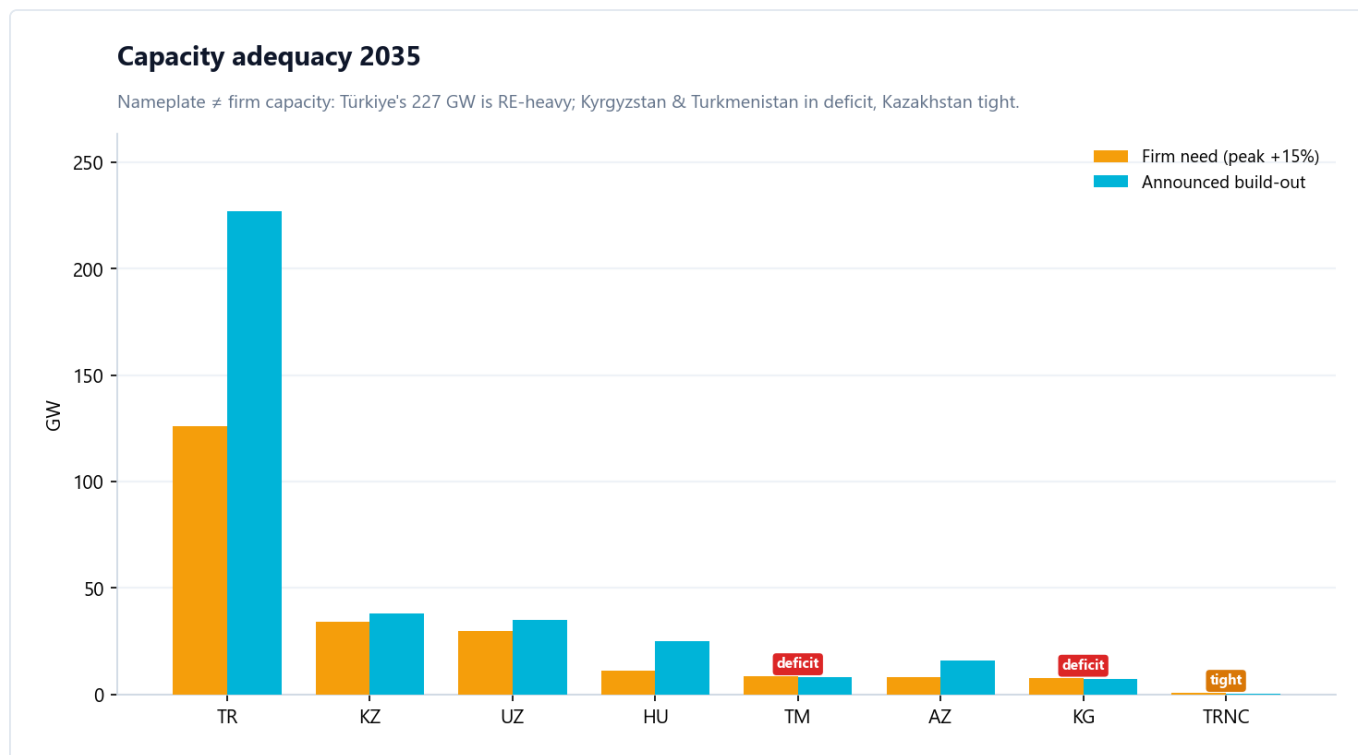


Figure 4 — Capacity adequacy 2035: firm-capacity need (peak load + 15% reserve) vs announced build-out. Türkiye's 227 GW nameplate is renewables-heavy; Kazakhstan tight near-term, Kyrgyzstan and Turkmenistan in deficit.

Investment read: demand growth is concentrated and bankable in Türkiye, Kazakhstan and Uzbekistan; the capacity-adequacy pressure (firm capacity, not nameplate) — and the cross-border integration that would relieve it — is where the 2030–2035 opportunity sits.

10. Analysis & outlook

Three conclusions for the bloc.

1. A two-speed market. Türkiye and Hungary operate liberalized, cost-reflective, EU-adjacent systems; the Central Asian members and Turkmenistan remain subsidy-heavy and mid-reform. The convergence question — whether Uzbekistan, Kazakhstan and Kyrgyzstan can reach cost recovery without social backlash — defines the 2026–2030 window.

2. Gas-to-renewables, with a nuclear flank. The fossil-heavy systems (UZ, AZ, TM, KZ) are all pivoting to solar and wind, driven as much by gas scarcity and export economics as by climate. Türkiye, Uzbekistan and Hungary add a nuclear dimension. Capacity will grow far faster than demand in percentage terms.

3. Integration is the unrealized prize. The bloc's grids are physically connectable and politically aligned, yet cross-border electricity trade remains far below potential. A coordinated OTS electricity-trade framework — building on CAPS, CASA-1000 and the Caspian corridor — would be the single most consequential regional development, and is the story worth tracking.

Bottom line for investors: the Turkic bloc offers emerging-market returns on a reform-and-renewables trajectory, with Uzbekistan and Kazakhstan as the largest near-term opportunities, Azerbaijan and Türkiye as the most bankable, and integration as the long-dated optionality.

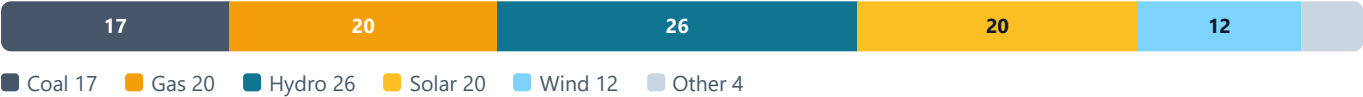
TR

Türkiye

The bloc's largest and only EU-synchronized system

122.5GW Installed capacity 62% renewable	363TWh Generation net exporter since 2024	361TWh Demand → ~538 by 2035 (Base)
~4,010kWh Per-capita ~73% of EU-27	7.7¢ Residential tariff US¢/kWh, VAT-incl.	395g Carbon intensity gCO₂/kWh · below EU

GENERATION CAPACITY MIX



ASSESSMENT

- The bloc's largest and most diversified system — **122.5 GW, 62% renewable**, and a net electricity exporter since 2024.
- The only physical bridge to the EU market (ENTSO-E, 650/500 MW), with Akkuyu nuclear phasing in from 2026.
- Demand reaches ~538 TWh by 2035 on EV uptake and industrial growth — the single largest growth engine in the bloc.

KZ

Kazakhstan

The bloc's coal heartland — highest output, highest carbon

26.7^{GW} Installed capacity coal ~49%	118^{TWh} Generation net importer	120^{TWh} Demand → ~162 by 2035
~5,700^{kWh} Per-capita ≈ EU-27 (gross)	7.2[¢] Residential tariff USc/kWh	604^g Carbon intensity gCO₂/kWh · highest

GENERATION CAPACITY MIX



ASSESSMENT

- The bloc's most coal-dependent grid — **604 gCO₂/kWh, the highest carbon intensity** — yet also its highest per-capita consumption (~5,700 kWh, EU-level on under half the income).
- A +26 GW build-out and first nuclear (Rosatom; 70% referendum yes) aim to displace ageing coal; adequacy is tight near-term — the LCGP concedes a ~6 GW gap by 2030.
- A single-buyer market (KEGOC system operator) with no independent regulator; tariff reform is moving gradually toward cost recovery.

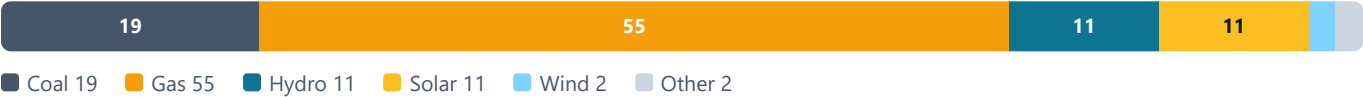
UZ

Uzbekistan

The most active reformer and second growth engine



GENERATION CAPACITY MIX



ASSESSMENT

- The bloc's **most active reformer** — unbundled Uzbekenergo (2019), independent regulator (EMDRA, 2023), single-buyer Uzenergosotish, wholesale liberalization targeted by 2026.
- Gas-heavy (55%) but pivoting fast: 27 GW renewables / ~40% of output by 2030 (ACWA, Masdar, Voltalia) plus first nuclear (Jizzakh VVER + RITM SMR, first concrete 2026).
- The largest near-term demand growth after Türkiye — ~84 → 137 TWh by 2035 on industrialization and the fastest-growing population.

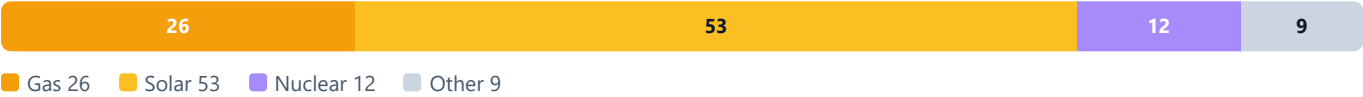
HU

Hungary

The decarbonization frontrunner — nuclear + solar, EU-integrated

~17GW Installed capacity nuclear + solar	38TWh Generation net importer ~22%	~48TWh Demand → ~52 by 2035
~5,080kWh Per-capita developed economy	12.0¢ Residential tariff regulated band	213g Carbon intensity gCO₂/kWh · clean

GENERATION CAPACITY MIX



ASSESSMENT

- The bloc’s **decarbonization frontrunner by share** — nuclear (Paks, ~42% of generation) plus a fast solar build (9+ GW), at 213 gCO₂/kWh.
- An EU-integrated market (HUPX exchange, MEKH regulator) with regulated residential tariffs but the EU’s dearest non-household rates (~27–35¢).
- Paks II adds two VVER-1200 reactors (~2032) — the EU’s first — deepening both low-carbon supply and Rosatom dependence.

AZ

Azerbaijan

A gas-led, state-run system pivoting to green exports

9.7^{GW} Installed capacity gas ~80%	28^{TWh} Generation net exporter	~25^{TWh} Demand → ~31 by 2035
~2,550^{kWh} Per-capita under ½ EU-27	4.9[¢] Residential tariff US¢/kWh	431^g Carbon intensity gCO₂/kWh

GENERATION CAPACITY MIX



ASSESSMENT

- A **gas-dominated, state-led system** (Azerenerji ~90% of generation, single DSO Azerishiq) — 80% gas, the most concentrated fuel mix after Turkmenistan.
- Renewables now scaling post-COP29 (Masdar/ACWA solar and wind), with a 30→35.5% RE target.
- A net exporter eyeing the Caspian 'Green Corridor' and the Nakhchivan/Zangezur expansion — positioning as a green-power bridge to Europe.



Turkmenistan

The least transparent system — all gas, deepest subsidy

~6.9^{GW} Installed capacity gas 100%	~32^{TWh} Generation net exporter	~27^{TWh} Demand → ~36 by 2035
~3,200^{kWh} Per-capita official data	0.7[¢] Residential tariff lowest · subsidised	~490^g Carbon intensity gCO₂/kWh

GENERATION CAPACITY MIX



■ Gas 100

ASSESSMENT

- The bloc's **least transparent system** — almost entirely gas (100%), no diversification, last public tariff schedule dated 2017.
- The lowest tariff in the bloc (~0.7¢ at the official peg; ~0.14¢ at the parallel rate), reflecting deep subsidy; no net-zero or RE target.
- A net exporter (Afghanistan, Iran) but adequacy is slipping — a flat gas fleet against rising demand puts it in structural deficit by 2035.

KG

Kyrgyzstan

The cleanest grid — hydro-bound, winter-deficit prone

~3.5GW Installed capacity hydro ~90%	15TWh Generation net importer	18TWh Demand → ~33 by 2035
~2,640kWh Per-capita under ½ EU-27	1.9¢ Residential tariff US¢/kWh	~153g Carbon intensity gCO₂/kWh · cleanest

GENERATION CAPACITY MIX



ASSESSMENT

- The bloc’s **cleanest grid by intensity** (~153 gCO₂/kWh) — hydro ~90% (Toktogul 1,440 MW) — but acutely exposed to drought.
- A structural winter deficit drives imports and emergency measures; in talks with Rosatom for a small modular reactor (110–440 MW).
- The fastest demand growth rate in the bloc (~18 → 33 TWh by 2035) against the tightest supply — new hydro and renewables are critical.

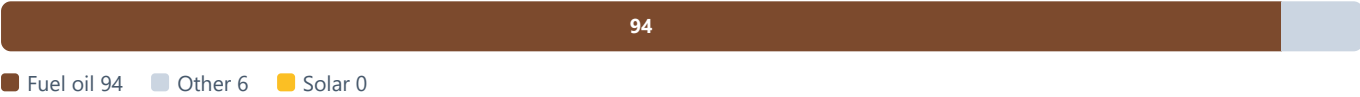
TRNC

Northern Cyprus (TRNC)

An isolated island grid — fuel-oil locked, no interconnection

~0.45^{GW} Installed capacity fuel oil 94%	~2.4^{TWh} Generation isolated island	~2.4^{TWh} Demand → ~3.1 by 2035
n/a Per-capita data-limited	12.7[¢] Residential tariff US¢/kWh	~700^g Carbon intensity gCO₂/kWh [est.]

GENERATION CAPACITY MIX



ASSESSMENT

- An **isolated island system** — fuel-oil thermal (Kib-Tek + AKSA Kalecik), over 94% fossil, with no import link.
- Among the bloc's most carbon-intensive (~650–750 gCO₂/kWh [est.]) and dearest residential tariffs (~12.7¢); heating runs on electricity + LPG.
- Structurally tight — a small, fossil-locked grid with no interconnection; solar is the only near-term diversification.

Annex A — Abbreviations

ADB Asian Development Bank	AERA Azerbaijan Energy Regulatory Agency	AIIB Asian Infrastructure Investment Bank	BEV Battery Electric Vehicle
CAPS Central Asian Power System	CASA-1000 Central Asia–South Asia 1000	CESI (Italian power-systems consultancy)	CNNC China National Nuclear Corp.
EBRD European Bank for Reconstruction & Dev.	EMDRA Energy Market Development & Regulation Agency (UZ)	ENTSO-E European Network of TSOs for Electricity	EPDK Energy Market Regulatory Authority (TR)
EPIAŞ Energy Exchange Istanbul	ETKB Ministry of Energy & Natural Resources (TR)	EU European Union	EV Electric Vehicle
GW / MW Gigawatt / Megawatt	HVDC High-Voltage Direct Current	IAEA International Atomic Energy Agency	IEA International Energy Agency
IPP Independent Power Producer	KEGOC Kazakhstan Electricity Grid Operating Co.	KHNP Korea Hydro & Nuclear Power	kWh / TWh Kilowatt-hour / Terawatt-hour
LPG Liquefied Petroleum Gas	MAVIR Hungarian TSO	MEKH Hungarian Energy Regulatory Office	NGS Nuclear Power Plant (TR)
OTS / TDT Organization of Turkic States	PCI Project of Common Interest (EU)	RE / YEK Renewable Energy	SMR Small Modular Reactor
TEİAŞ Turkish Electricity Transmission Co.	TRNC Turkish Republic of Northern Cyprus	USc US cent	VAT / KDV Value-Added Tax
VVER Russian pressurized-water reactor type			

Annex B — References

Public sources only. Listed by section so each claim is traceable to its source group (footnote function). Full URL set in the underlying research files; primary references below.

§2 Capacity & generation mix - Türkiye: TEİAŞ *Kurulu Güç Raporu* (teias.gov.tr); ETKB (enerji.gov.tr); Ember *Türkiye Electricity Review 2026* - Kazakhstan: KEGOC *Annual Report 2024* (ar2024.kegoc.kz); stat.gov.kz; Samruk-Energy - Uzbekistan: UzDaily; Enerdata; IEA *Uzbekistan Energy Profile* - Azerbaijan: minenergy.gov.az; IEA *Azerbaijan Energy Profile* - Turkmenistan: IEA; EIA *Country Analysis — Turkmenistan* - Kyrgyzstan: AKIpress; Climatescope; gem.wiki - Hungary: MAVIR; KSH; World Nuclear Association - TRNC: Kib-Tek (kibtek.com/uretim); AKSA Enerji

§3 Demand drivers — Population: World Bank. EV: IEA *Global EV Outlook*, EAFO/ACEA, national statistics. Heating: IEA, Eurostat, World Bank, CGEP (Columbia) *Central Asia's overlooked energy crisis*.

§3/§8 Per-capita consumption, generation & demand — Ember *Yearly Electricity Data 2024–25*; IEA; Enerdata. 2030 projections: Türkiye *National Energy Plan (UEP)*; German Economic Team (Uzbekistan); Enerdata.

§4 Retail tariffs — EPDK (TR, Apr 2026); AERA / regulator.gov.az (AZ); esalmaty.kz, prodengi.kz (KZ, Almaty); EMDRA / gazeta.uz (UZ); turkmenistan.gov.tm (TM, 2017 decree); regultek.gov.kg, nesk.kg (KG); MVM Next / mvmnext.hu (HU); kibtek.com (TRNC). FX: floatrates.com.

§5 Market structure & reform — IEA country profiles; World Bank *Rethinking Power Sector Reform in the Developing World* (2020); ADB; national regulators (EPDK, EMDRA, AERA, KEGOC, MEKH).

§6 Cross-border integration — ENTSO-E; casa-1000.org; CESI / ADB (Caspian corridor feasibility); gazeta.uz, Tashkent Times (UZ–Afghanistan); ministry announcements; Daily Sabah (four-country corridor); Caspian Policy Center (OTS).

§7 Nuclear — World Nuclear Association (country profiles); World Nuclear News; NucNet; Rosatom / TASS; IAEA. (Akkuyu, Paks II, Uzbekistan Jizzakh, Kazakhstan plant 1 cross-verified across ≥ 2 sources.)

§8 Emissions, efficiency & climate — Carbon intensity: Ember / Our World in Data. Per-capita CO₂: OWID / Global Carbon Project. Energy intensity: World Bank (EG.EGY.PRIM.PP.KD), Enerdata, IEA SDG7. Climate targets: UNFCCC NDC Registry, Climate Action Tracker, Net Zero Tracker. **Grid losses & customers (§2)**: World Bank (EG.ELC.LOSS.ZS), national regulators (TEDAŞ/ELDER, KEGOC, World Bank Uzbekistan project docs, CEER Power Losses), Kib-Tek.

§9 Outlook / projection model — Historical electricity demand: Ember *Yearly Electricity Data* (2010–2024, via OWID). GDP growth: World Bank (NY.GDP.MKTP.KD.ZG, 2010–2024). GDP & per-capita growth projections: IMF *World Economic Outlook* (Apr 2026). Population: UN *World Population Prospects 2024* (medium variant). National plans: Türkiye *UEP* (227 GW / 510 TWh by 2035), Kazakhstan *LCGP* (152 TWh / $\sim +26$ GW), Uzbekistan *German Economic Team* (117 TWh 2030). Elasticities and scenarios derived in-house (tools/tdt-projeeksiyon/).

Annex C — Method

Data vintage — at a glance. Every metric, its as-of date and primary source:

Metric	As-of	Primary source
Installed capacity & mix	31 Dec 2025	TEİAŞ, KEGOC, IEA, national TSOs
Generation & demand	2025 (full year)	Ember <i>Yearly Electricity Data</i>
Retail tariffs	latest in-force (TR Apr 2026; each row dated)	National regulators
Population	2025	World Bank · UN WPP 2024
Per-capita consumption	2024–25	Ember · IEA
GDP & GDP-per-capita	2025	IMF WEO Apr 2026
Sovereign ratings & risk premium	Jan 2026	Damodaran (NYU Stern)
Carbon intensity & per-capita CO ₂	2024	Ember · Our World in Data
Grid losses (T&D)	2024 (TR); latest available	National regulators · World Bank
Climate targets (NDC / net-zero)	current	UNFCCC · Climate Action Tracker
Demand & capacity projection (2030/35)	in-house model	tools/tdt-projeksiyon/
FX (US\$/kWh conversion)	report cut-off date; live on site	floatrates.com

- **Coverage:** OTS members (TR, AZ, KZ, UZ, KG) + observers (TM, HU, TRNC). Public sources only; no insider/AKSA input.
- **Scope:** This report focuses on the **electricity sector** (capacity, generation, demand, prices, grid, emissions intensity, reform, integration). It does not cover total primary energy supply, transport or industrial heat at IEA-WEO depth — a deliberate editorial choice. Carbon figures are power-sector operational intensity (Ember); subsidy magnitudes are out of scope for this edition.
- **Data cut-off (two-speed):** structural data (capacity, generation, demand, population, per-capita) as of **31 December 2025**; tariffs as of the **latest in-force schedule** (each row dated).
- **FX:** report PDF uses a fixed cut-off-date rate; the live UzEnergyNews site uses live FX. Turkmenistan at the official peg (parallel rate noted).
- **Tax basis:** all tariffs normalised to **final-consumer (VAT-inclusive)**; Kazakhstan figures ×1.16 (VAT-exclusive source).
- **Capacity:** nominal (nameplate), not available capacity — older thermal fleets (KZ, KG, TM) differ materially.

- **Projection (§9):** independent model — demand growth = $\varepsilon \times \text{GDP growth} + \text{electrification adder}$, with ε regressed from each country's 2010–24 history (log-log); Low/Base/High scenarios; firm-capacity need = peak load (load factor) + 15% reserve margin. Official plans are shown as a reference line, not reconciled. Uzbekistan follows its official national target (its historical ε reflects suppressed demand); Azerbaijan/Turkmenistan use a fixed ε + national plan (oil/state-distorted GDP makes regressed ε unreliable); TRNC is a regional proxy (no public series).
- **Pending verification ([teyit]):** TRNC per-capita; Hungary 2025 capacity total (MAVIR); some 2030 demand projections. See the [Methodology Note](#) for full decisions.

Full detail and all source URLs: the companion tariff dataset. Footnote-level citation to be finalised in the designed edition.