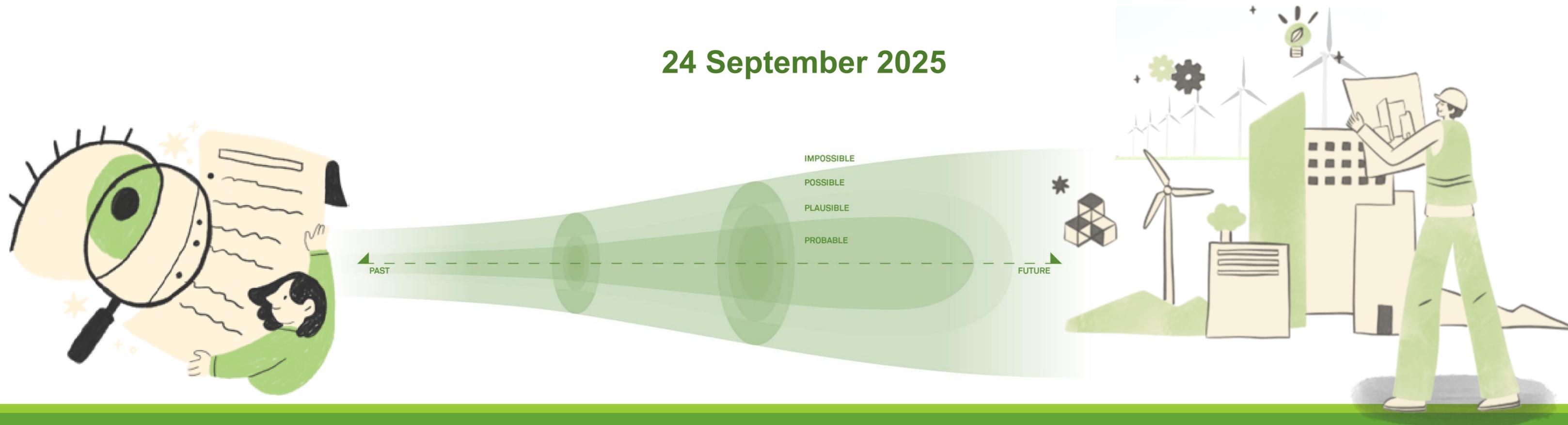


# Future Foresight: Just energy transition in Uzbekistan in the context energy poverty

24 September 2025



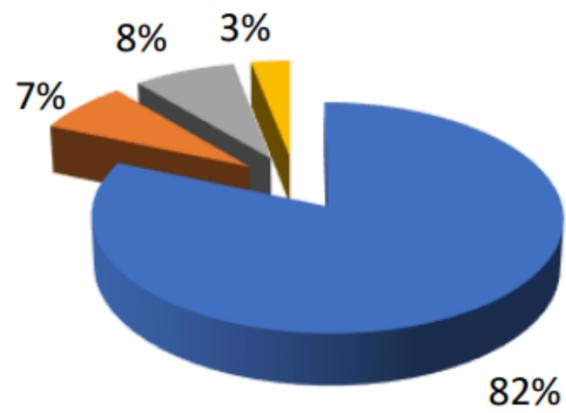
### Change in the structure of GHG emissions for 1990 and 2022 by sectors

- Total GHG emissions (excluding sink in the LULUCF sector) in 2022, were 209.61 Mt CO<sub>2</sub>-eq.

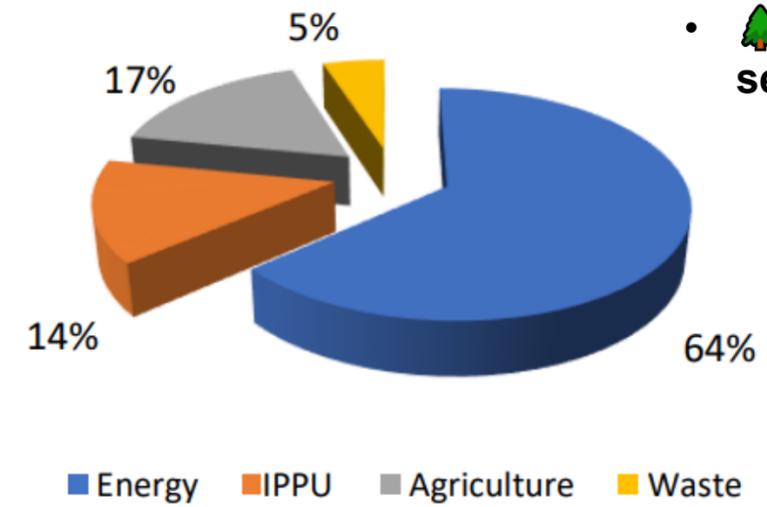
-  **Forests:** Would require approximately **3.5 billion tree seedlings grown for 10 years** to absorb this amount.

- Energy sector's share of total GHG emissions decreased from 82% to 64%.
- IPPU sector's share increased from 7% to 14%.
- Agriculture sector's share rose from 8% to 17%

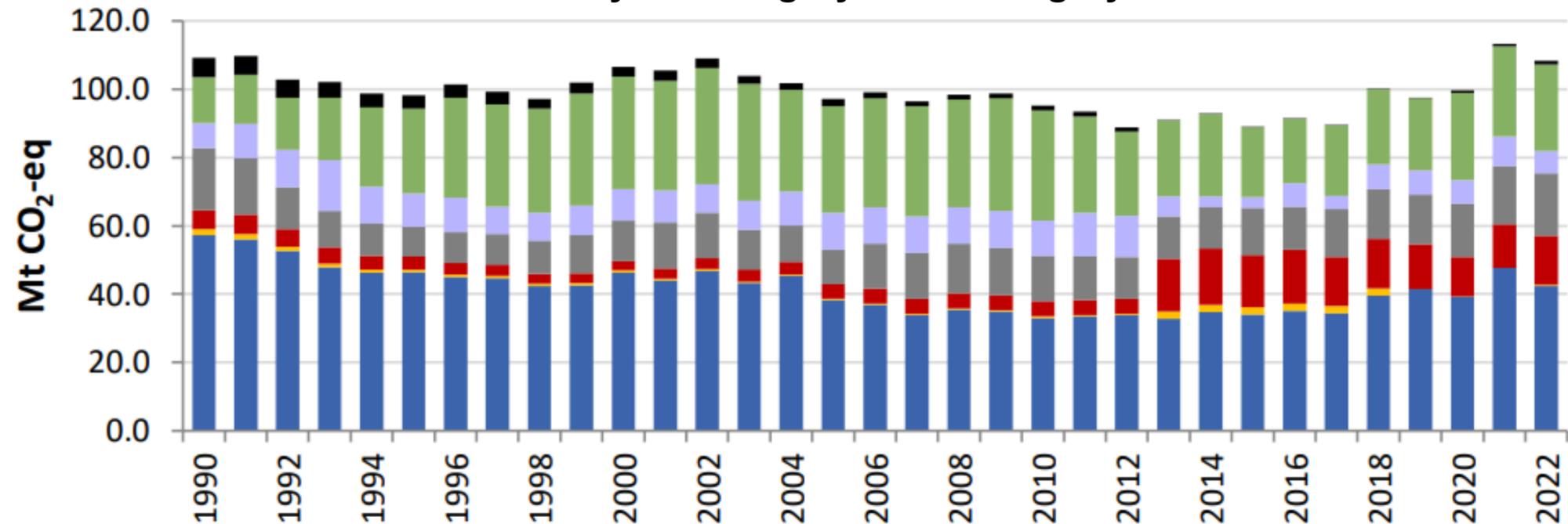
1990



2022



### GHG emission trends by subcategory of the category Fuel Combustion Activities



- Energy and heat production
- Construction
- Industry
- Transportation
- Commercial sector
- Residential sector
- Agriculture

Source: Uzbekistan. 2024 Biennial Transparency Report, UNFCCC

# Uzbekistan Energy Transition – Domain Map & Signals (2025– 2030)

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**Generation** – Gas ~80% of electricity (2023); renewables target **25 GW by 2030** (15 GW solar, 5 GW wind, 5 GW hydro); nuclear (2.4 GW) planned for early 2030s

 *Signals:* Nuclear plant planned for early 2030s in Jizzakh; hydrogen pilots being considered

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**Grid & Storage** – Losses are still high, around 11–13% smart meters rollout (8 million by 2026); first **300 MW BESS** projects under tender; CAPs reintegration ongoing

 *Signals:* Grid losses/outages; BESS capacity installed; cross-border trade volumes,

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**Markets & Finance** – Electricity demand grows ~6% annually; tariffs moving toward cost-recovery; Shift from blanket price subsidies to targeted cash transfers via Single Registry.

Tariff liberalization to cost-reflective levels by 2025–2030 with safeguards.

 *Signals:* Tariff reforms + % households on lifeline tariffs; annual FDI in green projects; issuance of green bonds

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**Technology & Skills** –) Solar costs now below \$25/MWh in tenders — highly competitive. Green skills gap remains: only ~30,000 students in energy-related TVET programmes, but few focused on renewables.

 *Signals:* # of certified solar/wind installers; TVET graduates in renewables; EV sales and charging stations

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**Social & Environment** – Around 10% of households face energy poverty. Rooftop solar target: 1 GW by 2030. Tariff reforms are politically sensitive — social protection measures must expand.

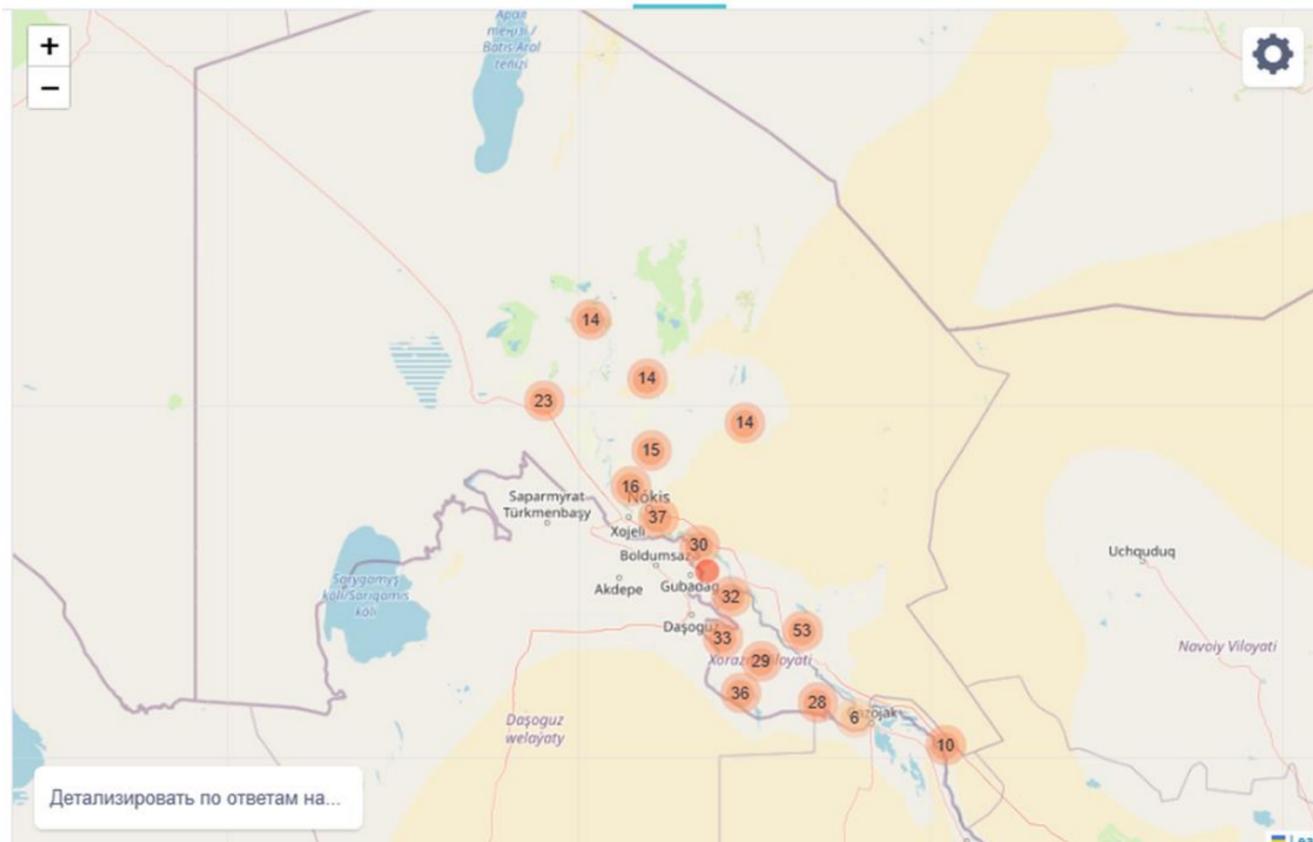
 *Signals:* Beneficiaries of social tariffs;

# Understanding Energy Poverty: Findings from Karakalpakstan and Khorezm

**Sample size:** 460 households (235 in Karakalpakstan, 225 in Khorezm).

**Coverage:** 17 districts/cities + 24 mahalla committees (10 in Karakalpakstan, 7 in Khorezm).

**Method:** Areas selected to reflect diverse socio-economic conditions, energy use, and geography.



≈13% of households report inadequate heating; highest in colder, poorer regions.



Karakalpakstan: ~30% of adults are multidimensionally poor; ~16% of HHS fuel-deprived.



Female-headed households are 30–50% more likely to struggle with utility payments.



The energy poverty rate is 26.8% in winter, 14.9% in autumn–spring, and 11.3% in summer.



Poor households spend 6–87% of income on energy (seasonal peaks in winter).



About 88% of respondents reported that due to fuel shortages, primarily natural gas, they are forced to use cold water in situations where hot water is needed.



The average monthly expenditure of households using a natural gas boiler is 572,900 UZS.

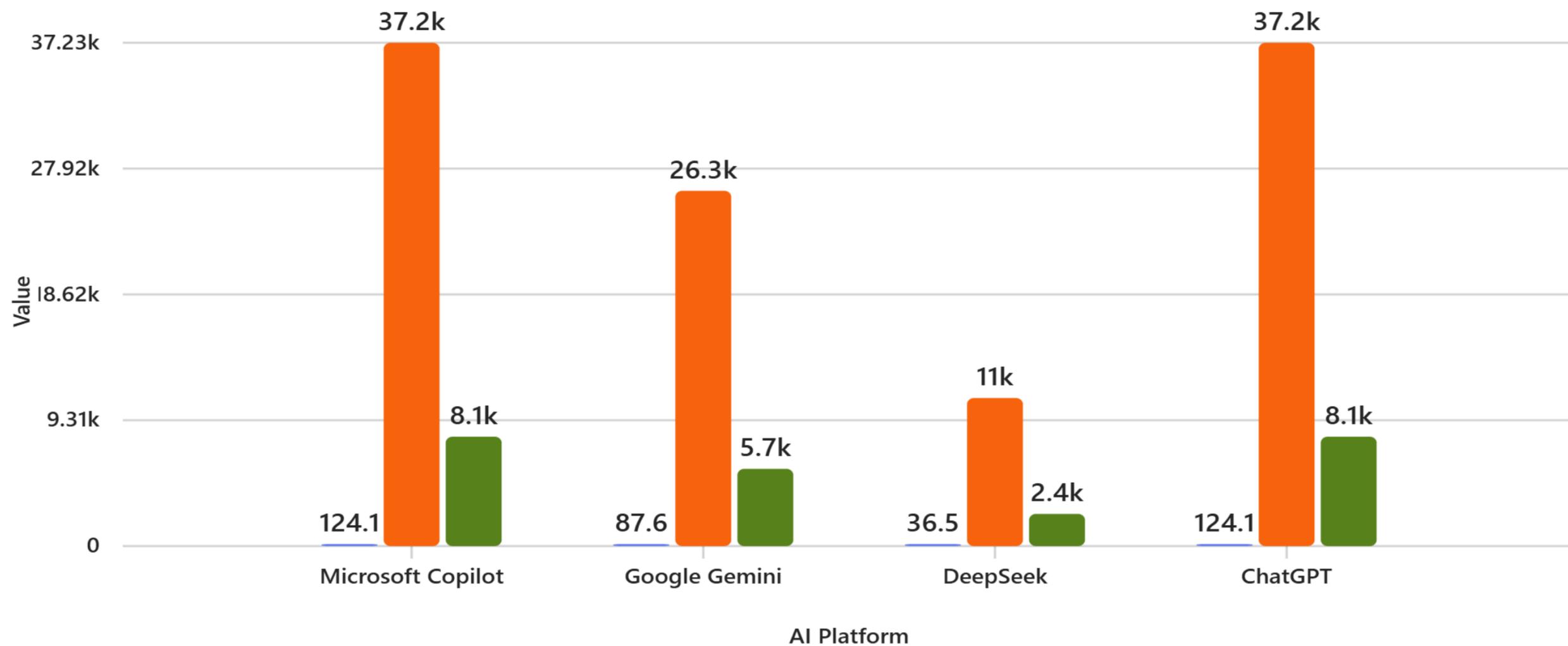


For households relying on electric heaters or air conditioners for heating, average monthly costs are 304,000 UZS.

	Котел/печь на угле	Электрический котел	Электрический переносной обогреватель или кондиционер	Котел/печь на природном газе	Котел/печь на таппи или дровах	Двухконтурный котел (газ и электричество)
Хорезмская обл.	42,3	0,4	5,7	52,0	14,1	0,9
РК	36,6	0,4	7,7	48,1	24,3	0,9
Обычные домохозяйства	40,7	0,5	7,8	49,0	19,3	0,8
Бедные домохозяйства	31,3	0,0	0,0	56,3	18,8	1,6
<b>Total</b>	<b>39,4</b>	<b>0,4</b>	<b>6,7</b>	<b>50,0</b>	<b>19,3</b>	<b>0,9</b>

**Частота случаев, когда из-за недостаточного отопления родители не отправляют детей в школу или детский сад**

	такие случае бывают часто	такие случае бывают редко	таких случае не бывают
Хорезмская область	14,1	45,4	40,5
РК	8,5	34,5	57,0
город	7,2	24,6	68,1
ПГТ	17,6	58,8	23,5
село	11,7	41,8	46,5
<b>Total</b>	<b>11,3</b>	<b>39,8</b>	<b>48,9</b>

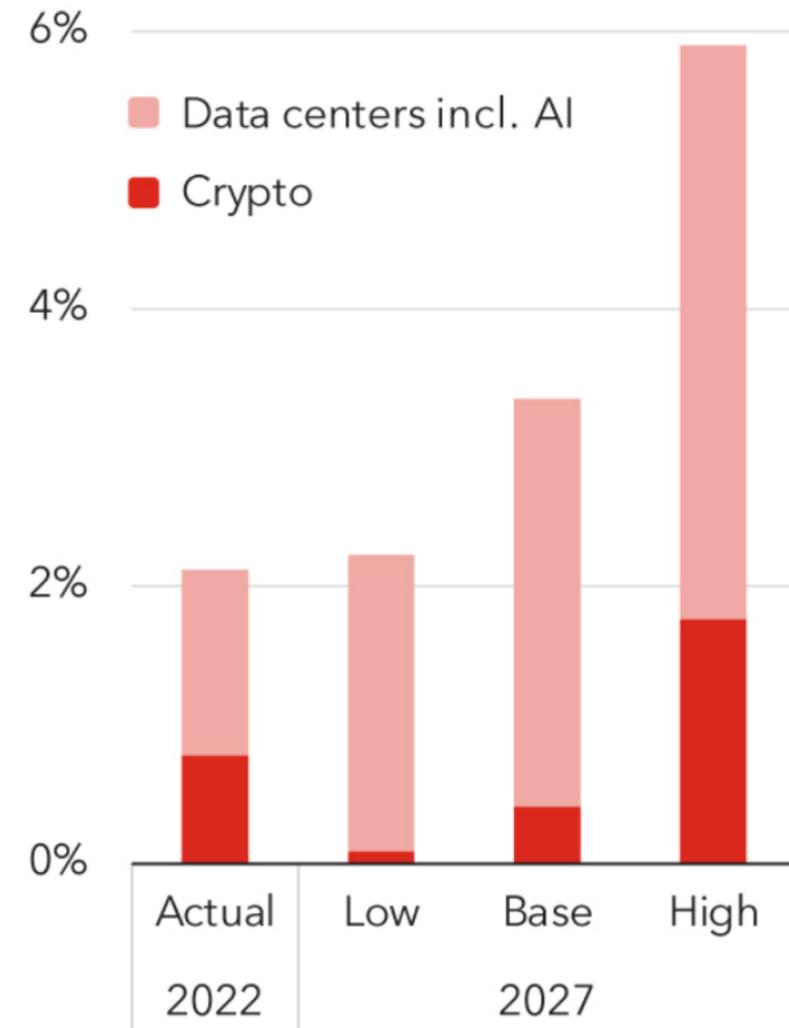


■ Electricity Use (million kWh)
 ■ CO<sub>2</sub> Emissions (metric tons)
 ■ Equivalent Cars per Year

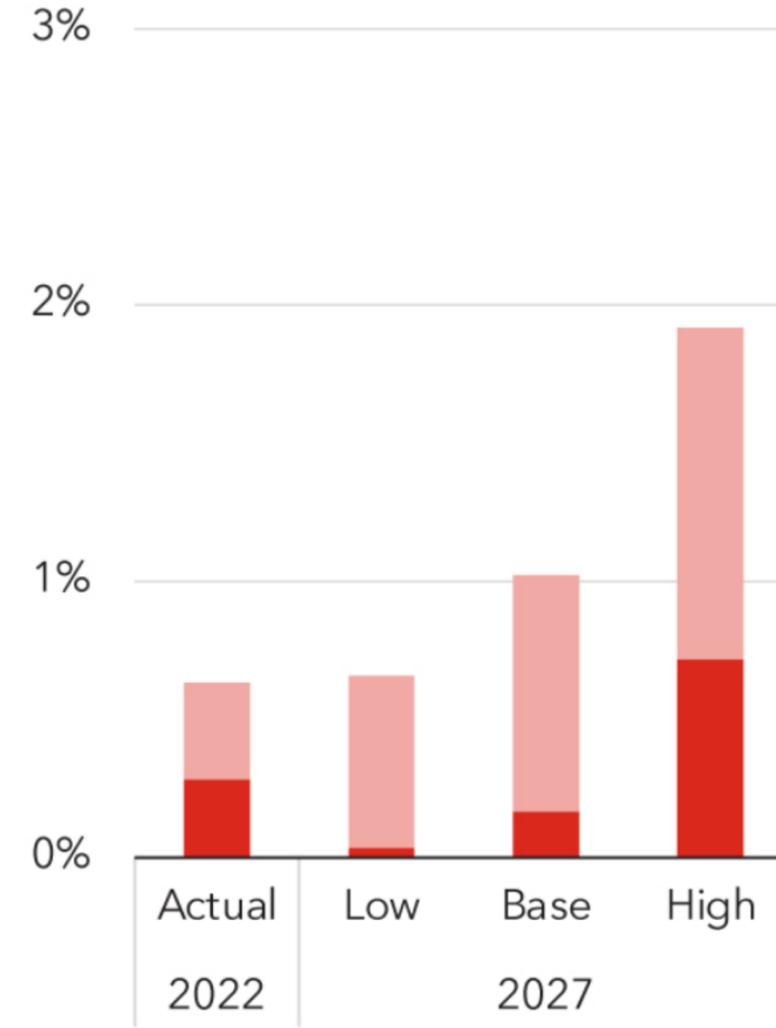
- 1 mlrd so'rov/kun → yiliga 40–60 ming tonna CO<sub>2</sub> (xizmat boshiga).
- Taqqoslash: bitta o'rtacha ko'mir stansiyasi → millionlab tonna/yil.
- bir nechta xizmatlar + talabning ortishi → umumiy iz keskin oshadi.
- Asosiy omil: elektr tarmog'ining tarkibi Toza (qayta tiklanuvchi) tarmoqlarda → 25–50% kam chiqindi. Ko'mirga tayanadigan tarmoqlarda → ancha yuqori CO<sub>2</sub>.

# Crypto and data centers account for a growing amount of emissions

Share of global electricity use



Share of global CO<sub>2</sub> emissions



Source: Hebous and Vernon (2023); Carbon Pricing Assessment Tool; IEA 2024.

# How to measure & monitor

Data-driven governance to course-correct early

Adopt a legal definition of Energy Poverty tailored to Uzbekistan.

Use a multi-indicator dashboard: cost burden, thermal comfort, housing quality, outages.

Create an Energy Poverty monitoring taskforce; publish an Annual Energy Poverty Report.

## Short-term (next 12–24 months)

Shield the vulnerable and stabilize supply before next winter

- Emergency winter assistance: boost cash benefits; fuel support in hotspots (Karakalpakstan, Khorezm).
- Targeted tweaks: seasonal/region-specific social-norm limits; temporary tariff pauses in hardship districts.
- ‘Blitz’ repairs where outages recur; set up local Energy Help Desks & hotline.
- Mass outreach: practical efficiency tips.

## Medium-term (2–5 years)

Structural fixes pairing infrastructure with social policy

‘Warm Homes’ retrofits (insulation, windows, heaters) – target 100,000 vulnerable homes by 2028.

Modernize district heating in cities; scale clean-cooking solutions in rural areas.

Decentralized access: solar home systems/mini-grids for remote settlements.

Adaptive social protection: energy vouchers for the poorest.

## Long-term (5–10 years)

Sustainable energy for all — fiscally sound and socially fair

- Universal modern energy access by 2030: reliable power/heat for every settlement.
- Fully liberalized pricing with permanent, targeted safeguards for low-income HHs.
- Culture of efficiency & conservation; integrate energy poverty into NDC 3.0.

# Implementation & financing

Make it executable, financed, and transparent

Governance: inter-ministerial Energy Poverty Taskforce + Tripartite social dialogue.

Finance: redirect subsidy savings; IFIs; carbon finance; investment in utilities.

Accountability: quarterly dashboards; public reporting; independent validation.

## Today's workshop – decisions we need

From evidence to an actionable, owned roadmap

- Validate the energy poverty definition and core indicators (dashboard).
- Agree top 5 actions for winter 2025–26 (owners, budgets, timelines).
- Select 3 pilot geographies (e.g., KK north, Khorezm rural, Syrdarya urban district).
- Endorse monitoring plan: who publishes the Annual Energy Poverty Report and when.