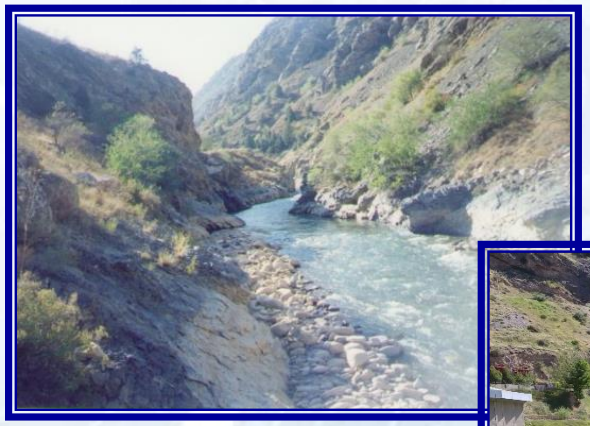
# Present condition and perspective for development of hydropower sector of the Republic of Uzbekistan



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# Condition of hydro power industry in the Republic of Uzbekistan

At present there are 46 functioning HPPs:

-With installed capacity more than 2 000 MW

-With annual average electrical power output 6,5 bln kWh

-Provide more than 10% of electrical power produced in Uzbekistan

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# Hydropower production in Uzbekistan by regions

| № | Name of the region | Amount of HPPs | Annual average production, mln kWh |
|---|---|---|---|
| 1 | Andijan Region | 6 | 682,7 |
| 2 | Qashqadarya Region | 1 | 80,9 |
| 3 | Samarkand Region | 8 | 78,8 |
| 4 | Surkhandarya Region | 2 | 139,4 |
| 5 | Syrdarya Region | 1 | 358,1 |
| 6 | Djizzakh Region | 1 | 1,0 |
| 7 | Tashkent Region | 18 | 4 531,7 |
| 8 | Fergana Region | 1 | 2,4 |
| 9 | Namangan Region | 3 | 72,8 |
| 10 | Khorezm Region | 1 | 393,8 |
| 11 | Tashkent city | 4 | 100,1 |
| | **Total** | **46** | **6 500,0** |

# Outlooks of hydropower industry development in the Republic of Uzbekistan

**Hydropower development background:**

-Studied hydro power potential of Uzbekistan is estimated in 27,5 bln kWh per year;

-Only 24% of this potential is in use;

Meanwhile, the above mentioned potential was estimated about 30 years ago and needs update, including overview of new potential fields, which have been researched recently.

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# Outlooks of hydro power industry development in the Republic of Uzbekistan

**Major advantages of hydropower development:**

- utility of natural and environmentally clean source of renewable energy;
- Preservation of fuel hydrocarbon sources for further generations and securing obligations of energy supplies for export;
- Low net cost of electrical power produced by HPPs in comparison with TPPs;

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# Outlooks of hydro power industry development in the Republic of Uzbekistan

**Purpose and objectives of long term hydro power development in the Republic of Uzbekistan**:

-the fastest development of the hydropower potential of the watercourses of the Republic, by staged construction of HPPs based on careful estimation of technically appropriate hydro potential;

-provision of accident-free and stable working regime of exploited HPPs, conducting of events on HPP modernization and change of worn off and old technological equipment in time;

-HPP generating capacity two times increase by 2030.

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# New capacities installed in 2020

| № | Name of HPP | Cost, mln. US dollar | Project capacity, MW | Annual average output, mln. kWh |
|---|---|---|---|---|
| 1 | Construction of Kamchik HPP on Akhangaran river | 27,2 | 26,5 | 77,9 |
| 2 | Construction of Zarchob small HPPs' Chain on Tupalang river (Zarchob HPP-1) | 80,4 | 37,4 | 99,0 |
| 3 | Modernization of Kadiriya HPPs' Chain (HPP-3) | 27,6 | 15,34 (+2,3) | 124,0 |
| 4 | Modernization of Tashkent HPPs' Chain (HPP-9) | 26,7 | 16,6 (+1,6) | 95,0 |
| 5 | Modernization of Nizhniy-Bozsu HPPs' Chain (HPP-14) | 31,6 | 15 | 90,1 |
| 6 | Modernization of Shakhrikhan HPPs' Chain (SFC-2) | 19,1 | 7,05 (+3,55) | 55,1 |
| | **Total** | **139,2** | **89,35** | **541,1** |

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# Projects under implementation in hydro power industry of the Republic of Uzbekistan

| № | HPP name | Implementation term | Cost, mln US dollar | Project capacity, MW | Annual average output, mln kWh |
|---|---|---|---|---|---|
| | **New construction** | | | | |
| 1 | Construction of Zarchob small HPPs' Chain on Tupalang river | 2017-2021 | 80,4 | 75,6 | 201,3 |
| 2 | Construction of Kamolot HPP on Chirchik Bozsuv canal | 2017-2020 | 22,6 | 8,2 | 41,9 |
| 3 | Construction of Shaudar small HPP on Dargom canal | 2019-2021 | 14,93 | 7,2 | 37,8 |
| 4 | Construction of small HPP on PK135+50 of Dargom canal | 2019-2021 | 15,7 | 7,4 | 34,3 |
| 5 | Construction of Pskem HPP on Pskem river | 2019-2026 | 796,2 | 400 | 946,0 |
| 6 | Construction of Nizhnechatkal HPP on Chatkal river | 2020-2024 | 143,04 | 76 | 282,0 |
| 7 | Construction of Bagishamal small HPP№2 on Dargom canal | 2020-2022 | 21,7 | 6,45 | 33,0 |
| 8 | Construction of small HPP on Piket 102+00 of Dargom canal | 2020-2022 | 19,23 | 6,4 | 32,5 |
| 9 | Construction of Rabat, Chappasu and Tamshush small HPPs on Aksu river | 2020-2023 | 75,3 | 24 | 97,5 |
| | **Total** | | **1189,1** | **611,25** | **1706,3** |

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# Projects under implementation in hydro power industry of the Republic of Uzbekistan

| № | HPP name | Implementation term | Cost, mln US dollar | Project capacity, MW | Annual average output, mln kWh |
|---|---|---|---|---|---|
| | **Modernization** | | | | |
| 1 | Modernization of Farkhad HPP | 2018-2021 | 72,4 | 127,0 | 95,9 |
| 2 | Modernization of Tashkent HPPs' Chain (HPP-1) | 2020-2022 | 12,4 | 6,0 | 44,4 |
| 3 | Modernization of Chirchik HPPs' Chain (HPP-10) | 2020-2022 | 18,6 | 29,0 | 213,8 |
| 4 | Modernization of Samarkand HPPs' Chain (HPP-2B) | 2020-2022 | 21,7 | 26,6 | 139,6 |
| 5 | Modernization of Tupalang HPP | 2019-2022 | 84,5 | 175,0 | 467,0 |
| 6 | Increase of safe operation of Charvak HPP | 2019-2022 | 14,2 | - | - |
| | **Total** | | **223,8** | **363,6** | **960,7** |

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# Investment projects at the final stage of project documents preparation and approval

| № | Name of investment project | Names of districts (cities) | Source of financing | Estimated cost of the project | Project capacity, MW |
|---|---|---|---|---|---|
| 1 | Construction of small HPP SFC-1A at Shakhrikhan HPPs chain | Buloqboshi district | French Development Agency (AFD) | 9,6 | 2,2 |
| 2 | Construction of small HPP SFC-2A at Shakhrikhan HPPs chain | Buloqboshi district | | 13,6 | 4 |
| 3 | Construction of small HPP Paytok in Andijan region | Izboskan district | | 32,1 | 7 |
| 4 | Construction of Mullala HPP on the Pskem river, Tashkent region | Bostanlik district | TBD | 200 | 140 |
| 5 | Modernization of Nizhniy-Bozsu HPPs' Chain (HPP-19) | Yangiyol district | EBRD | 17,9 | 9 |
| 6 | Modernization of Nizhniy-Bozsu HPPs' Chain (HPP-18) | Yangiyol district | | 11,1 | 6,8 |
| 7 | Modernization of Nizhniy-Bozsu HPPs' Chain (HPP-22) | Yangiyol district | | 9,9 | 4,8 |
| 8 | Modernization of Nizhniy-Bozsu HPPs' Chain (HPP-23) | Yangiyol district | | 20,7 | 18,8 |

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# Large HPPs to be launched before 2025

| № | HPP name | Implementation term | Cost, mln US dollars | Project capacity, MW | Average annual output , mln kWh |
|---|---|---|---|---|---|
| 1 | Nizhnechatkal HPP | 2020-2024 | 151,7 | 76,0 | 282,0 |
| 2 | Zarchob small HPPs' Chain on Tupalang river | 2017-2021 | 80,4 | 75,6 | 201,3 |
| 3 | HPP-2 at Tupalang reservoir | 2017-2022 | 84,4 | 145,0 | 364,7 |

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# Large HPP to be launched before 2030

| № | HPP name | Implementation term | Cost, mln US dollars | Project capacity, MW | Average annual output, mln kWh |
|---|---|---|---|---|---|
| 1 | Pskem HPP | 2019-2026 | 796 | 400,0 | 946,0 |
| 2 | Mullala HPP | 2021-2026 | 200 | 140,0 | 396,0 |
| 3 | Verkhnepskem HPP | 2025-2029 | 200 | 200,0 | 540,0 |
| 4 | Khodjikent PSP | 2024-2029 | 320 | 200,0 | 400,0 |

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# Perspective investment projects to attract foreign direct investments

| № | HPP name | Project capacity, (MW) | Average annual output, mln kWh | Cost, mln US dollars |
|---|---|---|---|---|
| 1 | Construction of small HPPs Chain on Big Andijan canal, Namangan region | 23 | 172,5 | 53,5 |
| 2 | Construction of Mullala HPP on Pskem river, Tashkent region | 140 | 396 | 200 |
| 3 | Construction of Zarchob HPP-3 on Tupolang river, Surkhandarya region | 16 | 65 | 32 |
| 4 | Construction of Kamchik HPP-2 on Akhangaran river in Namangan region | 11 | 47 | 26 |

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# Perspective projects for construction micro HPPs in Uzbekistan

| № | Name of the watercourse | Location (district, city) | Design discharge through micro HPP, $m^3/s$ | Water head on watercourse, meter | Designed power of micro HPP, kW | Average annual output, thousand KWh | Work regime of watercourse |
|---|---|---|---|---|---|---|---|
| | | | **DJIZZAKH REGION** | | | | |
| 1. | Kli river | Zafarabad district | 7 | 13 | 1400 | 9 239,2 | 12 |
| 2. | Djizzakh head collector PK2+20 | Zafarabad district | 4,5 | 11 | 350 | 2 809,8 | 12 |
| | | | **NAMANGAN REGION** | | | | |
| 3. | Canal SFMK PK64+30 | Uychi district | 10 | 10 | 800 | 1 200,0 | 12 |
| | | | **ANDIJAN REGION** | | | | |
| 4. | Micro HPP by HPP-5A | Asaka district | 2 | 34 | 550 | 291,0 | 7 |
| 5. | Micro HPP by HPP-6A | Asaka city | 3 | 21 | 500 | 350,0 | 8 |
| 6. | Canal «Ulugnor» PK30+50 | Oltinkul district | 4 | 7 | 200 | 306,0 | 12 |
| | | | **FERGANA REGION** | | | | |
| 7. | River «Shakhimardan» | Fergana district | 3,15 | 87,5 | 2 100 | 16 128,0 | 12 |

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# Perspective projects for construction micro HPPs in Uzbekistan

| № | Name of the watercourse | Location (district, city) | Design discharge through micro HPP, $m^3/s$ | Water head on watercourse, meter | Designed power of micro HPP, kW | Designed cost of construction, thousand USD | Work regime of watercourse |
|---|---|---|---|---|---|---|---|
| **TASHKENT REGION** | | | | | | | |
| 8. | Micro HPP by HPP-10 UP “Cascade of Chirchik HPPs" | Chirchik | 15 | 7 | 800 | 6 000,0 | 8 |
| 9. | Micro HPP by UP “Akhangaran HPP" | Angren | 6,5 | 20 | 1000 | 4 000,0 | 7 |
| 10. | Micro HPP by HPP-22 UP “Cascade of Lower Bozsu HPPs" | Chinaz district | 10 | 8 | 640 | 3 400,0 | 6 |
| 11. | Micro HPP on the canal Lower Dalvarzin by UP “Farkhad HPP" | Bekabad district | 20 | 7 | 1010 | 9 000,0 | 12 |
| **KASHKADARYA REGION** | | | | | | | |
| 12. | Micro HPP by UE «Gissarak HPP» | Shakhrisabz district | 1 | 80 | 1000 | 5 040,0 | 6 |
| 13. | Micro HPP by UE «Gissarak HPP» | Shakhrisabz district | 1 | 80 | 1000 | 5 040,0 | 6 |

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Thank you for your attention!