

Проблема була в тому, що на певній ітерації першого алгоритму значення помилки досягало сталого локального мінімуму. Для того, щоб запобігти таким «тупіковим» ситуаціям до вище описаного алгоритму було додано 5-й пункт сенс якого заключався у застосування алгоритму ліквідації локального мінімуму – кожену 100-у ітерацію виконувалась перевірка чи не з'явилась проблема локального мінімуму і при позитивному результаті застосовувався алгоритм імітації отжигу.

Таким чином було отримано інформацію про вартість фінансового інструменту, а саме українського фондового індексу, наперед, за допомогою гібридного алгоритму, який поєднав в собі алгоритм зворотного поширення помилки і імітації отжигу.

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PROSPECTS OF HYDROPOWER DEVELOPMENT

Hydropower is the most promising direction of electric power development and plays an important role in the stability of the United Energy System (UES) of Ukraine, since it is one of the main suppliers of system services, which provides energy system with high-command powers in the regulation of daily schedules of load covering peak part and fulfilling night failures, and also performs the function of emergency reserve of power [1].

The Hydropower development has long-term economic advantages (diversification opportunities), efficient and multi-purpose use of hydro power potential of large and small rivers (especially for localities remote from the power system).

According to the International Hydropower Association (IHA) hydropower supplies about 20% of the world's generation of power. Thus the fate of hydro generation in the general electric power balance of different countries varies from 9%

to 99,5%. Hydroelectric power potential of Ukraine is used at 60%, which is about 9,9% (more than 44 bln·kwh) of all generating capacities of UES [2; 1].

National interests of Ukraine in the sphere of hydro power are reflected in figure 1.

High flexibility is characteristic for hydroelectric power stations and pumped storage power stations. Thus, the start of hydraulic units from the stopped position in the turbine mode with synchronization and full set of power comprises 1-2 min, and it is 15-30 s at the rotation at no-load speed.

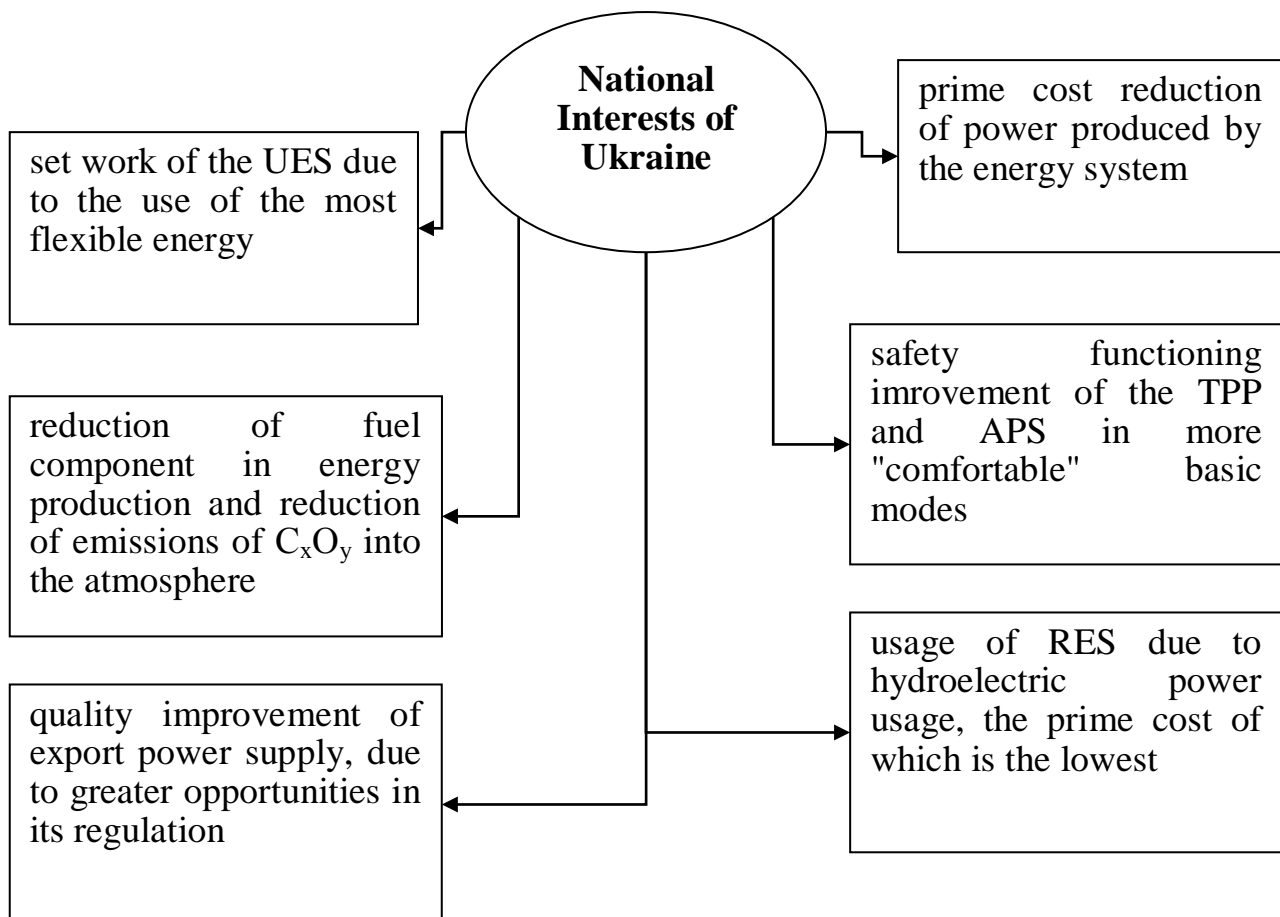


Fig. 1. National interests of Ukraine in the sphere of hydro power

Source: developed by authors

Power change of a hydraulic unit or its stop require a few seconds. However, it is the work of hydroelectric equipment of HPS as a dynamic reserve of the system has as logical consequence the increased load and loss of energy at transient processes, that can no longer be considered, taking into account the statistics of start and stop cycles of aggregates. Statistics for the endless growth of the number of operating cycles of the energy equipment in the last five years testifies the significant weight of dynamic components in the work of HPS hydropower equipment [3].

According to the Energy strategy of Ukraine for the period by 2030, for increasing the extremely scarce regulatory and shunting capacities for the energy system of the country, creation of favourable conditions for integration of UES in Ukraine with european energy system and increase of electric power exports, the following areas of hydro power development are foreseen:

construction completion of the PSP (completion of the first turn of the Dnestrovsk PSP, starting complex of Tashlyk PSP, development of technical and expert documentation of the construction of Kaniv PSP with the subsequent execution of a working project with the possibility of its implementation in further periods) with total capacity of 4074 MWth;

reconstruction continuation of HPS of Dnieper Cascade (second stage) and Dnestrovsk HPS aiming to increase their operational resource for 30-40 years;

construction of HPS on the river Tysa and Dniester and their tributaries;

reconstruction of the existing, reconstruction of non-functioning and construction of new small HPS on small rivers and drain sewerage systems (on existing reservoirs in the systems of technical water supply and sewerage) with the production of electric power on them up to 3338 mln kWh per hour by the year 2030.

Hydro power occupies an increasingly important role in the development of renewable energy supply systems and comprises about 76% of all world's renewable energy sources. According to the forecast of the World Energy Council, till 2050, the hydroelectric power plant potential may double – up to 2000 GWh upon condition of corresponding attention to the development of hydropower in countries like Canada, USA, Norway, China, India, Brazil, Southeast Asia, etc. [4]. In the Program for the development of hydro power of Ukraine for the period by 2026, referring to the mentioned international obligations, it is indicated that it will facilitate the implementation of such obligations in the area of reduction of CO₂ emissions, SO₂, NO_x and dust (in accordance with directive 2001/80/EU), by substituting the objects of hydropower energy of hydro generating capacities of the TPS [5].

Development and implementation of projects following cleaning hydraulic power plant (Purifying – Pumped Hydroelectric Energy Storage. P-PHES NAVALEO in Leon, Spain, is pure pumped plant with an installed capacity of 552 Mw (3 x 184 Mw) 17, construction of which is planned for abandoned mines in the region of Castilla-León, will let to reduce carbon dioxide emissions, reduction of fossil fuel consumption and emissions associated with its extraction, transportation and consumption [6].

At the same time, the energy sector requires the implementation of a complex of measures aimed at ensuring the use of the latest technologies, enhancing the safety of exploitation, minimizing the possible negative impact on the environment while providing high level of efficiency and environmental friendly production of electricity [1].

Along with the priorities of Ukraine's hydropotential, we should emphasize the relative advantage of the industry, namely its self-sufficiency. Ukraine has considerable scientific and technical experience in the field of hydro energy potential research, engineering design of hydro power stations, development of constructions and production of hydro turbine and electric power equipment, solution of water-economic and ecological problems in construction and operation of hydroelectric power stations. Ukrainian enterprises have the necessary production potential for the creation of domestic equipment of small hydroelectric power stations [1].

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**ОСНОВНІ НАПРЯМКИ МОДЕРНІЗАЦІЇ
ІСНУЮЧИХ СИСТЕМ АВТОМАТИЗАЦІЇ УСТАНОВОК
ДЛЯ СУШІННЯ ДЕРЕВИННОЇ ТИРСИ**

Оскільки Україна володіє великими запасами деревної тирси яка використовується в різних галузях промисловості. При переробки деревини виникає значна кількість відходів, яке можна використовувати для виробництва