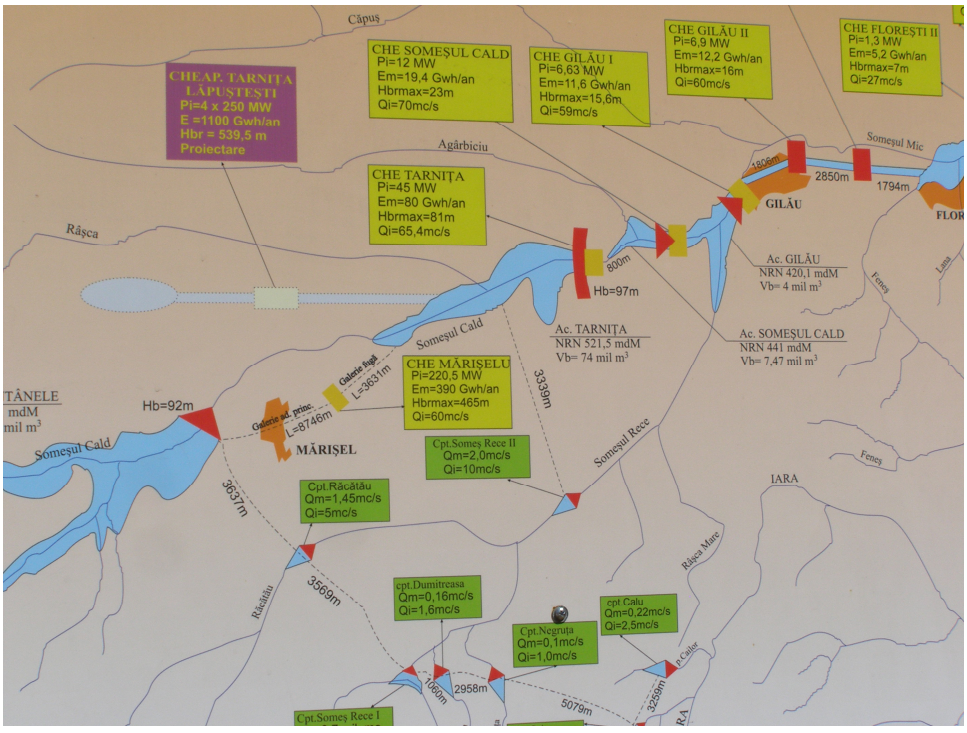
GOVERNMENT OF ROMANIA

DEPARTMENT FOR INFRASTRUCTURE PROJECTS

AND FOREIGN INVESTMENT

FUNDING, DESIGNING AND EXECUTION OF THE PUMPED STORAGE HYDROELECTRIC POWER PLANT (PSHPP) IN TARNIŢA-LĂPUŞTEŞTI



1. Value of the investment:

Execution of the PSHPP in Tarniţa-Lăpuşteşti implies, pursuant to the feasibility study drafted by SC ISPH SA, securing investment funds of around **EUR 1.164 billion (less VAT)**, of which EUR 135 million represent the investment necessary for connection of the PSHPP in Tarniţa-Lăpuşteşti to the National Energetic System (NES). The investment to connect to SEN is not part of the facility subject to funding from the shareholding of the future company and will be included in the investment plan of SN Transelectrica S.A.

Initially, the project was evaluated at EUR 1 billion.

On 13 April 2009, the website of the Ministry of Economy announced an increased in the value of the project: *"The Ministry of Economy reevaluated the hydropower plant in Tarnița-Lăpuștești at EUR 1.3 billion, more by EUR 300 million than the initial estimate and drew-up a draft Government Decision under which certain measures for implementation of this investment shall be taken".*

2. Estimated delivery term

Execution of the PSHPP CHEAP Tarniţa-Lăpuşteşti is foreseen to take place in two stages:

- **2018** for execution of 2 groups of classic reversible hydro-units each of 250 MW
- **2020** for execution of the other 2 groups, each of 250 MW.

3. Award procedure

Pursuant to the provisions of the Memorandum approved in the Government decision of 28.02.2012, currently the process of nominating the members of the Inter-ministerial Work Group has to be resumed and a new Order must be passed in this respect.

Similarly, a new Order is required for the appointment of the Negotiation Commission. Once the members of the new Inter-ministerial Work Group have been appointed, this body shall analyze and approve the tender documentation

and subsequently publish the participation announcement in the internal and international.

Estimated project performance schedule:

- Approval of the tender participation documentation – T0
- Publication of the international announcement regarding the call for offers – T0 + 1/2
- Submission of the binding offers by the private investors – T0 + 4 months
- Selection of the private investors in the Special Purpose Vehicle – T0 + 6 months
- Incorporation of the Special Purpose Vehicle – T0 + 8 months

4. Special Purpose Vehicle

The Special Purpose Vehicle is estimated to be established 8 months after the publication of the selection announcement regarding the potential investors in the domestic and international media.

Pursuant to the provisions of the Memorandum of the Government of Romania, as approved in the Government Meeting of 25.03.2009, a company shall be established and operate under the Romanian legislation for execution of the PSHPP Tarnița-Lăpuștești. Execution of the PSHPP Tarnița-Lăpuștești is foreseen to be done by transparently attracting the private capital of the companies with creditworthiness and financial power and which are willing to assume the potential risks associated to finalization and operation of this facility.

5. Opportunity of the project:

The opportunity of implementing the PSHPP Tarnița-Lăpuștești relies on the following advantages and functions delivered for the National Energetic System (NES):

- transfer of energy from low to peak;
- short-term safety reserve;
- frequency-power adjustment and spinning reserve;
- supply of reactive reserve and voltage adjustment;
- interchange within the UCTE (Union for the Co-ordination of Transmission of Electricity);
- recommissioning of the National Energetic System (black-out).

All these functions have to be quantified and taken into account in determination of the economic efficiency of the project, together with the fact that the PSHPP Tarniţa-Lăpuşteşti will support constant operation of certain hydropower plants which are currently used to regulate the NES.

6. Brief description of the project:

Romania is ranked 30th among the countries producing hydropower, with an annual production of 14-17 billion kWh, according to the pluviometric regime and availabilities.

6.1. Location of the PSHPP Tarniţa-Lăpuşteşti

The PSHPP Tarniţa-Lăpuşteşti is located in county of Cluj, approx. 35 km upstream the city of Cluj-Napoca, along the valley of Someşul Cald, on the left side, adjacent to the existing Tarniţa storage lake. The power plant shall be erected on a plot of land with a total surface of 1,446,600 sqm, part of the administrative territory of the communes of Căpuşu Mare, Râşca, Gilău and Mărişel Here, in additional to the actual power-plant, a stone pit, intakes, ducts, a storage lake shall be executed above and underground, term of the constructive solution adopted.

Advantages of the site

- existence of the lower reservoir – Tarniţa dam with NNR: 521.50 MAMSL and minimum operating level: 514.00 MAMSL;
- availability of the elevated plane Lăpuşteşti at at the average height of 1,070 MAMSL on the left side of Someşul Cald River, adjacent to the existing Tarniţa dam, an elevated plane which is appropriate for development of the higher reservoir (Lăpuşteşti dam)
- possibility of achieving a gross head of approx. 550 m between the higher and lower reservoir.

6.2. Characteristics of the PSHPP Tarniţa-Lăpuşteşti

Thank to the enhanced drivability and possibility to operate under a pump-turbine regime the PSHPP Tarniţa-Lăpuşteşti shall support:

- **Improvement of the operation regime of the units of Cernavodă Nuclear Power Plant (NPP),** by transferring electric power from low to peak, frequency-power adjustment, fast tertiary reserve, short-term safety reserve;
- Optimal conditions for installing a power of approximately 2,000 MW in wind power plants;
- Enhancing participation of the National Energetic System (NES) in the unique electricity market, thus enhancing the safety and the possibility to use it under higher technical and economic conditions.

The PSHPP Tarniţa-Lăpuşteşti will be equipped with 4 reversible turbine-pump units, with unit powers of 250 MW.

The lower dam shall be Tarniţa storage lake (existing). The 10 million cubic m polder-type higher dam shall be developed part of the new investment and be located on Lăpuşteşti elevated plane, approx. 1,100 m high. The new power plant is estimated to generate around 1.65 TWh per year. As many as 4,000 jobs are estimated to be created during the construction works.

Hidroelectrica and Transelectrica shall bring-up in-king contributions: Hidroelectrica shall buy the plot of land for the storage lake and the pumping route, while Transelectrica shall own the power discharge and pumping supply station, as well as the line connecting to the system.

The PSHPP Tarniţa-Lăpuşeşti shall produce energy at the peak demand (daytime) and shall consume the excess energy at low load. The nighttime operating is in pumping system, when the energy is cheap, while during daytime it shall operate as a producer of electric power under a generator regime. The hydropower plant shall be a consumer of cheap energy and shall ensure that all types of power plants, whose turning on and off required extended time, such as the two reactors in Cernavodă, operate continuously over night.

6.3. Hydro-energetic parameters of the PSHPP Tarniţa-Lăpuşteşti

- **Installed power (Pi): 4 x 250 MW = 1,000 MW;**
- **Pumping cycle: weekly;**
- **The quantity of energy produced under a generator regime: 1,624,567 MWh;**
- **The quantity of energy consumed under a pumping regime: 2,131,575 MWh;**
- **Conversion factor: 0.76**

6.3. Other opportunities created by the development of the PSHPP Tarniţa-Lăpuşteşti

Once the units 3 and 4 of Cernavodă NPP would enter into service, a new buffer consumer which would use with maximum efficiency the energy produced by Cernavodă NPP must be created. This does not have the optimal consumer coverage during the entire operating period. The solution is represented by the construction of the PSHPP Tarniţa, which, by pumping the water from the lower reservoir into the higher reservoir during the low load periods (nighttime and weekends), consumes the excess electric power through pumping and then generates electric power during peak load period, to be used in the National Energetic System. The PSHPP Tarniţa shall thus replace the electric power plants operating on natural gas, which are extremely expensive in terms of the fuel used.

Implementation of the Project PSHPP Tarniţa- Lăpuşteşti creates opportunities for delivery of the system services at regional level, an important factor which, together with the availability of the physical energy markets and access to regional electric power and natural gas markets, represents an important premise for development of a Regional SPOT market in Romania.

7. Status of the project/legislative actions:

- **2008.** S.C. HDROELECTRICA S.A. performed an agreement for the development of a **feasibility study** for the pumped storage hydropower plant Tarniţa-Lăpuşteşti, which was finalized in November 2008 by **SC ISPH SA** (the Institute for Hydro-Electrical Studies and Designs).

- **2009.** The Memorandum titled *"Implementation of the investment Pumped Storage Hydropower Plant Tarnița-Lăpuștești"* approved in the Government meeting of 25.03.2009 – sets-out the negotiation commission for selection of the project consultant.

- **2010.** The Consortium led by **Deloitte** is appointed **consultant** for the selection of the investors and establishment of the mixed company.

- **2011.** The Memorandum on: *"Coordination of the procedure for attraction of investors for execution of the facility Pumped Storage Hydroelectric Power Plant Tarnița-Lăpuștești"* approved in the Government meeting of 16.11.2011 – approval of the possibility to reduce the participation of Hidroelectrica from 51% down to 49%.

- **2012.** The Memorandum on *"Coordination of the procedure for attraction of investors for execution of the facility Pumped Storage Hydropower Plant Tarnița-Lăpuștești"* approved in the Government meeting of 28.02.2012 – determines the membership of a new Inter-ministerial group for selection of the investors.

The technical and business indicators of the PSHPP Tarnița-Lăpuștești have not yet been approved under a government decision, and the only documents issued by the Government of Romania regarding this project remain the three aforementioned memoranda.

8. Investors interested in the project

In August 2010, the Negotiation Commission established in the Ministry of Economy, Commerce and Business Environment appointed the as project consultant the consortium formed of

- **Deloitte Consultanţă** – to deliver the management of the project team, management of the project implementation, the economic and financial expertise, modeling, assessment;
- **HydroChina ZhongNan** – to deliver technical expertise;
- **Banca Comerciala Romana** – to deliver funding expertise;
- **Muşat & Asociatii** – to deliver local legal expertise;
- **Herbert Smith** – to deliver international legal expertise;
- **Knight Piesold** – to deliver technical, commercial and environmental protection expertise;
- **Tempo Advertising** – to deliver PR and communication expertise.

Pursuant to the provisions of the consultancy agreement, the representatives of the consortium contacted a large number of potential investors, but for the time being, due to the global economic condition, as well as to the insolvency of SC Hidroelectrica SA, their number remains low.

In April 2011, following consultations by the Consultant, the investors which displayed interest for the project were:

- International Utility Companies:
    1. **GDF Suez** (France)
    2. **E.ON** (Germany)
    3. **ENEL** (Italy)
    4. **Iberdrola** (Spain)
    5. **AES** (USA)
    6. **Verbund** (Austria)
    7. **EGL** (Switzerland)
    8. **Repower** (Raetia Energie) (Switzerland)

- Consumers of services:
    9. **OMV Petrom**
    10. **Alro**
    11. **Arcelor Mital**
    12. **Atel/Apiq**

- International developer:
    13. **China Three Gorges Corporation**

- International financial institutions:
    14. **EBRD**
    15. **IFC** – The International Financial Corporation

China Guangdong Corporation is also interested in the project, pursuant to an announcement by the Ministry of Economy.

9. Stability studies undertaken to support the project

1994. Institutul de Studii şi Proiectări Hidroenergetice SA - ISPH drew-up the *"Feasibility study for PSHPP Tarnița - Lăpuștești"* based on the equipping offers received from potential suppliers, a complex work, approached in all geo-morphological respects, hydraulics and hydrology, hydro-technical constructions, in the daylight and underground, equipments, etc.

1999-2000. During this period, the specialized institute Electric Power Development Co. of Japan developed an opportunity study, funded from a grant extended by the Japanese Government and relying on the technical and field data from the previous documentations issued by ISPH.

2003. Întreprinderea de Studii şi Cercetări Energetice SA - ISCE developed, together with ISPH, a new feasibility study which included no technical modifications, except for a larger unit power for the reversible units, such as 330 – 350 MW, in line with the latest global developments in the field.

2007. Part of the SEEREM Programme of the World Bank, funded by the IBRD, the Expert Study undertaken by the Consultant IPA/Verbund/Poyry built upon the previous solutions and fitting scheme, as proposed by ISPH şi EPDC.

2008. ISPH issued the documentation *"Pumped Storage Hydroelectric Power Plant Tarnița - Lăpuștești". Feasibility Study".* The solution proposed by ISPH in this study capitalizes the experience acquired in the previous studies, as well as the latest developments at European and global level in the field, proposing an optimized solution for the PSHPP Tarniţa – Lăpuşteşti.

10. Stages of the project

The processes of selecting the investors and negotiating with them the Association Agreement further aimed at establishing the Special Purpose Vehicle shall comprise the following steps:

- ✓ Publication of an announcement in the international medial regarding the commencement of the competitive process;
- ✓ Submission of the Binding Offers by the investors;
- ✓ Shortlisting the selected investors with a view to negotiating with them the Investors' Agreement;
- ✓ Signature of the Investors' Agreement;
- ✓ Registration of the Special Purpose Vehicle;

The Special Purpose Vehicle SPHPP Tarniţa-Lăpuşteşti shall implement the investment and go through the following stages:

- ✓ Technical Design;
- ✓ Obtaining the Construction Permit;
- ✓ Drawing-up of the Procurement Documentation;
- ✓ Organization of the Tender to select the General Contractor;
- ✓ Signing of the Execution of the Investment Objective Contract;
- ✓ Works Process of the Execution of the Investment Objective Contract;
- ✓ Commissioning;
- ✓ The operation of the PSHPP Tarniţa-Lăpuşteşti

11. Authorizations and endorsement for implementation of the project

Zonal Urbal Plan (PUZ) - 2012, December – the Technical Commission for Land Improvement and Urban Planning within the County Council of Cluj endorsed the Zonal Urban Plan relative to the future pump storage hydroelectric power plant Tarnița-Lăpuștești.

Urban Planning Certificate – the Urban Planning Certificate no. 350/03.08.2009 was obtained, whose validity was extended until 04.08.2012. The validity extension application no. 35596/29.06.2012 is currently submitted.

Endorsement of the Local Councils of Căpuşu Mare, Râşca, Gilău and Mărişel as administrators of the public and private domain of the indicated communes:
Endorsement no. 2765/14.07.2009 issued by the Local Council of Căpuşu Mare;
Endorsement no. 6098/13.07.2009 issued by the Local Council of Gilău;
Endorsement no. 2269/08.07.2009 issued by the Local Council of Râşca;
Endorsement no. 1289/15.07.2009 issued by the Local Council of Mărişel. The first 3 endorsements have a permanent nature, while the last one is valid "only for those surfaces which contracts with the landlords of the respective plots shall be executed for."

The endorsement of the National Administration "Apele Române" – Someş-Tisa Water Directorate – Water Management Endorsement no. 38/21.03.2011 issued by AN Apele Române. It remains valid throughout the period of execution of the works, provided such start within maximum 24 months since issuance.

12. IRR

The Internal Return Rate is **12.8**, in accordance with the feasibility study drawn-up by SC ISPH SA.

13. Internal/external funding sources for 2013

Hidroelectrica, a company in insolvency is currently preparing the business plan for 2013, which must by agreed also by the Creditors Meeting. This business plan shall articulate and define also the income and expenditure , including also the line corresponding to the amounts available for investments. This amount is expected to be considerably reduced in 2013 compared to the previous years, as well as to the future years . The management of Hidroelectrica shall rank the investment projects make a

proposal of "crisis" allocation of the investment budget , involving a reduction of the amount allocated to several investment projects currently under performance.
Based on the multiannual investment budget of Hidroelectrica and based on the ranking of the investment projects of Hidroelectrica, the investments which Hidroelectrica can make in the Special Purpose Vehicle in the next 7-8 years of the project implementation shall be estimated.
The planning of the amounts required to be invested in the Special Purpose Vehicle, in which Hidroelectrica would be a shareholder, is known approximately . Comparing the multiannual investment needs of the Special Purpose Vehicle with the amounts Hidroelectrica has available to invest , a decision can be made in respect of Hidroelectrica's participation in the shareholding of the Special Purpose Vehicle . In this context, the amount available for a capital inflow in 2013 in the Special Purpose Vehicle which would be established together with the private investors shall be identified.
No external funding sources were identified in 2013 for the Special Purpose Vehicle, except for the potential capital inflows from the private investors who would participate in establishment of this company .

14. Impact/multiplication effects

Impact. Construction of the power plant in Tarniţa-Lăpuşteşti means a green-field investment which would have a material contribution to the economic development of the country, as well as of the area located close to the city of Cluj-Napoca.
Commissioning of the PSHPP Tarniţa-Lăpuşteşti trigger important benefits for the National Energetic System (NES), making a contribution through:

- improvement of the operation regime of the large units of Cernavoda NPP and of the condensation and co-generation thermal power plants on fossil fuels through the transfer of energy from low to peak load (nighttime and weekend). This would contribute to a reduction in the consumption of fossil fuels which are largely imported;
- Participation to the frequency-power adjustment and securing the fast tertiary reserve, thus leading to an increase in the quantity of electric power supplied and an efficient use of the water in the storage lake; Ensuring short-term safety reserve by enhancing the operational safety of the NES;
- Operation of the PSHPP Tarniţa-Lăpuşteşti shall allow constant operation of certain hydroelectric power plant which are currently used for adjustment in NES;

The investment in the PSHPP Tarniţa-Lăpuşteşti shall result into creation of an important number of jobs – more than 4,000 – and implicitly to a higher standard of living in the area. Furthermore, the project will make an important contribution to the economic development of the country as a whole.

Multiplication effects

Pursuant to the financial model developed by the Consultant Consortium Deloitte Consultanţă SRL, HydroChinaZhongNan Engineering Corporation, Banca Comercială Română SA, the Special Purpose Vehicle could have a return rate of more than 10%. Nevertheless, this value depends on the regulatory framework applicable after commissioning , as well as on certain decisions of the investors regarding the type of equipments used (variable or fixed speed pumps).

The Romanian engineering, construction, equipment supply, etc. companies shall be able to use this reference in other international tenders, possibly on other continents, as a power plant of such a size is a pretty rare project.