A STUDY PROVES: THE BARRAGE OF THE MUR IN GRAZ BECOMES AN ECONOMIC DISASTER

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PRESS RELEASE

The study proves: the barrage of the Mur in Graz is an economic disaster

The barrage in Graz would be one of the most uneconomical water power projects in Austria

Graz, 8th January 2016 – For the first time WWF and "Rettet die Mur" submit a detailed study of the economic efficiency of the Mur barrage in Graz. The result is unambiguous: even in 50 years the 'EStAG' project could amount to a minus of 44.7 million euros. The reason for this is mainly to be found in the disproportionately high investment costs of 110 million euros. The barrage can't possibly go through the supervisory board of the EStAG – it would produce Austria's most expensive electricity by water power.

Environmental organizations like the WWF or the citizens' action group "Rettet die Mur" already pointed out the ecological damages of the planned barrage in the middle of the town centre years ago and these have been confirmed in the environmental compatibility assessment. Now the economic efficiency of the run-of-river power plant is questioned. The reason: a renowned energy expert calculated the economic perspectives of the power station on the basis of construction and operation data published by the EStAG.

DI. Dr. Jürgen Neubarth, author of the study and expert in energy industry, demonstrates among other things in a benchmark with 60 Austrian hydroelectric power stations that the Mur power station Graz shows not only disproportionately high, but even the highest specific investment costs with 1.52 euros per kilowatt hour. **"This is why an economic efficiency cannot practically be achieved."**

Dr. Günther Kräuter, president of the Association of the Austrian Worker-Fisheries Organization (AAWFO, *German abbreviation* VÖAFV) considers it a good thing that "there is finally an understandable and convincing study of economic efficiency for the barrage in Graz on the table. Electricity customers as well as the tax-paying population of Styria can now get a clear idea of the imminent waste of money. The biggest local fishery association, the Styrian worker fishery organizations, will in addition to this suggest an audit at the Auditor General's office in Vienna, should the project be pursued further."

The degree of expansion of Austrian lakes and rivers is already above 70 percent. Therefore the WWF advocates a strategic planning for expansion of water power throughout Austria. This means that only such projects that firstly do not interfere with ecologically high-quality stretch of rivers, and secondly which are useful from the point of view of energy industry. "Despite serious ecological doubts of the WWF for the Mur power station Graz-Puntigam a positive decision was made on account of the *public interest*", says **DI. Gebhard Tschavoll**, river expert at the WWF. "The study which is now on hand shows that available means should be invested in projects with a future. This would not only have positive effects on the financial means but also on the Mur as a valuable natural space of the town of Graz", argues Tschavoll.

"So unprofitable a project like the barrage Graz cannot and must not be passed by the supervisory board of the EStAG", states **Mag. Clemens Könczöl** of "Rettet die Mur". "The project assessment has to be carried out on the basis of capital costs of the EStAG (on the basis of the WACC). If the power station does not amortize according these requirements, it must not be realized by the company. **This project can't possibly be passed by the supervisory board.**" The fact that the EStAG is in addition looking for investors, who invest in such an uneconomic project, shows how untrustworthily people act in this matter. Even the 'VERBUND', Austria's biggest energy company, is not interested in this project any longer.

"In Graz we don't want to achieve notorious fame by having invested in an uneconomic and unecological power station in the town, with which **Austria's most expensive electricity from water power** would be produced", finally emphasizes Clemens Könczöl. "The living Mur should continue to be a famous landmark and an important habitat and space for relaxation of this town."

SUMMARY OF THE STUDY

Summary

The 'Energie Steiermark AG' - together with the 'VERBUND Hydro Power AG' - intends to construct a run-of-river water power station *Mur power station Graz* in the city area of Graz with a bottleneck capacity of about 16.4 MW and a standard capacity of not quite 74 GWh/a.

Despite all approvals which have been available since 2014, no final decision for the start of the construction has so far been made by the project developers, because the economic efficiency of the 110-million-euros project is increasingly called into question on account of stock-exchange electricity prices which have clearly dropped in the past years. However, no reliable statements on the economic marginal conditions of the Mur power station Graz are publicly available except for details of the planned investment costs, so that a matter-of-fact discussion of these problems is only possible with restrictions.

Against this background the 'e3 consult' of the WWF Austria was commissioned to draw up a study of the economic perspectives of the Mur power station Graz, whose results can be summarized as follows:

- **Investment costs are disproportionately high:** the Mur power station Graz shows the highest specific investment costs with 1.52€$_{2015}$/kWh in a benchmark with 60 Austrian hydroelectric power stations.
- **Currently there is a very low level of electricity prices:** the average year reference prices in the German-Austrian electricity market lie without exception in an area below 30€$_{2015}$/MWh until 2020.

- **Long-term rise of the stock-exchange electricity prices is probable:** fundamentally, electricity prices should rise again from their currently low level after 2020. A rise of the annual basic prices to 60 €$_{2015}$/kWh until 2030 is justifiable from the point of view of energy industry.
- **Electricity production costs not competitive:** the range of fluctuation of specific electricity production costs for the Mur power station Graz lies with 85 to 95€$_{2015}$/MWh clearly above the market prices to be expected until 2030.
- **High risk of stranded investments:** investments in the Mur power station can't even be earned again at the capital costs of 'Energie Steiermark AG' and 'Verbund AG' in 50 years of operation on the electricity market.
- **Attractiveness is low even in project financing:** the disadvantage of the very high specific investment costs which is immanent to the project consequently leads to the fact that capital costs are in all probability not to be refinanced in an acceptable time frame even in the case of an alternative financing of this project.

CENTRAL STATEMENTS OF THE STUDY

Graph see page 14 of the study:

Diagram 6: Specific investment costs of run-of-river water power plants in Austria

Specific investment costs in €$_{2015}$/kWh

Standard capacity in GWh/a

Specific investment costs in €$_{2015}$/kWh

Bottleneck capacity in MW

Source: own calculations on the basis of internet searches (start of operation from 2009 on, under construction or advanced project state; without financial support)

Page 7, paragraph 2: "The most up-to-date figure concerning the investment costs of the power station project as communicated by the project developers is taken from a company report of the 'Energie Steiermark AG' of the year 2013 and is at 109 million euros. **Within the past 5 years investment costs have thus risen by not quite 25 per cent**, where approximately the half of this cost development can be reduced to price increases due to inflation."

Page 10, paragraph 3: "It is not only in the market area Germany/Austria, but also in virtually all European countries, that an **unfavourable development of prices in the electricity market** is to be ascertained, not only from the viewpoint of water power."

Page 11, paragraph 2: "Here it is clearly to be seen that electricity prices are lower during summer months with the exception of the off-peak December (Christmas holidays) than during winter months. Because at the same time the utilizable drain of the Mur is higher in summer than in winter, **the average specific net profits from the Mur power station Graz are below the average annual electricity price**."

Page 14, paragraph 3: “The specific **investment costs of the Mur power station** Graz (1.52 €$_{2015}$/kWh), which depend on operation, are not only **clearly above the two power stations Gössendorf and Kalsdorf, which have been put into operation on the Mur in 2012 and 2013** (not quite 1.00 €$_{2015}$/kWh each), but also above the reference figure of all further power stations used for comparison.”

Graph see page 17 of the study:

Diagram 7: DCF and cash flow analysis Mur power station Graz (basic assumptions)

Cash flow / Accumulated cash flow

Source: own calculation

Page 16, paragraph 8: “At a **negative capital value of -44.7 million €**$_{2015}$ and an internal interest rate of 3.7%, investments in the project Mur power station Graz cannot pay for themselves within the period of consideration of 50 years.”

Page 17, paragraph 3: “Particularly considering a development of electricity prices, which can plausibly be argued, there is at least **no positive business case for the Mur power station Graz**, that can be derived with the start of operation before 2030.”

Page 19, paragraph 1: “The analyses of economic efficiency on the basis of publicly available information have shown that **a profitability cannot be guaranteed** under the current basic conditions of energy industry. Above all on account of the high specific investment costs of 1.52 €$_{2015}$/kWh, reference prices above 85 €$_{2015}$/MWh would be necessary on the electricity stock markets in order to be able to successfully refinance the project. This is a very improbable scenario, though, despite an increase of wholesale prices which can be expected again in the medium term.”

PRÄSENTATIONSFOLIEN:

FOLIE 1:

Assessment of economic perspectives of the project ‘Mur power station Graz’

- Summary of study results -
- Dr. Jürgen Neubarth :: Graz :: 8th January, 2016

FOLIE 2:

Marginal conditions from the viewpoint of energy industry for new building projects currently unfavourable

Development of wholesale prices in the German-Austrian market place

Motivation for the study “Economic Perspectives ‘Mur Power Station Graz’

- Currently a low electricity price level on account of:
- Low prices of coal, natural gas and carbon dioxide
- Overcapacities of conventional power plants
- Comprehensive expansion of renewable energy
- Stagnating power consumption

- So far no statements on economic efficiency of Mur power station Graz have been communicated
- Study fills information gap by the assessment of publicly available information
- Analysis of economic efficiency:
- Specific investment costs
- Specific electricity production costs
- Capital value (cash flow analysis)

FOLIE 3:

Cost estimations for the Mur power station Graz have risen in the past 5 years by 25%

Investment costs Mur power station Graz

Initial data for assessments

- Up until 2014 investment costs have continually been published in the company report of 'Energie Steiermark AG'
- 2015 for the first time no details on estimated investment costs in the company report
- Unclear whether additional construction costs are included in the published figures
- With high probability investment costs take contribution of 20 million euros to the planned storage channel of the town of Graz into account
- Further marginal conditions for the assessment of the economic efficiency from publicly accessible sources only available with restrictions

FOLIE 4:

Mur power station Graz shows clear cost disadvantages with regard to comparable water power plants

Specific investment costs of Austrian water power projects

Standard capacity in GWh/a

Specific investment costs as a technical and economic reference figure

- Specific investment costs are determined from investment costs related to standard capacity
- Reference figure is frequently used for the estimation of the economic attractiveness of a water power project
- Benchmark analysis on the basis of a power station and project database of the e3 consult
- Mur power station Graz with 1.52 $€_{2015}$/kWh at the topmost end of a comparison with 60 Austrian run-of-river water power plants
- Mur power stations Gössendorf and Kalsdorf are approximately at 1.00 $€_{2015}$/kWh, result corrected by the 'Verbund AG'

FOLIE 5:

Electricity production costs of the Mur power station Graz are clearly above electricity price forecasts

Electricity production costs as compared with selected long-term price forecasts

Range of fluctuation of the specific electricity production costs Mur power station Graz

FOLIE 6:

Investments will not be refinanceable at capital costs of the project developers

Discounted Cash-flow Analysis

Cash flow / Accumulated cash flow

Cash-flow model Mur power station Graz

- Application of a simplified cash-flow model for the Mur power station Graz:
- Capital costs before tax: 6.5%
- Start of operation: 2020
- Period of consideration: 50 years
- 6 million euros financial support according to Green Electricity Act
- Variable running costs: 16 €/MWh* (* including network loss charge and system service fee)
- Electricity price development (real): 40 €/MWh (2020), 60 €/MWh (2030) and 70 €/MWh (2040)
- Despite a comparatively optimistic development of electricity prices there is a clearly more negative capital value of -44.7 million $€_{2015}$ after 50 years of operation
- Internal interest rate of 3.7% (50 years) leaves less leeway for project financing
- At least there is no positive business case to be derived before 2030 at the start of operation

FOLIE 7:

Summary: "Assessment of the economic perspectives of the project *Mur power station Graz*"

1. Investment costs are disproportionately high as compared with similar Austrian run-of-river water power stations
2. Electricity production costs are not competitive even if stock-exchange electricity prices rise again in the long term
3. High risk of stranded investments – attractiveness is low even when the project is financed
4. The support of the strategic energy-political objectives of the country of Styria* is questionable

*The energy strategy 2025 allows for a further expansion of the use of renewable energy sources according to a future-oriented, sustainable and affordable energy supply.

CURRICULUM VITAE OF THE EXPERT

Curriculum vitae

DI. Dr. Jürgen Neubarth
e3 consult

Dr. Jürgen Neubarth is a graduate of the University of Mining in Leoben (Austria), he was a collaborator at the Institute of Energy Industry and Efficient Energy Application at the University of Stuttgart and did his doctor's degree at the Technical University of Graz in the field of renewable energies.

Afterwards Jürgen Neubarth has been in the E.ON company for seven years in various jobs of network and energy industry, - last he worked in Düsseldorf at the E.ON AG in the field of strategy and portfolio management: among other things, he was jointly responsible for the strategic development and optimization of the production activities throughout the company as well as for the integration of renewable energies into the production portfolio of the E.ON AG. Within the framework of his tasks, Jürgen Neubarth has also cooperated on the drawing up of the Dena network study I and has written publications dealing with the subject matter "controlling power/reserve power" and the merit-order effect of wind power.

After two years as a professor and director of the course of studies "European energy industry" at the Technical College Kufstein, Jürgen Neubarth has been the manager of 'e3 consult' since 2010. 'e3 consult' is a management consultation company for energy industry with its headquarters in Innsbruck and offers support for strategic and conceptional questions concerning the subject matter of energy.

Apart from his self-employed activity, Jürgen Neubarth is lecturer – among other things – at the University of Padua, the Technical College Kufstein as well as the Management Centre Innsbruck. He regularly publishes articles in magazines related to energy industry and gives lectures at scientific and practically-oriented conferences on up-to-date topics related to energy industry (e.g. E-world, Euroforum, Enerday, VDE congress, ÖWAV).