

PHES Ltd

**Waverley
Castle Road,
Blackrock,
Cork,
Ireland.**

Tel (087) 2556113 Fax(021)4357812

11000/200611

Clive Bowers
Commission for Energy Regulation,
The Exchange,
Belgard Square North,
Tallaght,
Dublin 24

Jody O' Boyle
The Northern Ireland Authority for Utility Regulation
Queens House
14 Queen Street
Belfast BT1 6ER

jody.o'boyle@uregni.gov.uk
cbowers@cer.ie

By Post

30th June 2011

RE: Work Packages 6 onwards - Analysis of the remaining work packages of the CPM Medium Term Review

PHES Ltd welcomes the opportunity to comment on CER's medium term review of the Capacity Payment Mechanism (CPM).

PHES Ltd strongly support the concept of capacity payments as an instrument to provide capacity adequacy through economic signals that are directly meaningful to the investment decisions of generators and to the decisions of demand-side participants. PHES Ltd also support the view that overall capacity payments should efficiently signal when, where and what types of new generators are required – and efficiently signal when, where and what market exit is appropriate.

In response to the consultancy document and question raised by the CER in **Section 3.1.4** namely;

“Should energy limited and pumped hydro storage units be treated differently to the current methodology in the CPM? “

Directors: Edward Sutton, Anne Sutton & Martin Murphy

Company Registered No: 481281 V.A.T. No: 9757021J
Registered Office: O'Brien and Company, Accountants, Crestfield Shopping Centre, Glanmire, Co Cork

While we broadly support the alternative suggestions for CPM that reward flexibility and the suggested floor price as in the SOCAP model we strongly believe pumped hydro energy storage should be treated differently in the current methodology.

Pumped Hydro Energy Storage is at a natural disadvantage to conventional plan thermal plant due to its inherent long lead-in time for development and construction -typically 6-12 years. While wind energy plant also has a relatively long lead-in time from planning to construction, wind has a payment structure in the form of REFIT that mitigates uncertainty to an extent. Our extensive analysis has shown that PHES projects cannot be made viable in Ireland on energy payments alone and require capacity payments as well as ancillary services revenue to be attractive for construction. PHES production to capital cost ratio is very different to conventional plant due to its energy limited capacity and site specific costs. However PHES offers many advantages to conventional generation, such as storage capability, fast ramping, high availability and black start capability. While we don't believe the PHES should be exempt for market risk, we do believe that it is at a natural disadvantage to conventional peaker plant whose capital cost and project lead in times are much shorter.

In light of Ireland's European obligations to carbon emissions reduction and our government's commitment to reduce carbon emissions by 80% by 2050, we believe that it is the CER's duty to encourage clean, environmentally responsible and flexibly generation to aid the integration of variable renewable and low carbon technologies. A study¹ commissioned by Eirgrid and undertaken by Poyry in March 2010 has shown that one of the only options (other than Nuclear and CCS which are unlikely for Ireland) for attaining a low carbon intensity (< 100g/kWh) for the year 2035 (as a pathway to 2050) is a portfolio with high levels of pumped storage, interconnection and high levels of renewables.

If PHES is required to balance large amounts of variable renewable technology in the future then a deployment path needs to be put in place now which recognizes the long lead-in time for PHES permitting and construction and also the need for firm policy and financial instruments that will make this type of large capital investment project reasonable in the private sector. Company Name see the CPM, or any mechanism that recognizes and rewards flexible and reliable capacity as a foundation for the development of PHES in Ireland. The current mechanism is too uncertain in the long term. This makes even the prospection and early development phase of this work challenging.

We ask that the CER recognize that PHES, due to it inherently long development and construction time, requires a firm CPM or other long term mechanism that will 1) reward its ability to provide a reliable capacity contribution 2) reward its ability to aid the integration of renewables in an environmentally suitable and low carbon fashion and 3) reward its ability to provide other power system benefits. We also recognize that such a mechanism would have to be capped so not as to provide an over saturation of PHES projects. We believe that if such a mechanism is put in place, with a capacity pot that reflects the system need for flexible capacity, it will encourage competition to develop efficient and environmentally sound PHES projects.

PHES Ltd hope these suggestions will be useful to CER in assessing a suitable amendment to the CPM.

For information purposes we attached as Appendix A, a letter issued to the CER on related matters.

Yours sincerely



Edward Sutton

¹ Low Carbon Generation Options for the All Island Market Poyry 2010

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Appendix A

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11000 300611 PHES Ltd Ltr EC CER

11000/290611

Eugene Coughlan
Commission for Energy Regulation,
The Exchange,
Belgard Square North,
Tallaght,
Dublin 24

By Post

24th June 2011

Dear Mr Coughlan

Re: Pumped Hydro Energy Provisions

1.0 Introduction

Further to our meeting with you and your colleagues on the 23rd March 2011 please note that we are to make a submission on "*Work Packages 6 onwards - Analysis of the remaining work packages of the CPM Medium Term Review*".

We write in relation to Pumped Hydro Electricity Provisions in Ireland and the need for specific provisions and supports to be put in place to facilitate this type of development on the East coast of Ireland.

This submission is made with respect to the potential of large scale PHES proposals to make a strategic contribution to energy security, the operation of the national grid and potentially contribute to issues of constraints and curtailment being addressed in the area of wind energy.

This submission is made in the context of the continuing development of PHES proposals by the Private Sector. The CER has been in receipt of many proposals for PHES. Some of these proposals are stand alone, others are related to wind farm developments, all however, are potentially unviable without a special support structure that recognises the potential of

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significance of pumped hydro storage provision to contribute to energy production and transmission in a sustainable manner.

2.0 Context

The government have committed Ireland to 40% renewable content of all electrical energy by 2020. At present according to Eirgrid approximately 1800 MW of wind turbine generators have been installed which generate approximately 10% of our electricity. While wind accounts for 71% of all renewable capacity but it is by definition intermittent and variable. According to the most recent All Island Generation Capacity Statement (Eirgrid 2010), over 5000MW of green energy will be required to meet the government's requirements of 40% of green generation by 2020. With an all Ireland grid and market put in place a pumped hydro facility would facilitate the integration of wind energy by providing a balancing tool for wind's inherent fluctuations. Given this situation the need for increased renewable energy related facilities such as pumped hydro is more important than ever. The costs of carbon taxes will most probably increase so this should be factored into the any market review by the CER.

The CER is tasked with acting in the interests of consumers is to ensure that:

- the lights stay on,
- the gas continues to flow,
- the prices charged are fair and reasonable,
- the environment is protected, and
- electricity and gas are supplied safely

These very basic objectives, as set out by the CER, require long term planning. It is our firm belief that any planning for the future requires recognition that a range of options for energy provision, security and transmission are considered and provided for.

3.0 The Proposal

Pumped Hydro Energy Storage is the only large scale, mature and reliable storage technology in the market today. At present Ireland has one pumped hydro plant which generates 292 MW at Turlough Hill in Co Wicklow.

Our proposal is to construct two artificial reservoirs within the estate with a 300 m head differential. We intend to have a storage capacity of in excess of 4,000,000 cubic metres in the top lake and 4,500,000 cubic metres in the lower. The scheme will have a daily generation capacity of in excess of 380 MW over a 7 hour period with output tailored to suit the grid demands.

While transmission may not directly be the responsibility of the CER, the energy market is and the CER is statutorily empowered to address key challenge areas in the delivery of PHES.

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It is our view that viable PHES provisions can have a positive impact on the management of the National Grid. In this respect they are strategic. Strategic provisions are not necessarily commercial proposals in the short term but can be made commercial through market supports. Short term supports in this respect to address key issues, such as uncertainty over entry to the market, have the capacity to provide a PHES resources that has the capacity to address strategic grid management for potentially a 100 yr period.

A key issue with pumped storage entry to the market is uncertainty, particularly the uncertainty around capacity payments and their structure. Pumped storage cannot survive financially without adequate capacity payments and as such capacity payments are a very important part of the revenue stream.

Because of the long-lead in time associated with PHES construction and planning the current capacity payment structure is too uncertain not only to finance projects but also it makes the financing of the planning elements of the project difficult. In this respect, supportive decisions need to be made now rather than later when the potential benefits of PHES to the system may be realized too late.

In this respect we submit that the CER has to consider the development of support mechanisms, such as REFIT, for PHES, or provide guidance that will support project financing.

Recent ESRI research has identified limitations to offshore wind and wave energy. Onshore wind energy faces challenges though constraints and curtailment. PHES is a potentially sustainable method of addressing constraints and curtailment. While noting the fact that there are significant conventional power generation assets throughout the country PHES offers significant positives to the management of energy transmission throughout the Country.

We are of the view that a PHES facility will need to be of a significant scale so as to be economically viable from a cost per MW perspective. Geographically, we are of the view that the facility is best located in close proximity to areas that are significant users of energy and close to National Grid provisions and potential upgrades.

In addition we are of the view that, small scale PHES, i.e. less than 100 MW, are not commercially viable and that the timescales that are involved in the development of an economically viable PHES proposal that can be charged off peak will require market supports given the multi year commitment to project planning, development and commissioning.

While there are a range of conventional power generation assets throughout the Country, and interconnectors are being developed and are likely to contribute to security of supply into the future, we submit that there is a strategic need to encourage additional energy security through the provision of a large scale pumped hydro proposal in Ireland to complement the operation of Turlough Hill and all other power generation sources.

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Strategically, the provision of a new PHES development on a commercial basis can contribute to energy security through enhancing grid stability in an environment where there is potentially a high volume of wind energy on the grid. This will contribute to a more efficient use of renewable resources.

3.1 Greenhouse Gasses

There is a real potential for a project of this form to contribute to addressing any future initiatives that address this area. In summary,

- (1) The economic recession has failed to curb global rising emissions, undermining hope of keeping global warming to safe levels.
- (2) Greenhouse gas emissions increased by a record amount last year, to the highest carbon output in history, putting hopes of holding global warming to safe levels all but out of reach, according to estimates from the International Energy Agency.
- (3) The shock rise means the goal of preventing a temperature rise of more than 2 degrees Celsius – which scientists say is the threshold for potentially "dangerous climate change".
- (4) It also shows the most serious global recession for 80 years has had only a minimal effect on emissions, contrary to some predictions.
- (5) Last year, a record 30.6 gigatonnes of carbon dioxide poured into the atmosphere, mainly from burning fossil fuel – a rise of 1.6Gt on 2009, according to estimates from the IEA regarded as the gold standard for emissions data.
- (6) According to the [Intergovernmental Panel on Climate Change's] projections, such a path ... would mean around a 50% chance of a rise in global average temperature of more than 4C by 2100," he said. Birol said disaster could yet be averted, if governments heed the warning. "If we have bold, decisive and urgent action, very soon, we still have a chance of succeeding," he said.
- (7) The IEA has calculated that if the world is to escape the most damaging effects of global warming, annual energy-related emissions should be no more than 32Gt by 2020.
- (8) Emissions from energy fell slightly between 2008 and 2009, from 29.3Gt to 29Gt, due to the financial crisis. A small rise was predicted for 2010 as economies recovered, but the scale of the increase has shocked the IEA.

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- (9) Most of the rise – about three-quarters – has come from developing countries, as rapidly emerging economies have weathered the financial crisis and the recession that has gripped most of the developed world.
- (10) About 80% of the power stations likely to be in use in 2020 are either already built or under construction, the IEA found. Most of these are fossil fuel power stations unlikely to be taken out of service early, so they will continue to pour out carbon – possibly into the mid-century. The emissions from these stations amount to about 11.2Gt, out of a total of 13.7Gt from the electricity sector. These "locked-in" emissions mean savings must be found elsewhere.
- (11) Another factor that suggests emissions will continue their climb is the crisis in the nuclear power industry. Following the tsunami damage at Fukushima, Japan and Germany have called a halt to their reactor programmes, and other countries are reconsidering nuclear power.
- (12) "People may not like nuclear, but it is one of the major technologies for generating electricity without carbon dioxide," said Birol. The gap left by scaling back the world's nuclear ambitions is unlikely to be filled entirely by renewable energy, meaning an increased reliance on fossil fuels.
- (13) Forthcoming research led by Sir David will show the west has only managed to reduce emissions by relying on imports from countries such as China.
- (14) Another telling message from the IEA's estimates is the relatively small effect that the recession – the worst since the 1930s – had on emissions. Initially, the agency had hoped the resulting reduction in emissions could be maintained, helping to give the world a "breathing space" and set countries on a low-carbon path. The new estimates suggest that opportunity may have been missed.
- (15) Recent work by Eirgrid (March 2010) has shown that one of the few alternatives other than Nuclear and Gas CCS of achieving low carbon emission (sub 100g/kWh) by 2035 is through the use of large scale storage, renewables and interconnection (ref Eirgrid [http://www.eirgrid.com/media/Low%20Carbon%20Generation%20Options%20for%20the%20All%20Island%20Market%20\(2\).pdf](http://www.eirgrid.com/media/Low%20Carbon%20Generation%20Options%20for%20the%20All%20Island%20Market%20(2).pdf)).

Economically, the optimists argued that the great recession of 2008-09 would give governments and industrialists a vital breathing space. A contracting world economy would naturally reduce carbon emissions; meantime, public and private sectors could strike a green new deal that would begin a shift towards low-carbon growth. Today's figures give the lie to all that: the link between GDP growth and greenhouse gases remains overwhelming. True,

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the distribution may have shifted eastwards since the Kyoto protocol – but that is partly because the west increasingly imports its manufactured goods. Finally, industrially, the great bet was that rich countries would wean themselves off fossil fuels and on to a mix of nuclear and renewables. Yet Fukushima has prompted Germany, Italy and Switzerland to mothball their nuclear

4.0 Conclusion

The 2007 Government White Paper spelt out three main strands of Irish energy policy: competitiveness, energy security, and sustainability.

- Delivering competition and consumer choice in the energy market;
- Ensuring that the regulatory framework meets the evolving energy policy challenges;
- Ensuring affordable energy for everyone;
- Creating jobs, growth and innovation in the energy sector.

Pumped hydro contributes greatly to achieving these laudable objectives.

The economic circumstances which govern Ireland but also the world have changed dramatically in the last few years but new research shows that prospects of avoiding a global warming have receded and future now looks considerably more uncertain than predicted.

Furthermore, there is a real potential that the impact of increased greenhouse gas emissions, the likely increase in carbon due to impending closure of nuclear plants in Germany, Japan, Italy, and Switzerland by 2022 when our proposed facility will be ready. The likely requirement to increase carbon taxes to restrain demand for fossil fuel type plants and the benefits which will accrue to Ireland by having additional pumped hydro facilities to stabilize Ireland's grid system and also to be available to stabilise Britain's grid system as is happening with Norway's pumped hydro plants today.

We offer security in terms of energy, its dependable and reliable, has a very quick response time, it stabilises the grid, our unique site, with exceptionally good prospect of achieving a satisfactory planning permission, the centrality of location on East coast.

We submit that pumped-storage hydro is an ideal option for firming the variability of other renewable power sources, such as wind and solar. However, tax incentives and new transmission-related policies are needed to encourage investment in development of these facilities. It is in this respect, namely encouraging markets supports to be developed, that we make the following submission to the CER and we would welcome their response to and consideration of the matter.

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Yours sincerely

A handwritten signature in black ink that reads "Ed Sutton". The signature is written in a cursive style with a large initial "E" and "S".

Edward Sutton

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