
# Guernsey Electricity Limited

## Formal Response to the

## OUR's Consultation Paper:

## Guernsey Electricity Limited Price Control

**Document No: OUR 10/13 November 2010**

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## Overview

GEL is responding to the Office of Utility Regulation's (OUR's) Consultation Document on the GEL Price Control of 13 November 2010. In doing so, we are also very conscious of the subsequent Report by the Regulatory Policy Institute (RPI) to the Commerce and Employment Department (CED) regarding its Review of Utility Regulation on Guernsey. In this response we have responded to the specific issues raised by the OUR and we have also commented on the broad but important implications of the RPI Report for the current price review process. To summarise, RPI have recommended that the whole approach to price regulation of GEL should be reconsidered. We agree with that recommendation and therefore believe that substantial progress cannot be made in the short term without the clarity on the Regulatory Framework which such reconsideration must provide.

Our overall conclusion therefore is that under these unprecedented circumstances, an interim arrangement is advisable. This interim arrangement could be designed to set a price for a period of one year from 1 April 2011, while the CED completes its Consultation on the contents of the RPI Report and takes the matters raised to the States of Deliberation. This would allow a longer term and more stable electricity pricing framework to be developed during 2011, in time for implementation from 1 April 2012. The impact of volatile energy market costs during that time would then need to be evaluated and dealt with in prices beyond 1 April 2012.

To achieve this transition successfully, we have proposed to the OUR a single year price control from 1 April 2011 which would involve a 7% increase in tariffs. This would allow the company to continue with its operations and its investment plans for a further year. A data submission in the light of the RPI Report has been provided to the OUR in the form of a Confidential Annex to this Consultation Response. This Annex covers the basic assumptions upon which it is constructed. In broad terms, the Annex proposes only a modest and phased initial year recovery of the historical pass-through costs which the RPI Report concludes have not been dealt with satisfactorily in GEL's price control to date. We believe that this will greatly assist agreement with the OUR in the time available and we are ready to supply any further information which the OUR would require.

GEL is confident that by working constructively with the OUR, CED, the Treasury and Resources Department (TRD) and other parties, that a new and sustainable Regulatory Framework for electricity can be developed for the future.

GEL believes that a successful electricity price control process will:

- Set out for consideration by GEL the proposed level of pass-through costs under the existing price control which have regulatory approval;
- Recognise the new uncertainty regarding the Regulatory Framework for Electricity as a result of the Report by RPI;
- Propose a simple interim arrangement of price regulation for 1 April 2011, while the Regulatory Framework matters in the RPI Report are taken to the States;
- Commence the recovery of the proposed level of pass-through costs to date but only in a gradual and phased manner – thereby protecting customers; and
- Allow GEL to operate profitably in 2011/12, while continuing with the necessary capital investment programme for the future.

## 1. Introduction

The Report by RPI on their Review of Utility Regulation on Guernsey concludes that very major change to the regulatory framework for Electricity should be considered. Given this context there are benefits to all parties in a one year interim arrangement from 1 April 2011.

The pre-eminent issue in the electricity price control to date has been the large monetary amounts involved in the pass-through mechanism and the crucial importance of dealing effectively with this issue going forward. Part of any interim solution therefore needs to clarify the magnitude of the pass-through costs which have been legitimately incurred to date – even though it might remain to be resolved precisely how those amounts are to be recovered from customers over time. GEL's view is that it would be wholly inappropriate for these pass-through amounts to be recovered from customers in a single year.

We strongly support the OUR's recognition of the need to adapt the pass-through arrangement and once the future Regulatory Framework is clarified we hope to work with the OUR to set out a practical medium term mechanism. Ordinarily the OUR's proposed four year price control period duration could be acceptable but a 1 year interim proposal would seem appropriate until the States has concluded on how the work by RPI is to be implemented.

The regulatory suggestions for cash ring-fencing and forecast capex reviews in the Consultation Document are, in GEL's view, unnecessary but in any case would now very much benefit from being revisited after the RPI Report. The approach of Save-to-Spend is one of Government Policy and if ever there were a political decision to change this approach, then it would take time to implement. We welcome however the acceptance by the OUR and their consultants that the company's capital expenditure plans are a basis upon which the company should continue.

We agree that there are benefits of retaining the usual Draft Decision stage by the OUR in this price control. This reduces the risk of an unsuitable price control outcome – since all parties are able to comment on the draft proposals. Also, experience has shown that there are considerable risks if, at the time of the Final Decision, all parties are not insistent that any proposed arrangement is specified in full. The Draft Decision should assist in ensuring that there is no ambiguity at the time of the Final Decision.

GEL welcomes the opportunity to comment on the issues raised by the OUR for the possible price control to operate from 1 April 2011. Although GEL has necessarily revised its capital investment plans in the light of accelerating increases in electricity demand, it is inaccurate to describe GEL as "substantially rethinking its investment programme". GEL's proposed changes are largely ones justifiably relating to the timing of investment and so the impact of this change in timing of investment on customers' bills will be relatively modest overall. The impact on customers' bills of energy costs is much larger – particularly since the current price control has not allowed for timely changes in tariffs to reflect changes in wholesale energy costs, the volatility of which could not have reasonably been foreseen by any party. The treatment of the pass-through of wholesale energy costs is the key issue in GEL's price control and we welcome the OUR's announcement that it would propose to adapt the pass-through mechanism to reflect weakened sterling and rising import and fuel costs.

GEL would welcome any moves to reduce the regulatory burden by not carrying out further efficiency studies. In the past year, the lengthy and extensive study by PB Power for the OUR has largely resulted in approval of GEL's capital investment plans – this is also welcomed. GEL has always been willing to demonstrate that its investment has been delivered effectively and efficiently for the benefit of customers and we will continue to be willing to do so. We are not convinced however that new regulatory processes and mechanisms are required to achieve this. Rather, the shareholder role and GEL's internal governance arrangements should be the route to achieve this control and oversight – this is the most efficient and cost effective way forward.

GEL looks forward to working with the OUR on the issues raised in this Consultation before the important next stage of the publication by the OUR of a Draft Decision.

## 2. Structure of the Paper

The Consultation Document makes a number of points for discussion and these are dealt with in this Consultation Response according to the section ordering in the original Consultation.

GEL notes the intention for a Draft Decision to be published in January 2011 and a Final Decision later in 2011. If the price control is to commence on 1 April 2011 then this leaves a very limited amount of time to deal with the issues in time for the appropriate period of notice to customers. These issues are complex and so it would be advisable to consider a more limited interim arrangement of a single year price control under the circumstances.

## 3. Licensing Regime and Legislative Framework

### 3.1 Overview

The regulatory framework for GEL is summarised in the Consultation Document. However the implications of the RPI Report to the regulatory framework summary could be very substantial indeed. They could include recognising the unsuitability of the RPI-X form of price control regulation since GEL is publicly owned and also moving to a less activist approach to price regulation. Under these circumstances it would be appropriate to consider a short term arrangement for price setting.

### 3.2 Current Licensing Regime

GEL's monopoly in conveyance and supply is presently only guaranteed until 2012. It would be helpful if the OUR would clarify the way forward that is envisaged in this area in the Draft Decision document. A four year price control would need a statement of the approach to be taken to GEL's markets during the period of that price control, which is currently not available.

### 3.3 Legislative Background to Price Regulation

We recognise that the content of the RPI Report is sufficiently radical to require some changes to legislation, should this be approved by the States. The possibility of this further justifies in our view an interim approach to price setting for 1 April 2011.

## 4. Principles of GEL's Price Control

### 4.1 Form

Rather than presume that an RPI-X +Y form of price control is appropriate for GEL under current circumstances, we believe that an interim approach needs to be taken.

If there is to be a Y element to any price control, then we believe that it needs to recognise the sterling costs of imported power and the need to make interim adjustments, if the variation in fuel costs and imported power costs is sufficiently volatile. Experience has shown that any Y element of a price control needs to be specified fully in an unambiguous way, as part of any final decision. We note however that RPI have concluded that *"we consider there to be a serious design issue in relation to the application of price-cap regulation to these publicly owned monopolies in Guernsey"*. Hence we believe that it would be inappropriate for the OUR to pursue the form of control proposed in the Consultation Document for a period of time longer than one more year.

### 4.2 Scope

GEL seeks confirmation from the OUR that the supply and conveyance activities will remain as monopoly activities by GEL for the period of any price control. This is a manifestly sensible approach given the natural economies involved in such arrangements – particularly on a small island. GEL believes that it would be appropriate for an arrangement to be agreed whereby GEL can rebalance its tariffs to provide the same overall regulatory allowed revenue – so long as GEL adheres to the need not to make any undue discrimination between the different tariff types.

### 4.3 Price Control Structure, Financeability & Save to Spend

The OUR has proposed the level of cash in the Save-to-Spend fund as a key financial variable. GEL would agree with this but believes that profitability is also a key variable. Because of the operation of the pass-through element of the price control, profitability by GEL has been prevented under the existing price control. This should not be allowed to continue.

Of critical importance to the level of the Save-to-Spend position is the impact of the pass-through mechanism – both any under-recovery and the timing of adjustments. Whilst a pass-through mechanism should accurately track the level of costs incurred, GEL has also always recognised and promoted the positive impacts of tariff smoothing in protecting customers. GEL's research demonstrates clearly that customers place a very high value on avoiding volatility in tariffs. RPI has noted that in electricity *"cash balances have not been built up to the extent necessary to fully finance GE's forward looking programme"* as a result of the inaccurate operation of the pass-through mechanism.

In GEL's view the OUR has proposed an unnecessary new approach of regulatory intervention in the control of ring-fenced Save-to-Spend cash reserves. GEL operates with transparent and appropriate mechanisms to ensure adequate control by TRD as shareholder on how the Save-to-Spend fund is used. All GEL expenditure over £250K must be authorised by the Board of Directors (both Executive Directors and Non-executive Directors) at full Board meetings. These types of processes need not be duplicated. Cash balances are fully transparent to TRD every working day – this is in accordance with States Policy and shareholder instructions.

The actual cash balance for the core activities of the company at 31 March 2010 has been submitted to the OUR within the company's Regulatory Accounts. The cash reconciliation and the adverse movement analysis is provided in the Confidential Annex.

Elsewhere in the Consultation Document reference is made to additional capital expenditure that was essential but was not allowed for in the 2007 Final Decision. This was in respect of oil storage tanks and rolling out the AMR project. These legitimate investment costs need to be allowed for by the OUR. However this additional expenditure is a relatively small part of the overall adverse variance. By far the largest part is the position whereby GEL had to incur higher non-controllable costs due to energy market conditions which under the current pass-through mechanism are only partly recovered, but also were recovered initially two years after the costs had been incurred. The recovery of the first year of additional costs of 2007/08 was only able to be made starting on 1 April 2009, i.e. GEL's financial year 2009/10. A summary of the figures for each year, including our latest forecast of the current year 2010/11 is included in the Annex to this paper.

The use of cash available within GEL is a matter of government policy.

## 4.4 Monitoring and Compliance

We believe that it would be efficient for GEL to be allowed to set tariffs subject to an OUR option to intervene – rather than the current system of the OUR announcing price levels. This would be consistent with RPI's recommendation that *" our own conclusion is that a more adjudicative approach to regulation in price setting is most likely to provide a good fit with the Guernsey system of government"*.

This is a fundamental but important and positive change to regulation, which we believe should be implemented as soon as possible. A four year price control which adopted current arrangements would be inconsistent with adopting such a preferable approach at the earliest opportunity.

# 5. Price Control Framework

GEL's financial forecasts are regularly updated to meet business requirements and the current update is incorporated into the Confidential Annex.

## 5.1 Capital Expenditure

### 5.1.1 Preamble

It is evident to GEL that section 5.1 of the OUR consultation document does not fully reflect the helpful discussions we have had with the OUR at a number of recent meetings in the September/October period this year. At those meetings GEL's reasoning for the changed timings of its capital expenditure programme were discussed in detail, along with the OUR's concerns. As a result, GEL believes much greater understanding of the issues now exists. Accordingly GEL's responses to this section have been truncated and delivered mainly in bullet point format.

5.1.2 The Need for Additional Local Plant

In its 2006 forecast GEL expected that additional plant would be needed in 2014 to replace aging plant and that the level of maximum demand would remain below the 92.3MW N-2 security criterion until the end of the decade.

Since this forecast, two major changes have occurred:

- GEL has decided to retain its old slow speed diesel plant for a further five years, postponing retirement of the oldest generator until 2019 at the earliest. This decision reflects continuing good condition of the plant and spare part availability, it also means that GEL will be operating 40 year old base load generation plant.
- The rate of growth of maximum demand has accelerated with 84MW being recorded in 2009/10, compared to the 2006 forecast for 2009/10 of approximately 70MW.

In considering these changes the following points should be considered:

- The growth rate has accelerated due to a combination of greater demand for electric heating and commercial activity, notably the growth of data centres.
- The calculation of the N-2 security criterion limit value is a calculation agreed between GEL and consultants for the OUR, which is documented in the "Statement of Opportunity". The calculation approach was agreed with the OUR's consultants after discussing the issues with GEL. The calculation is sensible and pragmatic and suggestions in the OUR consultation paper that use of this criterion is overly conservative by GEL are incorrect. It is also a criterion in widespread use in other developed islands albeit that it needs an agreed interpretation of the capacity assigned to the cable link.
- In the event of failure of the cable link, which can easily have a time to repair of six months, GEL must rely on local plant. The installed capacity of that plant is currently 114.9MW in eight generating units. Loss of a single large gas turbine unit reduces the capacity to 95.4MW. Loss of a further slow speed diesel reduces the capacity to 83.2MW best case, a level below the present maximum demand. GEL's view is that the risks of a failure of supply caused by a lack of generating plant coupled with the age of the existing plant are such as to require new planting to proceed as quickly as possible.

- GEL does not accept the criticisms of its forecasting methodology set out in the OUR's paper. As with all forecasts it is quite impossible to find a methodology that guarantees success. GEL accepts that the methodology used relies on local knowledge of the sources of demand growth and is, therefore, unconventional. Conventional forecasting techniques, however, rely on macro economic indicators such as GDP and population and such indicators are unlikely to be helpful in Guernsey circumstances where load growth is being generated both by fuel switching and new energy intensive commercial developments. Similarly GEL rejects the criticism that it has relied upon a maximum demand forecast and has not carried out an energy forecast. An energy forecast appears in the document reviewed by the OUR's consultants, but in GEL's view it is not particularly helpful in determining the growth of maximum demand.
- The overall level of investment over a ten year forecast period for GEL's 2009 submission differs from its 2006 forecast by only £1.24 million in a total forecast expenditure of £76.02 million – a difference of 1.63% over a ten year horizon.
- The OUR consultation paper suggests that "proactive assessment of alternative mitigation action" could result in a reduced need for local generation. Although the OUR has avoided any suggestion as to what is meant by this phrase, the industry standard phrase would be "demand side management". This technique relies upon providing customers with incentives to reduce load at peak times. GEL already has a very large percentage of its customers on economy structure tariffs, which incentivise off-peak consumption and dis-incentivise on-peak consumption. The success of these tariffs has seen the ratio of maximum to minimum demand on the island reduce from over 4:1 thirty years ago, to the present level of circa 2:1.

Against a background of enquiries for commercial developments requiring several megawatts of new installed capacity, it is highly unlikely that demand reduction techniques will make a useful difference, but GEL would be interested to receive further suggestions from the OUR, or indeed, any other party.

## 5.2 Cost reflective tariffs

The consultation document proposes consideration of tariff adjustments according to differential valuations of security of supply. Studies into this topic tend to be lengthy and expensive and we are not convinced that they would be conclusive in any practical sense if conducted on Guernsey. This is a study area in which GEL's small size should preclude substantial work, since utilities many thousands of times larger than GEL have already worked in this area. A review of that work would be a more productive first step, rather than the commissioning of any new local work from first principles.

## 5.3 Differential prices based on volume consumption

We agree with the OUR that this topic has already been dealt with satisfactorily. The analysis in the Consultation Document needs to take account of all of the charging elements of the published tariffs, if true like-for-like comparisons are to be made.

## 5.4 Favouring the cable link as a low carbon emission source

The issue of the relative carbon intensity of Guernsey heat sources has already been resolved via a dispute taken to the Advertising Standards Authority.

We note the very relevant observations of RPI in this area as follows: *"the regulatory framework….. would benefit from a clear and stable articulation of a coherent energy policy for Guernsey"; "There was considerable ambiguity evident in our discussions regarding the status of any energy policy in the States";* and that they were "*unable to locate a formal energy policy for the States".*

We believe that the opportunity exists for CED and the States to respond to the RPI Report within 12 months and to set an Energy Policy. This is a further reason why it would be more appropriate to put in place an interim arrangement for one year while that work takes place – rather than set at this stage a four year price control.

It is helpful however to examine the key issues on carbon emissions and these are set out in detail in Appendix 1.

In summary our conclusions are:

(i) Electricity in Guernsey is a blend of locally generated product from a fuel oil base and imports.

(ii) The carbon footprint of imports should be the same as that released onto the French grid by GEL's current supplier EdF. The carbon content of this electricity is in the area of 44g$CO_2$/kWh.

(iii) The carbon footprint of locally generated electricity is circa 670g$CO_2$/kWh.

(iv) The carbon footprint for imported electricity suggested by Guernsey Gas has no sound basis, is inconsistent with international practice and has proven unacceptable to an independent authority, the ASA, advised by the UK Carbon Trust.

(v) There is no doubt that a policy of increasing electricity imports at the expense of local generation would result in a lower overall carbon footprint for electricity in Guernsey.

In connection with the above conclusions GEL also takes the view that any change to its present "least cost" mandate should also protect electricity customers from the potentially excessive cost of simply adopting a "maximum imports" strategy. We consider this could be achieved by the insertion of a "maximum annual cost" cap, so that GEL would increase imports only until the additional cost cap was reached. GEL also takes the view that since measures to combat climate change are to the benefit of all islanders, all islanders and not just electricity customers should pay for these measures, if adopted, through the island's taxation system.

## 5.5 Operating Costs

GEL acknowledges the OUR's intention to use the existing approach to the efficiency of GEL's operating costs but needs to see the proposed amounts to be used at the Draft Decision stage. As regards the consultation by PPA in 2006, GEL can confirm that a revised five shift operation has been implemented by GEL, following a ruling by an Industrial Tribunal.

2001/02 was the base year for the production of regulatory accounts. To produce these accounts and those of 31 March 2003, each general account code was analysed using the most relevant factor to arrive at a percentage allocation of each account code in the general ledger. Thereafter all the allocations for new account codes were agreed with the OUR annually. This principle carries through to the price control data and formulae.

There are two further matters which GEL wishes to bring to the OUR's attention. The OUR model includes deferred tax as part of operating costs, whereas it should be separate as it is a calculation after all income and expenditure is taken into consideration; and this leads onto another tax derived matter. Our actual costs in the current price control period have also increased due to the States of Guernsey's economic and fiscal policy, which is outside of our control. As an impact of implementing the Zero 10 tax regime there has been a switch to higher indirect taxes. The main example of this affecting GEL was the replacement of Tax on Rateable Value (TRV) with Tax on Rateable Property (TRP). The basis on which this was devised by government included a high rate applicable to utilities. There has been an extremely large rise in cost to GEL for paying the new TRP instead (£385k versus £685k). This change came into effect on 1 January 2008.

## 5.6 Incentive Framework

The comments in the Consultation Paper regarding the proposal to maintain the existing approach for a further four year price control were written prior to some important conclusions in the report by RPI. RPI stated:

*"we consider there to be a serious design issue with the application of price cap regulation to these publicly owned monopolies"* and *"There may be more effective means of achieving the relevant public policy objectives than simple price cap regulation of public enterprises"* and *"Our assessment in electricity is that the regulatory system has failed in some key respects, including the treatment of the issue of cost-pass through".*

We would therefore strongly suggest that the incentive proposals set out in the Consultation should be fundamentally reconsidered, while a one year interim arrangement operates.

The reference to interim adjustments for pass-through costs is welcomed but it needs to be recognised that given the expected volatility in energy markets for the future, these will be the norm rather than the exception. Timely adjustments would therefore need to be built into any new multi-year price control approach.

However the incentive mechanism for capital investment is in our view, inappropriate. At present the proposals are necessarily in a very high level format and are therefore expressed at a theoretical level. This would need to be specified fully in any future proposals.

More importantly however, we note that the RPI Report recommends a new approach of "Limited Regulation" on Guernsey and an "LNBTW" test. That is, a test that the OUR does "A Limited Number of Big Things Well". Inventing and introducing an elaborate mechanism on capital expenditure incentives, when the OUR's consultants have already spent a great deal of time reviewing GEL's capital investment plans, would in our view, fail the RPI's LNBTW test.

It would be concerning if the pass-through mechanism were to be used in any adjustment to capital expenditure allowances. This would mix long term and short term adjustments and would risk making an already difficult mechanism even more problematic to solve in terms of a workable and reliable formula.

## 5.7 Rate of Return

We would propose here that there should be stability, based upon the financial fundamentals which were agreed at the last price control review. This is particularly the case since GEL has, through no fault of its own, not yet achieved even the return proposed previously by the OUR for the current price control. Pass-through costs have been under-recovered and delayed and this has suppressed even modest levels of profitability. GEL's financial fundamentals have already been agreed and all parties would benefit from a further period of stability in this regard.

## 5.8 Period of price control

In broad terms, GEL could accept the idea of a four year price control in the medium term but an interim solution seems to be manifestly appropriate as a result of the very significant conclusions of RPI and the fact that new circumstances might soon be proposed by the States as a result.

## 5.9 Pass-through mechanism

The pass-through mechanism is the main issue which has required examination over the last four years of the current price control. Within this, it is the size and the timing of adjustments in the allowed revenue to compensate for these movements in uncontrollable costs which remain as the main issues to be resolved.

In their Report, RPI have observed:

*"Our assessment in electricity is that the regulatory system has failed in some key respects, including the treatment of the issue of cost-pass through."*

The RPI examined the issue of Pass-through in the form of 2 Case Studies. Their conclusions were:

Cost pass through episode I – *"in this episode, the regulatory system failed the LNBTW test";*

and

Cost pass through episode II – *"this involves both a reluctance to act expediently to correct a previous mistake and regulatory over-reach… and…. amounts to another failure of the LNBTW test".*

In the light of these views a very fundamental re-assessment is justified – much more fundamental than was previously proposed in the Consultation Document.

We welcome however the main comments from the OUR to improve such arrangements in the future. We recognise that moving to a one year timing delay rather than waiting for two years is a move in the right direction, however it would be appropriate for the facility to adjust tariffs in the October of each year to be agreed, if the volatility of energy markets can already at that stage be seen to justify such an adjustment.

The RPI Report has found that the regulatory approach to pass-through costs has failed in the past. GEL strongly believes that the OUR should be in a position in January 2011 to issue a clear and unambiguous statement as to its view on the pass-though costs for the full four year period of the current price control, the under-recovered element of which should be included in future tariffs. The monetary amounts involved are significant and clarity on this topic is vital for GEL's financial position to be known.

The Tariff Application in the Confidential Annex is designed to be one which carefully starts the process of the recovery of pass-through costs to date. This involves phasing in over a number of years the under-recovered costs to date.

This concept of a spread of recovering legitimate past non-controllable costs is what we would term the use of a "control account" whereby the values that add to or are taken from the balance of the pass-through costs yet to be covered can be fully transparent to the OUR and GEL, electricity customers and indeed any other relevant stakeholders.

In the light of GEL's proposal for an interim arrangement under the circumstances of the RPI Report, it is still to be determined how the OUR will approach the topic of pass-through costs. However under all scenarios, it is vital that an accurate and transparent regulatory treatment of these costs is maintained over time.

## 6. Next Steps

In order for the OUR to issue a Draft Decision early in January 2011, we will need to make significant progress on the issues raised. GEL therefore hopes that the OUR will progress the detail of the price control with GEL during December and – subject to satisfactory assurances from GEL - will agree with GEL's proposal for an interim solution approach. We would strongly recommend that the Draft Decision planned for early January should be framed around the one year interim arrangement which is submitted by GEL.

**APPENDIX 1**
**Non-confidential**

## CARBON EMISSIONS

1. Basic science

Carbon dioxide is a primary product of combustion created by the burning of fossil fuel in air.

For electricity generated by a thermal process, such as the diesel engines or gas turbines operated by GEL, the carbon dioxide generated is determined:

- By the carbon intensity of the fuel.
- By the thermal efficiency of the process – in other words how much fuel is required to generate a unit (kWh) of electricity.

2. Measurement methodologies and issues

A number of methodologies exist for measuring the carbon intensity of electricity generation, but there are two specific ways of looking at the issue:

(i) To consider the carbon intensity of the output of a power station by reference to its fuel input. As an example, on this basis the output of a nuclear or hydroelectric power station will be zero carbon.

(ii) To consider the carbon intensity of the output of a power station by reference to all the materials and energy used throughout the life cycle of the station. On this basis the output of a nuclear power station is in the region 11-22g$CO_2$/kWh according to the UK DTI (see Attachment A).

To add to the confusion the carbon intensity of any source may be quoted in carbon or carbon dioxide terms.

To convert a figure quoted in weight of carbon to weight of carbon dioxide multiply by 3.66.

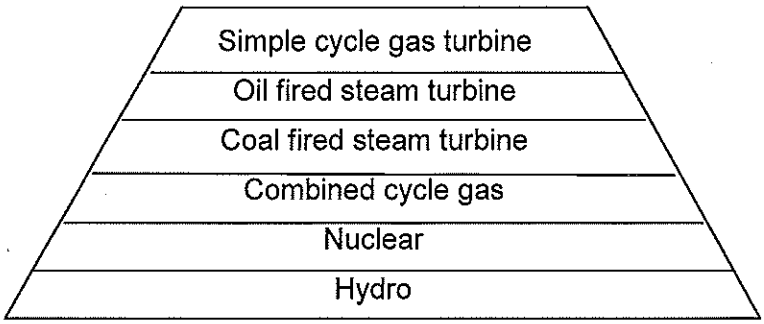
A further source of confusion when comparing the carbon intensity of fuels is the question of marginal emissions.

For any electricity system which is equipped with a variety of different production sources there exists an economic merit order in which sources are ranked by their production cost. This merit order normally determines in what order the sources will be used, with the cheapest sources being used 24 hours a day and the most expensive being used only at times of peak demand.

The merit order will vary, sometimes significantly, according to the price of fuel, but it is normally the case that nuclear and hydroelectric plants have the lowest operating costs and are despatched 24 hours a day provided they are available.

The use of power generating assets in this manner is normally depicted by a stack graph of which Figure 1 below is an example:

Figure 1




Whilst the order is economic it will be appreciated that each source of electricity also has a different carbon signature, with the carbon intensity (as it happens) tending to rise from the 24 hour (baseload) sources to the peaking (peakload) sources.

It will be appreciated that these concepts could be used to associate the carbon emissions of the peaking sources with equipment that uses electricity only at peak times, so that, for instance, direct acting electric heating which tends to use electricity more at peak times than off-peak might be considered more carbon intensive.

Such a methodology has been adopted by the French ADEME agency in Attachment B.

## 3. Electricity in Guernsey

As the OUR is aware electricity in Guernsey has two principal sources:

- Local on-island generation.
- Imports from France via the cable link.

Consider these sources in turn:

### 3.1 Carbon intensity of local generation

Local generation uses either heavy fuel oil or diesel as fuel, the amounts of diesel being tiny in comparison with heavy fuel.

The amount of fuel used is stated in GEL's annual report on a financial year basis. The carbon content of the fuel is a matter of scientific fact, so that the carbon emitted can readily be calculated as shown in Table 1 below:

| ***Year*** | ***Fuel burnt (litres)*** | ***Fuel burnt (tonnes)*** | ***Carbon emitted (tonnes)*** |
|---|---|---|---|
| 2004/5 | 11,376,023 | 10,955.11 | 9,585.72 |
| 2005/6 | 16,955,733 | 16,328.37 | 14,287.32 |
| 2006/7 | 33,700,022 | 32,453.12 | 28,396.48 |
| 2007/8 | 24,215,795 | 23,319.81 | 20,404.83 |
| 2008/9 | 37,952,920 | 36,548.66 | 31,980.08 |
| 2009/10 | 33,508,207 | 32,268.40 | 28,234.85 |

Density of fuel = 0.963 Kg/litre
Carbon emitted per tonne of fuel burnt = 0.875 tonnes
Fuel burn total includes diesel but proportion is very small so all assumed HFO

Note that these carbon emissions are instantaneous not "life cycle" since most European observers consider this measurement methodology to be the most appropriate for making inter-fuel comparisons.

To calculate the carbon dioxide emissions from local generation use 2008/09 as an example:

Carbon emitted = 31,980.08 tonnes
Electricity production = 173,523MWh
Carbon intensity of local production
= 184KgC/MWh
= 184gC/kWh

Convert to $CO_2$ = 184 x 3.66g$CO_2$/kWh
= 673g$CO_2$/kWh

## 3.2 Comparison with Jersey

The OUR consultation notes that Guernsey Gas complain that the above result is lower than the carbon footprint of generation in Jersey. With reference to section 1 above, this should be expected because a major part of the baseload generation plant in Jersey uses oil-fired steam turbine technology. Such plant has a thermal efficiency which is significantly lower than GEL's slow speed diesels. Hence more fuel is consumed per unit of electricity produced.

## 4. Carbon intensity of imported electricity

GEL currently purchases electricity produced by EdF.

The policy of the European commission is to encourage electricity suppliers to compete on both price and carbon footprint Directive 2003/54/EC paragraph 25 (see Attachment C) illustrates this.

Accordingly GEL believes it is most appropriate to use the carbon intensity figures of the electricity released onto the French grid by EdF. These can be found stated on a monthly basis at the following web address:

http://fr.edf.com/presentation/developpement-durable/promotion-du-developpement-durable-48631.html

The carbon footprint varies on a monthly basis because of the merit order effects discussed in section 3, with emission being higher in the winter than the summer since more fossil fuelled plant rather than nuclear or hydro will be in service.

The importation figures and their annual average carbon content are tabulated below:

| Year | Units imported at Barkers Quarry (MWh) | Units exported at La Haye (6% losses) | * EdF carbon content (KgC/kWh) | Total carbon emissions (tonnes) |
|---|---|---|---|---|
| 2004/5 | 288,463 | 305,771 | 0.0114 | 3,485.79 |
| 2005/6 | 276,812 | 293,421 | 0.0142 | 4,166.58 |
| 2006/7 | 197,020 | 208,841 | 0.0120 | 2,506.09 |
| 2007/8 | 257,093 | 272,518 | 0.0128 | 3,488.23 |
| 2008/9 | 210,440 | 223,066 | 0.0120 | 2,676.79 |
| 2009/10 | 239,332 | 253,692 | 0.0120 | 3,036.00 |

* Declared monthly on EdF website as $CO_2$ emissions, annual average allowing for monthly GEL consumption profile.

Combining the carbon content of local generation and importation allows the total footprint of electricity supplied to islanders to be calculated.

| Year | Import (tonnes C) | Generate (tonnes C) | Total (tonnes C) | Units imported & generated (MWh) | KgC/kWh |
|---|---|---|---|---|---|
| 2004/5 | 3,485.63 | 9,585.72 | 13,071.35 | 341,556 | 0.0383 |
| 2005/6 | 4,166.58 | 14,287.32 | 18,453.90 | 356,267 | 0.0518 |
| 2006/7 | 2,506.09 | 28,396.48 | 30,902.57 | 355,195 | 0.0870 |
| 2007/8 | 3,488.23 | 20,404.83 | 23,893.06 | 367,748 | 0.0650 |
| 2008/9 | 2,676.79 | 31,980.08 | 34,656.87 | 383,963 | 0.0902 |
| 2009/10 | 3,036.00 | 28,234.85 | 31,270.85 | 391,575 | 0.0799 |

**5 year rolling average 0.0665 KgC/kWh**
**Or quoted as $CO_2$ rather than carbon 243.8gm$CO_2$/kWh**

Given that this content will vary from year to year and that the information is being used to decide upon systems that will last many years, GEL considers, and the States Environment Department – Building Control agrees – that a five year rolling average should be used.

It should be noted that under International conventions Guernsey is entitled to ignore the carbon footprint of electricity from France since this is accounted for in the country of origin. However, to ensure a fair comparison with other fuels this entitlement has been ignored.

## 5. The ASA ruling

Attachment D presents the ruling given by the Advertising Standards Authority who were asked to consider complaints by GEL (and separately on similar advertising in Jersey by JEC).

We note that the ASA ruling suggested a carbon intensity figure for imported electricity of 92g$CO_2$/kWh, this figure having been provided by the UK Carbon Trust. We understand that this figure has been prepared on a "life cycle" basis, hence the difference between it and EdF's figures. Given that the EU commission is satisfied with EdF's methodology we believe it to be more consistent to stick with EdF's published data. EdF's research division commentary on the difference between the Carbon Trust's figures and their own is attached as Attachment E.

## 6. The use of marginal data and its applicability in Guernsey

Guernsey Gas have claimed that their figures of 300 to 680g$CO_2$/kWh can be justified because electricity supplied to the Channel Islands is "marginal". Note that in the ADEME study the maximum marginal carbon footprint quoted is 180g$CO_2$/kWh.

The majority of the electrical heating used in the islands uses storage technology, so electricity is used outside peak hours, and will be supplied by low emission generators.

On this basis it would attract a carbon footprint circa 40g$CO_2$/kWh.

Guernsey Gas has also argued that it would be appropriate to use the EU grid average figure for the carbon intensity of electricity. GEL considers this wholly inappropriate and so did the ASA and the UK Carbon Trust. Such treatment would also be contrary to the intentions of the EU in seeking to make suppliers compete on the basis of carbon footprint.