



EUROPEAN COMMISSION

Brussels, 25.IX.2007
C(2007) 4317 final

**Subject: State aid N 571/2006 – Ireland
RES-E support programme**

Sir,

1. PROCEDURE

- (1) By letter of 28 August 2006, the Irish authorities notified the Commission, in accordance with Article 88(3) EC, of the abovementioned aid scheme. By letters of 27 October 2006 and 30 March 2007 the Commission requested additional information, which the Irish authorities provided by letters of 1 February 2007, 23 April 2007, 3 May 2007, and 4 July 2007.

2. DESCRIPTION OF THE MEASURE

2.1. Background

- (2) The notified measure replaces measures employed to support renewable energy sourced electricity (hereinafter referred to as RES-E) in the past in Ireland, which were approved by the Commission in State aid cases N 553/2001¹ and N 826/2001². The previous measures were not capable of delivering by 2010 the renewables target addressed to Ireland in Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity

¹ OJ C 46, 20.2.2002, p. 7.

² OJ C 59, 6.3.2002.

Mr Dermot AHERN
Ministry of Foreign Affairs
St. Stephen's Green 80
Dublin 2
Ireland

market³ (hereinafter referred to as the RES-E directive). The notified measure is only available to new RES-E plants, and recipients of aid from the previous support programmes are thereby automatically excluded from the notified scheme.

2.2. Objective

- (3) The notified aid scheme aims at protecting the environment and saving fossil energy resources by increasing the contribution of RES-E to total electricity consumption by 1 450 MW. The scheme thereby seeks to achieve Ireland's obligation under the RES-E directive to increase RES-E consumption from 3.6 % in 1997 to 13.2 % in 2010.
- (4) According to the Irish authorities, there is sufficient interest among RES-E project developers to deliver the target addressed to Ireland in the RES-E Directive. The market deficit is a lack of investor confidence. The notified support programme is intended to establish a business case acceptable to investors.

2.3. National legal basis, form and budget

- (5) The national legal basis for the notified scheme is the Electricity Regulation Act 1999.
- (6) The aid will be granted in the form of payments to those retail suppliers of electricity (hereinafter referred to as suppliers) who enter so called Power Purchase Agreements (hereinafter referred to as PPA) with generators of RES-E. Under a PPA, the supplier undertakes to purchase all the output from a selected new RES-E plant at contract prices which are fixed between the RES-E producer and the supplier at the commencement of each individual contract (hereinafter referred to as PPA prices) for 15 years, irrespective of the open market price. For every kWh purchased under the PPA, the supplier will receive a so called REFIT (Renewable Energy Feed in Tariff) payment from a fund.
- (7) The PPAs are negotiated in the open market between any selected RES-E generator and any supplier, and the PPA price of each contract is decided by the contracting parties.
- (8) The fund used to finance the REFIT payments will be collected from all subscribers to the electricity network by the transmission system operator through a levy. The levy will be imposed under the supervision of the Commission for Electricity Regulation (CER), an independent regulator established by law. It will be based on the capacity of the connection of each subscriber, and the rate will vary depending on whether the connection serves a domestic account or a professional account. Although the CER will never become the owner of the levy payments, it will exert significant control over these payments. The value of the payments will be controlled and certified by the CER using, for this purpose, a number of high level principles fixed by the Law that leave a significant range of parameters in its control.

³ OJ L 283, 27.10.2001, p. 33.

- (9) The budget foreseen is 150 million € overall, or 10 million € annually.

2.4. Beneficiaries

- (10) The indirect beneficiaries of the aid are RES-E generators. The support programme is allocated up to a quantitative capacity limit of 1450 MW on a “first come – first served” basis to RES-E generators complying with the qualifying conditions of the programme. The selected RES-E generators will be awarded “letters of offer”, confirming to suppliers that those will be entitled to REFIT payments in return for entering PPAs with the selected generators.
- (11) The generators eligible to receive a letter of offer under the scheme are those who produce RES-E from small scale hydro, large scale wind, small scale wind and biomass. The Irish authorities have confirmed that all the RES-E eligible for support falls within the definition of renewable energies in Article 2 of the RES-E Directive. In order to be eligible, the RES-E plants must have planning permission and a connection offer. They must be new plants in Ireland or other EU Member States. In the latter case, the RES-E must be covered by a guarantee of origin, confirming that the exporting state will not, for a period of 15 years, use the electricity from that plant to meet its own RES-E targets under Directive 2001/77/EC, thereby accepting that the electricity can be counted towards Ireland's target. The support programme treats domestically produced and imported RES-E equally.

2.5. Duration

- (12) Access to the aid programme can be granted from the Commission approval until 31 December 2009 or when all capacity is allocated, whichever occurs first.
- (13) Once access to the programme is granted, the support can continue for up to 15 years, since the PPAs are entered for up to fifteen years. The Irish authorities have argued that the fifteen year duration of the PPAs is necessary to deliver the business case demanded by investors at least additional cost to consumers, and to minimize the aid intensity. According to the Irish authorities, with a shorter duration of the support, the unit production costs would be increased to include higher debt repayments, and the aid required would also increase.
- (14) A contracting generator can cancel a PPA at any time by agreement, or, in the case of a dispute, after giving a minimum period of notice of 12 months to the contracting supplier. In the event of any such cancellation by the generator, the letter of offer shall no more confer any entitlement to REFIT payments.

2.6. Costs of producing RES-E

- (15) The Irish authorities have presented the production costs of RES-E in Ireland split up in three elements. First, the Irish authorities have submitted that there is a significant cost of balancing undispachable electricity. Wholesale electricity prices are not constant and can vary significantly. The Irish authorities have provided data showing hourly fluctuations in wholesale prices which are available in the market (top-up and spill), demonstrating that the aggregate net spill cost

plus the aggregate net top up cost represent 16-19 % of the purchase price.⁴ Whereas suppliers contracted to conventional plants can negotiate bilaterally to avoid or minimise the balancing cost, suppliers with a PPA must bear those costs.

- (16) Second, they have indicated the following average production costs for each technology, referred to in the national scheme as "reference prices":

Table 1

RES-E from large wind	RES-E from small wind	RES-E from small hydro and landfill gas	RES-E from other biomass
57 EUR/MWh	59 EUR/MWh	70 EUR/MWh	72 EUR/MWh

- (17) These cost estimations are based on prices bid in the previous support programmes for RES-E in Ireland (AER). The estimations were compared with data on RES-E generation costs in different reports. One of the sources used was the European Commission communication *The support of electricity from renewable energy sources of 7.12.2005*⁵. The cost estimations presented in table 1 above were found to correspond in particular to the data contained in figures 4, 8 and 12 of annex 3 of that communication. The main cost elements are pre-operational costs, connection costs, turbine costs and construction costs. The Irish authorities have indicated that no reductions in capital costs are foreseen in the limited period of access to the programme, which is only until 2009 at the latest. The significant capital costs are incurred at the commencements of projects and remain unchanged.
- (18) Third, an opportunity cost will arise for the electricity supplier with a PPA if the so-called Best New Entrant price (BNE) goes down over the life of the programme. The BNE is the weighted average price for electricity from a new CCGT plant, and is currently 66 EUR/MWh. The Irish authorities have indicated that suppliers require assurance, in return for entering into a long term contract which they would not negotiate in open market conditions, that any such cost will be neutralised.

2.7. Aid amount

- (19) In the REFIT payments, three elements can be distinguished, each one of which corresponds to one of the abovementioned cost elements.
- (20) First, regardless of RES-E technology or PPA price, suppliers will receive a compensation of 8.5 EUR per MWh purchased under a PPA. This compensation is intended to cover the abovementioned balancing cost.

⁴ See annex 1.

⁵ COM(2005) 627 final.

- (21) Second, for RES-E from the more expensive RES-E technologies, electricity suppliers will receive so called premium payments of maximum 2 EUR/MWh for RES-E from small wind power projects, 13 EUR/MWh for RES-E from small hydro and landfill gas power projects, and 15 EUR/MWh for RES-E from other biomass projects. If the PPA price is below the reference prices referred to above (59 EUR/MWh for RES-E from small wind, 70 EUR/MWh for RES-E from small hydro and landfill gas, and 72 EUR/MWh for RES-E from other biomass), the premium payments will be reduced by the difference between PPA price and the reference price. To justify the premium payments, the Irish authorities have argued that it is a shared Community objective to diversify and grow the variety of available RES-E technologies. If the net additional cost of other RES-E technologies than the lowest cost alternative, i.e. large scale wind projects, were not neutralised, a rational retail supplier participating in the programme would contract for the latter form of technology only, which would impede the development of other RES-E technologies.
- (22) These two REFIT payment elements together will thus amount to the following maximum compensation for RES-E from the each eligible technology respectively:

Table 2

RES-E from large wind	RES-E from small wind	RES-E from small hydro and landfill gas	RES-E from other biomass
8,5 EUR/MWh	10,5 EUR/MWh	21,5 EUR/MWh	23,5 EUR/MWh

- (23) Third, so-called market price equalisation compensation will be granted to suppliers if the BNE falls significantly. If the BNE falls below a reference price of 57 EUR/MWh, the market price equalisation compensation will equal the difference between this reference price and the BNE.
- (24) The reference prices and reimbursements will be indexed to the consumer price index in Ireland. The aid cannot be cumulated with aid received from other local, regional, national or Community schemes to cover the same eligible costs. The plants for production of RES-E are not eligible for investment aid.

2.8. Market price of RES-E

- (25) According to information provided by the Irish authorities, the market price at which electricity suppliers would accept to buy electricity *from a conventional plant* in a bilateral contract is €52 MWh. In the absence of the REFIT payments, contracting suppliers would opt to contract with conventional dispatchable plants at that market price instead of contracting to purchase all the undispachable output from selected RES-E projects for up to fifteen years. This is because of the balancing costs arising due to the guaranteed purchases from undispachable plants.

2.9. Estimated investment amount and aid amount per capacity installed

- (26) In order to show that the aid is granted only for plant depreciation, the Irish authorities have submitted the following data concerning the balancing cost compensation and the premium payments:

Table 3

		Wind Large	Wind Small	LFG	Biomass/hydro
1	Full load hours %	34	34	60	50
2	Annual full load hours (row 1 x 365 x 24) h/year	2 978	2 978 h	5 256 h	4 380 h
3	Compensation €/MWh	8,5	10,5	21,5	23,5
4	Annualised compensation per MW installed (row 2 x row 3) €/MW	25 313	31 269	113 004	102 930
4	15 year compensation per MW installed (row 4 x 15) €/MW	400 000	500 000	1 700 000	1 500 000
5	Capital cost per MW installed €/MW	1 200 000	1 200 000	2 700 000	3 000 000
6	“Unallocated” capital cost (row 5-row 4) €/MW	800 000	700 000	1 000 000	1 500 000

- (27) In case no market price equalisation compensation is granted, the aid amount thus remains largely inferior to the investment amount.
- (28) Since BNE is currently above 57 €/MWh, no market price equalisation compensation will be granted under the current circumstances. Such compensation will be granted only if BNE falls below 57 EUR/MWh, and will in that case equal 57 EUR/MWh minus BNE. To demonstrate how much BNE would have to fall before the total aid amount would be so big as to equal the investment amount, the Irish authorities have provided the following data:

Table 4

		Wind Large	Wind Small	LFG	Biomass/hydro
1	“Unallocated” capital cost (row 6 in table 3 above) €/MW	800 000	700 000	1 000 000	1 500 000
2	"Unallocated" capital cost distributed per MWh for 15 years (row 1 / (15 x row 2 in table 3 above)) €/Mwh	17	15	12	22
3	Permissible BNE-reduction before compensation exceeds capital costs (66-57 + row 2) €/MWh	26	24	21	31
4	Permissible BNE-reduction in percent (row 3/66)	39 %	36 %	32 %	47 %

- (29) The Irish authorities have argued that Ireland is approximately 90% dependent on fuel imports to meet its energy needs, and that this high dependence delivers an electricity market particularly sensitive to international oil/gas prices. In other words, BNE follows international prices on fossil fuels. In consequence, in order for the aid to cover plant depreciation, international fossil fuel prices would have to be reduced in the order of 32-47 %.
- (30) If the gas prices would remain stable for, say, 3 years, the following table shows the reduction that would then be necessary in order for the total aid to cover plant depreciation:

Table 5

		Wind Large	Wind Small	LFG	Biomass/hydro
1	“Unallocated” capital cost (row 1 in table 4 above) €/MW	800 000	700 000	1 000 000	1 500 000
2	"Unallocated" capital cost distributed per MWh for 12 years (row 1 / (12 x row 2 in table 3 above)) €/MWh	22	20	16	29
3	Permissible BNE-reduction before compensation exceeds capital costs (66-57 + row 2) €/MWh	31	29	25	38
4	Permissible BNE-reduction in percent (row 3/66)	48 %	43 %	38 %	57 %

- (31) Since there is no conventional wisdom predicting any significant fall in fossil fuel prices continuing for 15 years of the order required, the Irish authorities argue that the accumulated state resources will not exceed investment costs under reasonable assumptions.

2.10. Market interest in RES-E

- (32) The national authority opened to receive applications from RES-E project developers under the notified support programme on 1st June 2006. The following applications had been received on 1st July 2006:

Table 6

Technology	Applications	Capacity
Large wind	32	576 MW
Small wind	22	53 MW
Biomass Landfill Gas (LFG)	2	6 MW
Other Biomass	2	3 MW
Hydro	2	1 MW

- (33) The Irish authorities are not aware of any PPA concluded so far which has been negotiated at a price below the reference prices indicated in table 1 above, i.e. 57 €/MWh for RES-E from small scale wind, 59 €/MWh for RES-E from large scale wind, 70 €/MWh for RES-E from small hydro and landfill gas, and 72 €/MWh for RES-E from other biomass.

3. ASSESSMENT

3.1. State aid in the sense of Article 87(1) of the EC Treaty

- (34) Article 87(1) of the EC Treaty covers aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods, insofar as it affects trade between Member States.
- (35) The notified compensation is financed through a fund collected from all subscribers to the electricity network. This same fund has been found to constitute State resources in a previous State aid decision taken by the Commission.⁶ The compensation affects the electricity trade, which can take place between Member States, and distorts the competition between RES-E and electricity from traditional energy sources, in conformity with its objectives.
- (36) Concerning the question whether the notified measure favours certain undertakings, the Commission notes that the compensation paid to suppliers is indirectly benefiting the producers of RES-E, who are thereby able to sell their electricity at a price that the suppliers would not have paid without the compensation. The Commission therefore concludes that the notified scheme

⁶ State aid case N553/2001

constitutes State aid within the meaning of Article 87(1) of the EC Treaty to the selected RES-E producers.

- (37) As far as concerns the direct recipients of the notified compensation, i.e. the suppliers entering PPAs, the extent to which the compensation will confer an advantage upon those will depend on the PPA prices, which will be the subject of free negotiations between RES-E producers and suppliers. The selected RES-E generators are free to enter PPAs with any supplier and are thus in a position to negotiate the best possible PPA prices. It can therefore be presumed that the PPA prices will reflect the market conditions, taking into account factors like the commercial risk of entering 15 year contracts to purchase all the electricity of a given RES-E generator, the development of prices on electricity from traditional sources and the estimated value of being able to sell electricity under a green label. However, the price will also reflect the suppliers' entitlement to the State financed REFIT compensation, and the contracts could turn out to be more advantageous than foreseen at the time when they were concluded. The Commission concludes that the notified compensation could confer an advantage to those suppliers who enter PPAs, and thus involve State aid within the meaning of Article 87(1) of the EC Treaty to those operators as well.

3.2. Legality of the aid

- (38) The Irish authorities have notified the aid to the Commission before implementing it, in accordance with the requirements of Article 88(3) of the EC Treaty.

3.3. Compatibility with the common market under the State aid rules

- (39) Whereas Article 87(1) of the EC Treaty sets out a general prohibition of State aid, Article 87(3)(c) of the Treaty foresees an exemption for aid to facilitate the development of certain economic activities or of certain economic areas, where such aid does not adversely affect trading conditions to an extent contrary to the common interest.
- (40) The criteria for the Commission's assessment under Article 87(3)(c) of State aid in the field of environment are laid down in the Community Guidelines on State aid for environmental protection⁷ (hereinafter referred to as the "environmental aid guidelines").
- (41) The rules applicable to operating aid for the production of power from renewable sources are contained in paragraphs 54-65 of the environmental aid guidelines. Under these rules, operating aid for the production of renewable energy will usually be allowable. The Commission takes the view that such aid qualifies for special treatment because of the difficulties these sources of energy have sometimes encountered in competing effectively with conventional sources. It must also be borne in mind that it is Community policy to encourage the development of these sources of energy, notably on environmental grounds. Aid may be necessary in particular where the technical processes available do not allow energy to be produced at unit costs comparable to those of conventional

⁷ OJ C 37 of 3.2.2001, p.3.

sources. Operating aid may be justified here in order to cover the difference between the cost of producing energy from renewable energy sources and the market price of that energy. When assessing cases, the Commission takes account of the competitive position of each form of energy involved.

- (42) Under paragraph 59 of the environmental aid guidelines, Member States may grant operating aid to compensate for the difference between the production cost of renewable energy and the market price of the form of power concerned. Such aid may be granted only for plant depreciation, and any further energy produced by the plant will not qualify for any assistance.
- (43) The Irish authorities have provided the following comparison of RES-E production costs and electricity market prices:

Technology	Market price	Production cost	Balancing cost	Total cost	Difference
Large wind	€52 MWh	€57 MWh	€8.5	€65.5 MWh	-€13.5
Small wind	€52 MWh	€59 MWh	€8.5 MWh	€67.5 MWh	-€15.5
LFG	€52 MWh	€70 MWh	€8.5 MWh	€78.5 MWh	-€26.5
Biomass/hydro	€52 MWh	€72 MWh	€8.5 MWh	€80.5 MWh	-€28.5

- (44) When comparing these differences with the aid amounts set out in paragraph 21 above, the Commission concludes that the compensation is limited to covering the difference between the production cost of the RES-E from the respective technologies and the market price of electricity in Ireland. The Commission also concludes from the data referred to in paragraphs 25-30 above that the aid will be limited to covering plant depreciation. Under current market conditions, the criteria set out in paragraph 59 of the environmental aid guidelines are thus met.
- (45) For the selected producers of RES-E, both costs and revenue from the RES-E will remain largely unchanged over the whole duration of the aid programme. This is because, first, as indicated in paragraph 15 above, their main costs are capital costs, which will remain unchanged once the investments are made, and, second, the revenue will be the fixed PPA prices.
- (46) For the suppliers, their cost of the RES-E is the fixed PPA prices. According to the Irish authorities, at present, none of the PPAs has been entered at a price below the abovementioned reference prices of 57-72 EUR per MWh depending on the technology. The Commission also notes that the production cost of RES-E in Ireland net of balancing costs equals the reference prices. It can therefore be expected that RES-E producers, although they will not have to support the balancing costs, will nevertheless be unable to enter PPAs at prices below the reference prices. This suggests that the PPA prices can be expected to be at least the reference prices.
- (47) Unless BNE falls substantially, suppliers with a PPA will only receive the 8,5 EUR granted for electricity from all technologies and the premium payment for

electricity from the most costly technologies. The 8,5 EUR will only cover costs other than the purchase price, that are avoidable when trading electricity from other sources, and the premium payments will only cover the part of the PPA price that exceeds 57 EUR per MWh. The suppliers' net cost of purchasing the RES-E can therefore be expected to be at least 57 EUR/MWh, which is higher than the price at which they could have purchased electricity from other sources, estimated by the Irish authorities to 52 EUR/Mwh.

- (48) The suppliers' opportunity cost of purchasing RES-E instead of electricity from conventional sources, will to some extent depend on the future market conditions.
- (49) If the BNE falls substantially from current levels, the suppliers will receive a further compensation corresponding to part of the fall. Since such a reduction of the BNE only reflects a corresponding reduction of the market price of electricity, such compensation would however only neutralise the opportunity cost that the suppliers would incur due to PPAs in a situation where electricity market prices would fall.
- (50) In the opposite situation, where the cost of electricity from conventional energy sources rises, the PPAs will become relatively more advantageous for the suppliers. However, a selected RES-E producer is free to enter a PPA with any supplier at any price. Suppliers wishing to enter a PPA will have to compete between them to offer the best prices for the RES-E. It can be presumed that the price setting will take into account all the commercial risk factors known when the contract is entered, including the possibilities that electricity prices go up. The risk of unnecessary State aid being granted to the suppliers is further limited by the generators' possibility to leave the PPAs for the open market, should the open market without REFIT payments become more profitable than the PPAs. The Commission concludes that any possible advantage for the suppliers is necessary for the functioning of the system and is limited to the minimum necessary in order for the PPAs to be concluded. Such possible State aid to the suppliers is therefore compatible with the common market based on Article 87(3)(c) of the Treaty.

4. DECISION

The Commission has accordingly decided not to raise objections against the notified measure, since it fulfils the conditions to be considered compatible with the EC Treaty.

The Commission reminds the Irish authorities that, in accordance with Article 88 (3) of the EC Treaty, plans to refinance, alter or change this scheme have to be notified to the Commission pursuant to the provisions of Commission Regulation (EC) No 794/2004 implementing Council Regulation (EC) No 659/1999 laying down detailed rules for the application of Article 93 [now 88] of the EC Treaty (OJ L 140, 30.4. 2004, p.1). The Irish authorities are also reminded to provide the Commission annually with a report on the implementation of the aid.

If this letter contains confidential information, which should not be disclosed to third parties, please inform the Commission within fifteen working days of the date of receipt. If the Commission does not receive a reasoned request by that deadline, you will be deemed to agree to the disclosure to third parties and to the publication of the full text of the letter in the authentic language on the Internet site: http://ec.europa.eu/community_law/state_aids/index.htm. Your request should be sent by registered letter or fax to:

European Commission
Directorate-General for Competition
State Aid Registry
B-1049 Brussels
Fax No: +32-2-296 12 42

Yours faithfully,

For the Commission

Neelie KROES
Member of the Commission

Annex 1 – Illustration of the undispatchability balancing cost

Table 1 below demonstrates hourly fluctuations in wholesale prices which are available in the market (top-up and spill) and the fluctuating levels of output from a 50 MW wind farm where the customer demand is constant. The table is based on the following assumptions:

- The customer demand is for a constant 17 MWh supply.
- The wind-farm is a 50 MW wind-farm with an annualised load factor of 34% = 17 MWh,
- the hourly output in the table is based on real time data supplied by a new entrant retail supplier to the electricity market, and
- top up and spill prices in the table are averaged
- The supplier purchases the wind power at € 57/MWh. The net spill cost is therefore the difference between €57/MWh and spill price, and the net top-up cost is the difference between €57/MWh and spill price.

Table 1

1	2	3	4	5	6	7	8	9	10	11
00.01-24.00	Customer Demand	50 MW plant output	Excess+/deficit-	Market Price (Top up/Spill)	Top-up Cost	Net top-up cost	Net Top-up cost agg	Spill Sales	Net Spill Cost	Net spill Cost Agg
Hrs	MWh	MWh	MWh	€	€	€	€	€	€	€
1	17	29	+12	T74-S35	---		---	420	264	264
2	17	35	+18	T68-S33	---		---	594	432	696
3	17	31	+14	T67-S33	---		---	462	336	1032
4	17	23	+6	T65-S32	---		---	192	150	1182
5	17	25	+8	T64-S31	---		---	248	208	1390
6	17	20	+3	T64-S32	---		---	094	077	1467
7	17	27	+10	T66-S33	---		---	330	240	1707
8	17	16	-1	T73-S36	73	16	16	---	---	---
9	17	8	-9	T84-S45	756	243	259	---	---	---
10	17	6	-11	T87-S47	957	330	589	---	---	---
11	17	6	-11	T90-S48	990	363	952	---	---	---
12	17	12	-5	T90-S49	450	165	1117	---	---	---
13	17	15	-2	T91-S50	182	68	1185	---	---	---
14	17	6	-11	T89-S49	979	352	1537	---	---	---
15	17	0	-17	T88-S50	1496	470	2007	---	---	---
16	17	9	-8	T88-S50	704	248	2255	---	---	---
17	17	17	0	T89-S51	---	---	---	---	---	---
18	17	22	+5	T119-S52	---	---	---	260	25	1732
19	17	17	0	T120-S52	---	---	---	---	---	---
20	17	16	-1	T88-S50	88	31	2224	---	---	---
21	17	18	+1	T86-S49	---	---	---	49	8	1740
22	17	12	-5	T84-S49	---	---	---	245	40	1780
23	17	8	-9	T79-S48	---	---	---	432	81	1861
24	17	21	+4	T76-S44	304	76	2300			
	408	399		---			2300			1861

Conclusions on table 1

A comparison of columns 2 and 3 demonstrates the balancing requirement arising even if customer demand is constant. In this case total production from the RES-E plant (399 MWh) is within 98% of customer demand. However the production and demand are in balance for 1 hour or 4% of the time. In this case the retail supplier has purchased 399 MWh at €22 743 (if he has bought the electricity at € 57/MWh) and incurred an additional cost attributable to the intermittent nature of the wind-power of € 4 161 (€ 2 300 + € 1 861). This represents a net cost of 18.23% above the budgeted costs if the technology was dispatchable.

Tables 2 and 3

Table 1 demonstrates the impact where the customer demand is constant. However this is an unlikely scenario. The more likely scenario is that both production and demand will vary. This variation is examined in tables 2 and 3, which use data for February and June to test any significant seasonal variation. Table no 2 provides the comparable data for February and Table no.3 provides comparable data for June based on data from another new entrant retail supplier.

Table 2

1	2	3	4	5	6	7	8	9	10	11	12
Hour	Customer Demand MWh	Plant Output MWh	Excess + / Deficit - MWh	Top-up price €	Spill price €	Top-up Cost €	Net top-up cost €	Net Top-up cost agg €	Spill Sales €	Net Spill Cost €	Net spill Cost Agg €
1	35	57	23	63	30	0	0	0	669	615	615
2	32	59	27	58	30	0	0	0	799	735	1350
3	30	56	26	57	30	0	0	0	776	713	2063
4	29	57	28	56	30	0	0	0	838	770	2833
5	28	55	26	55	30	0	0	0	779	716	3550
6	28	41	13	54	30	0	0	0	382	351	3901
7	31	46	14	57	30	0	0	0	428	393	4294
8	40	32	-8	62	30	499	44	44	0	0	4294
9	52	45	-7	77	30	568	150	193	0	0	4294
10	70	50	-20	80	42	1595	460	654	0	0	4294
11	75	37	-38	81	42	3092	922	1576	0	0	4294
12	76	57	-19	81	42	1510	443	2019	0	0	4294
13	76	58	-18	82	50	1501	459	2478	0	0	4294
14	71	61	-9	80	42	737	211	2689	0	0	4294
15	72	46	-26	80	55	2101	597	3286	0	0	4294
16	72	59	-13	80	42	1048	305	3591	0	0	4294
17	68	39	-30	82	42	2426	733	4325	0	0	4294
18	60	51	-10	185	50	1802	1246	5571	0	0	4294
19	48	56	8	185	58	0	0	5571	448	-10	4284
20	43	39	-4	76	51	341	86	5657	0	0	4284
21	40	53	13	74	42	0	0	5657	552	203	4486
22	35	48	13	72	42	0	0	5657	535	197	4683
23	32	52	20	66	36	0	0	5657	729	435	5118
24	39	30	-9	67	36	571	82	5739	0	0	5118
	1183	1183						5739			5118

Conclusions on table 2

In this instance the output is scaled to customer demand in a 24 hour period on the 15th February. A comparison of columns 2 and 3 demonstrates the balancing requirement arising where customer demand and supply both vary and the supplier, as part of the support programme, is required to purchase all the output. In this case, the retail supplier has purchased 1183 MWh at € 67 431 (if he has bought the electricity at € 57/MWh) and incurred an additional cost attributable to the intermittent nature of the wind-power of € 10 857 (€ 5 739 + € 5 118). This represents a net cost of 16% above the budgeted costs if the technology was dispatchable.

Table 3

1	2	3	4	5	6	7	8	9	10	11	12
Hour	Customer Demand MWh	Plant Output MWh	Excess + / Deficit - MWh	TU €	Spill €	TU Cost €	Net Tu over budget €	Net TU Agg €	Spill Sales €	Net Spill Cost €	Net Spill Cost Agg €
1	1,63	0,00	-1,63	59,08	37,43	96,39	3,39	3,39	0,00	0,00	0,00
2	1,44	0,00	-1,44	54,73	30,62	78,70	-3,26	0,13	0,00	0,00	0,00
3	1,33	0,00	-1,33	51,82	29,70	69,17	-6,91	-6,78	0,00	0,00	0,00
4	1,31	0,00	-1,31	50,91	29,70	66,71	-7,98	-14,76	0,00	0,00	0,00
5	1,29	0,00	-1,29	50,60	29,70	65,50	-8,28	-23,05	0,00	0,00	0,00
6	1,25	0,37	-0,88	50,72	29,70	44,58	-5,52	-28,57	0,00	0,00	0,00
7	1,38	1,75	0,37	52,35	31,35	0,00	0,00	-28,57	11,46	9,38	9,38
8	1,86	0,25	-1,61	60,47	44,74	97,48	5,59	-22,98	0,00	0,00	9,38
9	2,84	0,00	-2,84	74,85	63,33	212,84	50,76	27,78	0,00	0,00	9,38
10	3,23	0,00	-3,23	79,02	63,01	255,07	71,08	98,86	0,00	0,00	9,38
11	3,52	0,26	-3,25	79,52	63,01	258,56	73,22	172,09	0,00	0,00	9,38
12	3,62	1,59	-2,04	79,51	63,01	161,84	45,82	217,90	0,00	0,00	9,38
13	3,62	0,40	-3,23	80,37	63,01	259,21	75,37	293,28	0,00	0,00	9,38
14	3,33	1,06	-2,27	77,94	63,33	177,17	47,60	340,88	0,00	0,00	9,38
15	3,41	4,24	0,83	78,22	63,64	0,00	0,00	340,88	52,82	-5,51	3,87
16	3,39	4,10	0,71	78,84	63,33	0,00	0,00	340,88	45,05	-4,50	-0,63
17	3,25	3,31	0,06	79,75	63,33	0,00	0,00	340,88	3,89	-0,39	-1,02
18	2,85	5,03	2,18	80,26	63,33	0,00	0,00	340,88	138,13	-13,80	-14,82
19	2,28	8,21	5,93	80,55	59,58	0,00	0,00	340,88	353,35	-15,27	-30,09
20	1,96	6,36	4,39	76,14	50,06	0,00	0,00	340,88	219,78	30,47	0,38
21	1,79	5,30	3,51	72,65	37,11	0,00	0,00	340,88	130,12	69,74	70,12
22	1,59	2,38	0,80	71,72	37,11	0,00	0,00	340,88	29,55	15,84	85,95
23	1,56	3,57	2,01	67,68	37,11	0,00	0,00	340,88	74,63	40,00	125,96
24	1,42	6,99	5,57	64,83	31,52	0,00	0,00	340,88	175,61	142,01	267,96
	55,17	55,17						340,88			267,96

Conclusions on table 3

In this instance the output is scaled to customer demand in a 24 hour period on the 15th June. The customer demand is reduced from Table 2 and demonstrates that fluctuating levels remain. A comparison of columns 2 and 3 demonstrates again the balancing requirement arising where as part of the support programme the participating retail supplier is required to purchase all the output. In this case the retail supplier has purchased 55.17 MWh (€57/MWh) at €3145 and incurred an additional cost attributable to the intermittent nature of the wind-power of €609 (€341 + €268) This represents a net cost of 19% above the budgeted costs if the technology was dispatchable.