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Minister of Communication, Marine
and Natural Resources,
29 to 31 Adelaide Road,
Dublin 2.

Ref: 100 Others/103/Depcomm01
Date: 30.11.2006

Re: Response to Green Paper on Energy

Dear Sirs,

On behalf of the Irish Solar Energy Association, we submit an idea for consideration to privatise risk under the brand name

EXPRESS P.R.O.G.R.E.S.S

Expressly Privatise Risk for Owners Generation of Renewable Energy Sustainable Strategies

The current policy is to privatise risk but in an indirect and migratory manner which is excessively costly to customers because of the inherent dysfunctional planning methodology. This pattern of administration is set in law in Clause 9 (3)of the 1999 Electricity Regulations, where responsibility is designed to fall, between the Minister and the CER in all cases for the customer's reasonable requirements.

Please consider clarification of this Clause, as follows:

c) Case 1
For long term 5 to 30 year planning of renewable energy infrastructure it is the Minister's responsibility.

d) Case 2
For each customer it is proposed to expressly privatise the risk for security of supply, quality and storage of electricity.

e) Case 3
For short term 1 to 5 years it is the CER's responsibility to carry out and execute the Minister's strategy. The CER shall define a tariff for auto generation or other financial mechanism for the express privatisation of risk to provide an incentive to customers of all sizes to invest privately in distributed renewable energy generation.

Please find enclosed also a submission to the Dept of Environment for your information and what we referred to as plan B is simply re-branded here as Express Progress.

We also submit a challenge to 6 assumptions in the drafting of the green paper as follows

Assumption 1 : Electricity generation is considered solely as a wholesale operation- Why?

Assumption 2 : The 1999 electricity regulations consider that the electorate cannot tell the difference between delegation and abdication –Why?

Assumption 3 : Competitors shall enter the market to fossil fuel stations without a fuel variation clause – Why?

Assumption 4 : Uranium is a limited resource with a 6 to 30 year production potential, why is it assumed that nuclear power is more economical via an inter-connector?

Assumption 5 : Energy efficiency is assumed to be achievable by advertisement and not express financial incentives – why?

Assumption 6: It is noted that there is a co-ordinated PR campaign to influence the Irish Energy Policy regarding Nuclear Power through British based press, television and one has to ask why. Is it because they are worried that we shall consider an independent renewable strategy which could tilt UK public opinion against nuclear power?

Assumption 7 : It is assumed that our sovereignty is secure in a post peak world . –why?

Yours faithfully,

____

on behalf of ISEA

COPY

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Mr. Owen Ryan,
Principal,
Air Quality and Climate Change Section,
Department of Environment,
Heritage and Local Government,
Custom House,
Dublin 1.

Ref: 100Others/103/DeptofEnv
Date: 26.9.2006

Re: Kyoto Compliance

Dear Mr. Ryan,

Thank you for inviting the ISEA to contribute to the debate. Our submission " PLAN B " is enclosed for your information.

The Plan builds on our earlier submission branded the ABC plan and includes the capacity of auto generation above 100kw, wholesale renewable power, heating and conservation.

If you are interested in discussing this further, please let me know.

Yours sincerely,

Matt Barnes

On behalf of ISEA
c/o Matt Barnes, Director,
"Coolamber", Stocking Lane, Dublin 16.

Encl. Extract from Sunday Business Post dated 27.8.06

PLAN B

By : The Irish Solar Energy Association
For : The Department of the Environment

INTROUCTION

The purpose of the Plan B is to privatise electricity security of supply and storage by financing of auto generation of renewable electricity and its distributed storage by an Auto-generation tariff. It is a simple 20 year plan however it is inconvenient since it requires a new inventory of agreements between the Department of Communication Marine and Natural Resources, the CER and the ESB and an unprecedented industrial infrastructure.

THE PRINCIPLE : Privatise electricity security

Electricity is the main cog in the energy infrastructure and as such any CO^2 strategy that does not reform this structure is not a results orientated game-plan. Renewable Electricity generation is the only secure option since over reliance on international connectors ensure a loss of political sovereignty in a post peak oil economy.

THE FINANCIAL MECHANISM : AUTO GENERATION RATE

The Public Electricity Supply would pay the customer for every kwh generated by auto-generation renewable energy at a rate per KWH that ensures a minimum of 50% industrial growth rate in the sector for 20 years.

THE COST

It is estimated that this would add 5% annual increase to the cost of electricity for the first 20 years and then the cost would reduce at a rate of 5% per annum for the next 20 years after 2026.

THE CO^2 RESULT

The results are derived from a calculation of the market dynamics between Electricity, Heating and Conservation. The detailed calculations for under 100kw capacity are enclosed in the appendices. The graphic pie charts summarises the projected results at 5 year intervals for time line clarity.

THE BARRIER TO BE REMOVED BY THE GOVERNMENT

The Electricity Regulations of 1999 has a clause 9(3) which needs to be reviewed since it allows the responsibility for energy security to fall between the two offices of the CER and DCMNR. The drafting of this clause suggests that neither office want the responsibility.

DEFINITIONS

" Auto-generation rate" . A tariff to be paid to customers who generate up to their average yearly consumption and provide a minimum of publicly controllable battery storage . The total cost of this tariff would be added to the public electricity bill.

"Privatisation of Electricity security" This transfers to the individual customer's a responsibility to plan, finance, install hardware and management systems.

" CO^2 result" This would need to be calculated by the Department of Environment.

Cork firms go green to cut energy costs

By Nicola Cooke

Several large pharmaceutical companies in Cork are considering building wind turbines and solar panels in a bid to cut their soaring energy costs.

Some of the companies have already approached Cork County Council to see if the renewable energy devices can be built next to their multi-million euro businesses.

Pfizer, Janssen-Cilag and other Johnson & Johnson companies are looking to other sources of energy because of the rising price of oil, electricity and gas.

A spokesman for the planning division in Cork County Council said it would be discussing the issue as part of the review of the county development plan in four months.

"The big multinationals in Cork Harbour have seen a huge increase in their energy costs in the last while, and it has been suggested to us by some of the companies themselves, that they add wind turbines or solar panels to their company bases," he said.

"This would emit cheaper, cleaner green energy and I think new forms of energy and bio-energy will be coming on line sooner than a lot of people think. We want to be on top on this and plan for the future, sooner rather than later."

Pfizer said in a statement: "There are a number of studies ongoing in our plants investigating the potential use of wind turbine for . . . applications such as lighting. In addition, there is an active study into the use of bio-fuel-boilers for the generation of hot water.

"With rising fuel costs, the opening of electricity and gas markets and the implementation of new climate-change policies, there has never been a greater imperative for organisations to manage energy wisely. Pfizer believes that the adoption of strategic management practices can result in significant savings . . . and reduce our overall impact on the environment."

It is believed that Janssen and DePuy, both Johnson & Johnson companies, are also examining the possibility of using wind or solar energy. Company representatives were not available for comment.

Wind energy is the fastest-growing energy sector and is used by large and small companies for a variety of energy sources. Demand for the use of wind turbines to produce energy is highest among Japanese, US and European companies.

Ireland has some of the best wind energy conditions in Europe; about 5 per cent of the country's energy is generated by wind. The government's target is to increase this to 13.2 per cent by 2010.

The Department of Environment offers grants of between €1,100 and €6,500 under a 'green homes scheme' for the installation of renewable technologies, including wood-pellet stoves and boilers, solar panels and geothermal heat pumps.

Court orders Guerin to pay €38,000 to ad firm liquidator

By Ian Kehoe

Jimmy Guerin

Former Sunday Independent journalist Jimmy Guerin has been ordered by the High Court to hand over €38,000 to the liquidator of Doherty Advertising, the collapsed advertising agency.

The decision comes following a High Court action by Guerin, brother of murdered journalist Veronica Guerin, against the firm's liquidator, Dublin accountant Jim Stafford, in relation to a previously agreed settlement.

Guerin, a printer by profession, was paid €70,000 by Doherty during the three months leading up to the company's collapse in 2003.

After negotiations between the two sides in July 2004, Guerin reached a settlement with Stafford whereby he would repay €38,000 over five years.

His settlement was rendered void by the settlement of Beggs. McGovern said he found this explanation "unconvincing".

Guerin petitioned the court to have the liquidator removed, and he also sought an order de- . . . the liquidator to be in

. . . to revamp 'Dickensian' facilities

Michael Colgan, director, Gate Theatre: the theatre will undergo a €6.5 million upgrade TONY O'SHEA

By Niamh Connolly
Political Reporter

fundraised across the corporate sector and had worked closely with the Rotunda Hospital on its specifications. The extension was designed by architects Scott, Tallon, Walker.

The Gate Theatre's production of Faith Healer was celebrated as a success on Broadway and was nominated for four Tony Awards in New York earlier this year.

. . . programme, to include

News Bulletin

Conservatives' large AIB loan

AIB's British arm has emerged as the biggest new lender to the British Conservative Party, according to figures published last week. The Electoral Commission figures showed that AIB gave a loan of stg£2.8 million (€4.1 million) to the party earlier this year, the largest loan disclosed in the figures.

All the British parties will be required to declare loans from September 11 under the Electoral Administration Act, following a period of controversy over the funding of British politics. Labour has come under fire due to loans from millionaire businesspeople. However, the commission criticised the Conservatives last week for not giving details of all loans from businesspeople.

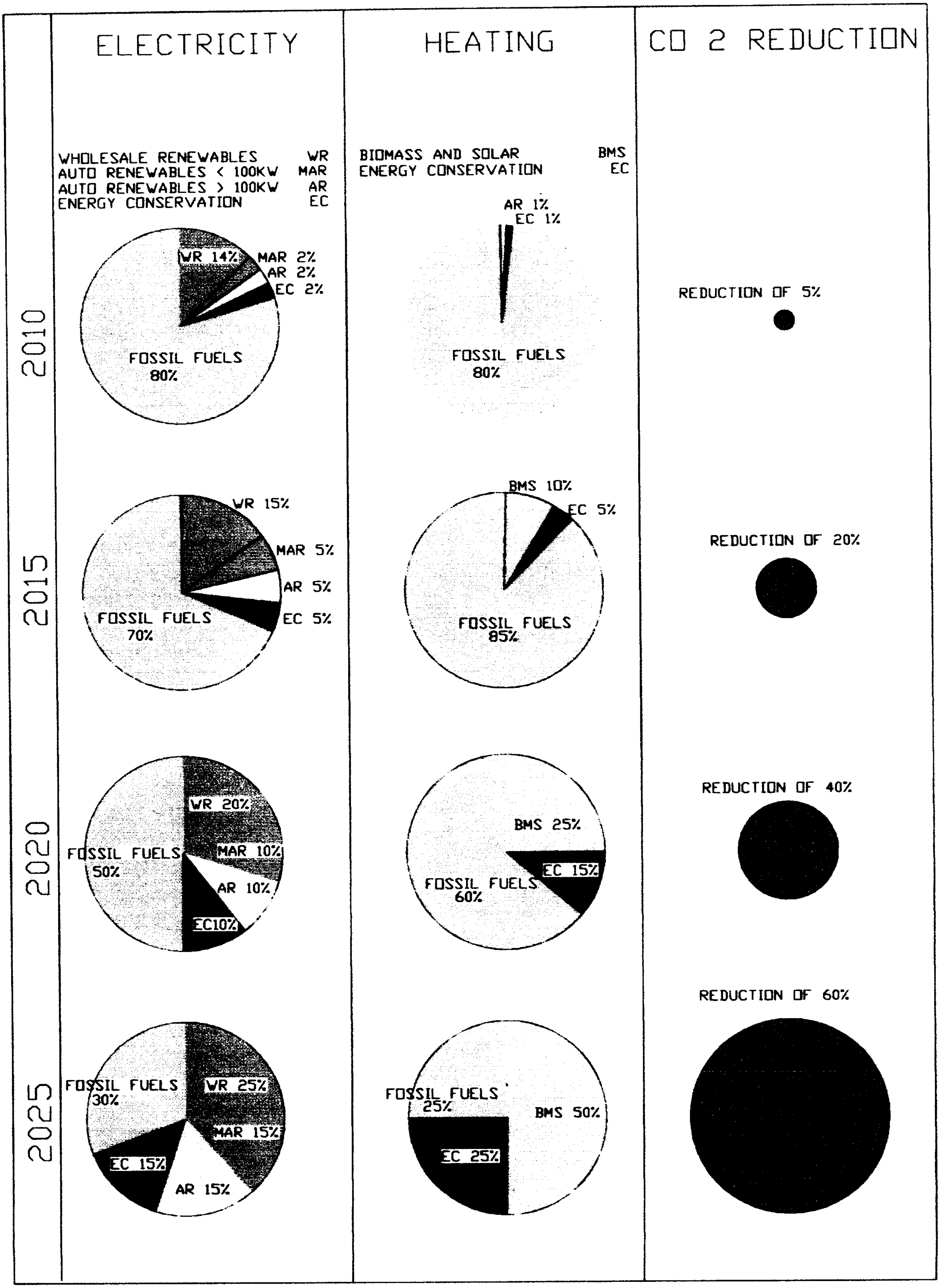
Geldof for business conference

Bob Geldof will be the keynote speaker at this year's Irish Family Business Conference in UCC on September 29. Geldof will speak about leadership. The Minister for Enterprise, Trade and Employment, Micheál Martin, will open the conference, which will focus on avoiding conflict in family firms through good governance. Other speakers will include Senator Fergal Quinn and Liam Griffin, managing director of the Griffin hotel group.

Hannigan hit with judgment

An accountant and former resident of Ballyknockan near Blessington in Co Wicklow, Hugh Hannigan, has had a judgment of more than €622,000 registered against him by the Collector General. The judgment was registered on August 17. Hannigan now lives in Panton Hill in Victoria, Australia, according to the judgment.

A judgment of almost €89,000 has been registered against James Bowen, a financial adviser from Blackrock in Co Dublin. The judgment was registered in the High Court, following a petition by Robert Tracey, also of Blackrock.


ELECTRICITY
HEATING
CO 2 REDUCTION
WHOLESALE RENEWABLES WR
AUTO RENEWABLES < 100KW MAR
AUTO RENEWABLES > 100KW AR
ENERGY CONSERVATION EC
BIOMASS AND SOLAR BMS
ENERGY CONSERVATION EC
2010
WR 14%
MAR 2%
AR 2%
EC 2%
FOSSIL FUELS 80%
AR 1%
EC 1%
FOSSIL FUELS 80%
REDUCTION OF 5%
2015
WR 15%
MAR 5%
AR 5%
EC 5%
FOSSIL FUELS 70%
BMS 10%
EC 5%
FOSSIL FUELS 85%
REDUCTION OF 20%
2020
WR 20%
MAR 10%
AR 10%
EC10%
FOSSIL FUELS 50%
BMS 25%
EC 15%
FOSSIL FUELS 60%
REDUCTION OF 40%
2025
FOSSIL FUELS 30%
WR 25%
MAR 15%
AR 15%
EC 15%
FOSSIL FUELS 25%
BMS 50%
EC 25%
REDUCTION OF 60%

Promoting Solar Energy
In Ireland

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Proposed A-B-C MODEL for the distributed Generation and storage of electricity.

Proposed to the CER

By
Irish Solar Energy Association

Date: 2.2.2005
Electronic ref : discussion.2.doc
Capacity appendix 1.doc
Storage appendix 2 .doc
Cost appendix 3 .doc
Estimates appendix 4.doc

CONTENTS

Executive Summary

This paper is to highlight the potential of micro electricity generation and distributed storage. We propose an interrelated model – the A-B-C model for customers who would require under 100 kW generating capacity. This would allow for approximately 90% of electricity customers to plan their energy costs in a reasoned and predictable manner. We estimate that this will provide for approximately 40% of the existing yearly electricity demand of approx 23,000 Gwh, should there be a 60% take up of the model. We estimate it would cost an additional 1% to 10% on top of the PES (public electricity supply) cost over 13 years depending on the price of oil and related fossil fuels.

We submit that the COMMISSION FOR ENERGY REGULATION (CER) is required to balance the ***reasonable demands*** of customers in a rapidly changing environment of post oil peak economics. It is estimated by the ISEA, through averaging 20 studies over the last 22 years that the ultimate recoverable resource of oil is 1.86 trillion barrels. The world has used half of this amount so the world economy is currently sitting on top of the bell curve of oil supply (post peak) with gas production reaching peak in 5 years time.

The recent consideration of the FCV (fuel cost variation) gave notice to the market that centralised generators need to balance the risk of fuel cost variations . It is proposed by the ISEA to recognise this reality however it also recognises that the FCV was an indicator of a more significant problem which is that of security of electricity supply. The A-B-C Model plans to spread the risk between the customer and supplier in a reasoned manner.

We submit that the following example of the ABC model would be understandable to customers without a specific expertise in electricity generation or renewable energy thereby promoting a take up rate of approximately 60 % of eligible customers.

We call this the A-B-C model:

Plan A:	Centralised grid power
Plan B:	Solar Photovoltaic panels; Solar thermal panels; biomass Combined Heat and Power (CHP); small scale wind power.
Plan C:	Storage in batteries integrated into appliances coupled with distributed storage batteries. The target capacity is 10 Gwh.

It is submitted that without appropriate information about Plan A, it is not possible for individual customers to reasonably size Plan B or plan C for their purposes. The costs of Plan B and C have traditionally been declared uneconomic by the CER, however should a customer have reason to anticipate or experience uncontrollable costs or a power failure that promises to be a precursor to future power failures then the economic calculation changes immediately. The "reasonable" question for the customer is how fast and how cheaply can he gather renewable energy for his own needs to compensate for unpredictable performance of Plan A.

It is submitted that the CER could recognise this economic argument prior to customers experiencing the pain of loss through power failure. It is further submitted that a ten year programme of decreasing feed-in tariffs are required to build capacity at a rate that is likely to compensate for loss of performance of Plan A. The advantage of the ABC model to the central grid generators and suppliers is three fold :

- Capital costs are redistributed to the private sector and liabilities for failure of the grid are reduced, should early action be initiated.

- The load on the system of central generation is reduced in line with the potential supply of fossil fuel allowing for a focus on larger industrial and commercial customers

- The central grid can reinforce power quality by the distributed storage which can be controlled by a remote electronic responsive load devise.

Introduction

The ISEA recently submitted a discussion document to CER on the proposal from the ESB for a fuel cost variation (FCV) mechanism. Preparing this submission gave us an insight into the need to spread risk in a balanced and reasoned manner that focuses on the every day needs of approximately 90% of the electricity customers. This figure of 90% of customers who require under 100kW of generating capacity is a speculative figure due to lack of concise customer information.

This paper is produced to highlight the potential of micro generation and distributed storage. We propose an interrelated model – the A-B-C model. This will allow the majority of electricity customers to plan their energy costs (in the era of post peak oil production) in a manner which they can sell to their bank. We estimate that this will provide for approximately 40% of the existing yearly electricity demand, should there be a 60% uptake by the targeted customers who require less than 100 kW generating capacity.

Interaction of Energy Sectors

There are three main energy sectors:
electrical;
heating;
transport.

Of these three, electricity generation is the only policy area controlled by government through the CER. The electricity market influences the heating market for storage heating, hot water heating and to a growing extent the heat pump market and air conditioning market. The direct heating market is controlled to a lesser extent by CER by its control of the gas market. The transport sector is influenced in a minor manner through Luas and Dart, however electric cars could also have an impact on policy in the future.

CER policy for electricity generation therefore has a domino effect on distributed generation and related sectors such as heating. It is therefore strategically impossible for renewable energy policy to progress in an effective manner since there is a current policy vacuum in the area of micro generation under 100 kW. There are three suspected reasons why this vacuum exists. One being that pre peak economics calculated all costs in competition with an oil supply, which was always in the comfortable position of exceeding the demand. The second is that micro generation has been perceived by the policy makers as an area of uncontrollable multiplicity, in comparison to central generation.
The third reason has been a concentration of policy on large scale renewable sources such as wind since they are closer in organisational terms to centralised fossil fuel generation.

It is submitted that the CER can either wait for the numerical logic of oil supply and demand to change or more reasonably, they can anticipate the change and act accordingly. We argue further that should the latter option be embraced by the CER then what was considered previously as uncontrollable multiplicity, is seen an urgent engineering necessity, to balance a delicate system engineered on pre peak logic.

The A-B-C Model

The basis upon which reasonable demands can be discussed has to include realistic options to fossil fuel or nuclear power. We submit that the following example of a model would be understandable to customers without a specific expertise in electricity generation or renewable energy. We call this the A-B-C model:

Plan A:	Centralised grid power
Plan B:	Solar Photovoltaic panels; Solar thermal panels; biomass; Combined Heat and Power (CHP); and small scale wind power.
Plan C:	Storage in batteries integrated into appliances coupled with distributed storage batteries. Batteries have a dual function. They provide protection for customers in a blackout and a load balancing device for the grid operator.

The A-B-C model is designed to cater for all categories of customers:

industrial;
commercial;
retail;
residential;
agricultural;
institutional.

Plan A

We submit that Plan A will rapidly become uncompetitive in price and unpredictable in performance in a post peak scenario and customers shall need a Plan B and a Plan C to sustain their businesses, social projects and residential requirements.

The existing system of centralised power generation is seeking to cope with the first stages of oil supply price uncertainty, as evidenced by the FCV proposal. The next stage is likely to be one of uncertainty due to security of supply of both oil and gas. The timing of this second stage is unpredictable due to increased demand for oil from China and the uncertain political climate in Russia regarding Siberian Gas. This current model of centralisation cannot function without a guaranteed supply of fossil fuel or the introduction of nuclear energy generation.

The CER, therefore, could consider a distributed system thus spreading the risk over the entire customer base in a reasoned and balanced manner by encouraging and facilitating Plan B and Plan C within a time frame that will allow the customer to compensate for the uncertain future performance of Plan A. The future costs of plan A are estimated under appendix 3 by using a best and worst case scenario of fossil fuel costs.

Plan B

The value of distributed generation increases with the likelihood or experience of a Plan A power failure. The costs to a business of a power failure are multi dimensional as follows:

- Loss of use of capital intensive plant
- Labour downtime
- Delayed cash flow due to late order delivery
- Lack of budgetary control
- Loss of confidence in planned expansion
- Loss of share value
- Diversion of management time from planned operations to management of unscheduled confusion.
- Loss of market share
- Costs of hiring Specialists to advice and research solutions to failures of Plan A.

These costs could become threatening to the commercial health of a business (and to the country), which would in turn lead to reduced tax income for the government and will make it difficult to attract new international business.

The costs and value involved in distributed generation therefore are not comparable directly to the price per kWh of centralised power supply because the additional costs of a failure in Plan A are significant and are different for each customer.

The costs of distributed generation are variable, however they can be simplified and reduced by appropriate planning of infrastructure, energy management and well informed assessment of the risks of Plan A.

It is submitted that without appropriate information about Plan A, it is not possible for individual customers to reasonably size Plan B for their purposes. Each technology in plan B has different cost profiles and performance profiles . It is advised that the customer balances the seasonal advantages of all the technologies with their site characteristics to obtain optimum security of energy supply. The technologies of photovoltaic panels, solar thermal panels, and small scale wind power have all 30 year track records with micro biomass CHP a year or two away from product launches.

It is further submitted that Ireland has a unique low density distribution of property which is advantageous to ground based solar installations independently of the main building or facility, with irradiation levels equivalent to northern Europe. Our growing environment for biomass and the wind speeds are the best in Europe. The target is ambitious at 40% of current demand and does require an integrated government policy to remove all barriers and trip wires to its progress.

The diversified small scale of the distributed generation reduces the planning permission roadblocks to the expansion of the capacity and the energy is collected and used on site reducing transmission losses. Plan B also allows for the customer to build their own capacity gradually, while using the existing grid infrastructure for mutual support between the central grid and the customer.

The target capacity over a ten year period is 9283 Gwh . The total demand of 23,000 Kwh is based on data from 2002 and since the demand growth is uncertain in the future it has been assumed that this figure shall remain relatively stable over a thirteen year period. This assumption is made since the rising cost of electricity induces a more efficient management of power and that the central grid shall probably reduce the imports of fossil fuels in line available supplies. There is an assumption also that the large scale renewable power sources such as wind wave and tidal power shall have a greater penetration of the market in the region of 20%.

Plan C

This storage would have two potential purposes. The first would be protection against power failures and the second would provide a balancing mechanism for grid power quality controlled by an electronic responsive load devise.

The local benefit to individuals is obvious. In the residential market a growing number of appliances have built in storage batteries and in the commercial market there are a wide range of UPS systems. Three-hour battery backup lights are normal for emergency lighting and this system could be readily encouraged for normal lighting. The central benefit of Plan C is only evident when there is substantial distributed capacity available. The technology of responsive load devices is at pre-commercial stage and its execution can be expedited with policy direction. It is assumed in Appendix 2 that the average household would invest €1,000 for 6 kW storage and the average commercial business would spend a minimum of €30,000 for 180 kWh. The target capacity for Plan C is suggested as 10 Gwh.

The Capacity potential of micro generation under 100kW

The potential capacity is significant and the ISEA submit the following figures from appendix 1 and 2 as an impetus to a more detailed study by the CER. It includes technologies not represented currently by our association and other associations such as wind or biomass have not been encouraged to research the economic potential of micro generation. It is reasonable to include these estimates since they fall within the same policy area of under 100kW for consideration by the CER. The assumptions made and the detailed calculations are presented in a manner that invites rigorous examination , which we would hope would be the appropriate response to this discussion paper in the context of our whole argument.

Summary of capacity of small scale micro generation = 40% of yearly electricity demand of 23,000Gwh.

The potential for distributed storage is estimated at 10 GWh.

These figures could of course be expanded if the commercial environment is created by the CER through further adjustment of the feed in tariff. The distributed generation industry would then be challenged to respond in an equally imaginative and ambitious manner.

Costs of the A-B-C model to the public

The proposed principle is to reasonably distribute the costs in a manner that balances risks, responsibilities and benefits in a manner calculated to maintain maximum equilibrium in competition with projected fossil fuel costs and security of supply.

The main variable involved with implementing this principle is that contracting fuel supply has no historical precedent for numerical logic. So caution would advise that the worst case scenario be acknowledged and agreed between parties. Should the worst case scenario not materialise in the predicted time frame then security shall have been purchased at a premium. This premium is calculated in appendix 3 as 4.8% of the PES. Most pragmatic businesses and home owners would accept this premium cost since the value would no doubt exceed the cost in the next financial period since the fuel for renewable energy is free (with the exception of biomass) and the economic cohesion of their organisation would therefore have a competitive position in relation to those customers who rely totally on the central grid.

It is submitted that the risks of taking no action, for the CER (representing government) , the ESB and property owners are all equally severe. The responsibility for action is therefore reasonably well balanced among all three parties, with the CER briefed under the 1997 regulations to balance costs to achieve the function of energy security for the maximum number of customers in a timely fashion.

In appendix 3 the cost to the PES of a feed in tariff of 50 cent decreasing over a 13 year period in increments of 5%. The net additional cost on a customers bill would average an extra 1% to 5% (10% would be the maximum) of the PES unit cost depending on fossil fuel costs over that period. For technologies such as solar thermal it is proposed that a credit be applied to the ESB bills in the same numeric logic as the other micro generators, on the basis that it displaces substantial central generating capacity.

Summary of the proposed A-B-C model

- The ABC model can distribute risk in a reasonable manner by encouraging 90% of customers to plan their own Plan B and Plan C ahead of experiencing loss through uncontrollable costs or power failure of plan A. The ABC model targets a 60% take up of the scheme.
- The pending reality of contracting fossil fuel supplies has no historic precedent for calculating the numerical logic, therefore caution would advise that the worst case scenario is acknowledged and agreed between the parties. The cost to the customer of accepting the ABC Model would represent an average 1% to 5% (Max 10%) extra on their ESB bill. They also get a contract to purchase their power at 50 cent per Kwh for the first year and reducing by 5% per annum over a 13 year period.
- The electricity storage target of 10 Gwh is also achievable under the scheme. This would have a dual benefit of customer protection and centralised balancing of power quality.

Conclusion

The value of distributed generation and electricity storage far exceeds the price per kWh of currently generated electricity under Plan A and it is argued that customers should not be subject to education through pain of loss but rather by reasoned argument and good planning.

It is further argued that the CER is mandated to co-ordinate and expand distributed generation by addressing reasonable demands by customers. There is no evidence of this reasoned discourse at present on a micro scale, which on closer examination of 90% of customers it reveals an opportunity to plan for substitution of up to 40% of the grid on a whole year basis.

The additional potential of distributed storage of the order of 10 GWh would contribute to grid stability and greater penetration of other renewable systems operating on a larger scale.

The industrial implications of this scale of substantial distributed generation are possibly of interest to all parties however there is no evidence that appropriate strategic industrial thinking is active at the appropriate levels. It is submitted that the CER are the appropriate body to advise the Minister in this regard, however, it is suspected they can only carry out this function effectively with government support and acknowledgment of the nature of the problem. The recent withdrawal of the carbon tax indicates a possible adjustment of the pending government priorities which encourages the view that a concerted effort is in train to find simple solutions at reasonable cost.

The proposed FCV represented not only a confused attempt to spread the risk of oil price uncertainty between the ESB and customer, but more significantly it represented a mindset of centralised thinking which demonstrates an over reliance on the current model of Plan A. It is submitted finally that effective technological thinking on a micro scale does have the potential to be replicated in a manner that has a growing impact on the macro balance if the majority of customers needs are accommodated in a reasonable manner.

References *CER discussion document on the proposed Fuel Cost Variation Mechanism*
Irish Solar Energy Society Submission the CER on the FCV 23.8.04
The Coming Oil Crisis by C.J. Campbell

Appendices
1. *Capacity of micro generation*
2. *Capacity of distributed storage*
3. *Cost of the ABC Model.*

1.2.05

Appendix 1 Rev.A

Capacity potential for micro generation of solar power generation by photovoltaic and thermal panels with small scale wind and biomass CHP

Property type	Property stock	Proportion suitable for Pv panels	Total area of PV	Annual output	Total area of Thermal collectors	Annual output as grid substitute power	Small scale wind power	Small Scale biomass CHP
Existing residential future 10yr residential	1,300,000 500,000	500,000 250,000	at 24m2 per unit for 750,000 dwellings is 18 million m2	with solar irradiation levels at 960kwh/m2/yr producing 108kwh/m2/yr 18m x 108 = 1944 Gw	for an average of 4 m2 per dwelling for 1million dwellings 1m x 4m2 = 4 million m2	For irish solar irradiation of 960 kwh/m2/yr this would produce approx 350kw/yr/m2 4m x 350 = 1750 Gwh	for 50,000 dwellings with a 5 kw generator at 25% load = 5 x .25 x 8760 x 50,000=547Gw	for 50,000 dwellings with a 5 kw biomass mini CHP plant at 8 hrs per day 50,000 x 5 x 2920hrs= 730 Gwh
Industrial	unknown	10,000	at 500m2 per unit 10,000 industrial units approx =5million m2	5m x 108 = 540 Gw	for an average of 5m2 per unit for 10,000 = 50,000 m2	50,000 x 350 = 17 Gw	for 1000 rural based industries with a 50 Kw generator at 25% 1000 x50 x .25 x8760 =108 Gw	for 5000 industries with 50 kw biomass CHP at 8 hrs per day 5000 x 50 x 2920 = 730 Gwh
commercial	unknown	10,000	at 50m2 per unit 10,000 commercial approx = 500,000m2	0.5m x 108 = 54 Gw	For an average of 5m2 per unit for 10,000 = 50,000 m2	50,000 x 35 = 17 Gw	it is considered that commercial units are not suitable for wind	for 5000 properties with 50 kw biomass CHP at 8 hrs per day 5000 x 50 x 2920 = 730 Gwh
Farming	unknown	10,000	at 50m2 per unit approx = 500,000m2	0.5 m x 108 = 54 Gw			10,000 farms with 10 Kw gen 10,000 x10 x.25 x8760 = 208Gw	10,000 farms with 10 kw CHP 10,000 x 50 x 2950 = 1460 Gwh
Institutional	unknown	2,000	at 50m2 per unit approx = 100,000 m2 30.1 million m2	0.1m x 108 = 10 Gw	at an average of 25m2 per unit for 2000 = 50,000m2	50,000 x 350 = 17 Gw	It is considered that institutions are urban based and are not suitable for wind power.	2000 units with 50 Kw CHP 2000 x 50 x 2950 = 292 kwh
Totals			30.1 million m2	2602 Gwh	3.15 million m2	1801 Gwh	863 Gw	3942 Gw

Small scale hydro. Total Gwh from survey of small hydro potential from each county detailed on the web site of the Irish Hydropower Association of Ireland totals 75 Gwh

Total accumulated distribution of micro generation = : 2602+1801+863+3942+75 = **9283**

Total for combined small scale power of PV, S Solar Thermal, small scale wind and biomass CHP and hydropower = 9283 Gwh per year

40% of current Irish demand of 23,000 kwh per year.

Property Type	Assumptions	
Residential	46% of dwellings in the Republic are detached	644000
	27% of dwellings in the republic are semi detached	378000
	73% of existing prope rties = 1.4 million = 1,0 million approx	1000000
	25% of these properties would be site suitable for back garden solar installations	250000
	25% of the remaining stock would be site suitable for roof mounted units	250000
	50% of new dwellings over a ten year period would suitable for solar installations	= 250000
	total number of dwellings suitable for installations of 24m2 of PV panels	750000

Calculations for above capacity potential

Birr records of solar irradiation = 960 Kwh/m2/yr
average trade effeciency of Pv = 131 W/m2
Average system losses of PV from inverters, cabling, overheating, overshadowing, orientation, angle = 14%
Average output for PV in Ireland = 960 x 131 x 0.86 = 108 153 w/m2 = 108 kWh/m2/yr
Output from 24 million m2 = 1 108 x 24 ,000,000 = 2592 ,000,000 kW/m2/yr = 2592 Gwh/ yr
Average output for thermal solar panels in Ireland = 350 kw/m2 / yr
Output from 3 million m2 of thermal collectors 350x4,000,000 = 1750 Gwh/yr

Appendix 1

CO_2 CALCULATIONS FOR THE ABC INSTRUMENT

	Solar PV	Solar Thermal	Wind	Biomass CHP Electrical	Biomass CHP Heat
Electrical Output in 2012	468 gWh	(Offset against electricity saved)	155 gWh	709 gWh	
Heat Output in 2012		324 gWh			1,620 gWh
Conversion Factor	2.5	2.5	2.5	2.5	1.25
Oil saved in gWh	1,170	810	387	1,772	2,025
Conversion factor to TOE	85.7	85.7	85.7	85.7	85.7
TOE	100,269	69,417	33,165	151,860	173,542
CO_2 Conversion Factor	2.9	2.9	2.9	2.9	2.9
Total CO_2 saved	290,780 tonne	201,309 tonne	96,178 tonne	440,394 tonne	503,271 tonne

TOTAL = 1,531,932 = 1.5 m TONNES OF CO_2 IN 2012

8.3 m TONNES OF CO_2 IN 2017

20.9.04

APPENDIX 2 : Capacity potential for distributed battery storage (plan c)

Assumptions

1 It is estimated that 6 Kwh storage would cost approx 1000 euro and this would be appropriate per house
2 It is estimated that 180 Kwh storage for industrial and commercial would cost approx 30,000 Euro

Property type	property stock	proportion suitable for distributed storage	Kwh storage per property	Total storage capacity
residential	1.8 million	1 million	6 Kwh	6 Gwh
industrial	uncalculated	10,000	180 Kwh	1.8Gwh
farming	uncalculated	10,000	20 kwh	0.2 Gwh
commercial	uncalculated	10,000	180 Kwh	1.8 Gwh
institutional	uncalculated	2000	100 kwh	0.2 Gwh

Total potential for distributed storage of electrical power **10 Gwh**

20.9.04

Appendix 3

Projected cost of Feed in tariffs for building capacity in distributed generation — ABC model

Assumptions
1. The demand is assumed as level for the next 10 years due to more efficient use and price induced energy saving management
2. The price of Gas shall shadow oil price increase closely followed by coal with increased transport costs and demand
3. The industrial infrastructure required for the distributed engineering to deliver these targets is prioritised by Government in all policy areas
4. The feed in tariff would be offered as a credit to customers who installed solar thermal panels to equate their contribution to the 3 other sources
5. The ABC model would also apply to small hydro and to anerobic digestion fe(Their contribution was not calculated through lack of information.

Best case scenario with an annual increase in oil prices of 15% with a projected PES yearly increase of 6% averaged over 13 years

Year	capacity target Gwh Growth at 50% /yr	feed in tarrif 5% reduction /yr *cents/ kWh*	Projected oil price USD per barrel *15% increase /yr*	projected 6% electricity unit price *cent per kW h*	% increase in PES	Total PES for 23,000 Gwh *Million Euro*	Additional cost of *ABC /kwh*	Additional cost of ABC Model to PES prices *Million euro*	Percentage increase in PES to fund ABC model %
2005	100	50	49	12.51	6%	2877	37.49cent	37.49	1.30%
2006	150	47.5	56	13.26	6%	3020	34.24	51.36	1.70%
2007	225	45.12	64	14.05	6%	3172	31.07	69.9	2.22%
2008	337	42.86	74	14.89	6%	3328	27.97	94.25	2.83%
2009	506	40.72	85	15.78	6%	3496	24.94	126.19	3.61%
2010	759	38.68	98	16.73	6%	3670	21.95	166.6	4.54%
2011	1139	36.75	112	17.73	6%	3855	19.02	216.63	5.62%
2012	1708	34.91	129	18.76	6%	4045	16.15	275.84	6.82%
2013	2561	33.16	149	19.88	6%	4248	13.28	340.11	8.01%
2014	3842	31.51	171	21.07	6%	4846	10.44	401.11	8.28%
2015	5763	29.93	197	22.33	6%	5135	7.6	437.98	8.53%
2016	7492	28.43	226	23.67	6%	5444	4.76	356.62	6.55%
2017	9630	27.01	260	25.09	6%	5770	1.92	184.89	3.21%

Average 13 yr Total = 4.8%

Worst case scenario with an annual increase in oil prices of 35% for 8 years and 0% after 5 years with a projected PES yearly increase of 13% for 8 years and 3% for the last 5 years.

Year	capacity target Gwh Growth at 50% /yr		feed in tarrif 5% reduction /yr *cents/ kWh*	Projected oil price USD per barrel *35% increase per yr*		projected 13%/8yrs electricity unit price *cent per kW h*	% increase in PES	Total PES for 23,000 Gwh *Million Euro*	Additional cost of *ABC /kwh*	Additional cost of ABC Model to PES prices *Million euro*	Percentage increase in PES to fund ABC model %
2005	100		50	62		14.09	13%	3240	35.91cent	35.91	1.10%
2006	150		47.5	83		15.92	13%	3661	31.58 cent	47.37	1.29%
2007	225		45.12	112		18	13%	4140	27.12 cent	61.02	1.47%
2008	337		42.86	151		20.34	13%	4678	22.52cent	75.89	1.62%
2009	506		40.72	203		22.98	13%	5285	17.74cent	89.76	1.69%
2010	759		38.68	274		25.96	13%	5970	12.72cent	96.55	1.62%
2011	1139		36.75	357		29.33	13%	6745	7.42 cent	84.51	1.25%
2012	1708		34.91	482		33.14	13%	7622	1.77 cent	36.26	0.47%
2013	2561		33.16	482	0%	34	3%	7820	-0.84	0	0.00%
2014	3842		31.51	482	0%	35	3%	8050	-3.49	0	0.00%
2015	5763		29.93	482	0%	36	3%	8280	-6.07	0	0.00%
2016	7492	30%	28.43	482	0%	37	3%	8510	-8.57	0	0.00%
2017	9630	28%	27.01	482	0%	38	3%	8740	-10.99	0	0.00%

average 13 yr Total = 0.80%

APPENDIX 4

Published Estimates of Ultimate Recovery

(Ref. Coming Oil Crisis by C.J. Campbell)

Campbell	1997	-	1.8
Campbell	1995	-	1.75
Campbell	1994	-	1.65
(Script illegible)	1993	-	2.27
Laherrere	1993	-	1.8
Campbell	1993	-	1.65
Campbell	1992	-	1.65
(Script illegible)	1991	-	2.2
Campbell	1991	-	1.65
(Script illegible)	1989	-	2.0
Deutsche BP	1988	-	2.9
Keller	1987	-	1.7
(Script illegible)	1987	-	1.75
(Script illegible)	1984	-	1.7
(Script illegible)	1985	-	1.6
Martin	1984	-	1.62
(Script illegible)	1983	-	1.85
(Script illegible)	1983	-	1.7
(Script illegible)	1983	-	1.7
(Script illegible)	1982	-	2.4
			37.34

Average 37.34 ÷ 20 = 1.86 trillion barrels