



The Greens | European Free Alliance
in the European Parliament

Moving to **renewable energy sources** in an energy-efficient London

A report by **Jean Lambert**, Green MEP for London



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ABOUT THE AUTHOR

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AUTHOR'S NOTE

In October 2002, I co-hosted a conference on the theme **Moving to renewable energy sources in an energy efficient London** at the London Assembly. My co-host was Victor Anderson, Green Member of the Greater London Authority (GLA). The purpose of this conference was to give London energy stakeholders an opportunity to hear from experts about the dynamics of the European energy debate, developments in our sister European cities and in the UK. From this, we hoped to emphasise the necessity for swift and fundamental change, to explore the potential for renewable energy technologies in London and discuss the importance of energy efficiency.

This discussion took place in the context of the redrafting of London's Energy Strategy. The London Mayor should be commended for his intention to use the vision building influence of the London Assembly to shape London's energy future, setting targets for reducing its carbon dioxide (CO²) emissions and improving its access to renewable energy sources. However, the Greens in London share concerns that: not enough emphasis has been placed on reducing energy demand and tackling spiralling energy consumption; not enough effort has been made to address the underlying planning and regulatory framework that facilitates excessive energy use; the public consultation has not created a favourable environment for broad stakeholder engagement.

The absolute imperative underlying this report is that planning for sustainable development is no longer a nice-to-have. The Intergovernmental Panel on Climate Change (IPCC) predicts that global temperatures could rise by 1.4 to 5.8°C over the next century leaving environmental devastation in its wake. The United Nations Centre for Human Settlements, in its 1996 global report on human settlements, forecast that an additional 350,000 people would be living in London by 2015.

The Royal Commission on Environmental Protection in its Energy – the Changing Climate report stated that the stabilisation of CO² in the atmosphere would require the UK to cut its CO² emissions by 60% by 2050. Around half of the UK's assets most under threat by climate change lie within the Thames region. There are 750,000 London homes at risk from major storms. Flooding in London could cause around £20 billion damage, threatening London's future international commercial viability, which should give the City pause for

thought and cause for action. The Thames Gateway region, designated as one of the largest regeneration areas in Europe, is the home to over 1 million people. Rising floods would affect all of these households. The Thames Barrier last year required more than double the annual closure requirements that it was designed for (Eppel and Eyre 2002).

The purpose of this report is not to provide a list of specific technical responses to London's energy problems. Instead it attempts to take a holistic view towards the different range of solutions proposed at the conference, from education to planning regulation, and propose an action plan for next steps.

A wide range of stakeholders attended this conference, including energy specialists, practitioners, business and the voluntary sectors, the construction industry, local planners, and media. We need such people to work together to provide and implement solutions.

CONTRIBUTORS TO THE CONFERENCE

- **Claude Turmes MEP:** Vice President of the European Forum for Renewable Energy Sources (EUFORES); Vice President of the Green/EFA Group and Green MEP for Luxembourg.
- **Jørgen Lund Madsen:** Deputy Director, Environmental Protection Department, City of Copenhagen, Denmark.
- **Hartwig Berger:** Green Speaker for Energy and Transport, Berlin City Council, 1989 - 2001; German Green Party's Energy Policy Advisor.
- **Professor Paul Ekins:** Head of Environment Group, Policy Studies Institute, and Professor of Sustainable Development, University of Westminster.
- **Victor Anderson:** Green Member of the Greater London Authority (GLA)
- **Godfrey Boyle:** Senior Lecturer, Design and Innovation Department Co-Director, Energy & Environment Research Unit, Faculty of Technology, The Open University.
- **Chris Dunham:** Director, Sustainable Energy Action; Southwark Energy Agency
- **Penny Shepherd:** Chief Executive, London Sustainability Exchange

CONFERENCE RECOMMENDATIONS

These are a series of suggestions which emerged from the workshops held at the conference.

ENERGY EFFICIENCY AND REDUCING CONSUMPTION

- 1 Reduced energy demand should be a policy objective within the Mayor's Energy Strategy. To this end, he should press for measures such as increased cycling facilities, and promotion of sustainable design for passive ventilation to replace cooling systems.
- 2 To stabilise London's electricity consumption to the current consumption level, the GLA and London Energy Partnership should initiate a series of energy conservation and efficiency programmes.
- 3 The Mayor should lobby the government to introduce incentives to increase energy efficiency and to reduce energy demand.
- 4 New energy regulations will be needed to ration energy use over the next decade in order to reduce per capita energy consumption to the level required by contraction and convergence in 2050.

RENEWABLE ENERGY AND INVESTMENT

- 5 London's renewable energy target for 2010 should be set at 10% of London's total energy consumption. It should be expressed as both electricity and heat.
- 6 Since off-shore wind power in the Thames Estuary is one of the most promising renewable energy technologies for London, the government should introduce supportive policy measures and reform the New Energy Trading Arrangement (NETA) to fast-track the development of wind power between now and 2010.
- 7 ETSU's target for wind turbines should be increased by the GLA.
- 8 Photovoltaics (PV) is a promising renewable technology which could make an important contribution to London's renewable energy target by 2010 and beyond. The government should follow the example of Germany and provide fiscal incentives to promote PV, such as preferential prices for PV electricity.
- 9 The GLA and the London Development Agency (LDA) should encourage investment in a large-scale PV plant to reduce the cost of PV.
- 10 The GLA should explore the possibility of a revenue-bond initiative which resulted in a 25% PV penetration of the market in California.

PLANNING, EDUCATION, INVESTMENT

- 11 To assess their climate change impact, the Mayor should require planning applications referable to the Mayor to include a CO₂ assessment of all emissions generated by the application, including access by public transport.
- 12 London should develop a heat grid to take advantage of its high density and energy demand.
- 13 The LDA should initiate a London Renewables Fund.
- 14 The LDA should be asked to consider the energy infrastructure and implications of the Thames Gateway development.
- 15 Utility companies should have a duty to provide information on heat and electricity consumption at household and area level.

THE EUROPEAN ENERGY DEBATE

Confronting increasing energy demand and Green House Gas emissions (GHG) is a task not just for London planners but also for every city, nation state and regional government in the world. The European Union (EU) has committed its Member States to fulfilling the CO² reduction targets established by the Kyoto Agreement on Climate Change. Each country has been allocated a target in proportion to its overall contribution to the problem (Britain has a target to reduce emissions to 20% of 1990 levels by 2010).

Claude Turmes MEP discussed with the conference some of the characteristics of the energy debate in Europe and the differing views on how this reduction can be achieved:

- The first dynamic is the liberalisation of the energy market and the influence that this will have on the ability of new energy sources, such as renewable energy, to obtain a strong commercial base and competitive edge against the monoliths of the fossil fuel and nuclear industry;
- There are also serious concerns over the future security of energy supply for the EU as the region is increasingly becoming a net importer of energy;
- The role that renewable energy and nuclear energy have to play in reaching the CO² reduction targets is a contentious debate, and one that has yet to be resolved.

The role of nuclear energy

The debate over whether nuclear power has any role to play in the reducing CO² emissions is central to the current EU energy debate. The EU Energy Commissioner, Loyola de Palacio, has taken the controversial step of calling on power companies to take a more active approach to increasing public awareness of the benefits of nuclear energy. However, there is fierce opposition to this from most Member State governments (excluding the British Government who are themselves considering expanding their nuclear programme).

Green politicians and leading Non-Governmental Organisations (NGOs) are very much aware of the significant public health risk posed by nuclear energy and are campaigning strongly against these influences. In addition, the massive hidden costs of this technology have been exposed (for example, the BNFL bailout fiasco in the UK). Most importantly, shifting from fossil fuels to nuclear represents a considerable step backwards into an increasingly unsustainable pattern of energy generation.

Liberalisation and the internal energy market

The liberalisation of the energy market does hold some opportunities for new energy sources. For example, it facilitates greater transparency on investments (also on nuclear investments); it promotes higher economic efficiency; it also enables the consumer to compare one type of energy supply with another. However the concerns are that: the price war, by decreasing energy costs, will remove any incentive for energy efficiency; that the market may be quickly dominated by a small number of oligopolies, and be distorted against small scale sustainable energy production.

The European Union is establishing the future framework for the management of these influences (see **Energy Directive: rules for the internal markets in electricity and natural gas (COM(2001)0125)**. Claude is the rapporteur for electricity). The Green movement is looking to the Union to undertake the following:

- separate the energy grid from production and sales activities;
- strengthen the role of national regulators;
- strengthen the ability of national governments to compel energy producers to internalise the cost of their production methods;
- strengthen national and EU competition policies;
- guarantee labelling of all electricity and enable consumers to make an informed choice;

- ensure fair access to the grid and favour small local utilities;
- give bonuses for decentralised supply and ensure lower technical and administrative hurdles.

Most importantly, it is looking to the Union to stop subsidies to fossil fuels and nuclear energy and offer subsidies instead to sustainable energies until they are competitive.

For more, read Claude Turmes report to plenary (A5-0077/2002) at www.europarl.eu.int/plenary/default_en.htm

Energy conservation and reducing demand should be the first priority for the EU. It addresses the security of supply concern, stabilises demand and enables smaller producers to supply contracted energy needs.

In order to work towards this, the European Commission (EC) is looking to introduce directives on minimum standards for appliances, office and information technologies; on efficiency in the Internal Market of Electricity (IEM); EU and national labelling and information initiatives (EU agency for efficiency); directives on energy efficiency regulation.

These were some of the proposals made by Claude Turmes MEP for improving the uptake of renewable energies:

- **The transposition into national law of an EU directive (2001/77/EC) on renewables in electricity (to be implemented by October 2003)**

In this directive the EU is committing to producing 22% of its overall electricity use from renewable energy sources by 2010. Each Member State has its own target (the UK's is 10%). If the voluntary implementation of the directive by Member States fails, the Commission could push for legally binding commitments to achieve the target. The European Parliament had hoped for binding targets to achieve 23.5% by 2010, and did not want energy from waste to be considered a 'renewable' source. However, despite this, the directive does seek harmonisation of support measures for renewables, looking for best practice from various national schemes over the next four years. (RES, 2001)

- **The introduction of off-shore wind to the Trans-European Network (TEN) schemes and investment in renewables by the accession countries**
- **Revision of EU state aid rules for the environment**
- **Enforcing a 5 Eurocents/kWh for external costs of energy production**
- **Supporting and investing in technological innovations**
- **Establishing the new 6th framework for research (810 Million Euros)**
- **Promoting biomass and solar for heating and cooling**
- **Establishing a new EU renewables target for 2020 (25% of all energy)**

What role can the city play in combatting climate change?

Claude ended his presentation by coming back to the City and asking how it could become a more sustainable performer on the energy stage. He noted the following:

The City is a planning authority: it should use its ability to establish building regulations and spatial plans to entrench renewable energy and energy efficiency. Every new building is a potential energy producer (and saver). Every existing building is a goldmine for CO2 reduction and jobs. We have to reduce heating and cooling needs through intelligent architecture and integrated planning.

The City is an energy actor: it has the ability to regulate its access to the electricity grid, gas pipes and district heating systems. It is also a power producer.

The City is an energy client: it is a purchaser of energy and should look to prioritise and integrate Green/Combined Heat and Power (CHP) electricity.

The City is a facilitator and awareness raiser: build green buildings; buy green energy, and educate the population as to the alternatives.

WHAT LESSONS CAN LONDON LEARN FROM BERLIN?

The City of Berlin began its own energy revolution shortly after reunification. The conference heard from Hartwig Berger, an influential planner at the time of this process, about what London could learn from Berlin's success and (perhaps more importantly) its mistakes.

What successes could London replicate?

Berlin is a useful comparator to London as it shares common geographical and political conditions:

- When the energy plan was being written, there were poor standards of energy efficiency in Berlin's buildings, both East and West;
- Berlin has a city senate with policy making and vision setting ability;
- Berlin is a city of tenants (90%) with a high proportion of buildings owned by the State: nearly 1/3 of the 1.7 million residences. The tenants are interested in saving money by consuming less energy; but this was not necessarily the concern of the owners;
- Renewable energy had not really been used in Berlin before.

Institutional changes that worked

The implementation of the **Berlin Energy Concept** was made possible through the establishment of an institutional framework which facilitated the necessary conceptual (as well as fiscal) transformation from high-energy wastage and dependence on fossil fuel. These included:

- **Establishing an Energy Task Force:** set up to coordinate cross-departmental policy on energy production and consumption;
- **Establishing an Energy Advisory Board:** set up to advise businesses, public authorities and non-profit organisations on energy conservation, on modernisation and efficiency, on ecological building methods, and energy-efficient plants;
- **Establishing a Council on Energy:** an advisory committee offering a forum for NGOs, trades unions and energy utilities to discuss energy policy issues and to recruit consultancy;
- Establishing an a **new law on energy conservation** (Landesenergiespargesetz);
- **Berlin Impulse:** the Berlin Senate's programme of information on rational energy consumption and the use of renewable energy sources;
- **Berlin's Climate Protection Partners:** housing associations and builders committing to a low energy concept;
- **Partnership with Energy Utilities:** the Senate encouraged energy utilities to expand their activities in the direction of energy services in accordance with the energy conservation law.

Target setting

The 1994 Berlin energy plan was used as a basis to set targets. It set a target of reducing CO² emissions by 25% of 1990 levels by 2010. Through this target, CO² emissions per head were reduced from between 15 -18% between 1990 and 1999. The reduction was due to: 1/3 "wall-fall" profits (such as the decommissioning of fossil fuel power stations), 1/3 change of fuels (from coal and oil to gas), 1/3 successes in energy efficiency and energy conservation. It should be noted that CO² emissions from traffic grew, relatively as well absolutely, from 17% 1990 to 23% 1999.

Addressing increasing energy demand

In Berlin, a major focus was placed on contracting energy demand as a means of achieving the CO² reduction target. No differentiation was made between energy conservation and energy efficiency.

What specific energy measures made it possible to attain this reduction?

- Substitution of (mostly) brown coal by gas.
- Replacement of individual coal-fires (also reduces air pollution); residences using coal fires reduced from 400,000 to 90,000, in most cases substituted with gas, but a limited number were replaced with CHP and distant heating systems.
- CHP programme: not very successful as one electricity company had a monopoly and offered bad prices.
- The new gas and steamturbine power energy plant 'Berlin-Mitte' (reduction of nearly one million tonnes of CO²).
- Programme of building renovation, mostly of large company buildings, with subsidies from the City (insulation of roofs, cellars, walls and windows).

The target for the modernising programme was to reduce the average heat energy consumption in Berlin from 190-200 kWh/m² per year to a level of 100-130 kWh/m² per year.

Means for attaining these goals were:

- Subsidies for modernising buildings, combined with regulations setting minimum energy efficiency conditions.
- The 'Heizspiegel': a standardised system which classifies expected energy efficiency in typical buildings.
- The Berlin Energy Standard (B.E.S.T.), a standardised advice system which helps landlords and tenants to choose the most efficient and most valuable energy service in modernising and in energy deliverance.
- National regulations promoting energy saving, established in 2001, which set standards in energy consumption for new buildings and for modernising projects on a large scale.

As a result, about 650,000 residences in Berlin are now better insulated and have more efficient heating systems. However, there were serious failures in control, monitoring and evaluation. Furthermore, the public subsidies have stopped due to the city's financial deficit.

Follow through on the initial investment is a lesson London should learn.

Using the planning system support the roll-out of Photovoltaics (PV)

2000: In Berlin, PV produced 3 MW from 550 PV systems. Solar collectors for generating heat covered an area of 26,000 m².

2001: In Berlin, PV produced 4.9 MW from 820 PV systems.

2010: Anticipation is that there will be 30 MW energy generated by PV in Berlin by 2010 (although recent studies have suggested this may only reach 13%).

- PV has been encouraged by the national government's subsidy of 50 cents per kWh for PV-electricity. 1000 MW to be generated by new PV systems over the next few years.
- PV was installed initially on government buildings.
- The City then introduced a smaller subsidy programme (the '100,000 roof programme').
- Another idea was to oblige electricity companies providing energy to public buildings to ensure that a certain proportion of it was from 'green' sources. This has increased the amount of energy generated by CHP (which supplies more than 50% of the public sector's energy in Berlin).

- The parliament claimed that the proportion of photovoltaics in public energy consumption should grow 2% every year.
- Recently, there was a favourable step towards 'renewables': the City government decided to offer public roofs for PV rent free.

What lessons should London learn?

Energy contracting in public buildings

About 10% of the energy consumption in Berlin is under the control of public organisations: public administration, sports centres, schools and colleges, public services such as waste, water, public transport.

Energy is money: about 250 Million Euros a year is spent by the public sector on energy. A proposal was made, initially by the Greens in 1988, to reduce excessive energy consumption and use the money saved for further energy savings.

Berlin offered the task of energy saving to private companies who were to be paid to do the finance work to quantify the financial benefits of energy saving and take some of the profit. A part of the profit is for the City budget. The average saving rate reached by conservative procedures is estimated between 20 - 30%.

In principle, this was a good and convincing concept, but its realisation has progressed too slowly. Although the proposal was made in 1988, in 2001 only eight contracts had been signed. 300 of the 6,000 public buildings are involved, which represents about 8% of the total public energy consumption. Parts of the Berlin administration have been working against it. The public profit goes exclusively to the city budget.

The importance of using regulation to induce change

The Berlin Senate was limited in its ability (and occasionally disinclined) to use regulation to shift the balance of energy supply to renewable energy sources. Lessons London should learn are:

- The privatisation of the electricity company and of the gas concern in the nineties made it harder to regulate. The integration of the local electric company in a global player made it harder to regulate. One bad consequence of this was that the use of brown coal expanded in the electricity generation market (caused serious water problems for Berlin).
- Berlin was unable to regulate effectively on energy efficiency and energy saving measures in buildings as law did not enforce the minimum requirements.
- Berlin's financial deficit has led to the end of public subsidies for modernising buildings. There is a new national government programme, but this involves a much smaller amount of money.
- Traffic and transport was almost completely excluded from energy planning during the Social Democrats / People's Party coalition (so called red-black coalition) in the City government, despite 23% of Berlin's CO² emissions being generated on the road. Green house gas (GHG) emissions by aircraft (flights from Berlin citizens) are also ignored, although there is a discussion currently on airport planning in Berlin and the Berlin region.
- There are not many Solarthermal collectors in Berlin, compared with other German cities. It was proposed that Berlin implement a Solarthermal Regulation, requiring 60% (depending on local conditions) of water-warming to be generated by solar collectors. This was to be an obligation for all new apartment buildings. Though the City Assembly agreed to do this before the 1995 election, the regulation was never enacted, under pressure from the building lobby. It was substituted by a voluntary agreement which does not work at all. A Solarthermal Regulation has since been successfully implemented by Barcelona. What about London?

WHAT ARE THE POLITICS OF THE UK ENERGY DEBATE?

“A combination of energy efficiency and new renewable energy sources performs strongly against all the sustainable development criteria and is the first choice when it comes to meeting the energy demand and supply challenges of the future in a manner consistent with sustainable development.”

Sustainable Development Commission (2001)

Professor Paul Ekins from the University of Keele set the scene with an outline of the opportunities, obstacles and funding streams that characterise the current UK energy debate. These mirror in many ways the characteristics, identified by Claude, of the European debate: security of supply, market liberalisation, making the polluter pay, and protecting national competitiveness.

His starting point was the findings of **The Performance and Innovation Unit (PIU) Energy Policy Objectives**, a report commissioned by the Government in 2001.

The findings in this report were significant and, if implemented, would see a transformation in the way in which the UK conceives of the energy supply/demand chain.

It recommended that, in setting future energy policy, *“The guiding policy principle for government should be sustainable development, requiring the achievement of economic, environmental and social objectives”*.

Its key priorities: security of supply, compliance with existing carbon abatement targets, and development of a range of low carbon options to be used to meet future CO₂ reduction targets. The UK should also be pursuing innovation to permit deep cuts in carbon emissions in the longer-term.

Its conclusions showed that energy efficiency has the closest match with all the major sustainable development objectives and that efficiency should be at the centre of low carbon strategies. So much can be achieved at very low cost. It recommended that the UK should work towards a 20% improvement in energy efficiency by 2010, and a further 20% by 2020.

It also suggested, although not ruling out the nuclear option, that the wide range of renewable energy technologies represents the most important priority among zero carbon options. It therefore recommended a target of 20% of energy supply should be sourced from renewables by 2020.

In order to achieve this, the UK must develop a wider range of renewables options and instantly remove all institutional barriers to their development, such as fossil fuel subsidies, the non-internalisation of environmental costs, access to the grid, and lack of a land-use planning strategy for renewables.

The report also countered the economic argument that cutting carbon emissions will impact economic growth by suggesting that a 60% carbon reduction by 2050 would cost perhaps 1% of the economic growth which can be expected over the next fifty years.

Technologies identified in the PIU report as potential contributors to CO² emission reduction. Table derived from information in the Performance and Innovation Unit Report (2001)

COSTS	Energy cost, p/k Wh	Carbon abatement cost £/tC (2020)		Potential contribution to carbon emission reduction, MtC	
		2020	Min	Max	2020
Domestic EE	Low	-300	50	15	30
Service Sector EE	Low	-260	50	4	10
Industrial EE	Low	-80	30	9	25
Transport EE	Low	Probably negative	Detailed assessment needed	14	30
Large CHP	<2	-190	110	3	5
Micro CHP	2.5 - 3.5	-630	-110	1	5
Onshore wind	1.5 - 2.5	-80	50	1	5
Offshore wind	2.0 - 3.0	-301	50	8	>20
Marine (wave and tidal)	3.0 - 6.0 (wave)	70	450	Small	>20
Energy crops	2.5 - 4.0	70	200	3	10
Solar PV	10 - 16	520	1250	<1	>20
Nuclear	3.0 - 4.0	70	200	7	>20
Carbon sequestration	NA	80	280	Small	>20
Fuel Cells	Unclear	Unclear	Unclear	Unclear	Unclear
Gas (CCGT)	2.0 - 2.3	The reference case against which the carbon reduction for other options was calculated			
Coal(IGCC)	3.0 - 3.5	This would only be a carbon reduction option with carbon sequestration			

The UK's carbon reduction target will not be attained on current policies. Change is therefore essential. This makes the case for vigorous policy clear. There is a need for rapid deployment of energy efficiency technologies and the creation of new markets for renewables.

Proposals for Energy Efficiency Policy

- Establish incentives for demand reduction.
- Establish incentives for greater efficiency (rebound effect).
- Use regulation to oblige minimum standards of energy efficiency.
- Market best practice to encourage best practice (zero emissions developments).
- Facilitate and invest in technological innovation.

Solutions

Action plans to address energy demand and supply can draw on a range of policies. These can be applied cross-sectorally, tailored to specific sectoral situations. These can be summarised as:

Use of tight and visionary targets

Visionary targets: (e.g. very low carbon emission targets by a certain date) even if not met, targets do set the conditions for change. Politicians have become so immersed in the technical detail of setting targets that they fail to see the long term picture of progressing towards achieving a target.

Domestic: no target has been set for reducing energy use in the UK's households. This is a despite domestic energy use accounting for 30% of all primary energy demand in the UK.

Use of planning and regulation

Domestic: the use of regulation in the housing sector is essential to the setting of minimum efficiency standards on new build and renovations. Energy efficiency labelling is also required and household appliance efficiency regulations.

Office/Public: Energy efficiency audits should be mandatory on all offices.

Use of incentives and taxation

Industry: The Government has already introduced industry to the concept of energy efficiency through the climate change levy, a tax on energy use which the government has offset against national insurance contributions, which will need to be increased over time. In addition to this they have introduced the Carbon Emissions Trading scheme. This package must be supported by a campaign to raise awareness among business owners that energy levies can be offset through increased efficiency in the business use of energy.

Transport: the Government should be focussing on reducing fuel demand through the use of fuel duties. It should restore a fuel duty escalator to increase the real price of carbon emissions. Establishing a fuel efficiency agreement with manufacturers, implementing company car tax reform and differential vehicle excise duty are just a few ways to tackle demand.

Domestic: There is a need to establish an expectation that the real price of energy will rise. This should be supported by complementary measures to protect those on low incomes (fuel poverty).

Use of investment and subsidy

Transport: Faster development of low or no carbon fuels.

Domestic: An environment should be created whereby investment is attracted to constructing best practice exemplars of low-carbon buildings. Investment should also be made in the development of low or no carbon energy appliances (e.g. micro-CHP using fuel cells).

The role of education and sharing best practice

There is a tremendous ignorance across all sectors – industrial, private, public and domestic - about the true costs of energy use. Organisations such as the Carbon Trust and Action Energy, ECAs should be allocated greater resources to systematically reach small and medium enterprises (SMEs).

Providing consumers with information is a massive priority. This applies to SMEs, car users, home owners, landlords and tenants (both domestic and office sector).

Renewables Obligation

In April 2002, the Renewables Obligation Order came into force in the UK, requiring electricity supply companies to work towards obtaining 3% of their power from renewable sources by 2003 and 10% by end 2010 or pay a 3p/KWh 'buy-out' of their obligation to the energy regulator, Ofgem. The Renewables Obligation replaced the Non Fossil Fuel Obligation (NFFO) which guaranteed a fixed price to renewable energy producers for electricity supplied to the energy grid. The prices declined markedly through the different phases of the scheme.

Summary of The Non-Fossil Fuel Obligation (NFFO)

Table from NFFO Orders and operational capacity as at 31 December 2001 (DTI, 2001)

	NFFO 1	NFFO 2	NFFO 3	NFFO 4	NFFO 5	TOTAL
Number of contracted projects	75	122	141	195	261	794 (335 live)
Average price (p/kWh)	7.10	7.20	4.35	3.46	2.71	
Contracted capacity (MWDNC)	152	472	627	843	1177	3271
Operational capacity (MWDNC)	141	172	299	158	94	865 (26%)

The Renewables Obligation is an important step in the right direction, but a number of barriers to the actual construction of renewables capacity still remain, most importantly perhaps planning constraints. One lesson from NFFO is that if the financial incentive for construction is inadequate, then the new capacity will not be built.

Conclusions

Although many policies have been introduced, they are not yet reducing UK carbon emissions. There is not yet enough evidence of commitment through long-term policy signals (especially prices), and cross-department policies, such as transport, are riddled with contradictions. Household energy efficiency is very problematic and is, as yet, not being systematically addressed. It is also not yet clear that the Renewables Obligation will kick start the renewables market to the required extent. There is not yet enough to give the UK a clear lead in the low-carbon markets and technologies of the future.

WHAT IS LONDON PLANNING TO DO?

Acting upon the recommendation of Green advisers, in 2001 the London Mayor decided to develop an Energy Strategy (despite it not being required by the GLA Act 1999) because of its importance in terms of climate change, and implications for fuel poverty. The Mayor has powers to implement it through planning, the London Development Agency and Transport for London. The first draft was released to consultation in 2002 and the public draft will be released in January 2003.

Victor Anderson, Green London Assembly Member, outlined the current procedure and pointed out possible lines of action.

Growth in London

The growth pressures expected in the capital are expressed in the Draft London Plan:

- 700,000 population increase by 2016.
- 30% more office accommodation by 2016
- 20% increase in energy consumption by 2016 (this is implied by existing trends but London Plan policies may raise this further).

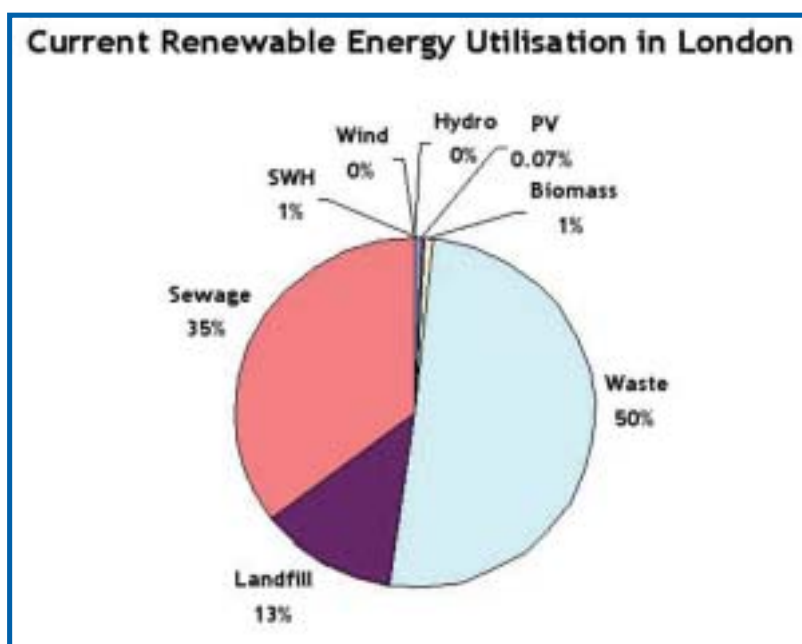


Diagram from Chris Dunham's presentation (Sustainable Energy Action)

The Mayor's Planning Powers concern:

- 1 Applications which can be considered by the Mayor - which include housing of 500 units or more
- 2 The Mayor is consulted on local authority Urban Development Plans (UDPs)
- 3 The London Plan, and supplementary guidance for Unitary Development Plans.

Examples of relevant policies and proposals in Draft Energy Strategy (March 02 Version)

Proposal 11: To contribute to meeting London's target for the generation of renewable energy, the Mayor will expect applications for new developments of strategic significance (i.e. those referable to the Mayor) to generate a proportion of the site's energy needs (electricity and heat) from renewables. The Mayor encourages Boroughs to expect the same of developments of a significant size.

Proposal 13: The Mayor expects planning applications referable to him to incorporate passive solar design, natural ventilation and borehole cooling wherever site conditions make them technically feasible and encourages boroughs to expect the same.

Proposal 17: When reviewing UDP policies, boroughs should identify sites in their Borough suitable for wind turbines and seek to influence such schemes.

London Development Agency (LDA)

The LDA is part of the GLA family, and is the Regional Development Agency for London. It provides the lead on economic development and regeneration.

Examples of relevant policies and proposals:

- **Policy 16** The Mayor will work with the LDA to ensure that the LDA's regeneration work demonstrates high standards of sustainable design, by promoting the development of exemplary pilots and demonstration schemes.
- **Policy 17** As part of the LDA's work to promote the growth of a distinct environmental business sector, the Mayor requests strong support for the sustainable energy industry, and particularly renewable energy technologies.
- **Policy 18** The Mayor will work with the LDA to encourage business, the public sector and small and medium size enterprises to enhance their energy performance, and so their environmental and economic performance, and demonstrate best practice in using resources efficiently, employing renewables and purchasing green power.

Transport

Transport accounts for an increasingly large share of energy consumption. Transport for London (TfL) is part of the GLA family and is chaired by the Mayor.

Examples of relevant policies and proposals:

- **Policy 20** The Mayor requests Transport for London to lead in adopting new and fuel efficient technology for use in London's public transport.
- **Proposal 41** The Mayor will work with relevant organisations towards meeting a significant and growing proportion of power for the Underground from renewable sources over the next ten years. To this end, the Mayor encourages London Underground to investigate the possibility of entering into a long term relationship with one or more renewable electricity suppliers.
- **Proposal 42** The Mayor supports ending the exemption of aviation fuel from taxation.

London Energy Partnership

This is a proposal advocated in the Draft Energy Strategy in which the GLA, business, investors and other organisations would work together on energy issues, including fuel poverty and the promotion of the renewables sector.

London Sustainable Development Commission (LSDC)

LSDC has recommended a CO² reduction target of 20% decrease in CO² emissions by 2010. This is to be integrated into the redraft of the London Energy Strategy.

WHY SHOULD LONDON BECOME MORE EFFICIENT AND REDUCE ENERGY CONSUMPTION?

Climate scientists advise that humanity needs to cut CO² emissions by 60-90% to avoid fundamental changes to our climate. According to the draft London Plan "Growth in London is set to exceed UK average growth, and is projected to provide up to 636,000 additional jobs by 2016". The increase in energy demand embedded within this is evident. Unless London takes significant measures to reduce its energy consumption, its emissions targets will not be met.

Secondly, renewable energy sources will only be able to supply the tip of current, let alone increasing, energy demand. If you use less energy you can afford to pay extra for renewable energy (as at zero emissions developments where 1/2 energy is saved through insulation and efficiency and 1/2 generated from renewable sources).

Households, in the words of the old Government Information Film slogan, are still "*paying to heat the street*". Many of London's buildings still leak heat, have appliances on permanent stand-by and generally waste energy. Fuel prices are driven down, so waste becomes artificially cheap.

Finally, according to government figures, offices in England waste 20% of their electricity (worth nearly £150 million every year). Building a coherent education, investment and regulatory programme to enable organisations to reduce their energy consumption can only be good for business.

Reducing energy demand must be a central policy objective within the Energy Strategy. The energy implications of Transport must be integrated within this.

How can this be achieved?

The measures recommended by the conference to reduce energy demand in London included:

- To stabilise London's electricity consumption, the GLA in partnership with key stakeholders should initiate a series of energy conservation and efficiency programmes via a London Energy Partnership.
- The biggest problem with energy efficiency is the lack of knowledge about it: from the equipment design and purchasing level upwards. We need to believe in it, e.g. require public sector organisations to create procurement policies so that they always buys the most energy efficient equipment.
- Developers and development financiers need educating about building design options and tenant preferences. For example, a majority of office workers prefer natural ventilation, but air-conditioning is thought to be essential to rent out a building. The GLA could enforce minimum building energy efficiency standards.
- The GLA could encourage energy efficient purchasing by facilitating a consortium of local authorities in London.
- It could work with retailers of electrical goods to reduce electrical demand from plug in appliances. Proper labelling, special offers and more information on lower energy demand TVs, computers, etc.
- Cooling systems may need regulation. Does London need a version of part L of building regulations?
- The Mayor should lobby the government to introduce incentives to increase energy efficiency and to reduce energy demand.
- To assess their climate change impact, the Mayor should require planning applications, referable to the Mayor, to include a CO² assessment of all emissions generated by the application, including access by public transport.

Note: a new Directive on the **energy performance of the buildings (COM(2001)0226)** is currently working its way through the European decision making process and should become law over the next three years. The implications of this for London's businesses and landlords is not yet known, but it will undoubtedly mean that minimum standards will be enforceable by national (and local) regulation. The GLA should see this as an opportunity to raise building efficiency standards in London and should be researching the implications now.

WHAT SHOULD LONDON'S RENEWABLE ENERGY TARGET BE AND WHAT FINANCIAL AND POLITICAL INFRASTRUCTURE IS NEEDED TO ACHIEVE IT?

Targets

Targets must be realistic, demanding and relate to the ability to deliver and to where there is power to create change. Targets should be set in steps working back from what is needed in the long-term to prevent climate change, i.e. what do we have to achieve rather than what we think we can achieve now. Targets need to be integrated: for example, achieving any CO² reduction target must be seen in terms of achieving renewable energy targets and energy conservation targets. Targets should also take the total energy use into consideration, not just electricity use.

London's renewable energy target for 2010 should be set at 10% of London's total energy consumption. It should be expressed as both electricity and heat. Challenging and visionary targets beyond 2010 should also be set. We should aim to be totally renewable by 2050 and there should be a strategic plan of how to get there between 2002 – 2050.

Infrastructure

The measures recommended by the conference to create a supportive framework for the implementation of targets included:

- Targets must be linked to investment strategy, planning, national and London policies.
- As suggested above, we need to look at more than just planning control. We also need to consider a package of investment, subsidies and regulations (carrots and sticks). Financial incentives (e.g. for PV as in Germany) could quickly change public behaviour.
- The GLA should explore the possibility of a revenue-bond initiative which resulted in a 25% PV penetration of the market in California.
- Should do more to harness London's investment power. For example, secure a high profile investor, e.g. Merrill Lynch, to take part in joint work.
- The Disability Discrimination Act will force people to put in wheel chair access in buildings at their expense. Why not do the same with renewable energy systems?
- London should develop a heat grid to take advantage of its high density and energy demand.
- Utility companies should have a duty to provide information on heat and electricity consumption at household and area level.
- The LDA should initiate a London Renewables Fund. The LDA should also be asked to consider energy infrastructure within the Thames Gateway framework development.
- A campaign is needed with the slogan 'Solar is beautiful'. PV panels should be given rent-free, as part of the promotion campaign, as in Germany.
- Enable Borough Councils to lead by example. Boroughs should lead by example with the buildings they own and manage. Should link this to awareness raising – e.g. if the building is a school you can link it into the school's education programme.
- Merton's Urban Development Plan (UDP) establishes that 10% of energy needs from new commercial developments should be sourced from renewable energy. Two buildings have gone through the process. One developer resisted and the inspector backed Merton and forced compliance. Four other Boroughs are to include similar target in their UDPs.
- Wide-spread implementation of the 'Merton' solution: making it mandatory for all of London's planning applications to derive a proportion of their energy needs by renewables. The rest of their energy should be derived from a green supplier such as RSPB Energy, Juice or unit[e].

- Use the unique position of the GLA to encourage/co-ordinate the London-wide implementation of the 'Merton solution' across all Boroughs.
- All Boroughs should be brought up to best practice. There is a need for us to share good practice and offer training across the professions.

Help stimulate domestic demand for Green Energy by:

- Publicising green energy options to domestic users.
- Making it mandatory for London Boroughs to meet their own needs from 100% renewable energy suppliers. Make the distinction between incinerator schemes and genuine zero carbon solutions. (Do the same for the GLA).
- Offer a CO² emission pay back for green/efficient businesses.
- Offer a percentage on VAT for renewable systems.
- Oblige electricity companies providing energy to public buildings to ensure that a certain proportion of it is from 'green' sources.

WHAT ARE THE RELEVANT TECHNOLOGIES THAT LONDON SHOULD USE TO FULFIL ITS RENEWABLE ENERGY TARGET?

As has been said before, deciding on the technical solutions to achieving London's CO² reduction target is only one part of the equation. At the conference, it was generally agreed that **policy** is more of a barrier than **technology**. For example, it is necessary to question how adept and prepared the construction industry is in terms of skills and training. There is also the question of whether planners have the capacity to literally build renewables into their blueprints.

With this in mind, the following is a record of the most appropriate technical solutions identified by the conference workshops. The accompanying figures and diagrams were provided by guest presenters, Chris Dunham and Godfrey Boyle.

Photovoltaic (PV)

- PV is a promising renewable technology which could make an important contribution to London's renewable energy target by 2010 and beyond. The Government should follow the example of Germany and provide fiscal incentives to promote PV, such as preferential prices for PV electricity. The GLA should also look to provide supplementary incentives from the City budget.
- The land area of Greater London is approximately 1500sq km. London's electricity demand is 31 TWh/yr. About 2% of London's surface area (31 sq km) could generate 10% of electricity (3.1TWh) from PV. This would be on roofs of houses and flats; roofs and facades of commercial and public buildings; alongside roads and railways; petrol stations, car parks etc.
- The GLA and the London Development Agency (LDA) should encourage investment in a large-scale PV plant to reduce the cost of PV and enable economies of scale.

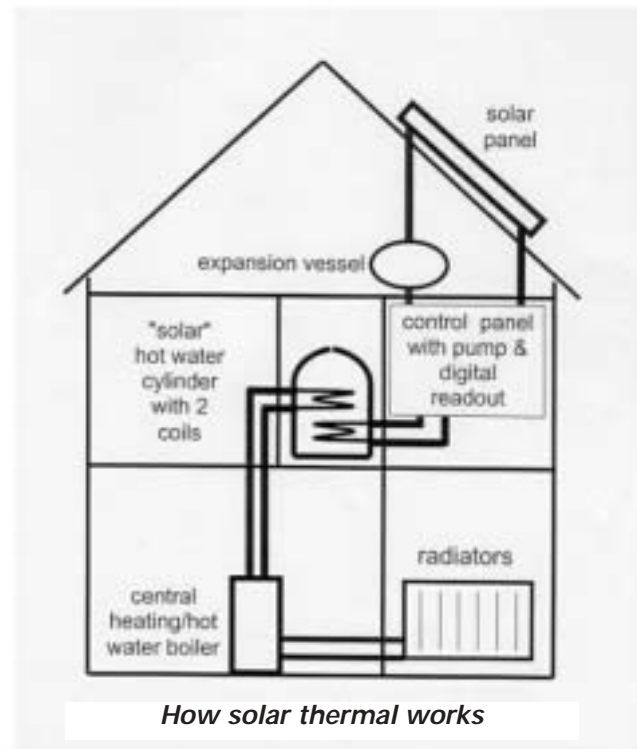
Solar Thermal

- Solar thermal could potentially provide up to 50 – 70% of London's annual domestic hot water requirements, were the technology made available to household owners.
- Rolling out the technology to only 30,000 households would effectively supply 1% of London's housing heat demand.
- 10% of London's surface area would be needed to provide all heat for housing, but this would require interseasonal storage

- This is a relatively inexpensive technology for commercial and domestic buildings.

Wind turbines

- Off-shore wind turbines in the Thames Estuary would generate approximately 8,000 MWh/yr per turbine. About five off shore wind farms, each with 80 turbines would be needed to provide 10% of London's electricity (3.1 TWh): c 400 (1200MW)
- Since off-shore wind power in the Thames Estuary is one of the most promising renewable energy technologies for London, the government should introduce supportive policy measures and reform the New Electricity Trading Arrangement (NETA) to fast-track the development of wind power between now and 2010.
- On-land wind turbines are less promising as about 100 - 200, each with a 1.5MW capacity, would be needed to provide 1% of London's current electricity demand (0.31 TWh). However, this should not be ruled out for small scale production on the periphery of London.



Combined Heat and Power (CHP)

- 40% of London's electricity is generated within London. Only 10% of the heat generated by this process is used. 2200MW recoverable heat is dumped. This would be enough to provide 22% of London housings' heat demand. CHP is ideal because of London's density and high energy demand. London should develop a heat grid to take advantage of its high density and energy demand.
- Micro-CHP: (NB not considered by ETSU) still reliant on gas which is a limited resource. This is more useful at a community scale as it is easier to switch fuel when changing a system for an area rather than a system per household.

Biofuel

- Biofuels are storable and are a useful as backup to intermittent renewables. But the efficiency of the conversion of biomass is low (about 0.5%). So output from energy crops only 5 kWh per square metre per year. It also requires efficient combustion to avoid greenhouse gas (e.g. methane) emissions. If used for CHP, the electricity output per square meter is about 2kWh electricity, 2kWh heat.
- All of London's land area would be required to produce enough biofuel to supply 10% of London's electricity. For 1% of electricity, you would need about 10% equivalent of land.

Transport

- Produce hydrogen fuel cells within London from water by electrolysis using PV to provide fuel cells for transport purposes (tie into using groundwater table problem).
- Green diesel/biofuel requirement for commercial vehicles delivering within Greater London (vehicles can be dual-fuelled for journeys outside London).

WHO SHOULD BE INVOLVED IN THE IMPLEMENTATION OF THE TARGETS?

We were fortunate to be joined by a representative of **Kopenhagen's Environmental Protection Agency**, Jørgen Lund Madsen, who gave us specific case studies of large scale environmental projects that succeeded primarily because stakeholder involvement and support was secured well in advance of development.

The Kopenhagen Environmental Protection Agency (EPAC) is a local government body with over 20 years of experience in establishing environmental systems, tools, and associated training programmes. EPAC includes more than 140 professionals and specialists with skills covering all aspects of regional and urban environmental planning and monitoring.

Jørgen gave the example of a stakeholder involvement in the construction of the **Middelgrunden Offshore Wind Farm**.

Kopenhagen built an offshore wind farm of 20 wind turbines located on a former dumping area in the bay. This generates 89.000 KWh per year (3% of electricity consumption of Kopenhagen). Ten turbines are owned by Kopenhagen Energy, ten owned by a stakeholder co-operative which holds 0.500 shares (500 Euro per share).



Middelgrunden, offshore wind farm

Investors (both large scale and small scale) were engaged in a practical and sustainable action. Kopenhagen achieved popular ownership which contributed to the installation of extra capacity. In addition, it resulted in popular acceptance of a large-scale project – there were no complaints.

Although it was challenging to generate co-operation between an energy company and stakeholders, the success of the project in the long-term was reflected in the smooth nature of the implementation. Now the process has been successful, it offers possibility for the future anchoring of projects.

Well managed partnerships are the catalysts of change and, in order to deliver energy targets, a wide range of stakeholders need to be involved in setting, owning and delivering the targets. The GLA should look to establish a range of energy partnerships to cover the strategic, implementation and education elements of the plan.

Partnerships

Partnerships should represent a suitable balance of planners, investors and implementors. Sample groups could include:

- Cross departmental Local Authority strategy teams to think and plan laterally (housing, transport, parking, energy sourcing).
- Purchasing groups commissioning new renewable energy production. Planners and developers and financiers must be brought to the table.
- Investors (including small scale investors/shareholders), Construction industry (including unions), Architects, and specialist developers (for example, Bioregional and Zedfactorys).
- Local community involvement in renewable energy schemes is critical both to their design and usage. Involvement minimises complaints and increases awareness, not only of the utility of the scheme but also having far wider implications for the way in which people conceive of their own patterns of consumption.

CONCLUSION

London must aim to become one of the world's leading sustainable cities. We all know the consequences if we fail to act, but knowing and doing are quite different things.

Action is needed on a variety of levels: from the local to the international. Some of this action is simple, such as installing energy efficient light bulbs in all public buildings; some of it difficult, such as amending the planning system to bind construction firms to renewable energy targets; some of it is challenging such as the Government introducing a dramatic programme to promote renewables.

All of these actions are possible and necessary. There is no shortage of solutions, just a shortage of political will power.

For example, by the end of 2001 the German solar PV programme had delivered 35,000 solar roofs. In just one month (April 2001) more applications were approved under the German programme (4,198) than are predicted for the entire three year UK Major Demonstration Programme (approximately 3,500 systems).

We must reduce our energy demands overall and meet our needs in ways that place as little stress on the environment as possible.

Such changes will improve the quality of life for Londoners both now and in the future. It is time to change – we first need the energy to do it!

GLOSSARY

£/tC	Pounds per tonne of carbon
CCGT	Combined Cycle Gas Turbine
EURATOM	European Atomic Energy Community
GHG	Green House Gas
GJ/tonne	Gigajoules per metric tonne
IGCC	Insulating Glass Certification Council
KWh	Kilowatt hour
kwh/m ²	Kilowatts per hour per square metre
MSW Incineration	Municipal Solid Waste Incineration
MT CO ₂ Equiv	Megaton of Carbon dioxide emissions equivalent
MtC	Million tonnes of carbon
MW	Megawatt
MW (DNC)	Megawatt (declared net capacity)
NFFO	The Non-Fossil Fuel Obligation
p/kWh	Price per kilowatt hour
RE	Renewable Energy
UDP	Urban Development Plan
TEN	Trans-European Network schemes
tnC/capita	Tonne of Carbon per capita (person)
Tpa	Tonnes per annum
TWh/yr	Terawatt-hours per year
w/capita	Watts per capita (person)

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www.greenparty.org.uk

Website for Jean Lambert MEP
www.jeanlambertmep.org.uk

Green/EFA Group (European Parliament)
www.greens-efa.org/en/

EU Energy.com
www.eu-energy.com/Electricity.html

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UK Sustainable Development Commission
www.sd-commission.gov.uk/

Policy Studies Institute
www.psi.org.uk

Forum for the Future
www.forumforthefuture.org.uk

PIU Energy review
www.cabinet-office.gov.uk/innovation/2002/energy/report/

Department for Trade and Industry
www.dti.gov.uk

Energy & Environment Research Unit, Open University
www.open.ac.uk/t206

Sustainable Energy Action
www.southwark-energy.co.uk

Energy Savings Trust
www.est.org.uk

ATTENDANCE

The conference was widely advertised and attended by many individuals and organisations. The latter included:

ACE (Association for the Conservation of Energy)	London Borough of Camden
AES Solar	London Borough of Ealing
Association of Local Government	London Borough of Greenwich
Bioregional	London Borough of Hackney
Brent Energy Network	London Borough of Hillingdon
British Science Museum	London Borough of Islington
CEN (Creative Environmental Networks)	London Borough of Southwark
Combined Heat & Power Association	London Borough of Sutton
Connick Tree Care	London Borough of Waltham Forest
Earthed	London Development Agency
Ecofys UK Ltd	London School of Economics
Ecological Development	National Energy Action (NEA)
Energy Saving Trust	NCP Housing, Westminster City Council
Environmental Services, Croydon Council	OFGEM
Fuel Cell Today	Policy Studies Institute
Greater London Authority	PV Systems Ltd
Global to Local Ltd	Renewable Energy in the Urban Environment (RENUE)
Government Office for London	RICS Foundation
Greater London Energy Efficiency Network (GLEEN)	Schools & Homes Energy Education Project
Green Events	Sustainable Energy Action
Green Party England and Wales	The Schumacher Society
Guildford Environmental Forum	Westminster City Council
ILEX	Windpower Development
London Borough Bromley / Solar For London	WWF
London Borough of Barnet	



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