MAKING IT IN LONDON

LONDONASSEMBLY

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BACKGROUND

This report sets out the proceedings of a seminar held on behalf of the London Assembly's Environment Committee at City Hall in October 2007 entitled 'Making it in London'. For the first time in London, this conference brought together a range of speakers from across academia, the private and public sector to discuss the barriers to further growth of London's eco-friendly manufacturing sector.

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Foreword

Are we at the dawn of a great business revolution? Many of the speakers at our conference 'Making it in London' think we are. The environmental technologies of solar, wind and wave power, energy conservation techniques, waste technologies that generate heat and power, hybrid fuel cells and the building blocks of a hydrogen economy; these are the great economic drivers of the coming industrial revolution. Germany is becoming virtually the world leader in this field. Its environment sector is creating new firms, new exports and new jobs; but meanwhile the UK lags behind.

London's environment sector is growing but there are critical gaps in a number of areas including manufacturing capacity for priority energy and fuels technologies and little capacity for using waste streams such as metals and glass. Our conference found that many of the necessary ingredients exist to begin an environmental manufacturing renaissance in London.

- London's reputation as the workshop of the world in the 19th century was based on its interconnectedness with the rest of the world through physical access to the Thames. Now London's access to global markets is through the digital networks of the internet and broadband and driven by diverse social and work based networks.
- We have innovative public and private sector bodies looking to mainstream climate change mitigation into procurement policies.
- We have vast capital wealth managed by investment and capital venture funds that are actively seeking new business opportunities.
- We have the drive and ambition of young people across the skill spectrum anxious to combine work with tackling climate change.

'Making it in London' found key challenges that policy makers and other interested parties need to address.

- A new style engineering career which includes, design, knowledge of materials and marketing as well as production techniques needs to be promoted, particularly to young people.
- Small and medium sized firms need to look to changes in the nature of manufacturing to innovate around whole life cycle design, bespoke and small production runs.
- Finance companies need to innovate financial instruments that can front load expenditure on micro-generation to be repaid through savings on conventional energy bills.
- Dedicated regional government leadership is needed to drive forward the development of the East End's sustainable industries business park.

- National government support is required to jump start market enablement where pilot schemes have proven their worth.

'Making it in London' has shown how we can capitalise on these strengths and spur the creation of a new generation of 'green collar' jobs to create a dynamic and environmentally sustainable city economy. The challenge for us all is to create the new public/private networks that can support innovation and grow new businesses in this sector. In some small way this conference has started that process.

Ships, cables, chemicals and guns

How London's East End industrialised in the 18th and 19th centuries

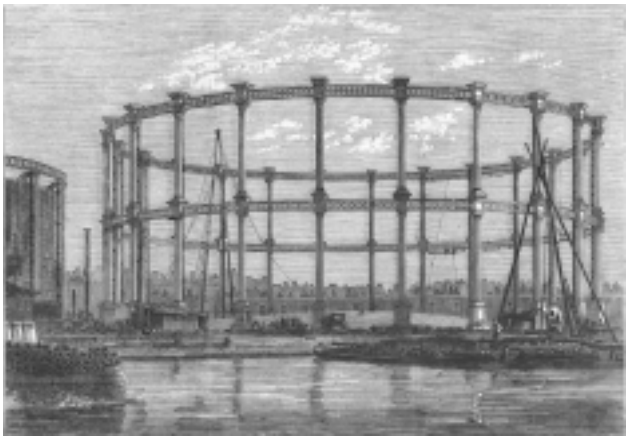
John Marriott is a reader in History, and Co-Director, Raphael Samuel History Centre, University of East London specialising in the cultural and intellectual history of London, and the relationship between London and empire, with particular reference to India in the long 19th century.

'Before the 19th century, London had established itself as the world's centre of commerce and finance. Such authority was built on and sustained by a communications infrastructure at the heart of which stood the Thames and an extensive Docklands complex.'

Several years ago when these things were rather more fashionable, the contradictory location of London within the process of the Industrial Revolution, and modernisation more generally, received considerable attention. London, it was argued, was unlike so many of the great industrial centres of the Midlands and North, in that it was not begat of the Industrial Revolution. Despite the fact that London remained the greatest centre of production and consumption, it was seen to possess few of the features that essentially defined the experience of industrialisation. Thus there were few of the great factories that we saw up North. For the most part London's economy was dominated by small-scale industry employing less than 25 people.

To privilege heavy industry in this way, however, I think is rather misleading. In this respect I think we need to revisit the whole question about what we mean by the Industrial Revolution. I do think, for example, that particular picture tends to underplay other vital dimensions of London's modernisation. Before industrialisation took hold in the first decades of the 19th century, London had established itself as the world's centre of commerce and finance. Such authority was built on and sustained by a communications infrastructure at the heart of which stood the Thames and an extensive Docklands complex.

Truman, Hanbury & Buxton Brewery, Brick Lane, 1842.



Imperial Gas Company, Bethnal Green, 1858.

Bryant and May, 1871.

Towards the close of the 18th century, powerful merchant traders combined with developers to construct the West India Docks on the Isle of Dogs, soon followed by Wapping, East India, Surrey and Saint Katherine's Docks. With the completion in 1855 of the Victoria Docks, London possessed by far the largest and the most extensive docks complex in the world. If there was any single thing that was used to celebrate London's modernity, it was those Docklands areas.

As far as this traditional view of the Industrial Revolution is concerned, the role of London itself is underplayed, particularly in terms of its spatial boundaries. Discussions about London's industrialisation tend to emphasise what is considered to be London's administrative boundaries. When people talk about London they tend to think of London stopping at the London County Council (LCC) boundary of the River Lea, north of the Thames, and East Woolwich, south of the Thames. This particular view is rather myopic. I do not think London's industrialisation can be seen in terms of administrative boundaries, not least because the movement to capital of course transcended those sorts of boundaries.

'At their height in the early decades of the 20th century, the Great Eastern Railway Works at Stratford employed 7,000 people; the Thames Ironworks in Canning Town employed 6,000; Siemens in Woolwich employed 7,000; the extraordinary Woolwich Arsenal at the time of the First World War employed in excess of 70,000 people; Beckton Gasworks employed 10,000 and Ford's at Dagenham employed 15,000.'

I approach this matter rather differently from the way in which it has been seen in the past. Certainly I want to extend the boundaries of London way beyond the traditional administrative boundaries. For example, workforces data attached to particular industries conventionally thought to be outside London boundaries, reveal a very different scale of industrial activity. At their height in the early decades of the 20th century, the Great Eastern Railway Works at Stratford employed 7,000 people; the Thames Ironworks in Canning Town employed 6,000; Siemens in Woolwich employed 7,000; the extraordinary Woolwich Arsenal at the time of the First World War employed in excess of 70,000 people; Beckton Gasworks employed 10,000 and Ford's at Dagenham employed 15,000.

At a time when London was putatively dominated by small-scale production units, these figures point to a rather different picture of London's industrialisation.

In the course of the 19th century this embryonic industrialisation matured and greatly expanded, transforming the region into a manufacturing centre which in terms of mechanisation, production and organisation rivalled any in the country.

Women working at the Royal Arsenal, Woolwich.

Building Dagenham Dock, 1890

Easton & Anderson Works, 1895, Erith.

At the heart of this transformation were the docks and shipbuilding on the Thames, sustained by the arterial Thames. The first phase of this great phase of modernisation took place towards the end of the 18th century/ beginning of the 19th century. During this period, the old London docks were extended and commercial docks were constructed. This development essentially transformed a metropolitan riverscape that had remained largely unchanged since the late 15th century and consolidated London's position as the great centre of world trade and commerce.

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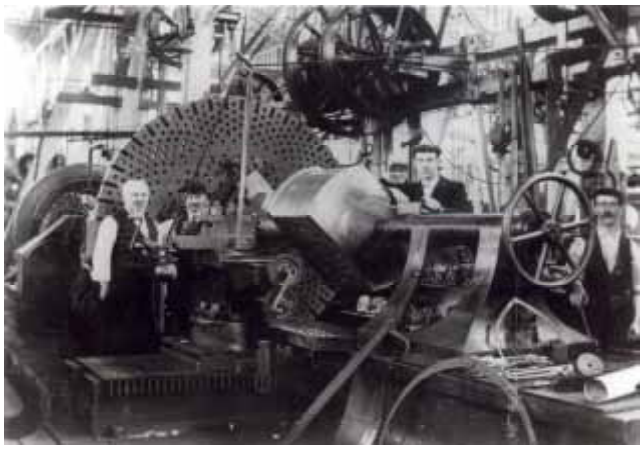
The direct impact on industry however, was problematic. I do not feel that the docks as such actually generated large-scale industrialisation. Rather what it did do was to open up particular areas which had previously been considered unsuitable by extending the communications infrastructure. The other important factor was of course that the docks made available abundant supplies of cheap coal to London. Many of the industries that subsequently emerged in the 19th century relied very, very heavily upon the supply of cheap coal in that way.

It is tempting to think that this process really began at the end of the 18th century and the early part of the 19th century, but if you look at the individual industries I think you can see that many of these industries actually had precursors in the early 18th and indeed 17th centuries as well. Just to give you one example that immediately springs to mind: this area became the world centre of cable making in the 19th century. All of the great cable makers of the world were located in east London - Siemens, Callenders, India Rubber and Gutta Percha works, Henleys. The point here is that these industries all had previous experience of rope making for London's shipbuilding industries. Of course it was fairly easy once you had the expertise in making rope to extend that expertise into the making of cables.

Now, what were the industries therefore that emerged during this period? Well, I think, broadly they can be situated within one of four broad classifications. First of all: shipbuilding and engineering. London was the great shipbuilding centre of the nation in the early part of the 19th century. Now, to a certain extent London lost its advantages with the introduction of ironclad vessels, because the argument was that London was too remote from the suppliers of iron and coal, enabling northern shipbuilding yards to take advantage.



Thames Ironworks, London.

Thames Ironworks shipbuilding.

Limehouse Generating Station, London, 1929.

Actually that is only part of a complicated story. You do find, if you look at the record, that some London shipbuilders survived well into the 20th century. They survived because they were able to draw upon abundant suppliers of coal and they actually had their own foundries on site.

Heavy engineering was also part of that. A lot of these engineering works were related to shipbuilding and ship repairing but there were others, such as Frasers and Chalmers in Erith, that was responsible for the manufacture of heavy mining equipment, most of which was shipped abroad. That is the vital point that I need to make here, that many of the industries that emerged at this time cannot be understood exclusively in terms of the London environment. London was at this time, as I have hinted, the commercial centre of the world and the Thames provided access was really the gateway to the world. Many of these industries made full use of that.

'Many of the industries that emerged at this time cannot be understood exclusively in terms of the London environment. London was, at this time, the commercial centre of the world and the Thames provided access was really the gateway to the world.'

The second broad area is gas and chemicals. Again, this is an industry that relied very heavily upon coal because gas companies produce gas from the burning of coal. As a spin-off from that, of course, we had the development of a very extensive and sophisticated chemical industry. Many of the coal by-products from the production of gas were therefore turned into chemicals of one description or another.

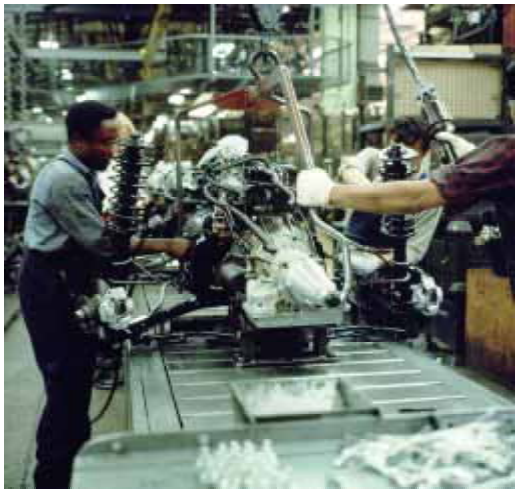
Thirdly: cables and telegraphy. Well, I have already talked very briefly about this. The world cable industry was centred in what is now the metropolitan end of the Thames Gateway.

Finally, the fourth broad important industry was that of armaments. I have already cited the example of the Woolwich Arsenal, but there were others such as the Brunner Mond Factory in West Ham. They were located here because it was considered that this was a location safely remote from the city. If there were accidents, as indeed there were, then relatively few lives would be lost and equally importantly, little property would be damaged.

By exploring the experience of the region to the east of London, generally thought to be outside its general purview, I want to argue that there is a need to revisit the industrial history of the metropolis. Industrialisation of this region may have differed in scale and intensity, periodisation and trajectory, but it is the commonalities and complex interdependencies that persuades us of the importance of thinking about the region as a totality and of its neglected contribution to London's industrial history.

Production line, Ford Motor Company, Dagenham, 1950.

1 millionth car, Ford Motor Company, Dagenham, 1965.



Production line, Ford Motor Company, 1968.

This shared experience derived from locational advantages offered by riverside sites; these have long been recognised and were critical to the region's proto-industrialisation. In the 19th century, the active confluence of access to the river and hence overseas markets, completion of an extensive docks and transport infrastructure, availability of cheap land outside London, equally importantly proximity to the London market (much of this industrialisation was of course financed by city brokers and bankers), abundant coal supplies and networks of associated industries promoted a dramatic new phase in the region's industrial history as numerous sizeable factories settled here and expanded.

'The 20th century saw the demise of most of these industries. Now, rather sadly, this experience is only there in the collectively and official memories and to a certain extent in the archaeological heritage as well. The dock's complexes still survives in one form or another and a few isolated outposts like Tate & Lyle.'

Here too came among the age's great engineers: Maudslay; Telford; Rennie; Brunel; Stevenson; Mare; Travivick; Hancock; Hudson; Siemens; the list is a long one. Here engineers settled and worked and they secured their reputation in the shipbuilding, chemical, locomotive, armaments and other industries of the region.

The 20th century saw of course the demise of most of these industries. Their fall is something that is linked to the long-term demise of Britain's manufacturing industry, and of course the loss of empire as well. Now, rather sadly, this experience is only there in the collectively and official memories and to a certain extent in the archaeological heritage as well. The dock's complexes still survives in one form or another and a few isolated outposts like Tate & Lyle.

I want to finish very briefly on two points - not the impact necessarily - of why these sorts of issues are important in thinking about the nature of regeneration in this particular area of London. Well, I think one thing is clear, is that the sort of industries that we saw in the 19th century are not likely to be replicated in an economic and social context which has changed out of all recognition. This is a conference concerned with eco-manufacturing and I think one of the things that we can learn from the past is that these industries were amongst the dirtiest and most polluting industries imaginable. As we have learnt to our cost. Because when these industries were closed down and when the sites are now proposed to be used for new settlements, one of the first tasks that are faced by developers is actually to clean up those sites. This has been a major headache for many of the developers because the land is simply so polluted.

Second and final point that I want to make is that much has been made by, well amongst others, the Department for Communities and Local Government about Thames Gateway regeneration and the need for sustainable communities. Now, I am not sure what is meant by sustainable communities but I think there is an awful lot that can be learnt from the experience of the 19th century, because you only need to look at the experience of industries like, well, Tate & Lyle, Ford's, Siemens and The Arsenal, to look at sustainable communities that have worked over protracted periods of time.

These employers, for all their faults, actually did provide secure and relatively permanent employment for their workers and, in addition to that, provided a whole range of social and sporting facilities. When you talk to people that were employed in these industries, I have to say the majority remember them with a degree of affection because working in these industries provided these people with a whole way of life. I think when we think about sustainable communities in the future, I think this is something that we need to look at very seriously.

A city of innovation

Why and how the London Development Agency are putting decentralised energy at the heart of their environmental policies

Ted Kyzer has over 30 years experience in executive management, project and construction management and international marketing and business development. He has worked on a range of major projects spanning property development and the civil/infrastructure, power generation, petroleum and chemical, mining and metals, pipelines and telecommunications industries.

After starting his career as a pilot in the US Armed Forces, Ted worked at Bechtel for 25 years, where he held positions as Engineer, Business Development Manager for Asia and later China, Vice President of Europe, Africa and the Middle East, Senior Vice President of Southeast Asia, President of Asia Pacific and President of Civil Infrastructure.

Ted worked at the London Development Agency as Group Director, Olympics & Pan London Infrastructure Development between 2006/07. He was responsible for the acquisition of the land required for the 2012 Olympic Games, Infrastructure Development across London, the Environment and Climate Change Unit, Design for London, Housing and the LDA's Real Estate and Property Portfolio.

Ted is a Fellow of the Royal Society of Chemistry and a Member of the American Institute of Chemical Engineers.

'Walk out on the South Bank and talk to ten people; six of them would probably know about climate change.'

London is probably the leader in tackling climate change in the world. I do not have any empirical data to support that, but there is a lot of anecdotal data. Walk out on the South Bank and talk to ten people; six of them would probably know about climate change. They might come from government, from private industry and there might be an average citizen. I think if you walked out on the street in most other big cities in the world, you would not find that to be the case. I think London is at the front of this and I think the reason for that, one of the big reasons, is the Mayor. The Mayor is leading from the front and he has raised this issue in the world and it is clearly in the front of all of our agendas here in London.

The other thing that we have going for us in London to make things happen is all the projects that are going on: the Olympics. Crossrail has just been approved and there is all the work and money that we are putting into the Thames Gateway and east London. Through these initiatives we can change

things - introduce new technologies, get new businesses established on this momentum. It's like the space programme – if you do a space programme, a lot of technologies come out of it. I think that the same sort of activities going on at that kind of level in London right now will allow this to happen.

'Tackling climate change is at the core of everything that the LDA does. We have two rules now. Rule number one is that every development we do will be either low-carbon or zero-carbon. Rule number two is if you cannot achieve low or zero carbon, see rule number one, because that is the way we are going to do it.'

Tackling climate change is at the core of everything that the LDA does now. It used to be right out on the edge, now it is right at the centre of what we do. We have two rules. Rule number one is that every development we do will be either low-carbon or zero-carbon. Rule number two is if you cannot achieve low or zero carbon, see rule number one, because that is the way we are going to do it. You will find that it is a big change and it is making a big change in the way we all think about it there.

One of our aims is: *'Management of our waste and growth of industries and developments in a reasoned, thoughtful and sustainable way is crucial to London's future''*

I believe London, which is probably the financial centre of the world as it was a long time ago, can maintain that if it handles these kind of practical things in the right way. If it does not, that will change, and I think that goes for all the big cities of the world like New York, Beijing and Mumbai. They are going to have to tackle this in the same kind of way.

There are three things that the LDA have going on in relation to climate change. The first one relates to behaviour and that is this group of programmes: Green Homes Programme, Green Organisations and Green Construction.

The second part of this is Decentralised Energy Delivery (DED) that is the core of what we are doing. Our plan here is to put combined heating and power on the ground in London. We are going to make that happen and our strategy is to show by doing, not show by talking. We are going to try to build some things. Malcolm Ball (Director, Decentralised Energy Delivery Team, LDA), who is the leader of that group at the LDA, has got this down to a small number of projects and we are going to make one of those happen in a few years. I hope that when the Olympic Games happen here in 2012, the Mayor can point to a couple of these projects that are built and up and running. That is the goal of the LDA in that area.

The third part of it is the London Climate Change Agency (LCCA), which has responsibility for the energy services company (ESCO).

There is a fourth part to the environment and climate change work we do at the LDA, which we do not have yet. We do not have a remit or a budget for

waste. Our way of dealing with this? To just do it anyway. We are trying to make a couple of projects happen. We have given a contract to London Remade recently to identify about three business opportunities that we can take to financial close, one of those within a year. They are hard at work at that and doing a good job at it. Park Royal is a second project we are putting money and effort into and then finally there is the Closed Loop project, which is at Dagenham Dock and the Sustainable Industries Park.

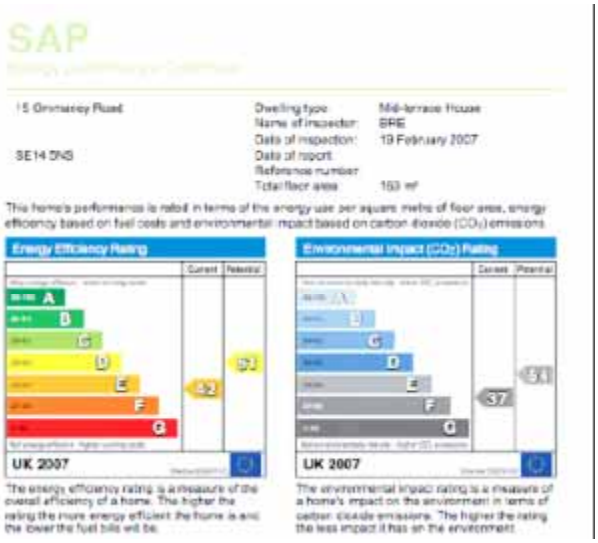
Green Homes

This is a project run by Helen Keenan (Director, Climate Change Programmes Delivery Team) at the LDA. The idea here is to change the behaviour of the average Londoner: to do something about emissions from their homes, to do something about the average business owner about the emissions from their buildings or their business.

By April 2008 our aim is to have 1,000 homes in London audited for emissions. We expect to have 50 of those to have done something about it. That seems like a very low take-up rate, but that is actually the average in the world of how that gets taken up right now. What we need to do is improve that dramatically.

'A home or a building that has got a higher efficiency and environmental rating is going to sell for more than one that has a lower one.'

Then within three years we expect to have about 17,500 homes audited, 7,000 of those to have done something about it, 50,000 owners of homes to have called and asked about it and saved about 17,000 tonnes of carbon.



The graphics to the left are energy efficiency ratings and environmental impact ratings that are becoming part of the Home Information Pack (HIP) that accompany the sale of a home.

The further you move up that curve then the better rating you get, and I believe that is going to have an impact on pricing. If a home or a building that has got a higher efficiency and environmental rating is going to sell for more than one that has a lower one. I think you are going to see that change over time, so it is going to have an impact on the property market, which is exactly what we want to happen.

Green Organisations

The Green 500 scheme

Our aim is to get about 500 businesses to do an audit at the beginning of the year and at the end of the year and if they meet the targets that they set for themselves in terms of reducing emissions then they get a badge - they will get to become part of the 500. We want to make this club become something that people are striving to get into. I think that will happen.

The Better Buildings Partnership (BBP)

Our aim is to get the top 10 or 15 building owners in London to sign up and change the commercial way in which they deal with those buildings. For example changing the leases so that they would have some authority over how the building is operated with the tenant, to change the valuation model and then alter how the managing agents run them. If we can change that we can change behaviour.

'Our aim is to get the top 10 or 15 building owners in London to sign up and change the commercial way in which they deal with those buildings.'

The Gemini Business Park (below) is one of the Olympic relocations. I thought we did a pretty good job of getting the environmental specifications built into the plans even though it was done quite quickly. It has got an excellent BREEAM (Building Research Establishment's Environmental Assessment Method) rating; it has grey water recycling; ground source heat pumps; photovoltaics; and there is a lot of planting on the buildings and around the buildings. This is an example of what needs to happen when we do a new development.

Green Construction

This is the area that we know the least about and one that we are going to have to put some more work into to make into a logical programme that we can make work. When the manufacturers come up with a new product then they typically train people on how to install their products, and so we are trying to facilitate that connection. We are going to give ourselves to the spring of next year to have a good programme that we can roll out.

We are helping in the training of local authority planners. There is a void in the planning knowledge base about how to install some of the things we are talking about now, so we are doing some of that training or paying for some of that training.

Decentralised Energy

This is something very close to my heart. If we go from large centralised electricity generators, like you see in the world now, to more localised electricity and heat generators, then that is going to make a big difference in the way the world operates.

'If we go from large centralised electricity generators, like you see in the world now, to more localised electricity and heat generators, then that is going to make a big difference in the way the world operates.'

There is no technical issue with this – if anybody tells you that they are not telling you the truth. It is a commercial issue. What we have to do is make this commercially attractive so that commercial companies can make money doing this business. If they can do that then they will get engaged in that process and it will be picked up and you will see a proliferation of combined heating and power plants.

The LDA has Malcolm Ball, who is leading this group and Robert Tudway, who is maybe the best climate change regulatory lawyer there is. He has just retired from the bar – having worked on the commercial deal that will put the net present value of these plants somewhere above zero.

We are accumulating heat loads, determining what size of plant will make the most sense and how you portion the risk in the business deal. Size does make a difference. They need to be somewhere north of about 15 megawatts or they will not make sense. As that curve comes down you pass the developers' threshold and then it starts to make commercial sense. Then I think the private sector will pick it up.

Five projects the LDA are using to improve the East End's energy supply

Project 1 The Royal Docks

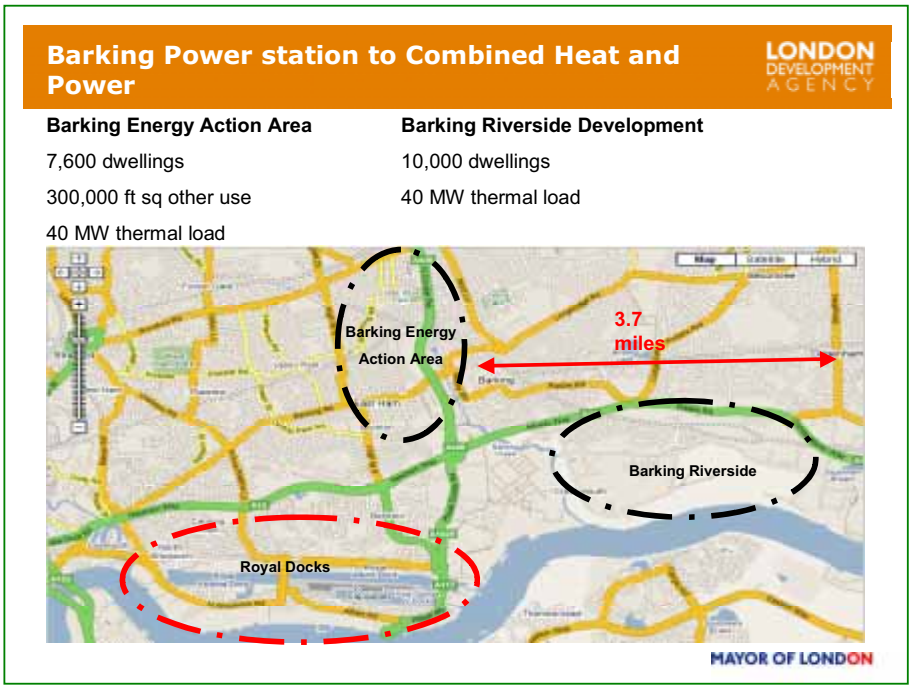
19,000 dwellings; 5,500m² education/ health; 85,500m² light industry; 40,000m² hotel; 391,500m² commercial/office

The Royal Docks area includes: ExCel; London City Airport; across from the Royals Business Park; and Silvertown. We were looking at much smaller CHPs of a megawatt or less but they do not make commercial sense. Now we are looking at this whole area and somewhere in the range of about 30 megawatts, if you take into account this whole area, If you look at that as an area that would be supported by CHP, then you can make commercial sense out of it.

This takes account of the whole of the heat load in that area and this would be the basis for establishing CHP to service this area. If we look at London that way in these big chunks, it will start to make sense.

Project 2 Barking power station

Barking is 1,000-megawatt station. At the moment it dumps 400 megawatts of waste heat into the Thames. We would like to capture that heat and use it for a district heating scheme. What they would like to do is add another 400 megawatts to this station, making it a 1,400-megawatt station and then capture all the heat and use it in district heating schemes. You can see from this map it is only 3.7 miles from the Barking town centre, which we are calling the Barking Energy Action Area.



We could take that heat, pipe it to that area and create a district heating scheme. Barking Riverside is very near there, The Royal Docks are very near there, so it's entirely feasible that we could use all of that waste heat and create CHP schemes here. The owner of the power station is engaged in the process. The commercial deal for this needs to be worked out, this is not a technical issue. 3.7 miles to pipe around waste heat is nothing actually. There are schemes in the world that transport this 100 miles, 90 miles, that sort of thing, so this is something entirely feasible.

Project 3 Thinking of Waste as Fuel

The area that I mentioned that we do not have the remit for and the one we want to really tackle is waste. I put here 'Thinking of Waste as Fuel' and we need to start thinking about it that way. We think about waste as having no value. We need to think about waste as having a lot of value. If you think about it as fuel then I think we will start getting there.

We are looking for a pipeline of projects that we can put together. I mentioned we have got London Remade helping us do that. A possible project is the waste site at Aylesford Street in Tower Hamlets that we would like to clean that up and use for residential property. There is a site very near that Olympic CHP plant that we could use for a land swap – this would move the waste site near the CHP plant and use it for fuel. Tower Hamlets is leading on that and I think you will see something happen there that will be quite interesting before the Olympics happen. That will start to use waste as

a fuel, and I would like to see that happen.

We are working on a project in Park Royal, west London, one of the biggest food producers around. I think it is the best opportunity for anaerobic digestion in Europe because of all the food waste.

Project 4 Closed Loop

Closed Loop is a manufacturing project that is being built at Dagenham Dock. It is a £12 million facility and what it does is recycle polyethylene terephthalate (PET), which the plastic bottles that you buy your squash, coke, water and so forth in. Now, it will recycle those bottles and put it back into the reuse of PET. In the packaging industry they have deals with Marks and Spencer and some other companies.

This project makes perfect sense. It is the kind of manufacturing project that can happen in a place like London, which is a high-cost place; usually manufacturing goes to the lowest-cost place. This is the kind of project that can work here because the feedstock is local, it needs to be dealt with locally; the capital cost is not so high and it is not labour-intensive, so we are quite excited about this project.

Project 5 Sustainable Industrial Park

I want to conclude with the Sustainable Industrial Park. The LDA and the London Thames Gateway Development Corporation (LTGDC) have been trying to create an area for recycling and environmental business. The LDA is supplying five hectares of land and putting the roads and the infrastructure in right now; the Closed Loop plant is very nearby.

The LDA Board on 15 October approved money for the project. We are working with Peter Andrews (Chief Executive Officer, London Thames Gateway Development Corporation) and Ian Short (Chief Operating Officer, London Thames Gateway Development Corporation), Peter [Andrews] is the CEO of that, Ian [Short] is really running this project, but to do a joint venture with them where we put in the land, they put in the bulk of the money and we make this thing happen. We are in the process of getting Mayoral approval, which we expect to have in the next 30 days or so. Next thing that will happen the infrastructure and the roads will be done. In the summer of 2008 we will start marketing the land to various businesses that may be interested in it. In 2009 we start construction of the building. This is another project that will happen and this is the way we can create a place that we can do manufacturing in London in this business.

Venturing out
Investing in the environment sector

Michele Giddens has ten years of international development and community finance experience ranging from large equity and debt instruments to micro-finance and small business lending. She was previously at Shorebank Corporation, one of the leading community development banks in the USA. She was Chair of the Community Development Finance Association (cdfa) 2003-2005.

Bridges Ventures

'There is an increasing desire from investors to find products which are ethical as well as good in terms of financial return.'

We are a venture capital company with a difference. We are a private sector venture capital company, but we are a company with a social mission. We will only ever raise funds that have a dedicated social or environmental purpose as well as being dedicated to making a financial return for our investors. All our funds will always have a dedicated social or environmental purpose.

This is a growing area that could really benefit environmental and sustainable businesses in London in the future, because there is an increasing desire from investors to find products that are ethical as well as good in terms of financial return. We believe that we are part of a growing sector, and certainly in terms of availability of venture capital for environmental businesses it is a fantastic time - there is a lot of money available for entrepreneurial environmental businesses. We at Bridges believe that market forces can be harnessed to make a positive social or environmental impact.

Our current funds invest in unquoted entrepreneurial businesses in one of the following two sectors, either businesses which are in regeneration areas - so using the Index of Multiple Deprivation (IMD), we invest in ambitious entrepreneurial businesses located in the most deprived 25 per cent of the country - or in businesses where the positive impact is not from where the company is located but rather from what it does intrinsically. For these, we are looking for sustainable businesses and we target sectors like the environment but also healthcare, education and ethical businesses such as organics and fair-trade.

Funds Managed

We were founded in 2002 and our first fund could not have been raised without the help of the government. The first fund was 50 per cent government and 50 per cent private sector and was a £40 million fund. I am delighted to say that there must be something to all of this because now that we have proved that we can, or at least we are showing that we can make money and also make a measurable social or environmental difference at the same time, we are able to raise our second fund this year. We targeted £50 million; we actually raised £75 million and in fact had to cut investors back a little bit to bring them down to £75 million.

'There are sceptics who say that you either go and you maximise your profits and then, if you are a nice guy, maybe you give it away when you are a bit older; or you are a warm-hearted charitable sector person and you are going for social return, but the blending of the two does not work We believe we can confound the sceptics and show that it does.'

That was a pretty remarkable success in confounding the sceptics who say that you either go and you maximise your profits and then if you are a nice guy maybe you give it away when you are a bit older, or you are a warm-hearted charitable sector person and you are going for social return, but the blending of the two does not work. We believe we can confound the sceptics and show that it does. It is interesting to hear that the London Development Agency is also unprepared to compromise on the mixture of financial and social or environmental goals.

We are also very lucky as we were founded by 3i, Apax Partners, and Doughty Hanson is also involved - so three of the biggest private equity firms in Europe are behind us. High-street banks and pension funds, and wealthy individuals and families also back us.

Track Record

So far we have invested £37 million in 33 companies. We have supported 75 per cent of the portfolio with further money, which just lets you know it is about being engaged and feeding the money into the company as it succeeds. We have sold so far three companies which delivered a profit of £12 million, I will tell you about a couple of those but just to give you a sense of financial returns we sold at 165 per cent net IRR (Investment Return Ratio), 84 per cent IRR and 29 per cent IRR - all of which would be very healthy returns regardless of any social or environmental mission.

Making a Social Impact – Our Three Stage Process

We believe that it is crucial to be very clear what decisions you are making at any point in time. If you are trying to really evaluate social and financial goals and commercial goals at exactly the same time, you can end up failing in both because we could end up picking businesses that we think are really lovely and nice and can do good things, but missing whether or not they are commercially going to succeed.

Now, the problem is it could be a lovely idea but fundamentally if the business engine does not succeed and commercial drivers do not work then

the jobs we hope will be created are not created, the carbon we hoped would be saved is not saved because the company does not succeed. We have clear social screens but we also have to separately make a very clear commercial judgement as to whether we think this company can be a winner.

'Fundamentally if the business engine does not succeed and commercial drivers do not work then the jobs we hope will be created are not created, the carbon we hoped would be saved is not saved because the company does not succeed.'

Stage 1 - the social or sustainability screen
We have got specific criteria we are looking for in regeneration companies. Being located in the most deprived 25 per cent of the country is not enough because you could be located there and still have no impact on that local area. Any company must also be recruiting people who live there or spending money on suppliers that are located in these areas, or serving those areas as a market.

Stage 2 - the social impact scorecard
This gives partners the ability to track a number of measures: how they are impacting the local community, how they are impacting the environment, how they are impacting their workforce. By working with them during the investment process, we look for win-win opportunities – typically, where they can do something that is good for the environment or the community and is also good for their business.

Stage 3 - reporting back to investors
I think we are the only venture capital company in the country that reports to investors, not only on financial returns, but also on social and environmental impacts. It is amazing how fascinated our investors are in that part of the reporting because they do not get that in general from other firms.

Case Study 1 **Simply Switch**

Simplyswitch is one of our first three exits - it is also our smallest ever investment at £125,000. It was a female-led business and it was a complete start-up when it came to us. At Bridges we invest in start-ups, we invest in development growth businesses and we invest in small management buy-outs. This one was a complete start-up.

Karen Derby (Founder & CEO, Simplyswitch) thought she could save customers money on the gas and electricity bills, and that not everybody could do it online, some people might want to speak to a human in the course of changing their supplier. She created Simplyswitch and we invested £125,000 building up to £345,000. The company was sold in August 2006 for £22 million, so £345,000 turned into £7 million for our investors, and there is your 165 per cent IRR and 22 times money multiple.

On the social impact side: she located into one of our target areas; created 80 jobs while we owned the business, many for women, many for ethnic minorities; she switched consumers to sustainable energy where they wanted that and she partnered with charities who promoted this free service, the revenues come from the power companies, it is free to the customer who switches. She promoted this through charities and raised £500,000 during the time that we owned the business for partner charities. We think that is an example of a business that both performed fantastically financially and sustainably. The win-wins that we identified through our social impacts scorecard were the idea of marketing through charities, which I do not think she would have otherwise thought of.

Case Study 2 **The Office**

The Office Group is another London-based business. This is actually an idea Bridges Ventures came up with so we have created a company and hired a management team to lead it. The company buys worn out or redundant buildings in our target areas in London and transforms them into easy-in, easy-out flexible office space for small businesses. If you do it right, and it is not easy to do it right, but if you do, it is a fantastically profitable business and also brings dynamic young businesses to our target areas. They are just about to open, hopefully in January, their fifth building in London, in Shoreditch, and they are using a lot of environmental building techniques and trying to make it as green as possible, hopefully possibly the greenest serviced office building in London.

Again, through working with them we have come up with ideas like turning their flat roofs into green roofs in cooperation with a London-based charity that works with inner-city kids, so environmental and social at the same time. Plus it makes it more desirable to rent the space in those buildings, to have a flat roof with a garden on it and to know that all these good things have happened in the building of your building.

Social Investment – Drivers of Growth

Socially responsible investment as an asset class is already worth billions and billions of pounds and is growing very, very fast, but, I do not know if everybody has noticed, it is only for investment in Stock Market businesses. Now, why on earth would an investor decide, 'I want to be ethical about my investments but only about the Stock Market ones, I do not want to be ethical about my property investments, I do not want to be ethical about my venture capital investments, only the quoted investments.' We are convinced that that is a driver for more funds like us targeting businesses that are sustainable or environmentally positive. You only have to look at the growth in consumer demand for fair trade, for green goods, for organic

products to see that not only is it being driven by investors, it is also being pulled through from the consumer side. In addition Bridges Ventures is beginning to show that you can make money and make a difference at the same time. We believe that many others will follow.

We have a clear decision-making process. Although we are set-up to achieve social or environmental goals, when we look at a business we are looking for an entrepreneur who knows what he is doing; we are looking for a team that has what it will take to make it work; we are looking for a clear business proposition; we are looking for a business that in three to five years can be worth substantially more than it is today, hopefully with our help; we are looking for an exit opportunity, we will sell our shares along with the management team if they choose or in a way that the management team chooses.

We are making very clear commercial decisions but within the context of a social framework and we see ourselves as sitting in a nascent field of sustainable venture capital, which I am sure is going to benefit any of you who are looking for venture capital for sustainable businesses. We hope that we are the beginnings of a new asset class.

Pupils, parents, teachers and bosses

Education and employees working together to create a new engineering sector for the capital

Jacqui Wordsworth, Centre for Engineering and Manufacturing Excellence in London

A Chartered Mechanical Engineer, Jacqui graduated from Birmingham University in 1993 with a Masters degree in Mechanical Engineering, Manufacture and Management.

After working for seven years at Shell here and across the world, in April 2000, Jacqui accepted a new challenge as Gateway to Industry Manager – responsible for setting up and delivering a £5.7m project to support manufacturing industry in east London as part of the London Riverside regeneration programme 'Engineering a Competitive Futures at the Heart of Thames Gateway'. Funded through Single Regeneration Budget, Gateway to Industry devised a number of projects encouraging young people into engineering careers and supporting local engineering and manufacturing companies.

In 2005 Jacqui developed the programme's forward strategy and secured London Development Agency funding for two new CEME based projects - Gateway to Skills and Gateway for Business. As Programmes Director at CEME, she is now responsible for delivery of these projects and for development of future programmes to support skills and training east London.

I will address the barriers associated with creating the right skills base for the manufacturing of the future, including traditional engineering and manufacturing and eco-manufacturing.

Tony Blair and Ken Livingstone opened the Centre for Engineering and Manufacturing Excellence (CEME) in 2003. It is an innovative public/private partnership between the London Development Agency, Ford Motor Company, the Learning and Skills Council (LSC) and the local authorities in the area. That is quite a mix of people to get together in one building, in one facility. This was born out of the single regeneration budget programme, engineering a competitive future at the heart of Thames Gateway. This was started in 1999, a £436,000 million regeneration investment programme into this part of east London. CEME was really seen as the lynchpin in that strategy.

It is a landmark building. I would recommend anybody to come down to have a look at it. It is a sustainable building; it is built with a grey water lake; we have a large bank of photovoltaics; it is a fantastic looking building and a real inspiration for those driving into what is traditionally quite a grim area of Dagenham in east London.

We are a campus facility that houses a further-education college, a commercial training provider, incubation space for new businesses, nursery facilities and regeneration programmes. That is a big mix of different types of initiatives.

'CEME is trying to create pathways from school through college and into employment, generating a real holistic approach to the skills needs for the area.'

We deliver economic regeneration programmes for Barking, Dagenham and Havering. We try to deliver leading edge education and training, specifically in the sectors of manufacturing, engineering and technology, and we deliver a fantastic facility to support the businesses in the local area to grow and develop to generate new jobs for the future.

In summary, CEME is trying to create pathways from school through college and into employment, generating a real holistic approach to the skills needs for the area.

From Education to Employment

First we try to develop the supply of engineering labour by developing a number of different initiatives through the Gateway to Skills project at CEME. This works with local secondary schools and tries to promote engineering as a career path for young people of today. We do not differentiate between a further and higher education route and a work-based learning route. It is really horses for courses. So whichever way they choose, it is really about developing a greater number of young people going into manufacturing technologies.

There is no point having lots of enthusiastic young people unless you have got jobs for them, so we try to create a demand for that labour by growing

the local business base and creating more jobs in the local area. We do that through the Gateway for Business project.

Barriers to creating a skilled workforce

We are responding to an acute set of issues, both nationally and regionally, with regards to the skill base for engineering and manufacturing. The *Foresight 2020 Manufacturing* report looked at the coming changes in the manufacturing base of the UK and really pointed to the acceleration in the change of businesses and the growth particularly of the small to medium-sized enterprise sector.

The report looked at the type of manufacturing that we would be doing in the future and a move away from the large-scale production engineering that we have seen in the past, as alluded to this morning, into more design-based, prototyping type manufacturing: small runs; bespoke designs. So, focusing in on the whole design life cycle from the initial concept design right the way through product development, manufacturing and into decommissioning of the products, some of which we may hope for the Dagenham Dock area.

'In 1993, science and maths made up about 30% of the A levels, by 2003 that had dropped to only 23% and the trend is still declining. If people are not choosing A levels, they are not going to go onto university and they are not going to become engineers.'

This requires a change in the skills for engineers and we therefore need a broader breadth of skills and a higher level of skills in the workforce. The Science, Technology, Engineering and Maths (STEM) report commissioned by the LDA last year started to look at the issues surrounding skills in London, in particular in this sector. It found that there has been a pervading negative perception around career choices of young people towards manufacturing. It is seen still very much as a grim, dirty career, evoking dark satanic mills, welding and getting absolutely filthy – misconceptions in today's age of manufacturing.

It also found that there has been a decline as a result in the number of A levels (Advanced Levels) in the engineering subject areas, for example physics and maths. In 1993, science and maths made up about 30 per cent of the A levels, by 2003 that had dropped to only 23 per cent and the trend is still declining. If people are not choosing the right A levels, they are not going to go onto university and they are not going to become engineers.

Crucially this report also found that we had an issue with a regard to the teaching and lecturing staff around science and technology in London. It is difficult to recruit and to retain high calibres of staff in these areas. This has a huge impact on the young people that they are working with. If you do not have good teachers, they are not going to inspire and enthuse.

Sandy Leitch pulled all these factors together in his Review of Skills and

called upon education and industry to work together to try to come up with the right type of learning qualifications for the world of work. We really need to respond in the education sector and in the employment sector to make that happen. It is about bringing the two parts together to create a new set of skills for the future.

Barking, Dagenham & Havering

Locally in Barking and Dagenham the problem is even more acute. When we started the SLB programme back in 2000 we had quite a big issue that we were trying to solve with the inward investment. We had a dependence of one major employer, no prizes for guessing their identity, and manufacturing was declining and is still set to decline in the area. There had been little inward investment over the years. Now, with the advent of sites such as Dagenham Dock we have seen some inward investment coming in, but it has been a long time coming and the area has really seen a dearth of new companies coming in over the past few years.

'With the advent of the site such as Dagenham Dock we have seen some inward investment coming in, but it has been a long time coming and the area has really seen a dearth of new companies coming in over the past few years.'

There are very low aspirations in the local population. The demographic really does not have very high aspirations in terms of education. Only 15 per cent of the workforce has greater than level three qualifications across the two boroughs. The higher education take-up in the area is ten per cent lower than the national average. People are not really looking at where they are going to take their careers.

When we first started in 2000, only 20 per cent of the companies in the area had a training plan, less than 25 per cent of them were actually doing any training. Nobody was addressing workforce development issues. We needed to do something fairly major to create a sustainable intervention in the area to address this problem. Hence, we are trying to create a vibrant inward investment and business start-up environment, stimulate a local population that is qualified to access those jobs and to change the attainment levels and the aspirations of the population that we are working with.

What we want is high growth manufacturing businesses that employ qualified, local people.

Gateway to Skills

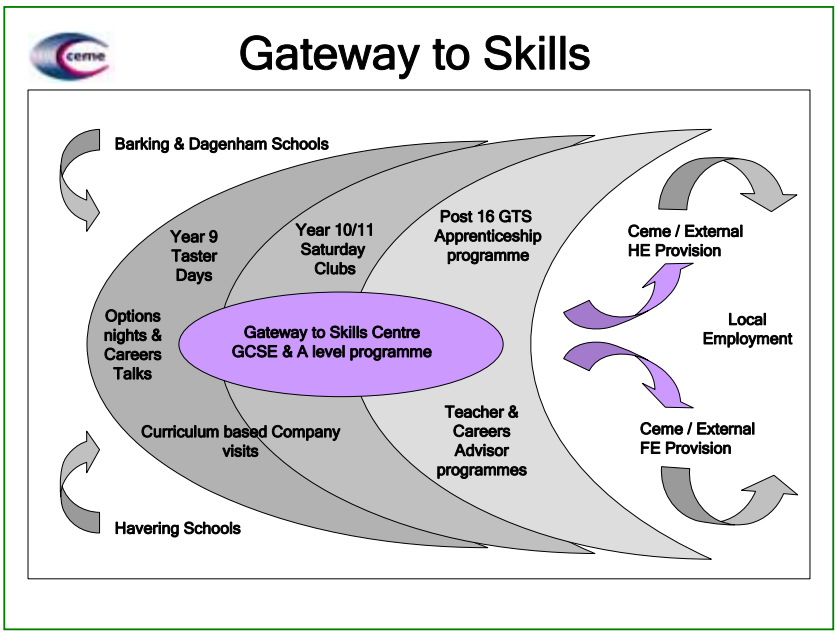
In 2000 we created a project called *Gateway to Industry*, that was funded through the single regeneration budget and since then we have developed and grown that project into Gateway to Skills, which started at CEME in 2005.

This is a unique collaboration, again between CEME, the company, the

London Development Agency, who provides the majority of the funding; the two local boroughs of Barking and Dagenham and Havering, in particular their education authorities and the 30 local secondary schools that we work with. That is quite a lot of people to meet their needs, but we do try to do that.

'We are just trying to make engineering exciting again in Dagenham.'

We are trying to make engineering exciting and inclusive for everyone and really start to push it as an interesting career choice for the young people in the area. We do this in three different ways.



In the early stages at Year 8 and Year 9, that is pre-GCSE choices for those who do not know your year groups, it is about just trying to make it exciting, raising their aspirations, showing them that engineering is different, that it is not about welding in Ford's, that it is about exciting new types of manufacturing.

At Years 10 and 11, we try to focus on something that is very important to schools and that is the attainment levels at GCSE. Schools are marked in league tables on their attainment levels and we try to add value to that process by the activities that we do.

At Post-16 it is about trying to increase the number of opportunities into the job market and trying to challenge the way young people and employers see their opportunities in the local area. We are just trying to make engineering exciting again in Dagenham.

We have a range of activities throughout the programme targeting the different age groups that we work with. We have about 30 schools in the local boroughs and we work with most of them over the course of the programme. At Year 8 and Year 9 it is really about taking the students out of school, showing them engineering in its reality.

We take them on curriculum-based visits to local companies and places of interest, bring them up here to the Design Museum and show them that engineering can be about creative design as well as the hard manufacturing part of it. We do a lot of talking to parents, teachers and students at schools' option nights. Pretty much every week between September and March we could be found on a Thursday night standing talking to parents who come up to us and say, 'Urgh, manufacturing is dead! Ford's are closing down! It is the end of the world!' We say, 'No, it is not.' It is very much about changing some of the key influences of young people, their teachers and their parents' views about what the career opportunities are.

'We had eight teachers from the local schools and we took them around four different companies, right on our doorstep. We had a fantastic design-led business who makes taps and bathroom fittings; a company that makes magnets just down the road from us; the new diesel engine plant at Ford's and we showed them the breadth of manufacturing that is literally right on their doorstep.'

We also run teacher programmes recognising that they have a lot of the career influences on the young people today. The careers guidance provision in schools is sadly much reduced these days, so what we try to do is make sure that the design and technology teachers, the business studies teachers really understand about the world of manufacturing that is sitting right on their doorstep.

We have just finished a four-day teacher professional development programme. We had eight teachers from the local schools and we took them around four different companies, right on our doorstep. We had a fantastic design-led business who makes taps and bathroom fittings; a company that makes magnets just down the road from us; the new diesel engine plant at Ford's and we showed them the breadth of manufacturing that is literally right on their doorstep. On the Monday morning these teachers go, 'No, would not recommend anybody goes into manufacturing.' By Thursday afternoon yesterday they were going, 'This is amazing. Yes, so many opportunities for our students.' It is a real 'eureka' moment. Now, those eight teachers are going to teach hundreds of students over the next few weeks and hopefully they will start to pass that message across.

We have also been running for the last five or six years Saturday morning clubs. This was born out of an idea that we really need to add value to the GCSE programmes and give the students a real hands-on experience of engineering. These days in classrooms you do not get to make very much any more. What we found was by bringing these students into a college

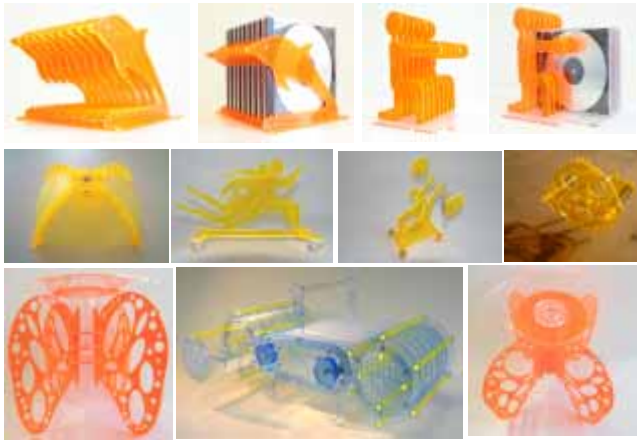
environment, 24 weeks, 9am in the morning these students get up and come to college, we treat them as adults and they get to make CD towers, they get to make electrical extension leads that their parents are very brave and plug in at the end of the programme.

We talk to the parents before and afterwards and again bring them into the whole opportunity of what this means for their student. We have had a good progression rate from those Saturday clubs into further learning and engineering, either A level or apprentice routes. There is no real substitute for having a go at something yourself. If a young person decides he does not want to be an engineer at the end of that programme, fair enough, but at least they have made a cognitive choice and are not just basing it on their preconceptions of the sector.

Exceptional Outcomes

Below are some of the GCSE-pieces that our classes are producing. They are amazing. If you imagine when we were doing metalwork years ago at O level, everybody in the class would produce the same bottle-opener and you would be filing it for weeks. These days the students can produce and design individual creations. Look at the range of different CD towers they are producing.

'If you imagine when we were doing metalwork years ago at O level, everybody in the class would produce the same bottle-opener and you would be filing it for weeks. These days the students can produce and design individual creations.'



If you took these to a job interview or to a university interview, how much can you talk about the valuable experience you have gained that can be applied to your future career? It is really inspirational and the students, naturally, are improving their results as a result of this.

We opened last year, we mostly had Year 10s that is the first year of GCSE, so we need to wait till this summer to find out what the results are going to be, but we are hoping for good things. We have had some anecdotal evidence from the teachers that their results are looking pretty good so far. We hope that some of those will go onto A level and further education and hopefully higher education, maybe these will be the designers of the future.

Gateway to Skills Apprenticeship Programme

Removing Barriers to Employment

When we started in 2000, we were knocking on doors of local companies and saying, 'Take an apprentice. Go on, you know you want one,' and the door would slam in our face unsurprisingly. We would go to students and say, 'Go and be an apprentice,' and they would be pretty rude as well. We decided that there needed to be something to break down these barriers. The employers were telling us that their students were not job-ready, they were uncommitted to engineering, they did not have the right skills base; what could we do about it?

So, in collaboration with Havering College, and using LDA and Learning and Skills Council funding, we have created a one-year foundation programme. This gives the students basic underpinning knowledge in engineering, they get to an NVQ (National Vocational Qualification) Level 2 at the end of the year and a BTEC (Business and Technology Education Council) first certificate and they have key skills embedded in the programme.

The difference with this programme is that we work with our local companies to create work placement opportunities for those students. Over the course of the year they are placed predominantly into local small businesses and get to work in a variety of companies. This gives the company the opportunity to try-before-they-buy an apprentice, they get somebody for free in the business, and low and behold they recognise that they have got a good skill and that actually they might want to think about employing a young person in the future.

For the student it gives them an opportunity to see that life is not all about applying necessarily to the large companies for apprenticeships, but there are opportunities in small businesses locally as well for them.

Over the last seven years we have had 83 students through the programme and have achieved a 73 per cent completion rate. Now, for those of you involved in education that is pretty good in terms of keeping them on. This thanks to the team who mentor and progress the students through that programme. Importantly, we have had over half of them go into employment or further study and ongoing apprenticeships. Some will go to the large companies such as Ford Motor Company and Britvic - I am seeing them as a good feedstock for their apprentice programmes. What we have tried to do is create new opportunities in the small businesses locally as well.

We have had a number of companies that have not taken apprentices for years - a lot of our businesses locally are less than ten employees and it is quite an undertaking to take a young person on. What we have proved with

this programme is that they can take them on and then progress them through into advanced apprenticeships at the college with us as well. We have had a couple of companies over the years who have not only taken one but they have come back, maybe not the next year but the year after, and taken another apprentice on.

These are real jobs that are being created out of nowhere - they would not be there unless we provided this programme. It is a small number but it is a start in terms of creating more jobs in that engineering sector locally.

Gateway for Business

We cannot do any of this without some companies on board and that is where the sister project to Gateway to Skills comes in, Gateway for Business. This, again, is funded through the London Development Agency and European funding. What we have created is a really localised centre with local business advisors specialising in workforce development and business planning and providing a real sector-specific focus for the manufacturing and industrial companies that surround the CEME campus.

Conclusion

We have been working at the coalface of skills in manufacturing for the last seven years and have really been tackling the barriers head on. There is nothing like a fairly angry parent in front of you on a schools' night telling you that manufacturing is not going to be the choice for their child to make you think, 'OK, I really need to convince you otherwise.'

We hope that what we are doing with the *Gateway to Skills* programme proves that it is not grim and dirty, that it is exciting. The kind of things that they produce, even in a single day session, results in a product they have designed and made in one go. It is amazing and we really hope to see the benefits of that over the coming years as more of the young people in the area take up engineering-type courses.

'What CEME are trying to do is create those building blocks in a small localised area but we hope that it would be applicable to other areas potentially across London.'

The barriers are very real and we need to try to break them down, both for the traditional manufacturing sector and for the new emerging technologies of the future. We need to change those peoples' perceptions and start very young. We start at Year 8 and Year 9, but even that sometimes, the preconceptions are already made. Ideally I would like to go down and work with primary school children to try to convince them about engineering.

What we need to do is not just convince them at an early stage but provide real progression routes through. You cannot convince them if there is no end point, if there are no courses available and job opportunities at the end

of it. What we are trying to do at CEME is create those building blocks in a small-localised area but we hope that it would be applicable to other areas potentially across London. Hopefully, in the future, we will have created a few more of the budding engineers that you see there today.

Clean energy, clear profit, muddy thinking

Why the UK lags behind in the pursuit of clean energy technology

Jeremy Leggett, Chief Executive, Solarcentury

The UK's largest solar solutions company, winner of multiple awards for innovation and sustainability. He has worked in the oil industry, among other things researching oil source rocks funded by BP and Shell, and in the environment movement, where he won the US Climate Institute's Award for Advancing Understanding. He is a director of the world's first private equity fund for renewable energy, Bank Sarasin's New Energies Invest AG, and was a member of the UK government's Renewables Advisory Board from 2003-2006. His books 'The Carbon War' and 'Half Gone' have been critically acclaimed but have failed to sell as well as those of Jeremy Clarkson.

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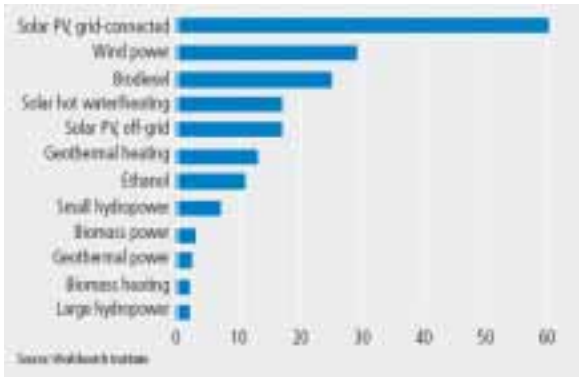
solarcentury

I am going to take two approaches. First, to talk about the global market in Solar PV, then the UK market and I have also been asked to talk about the experience of Solarcentury, just as one London company.

The global market for Solar PV

This is a selection of renewables and their growth rates in global markets between 2000 and 2004.



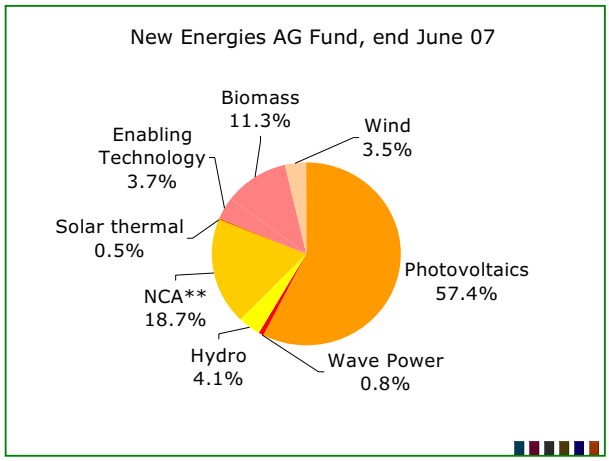
You can see straightaway why CleanTech is so exciting. These are massive growth rates across these markets and solar photovoltaics comes out top, of course, coming from a very small start.

'This is a race in an inevitable great business revolution. None of the races' leading runners, sadly, come from the UK, but it is not too late for us to catch up if we collectively can find the will and that is an issue.'

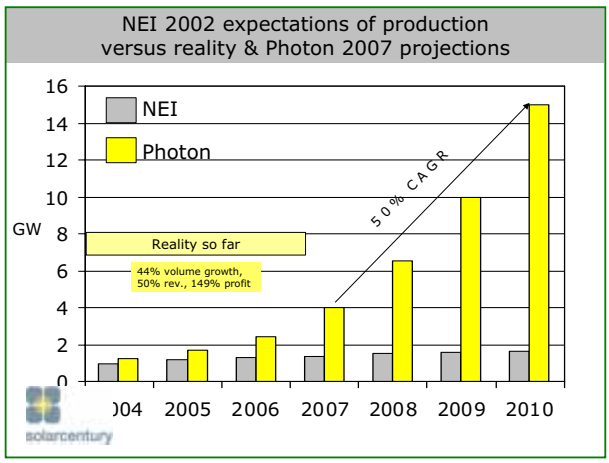
For about the last 18 months as you read the reports of the investment analysts on this market, you soon realise that this is a race in an inevitable great business revolution. None of the race's leading runners, sadly, come from the UK, but it is not too late for us to catch up if we collectively can find the will and that is an issue.

For example, I am Chief Executive of Solarcentury, but one of my evening jobs is as a director of an investment fund. It's the world's first private equity investment fund for renewable energy that was set up in 2000 by a Swiss bank.

I think many people here will know my motivations: I am a green, I worked for Greenpeace before I became an entrepreneur, that is why I am in business, but my colleagues in this Swiss bank do not have that kind of background and it is fascinating to watch them wake up to the potency of these technologies. As you look at the portfolio, we set out to invest in just green renewables, but where most of the money is now in terms of the net asset value, it is now much more than that figure.



This is not tokenism this is real performance. The fund was set up with some excitement in the bank, based on projections that were healthy but not exceptional. The reality is far outstripping what the bank's analysts predicted, bringing in at 44 per cent volume, 50 per cent revenue, projected and 149 per cent profit in the global industry. That is where we are going, at a speed generated 50 per cent compound annual growth rates. This industry is going to burst upon the world from its tiny start at a speed that will leave people who do not know this story breathless. It is going to be one of the great business revolutions.



'This industry is going to burst upon the world from its tiny start at a speed which will leave people breathless who do not know this story. It is going to be one of the great business revolutions.'

It is driven by reduction in cost. The fall has been rapid and it is in parallel with a fall in manufacturing cost. Basically, every time this industry doubles

its capacity the manufacturing cost comes down 20 per cent. Over the last few years the demand has been so great downstream in the industry that the upstream part, the melting of the sand, this is not hi-tech, this is what is at the top of the value chain, has not been able to keep up and therefore price has been out of kilter with cost. Now, the cost is coming down all the time, meanwhile the retail price of polluting power, are going nowhere but up. This is all about positioning for a very exciting future.

Costs are falling. The cost of making the electricity is going from US$0.25 global average today per kilowatt-hour down to US$0.5. Of course the price at that point will depend on the margin the industry takes but nonetheless today the cost is at parity with electricity in the OECD (Organisation for Economic Co-operation and Development) - 150 to 300 gigawatts worth of market. You think what is going to happen in a few years time.

The value of the chain is growing. It starts at the top with the melting of the sand ($1.9 bn total revenue); you produce ingots and wafers (total $2.7b revenue); you slice them into cells and make them into modules (total $5.7bn); add a few other components like invertors and you design it into great systems (total $2.2bn), and you bung it up on buildings, or in the case of most of Europe out in fields (total $6.4bn). There is only one significant player across this supply chain - PV Crystalox – the rest are predominantly German, Japanese and American. The big name players - Sharp, Suntech, Q Cells – are new entrants, created in Germany. The Germans have created 200,000 jobs since 2000 while we have been sitting on our backsides wondering how to get nuclear back into the frame.

"The Germans have created 200,000 jobs since 2000 while we have been sitting on our backsides wondering how to get nuclear back into the frame."

Developing in the UK: Solarcentury's perspective

From Solarcentruy's experience stretching back to 1999, we took a bet on the fact that this was such an incredibly attractive technology, that something would happen in Britain. We are still waiting to see kick-started here today what had already started by that time in Germany and Japan.

In 1999 I lived in UK's first solar roof tile home for a year and we generated more electricity with constant occupancy than we consumed during the year. In 2000 the domestic field trial started. In Germany and Japan, of course, they are enabling proper programmes, they do not need field trials, they need market enablement and they are going for it with 100,000 roof programmes and the like. In the UK, we had a little field trial and this helped.

Things began to look good in 2001. Peter Hain was Energy Minister for

about ten minutes and he boasted that we were going to compete with the Germans and the Japanese. The national press were there, this is what they said they were going to do and we thought that maybe our time had come.

We barrelled on and there was a major demonstration programme. Now, we have gone from trial to demonstration. In Germany, of course, Japan and elsewhere, they are not demonstrating, they are really into market enablement. We begin the process of real innovation with PV in the glass and the rest of it. So the trend reverses a little bit. We make a decent profit but we are still burning money and we should be profitable at this time.

Finally, after a few years we broke even and made a decent profit. Things are beginning to look good at last with a portfolio of products delivering a sizable operating profit that is vital to our charity, Solar Aid.

'The C21 is an electric roof tile, designed by young British innovators, is manufactured here in the UK in a factory in South Wales. Sony makes it on a robot line that would have gone out of business if they had not been able to find something to replace the cathode ray television screens. It is an accident that this is not being assembled in London.'

Solar Aid aims to take solar into some of the poorest places in the world; teach kids how to wire small panels together and knock out kerosene lanterns. You can make a solar lantern much cheaper than a kerosene lantern, gives you light at night, teaches people how to lift themselves out of poverty and on and on. So, Solar Aid, run by volunteers from Solarcentury, is now attracting good funding.

In London, we have installed solar installations for Transport for London (TfL), The Fire and Emergency Service, for the BBC at Bush House, for Sainsbury's. The Waterloo Living Space is a fantastic installation with three kinds of solar designed into the building in a great regeneration scheme.

As you do these installations you develop the expertise to design your own products. For example, the C21, the award winning Solarcentury solar electric roof tile manufactured here in the UK. The tray, designed by young British innovators, is manufactured by Sony in a factory in South Wales on a robot line that would have gone out of business if they had not been able to find something to replace the cathode ray television screens. It is an accident that this is not being assembled in London.

Moving the UK forward

The UK needs to enable markets for the inevitable revolution that is coming and unlocking the power of this technology when hooked up with energy efficiency, which is the key thing. You do not use it on its own that would not make any kind of sense; you do the last mile with PV after you have done the energy efficiency.

What successful market enablement does is provide enough finance, like they have done in Japan, or legislation, like they have done across most of

Europe except the UK, and that allows an industrial scale up on an industrial scale.

It requires billions-of-euros - a scale of investment or facilitation of funds from ratepayers or in the case of the European style a feed-in-law that you unlocks the demand just for a few years - not like oil where you have to subsidise people to drain the last fields - just a few years worth of market enablement money. The UK must offer continuity to allow effective business planning, investor confidence and the rest of it.

Instead, what we have in the UK is insufficient finance. For example, we measure ours in the millions-of-euros scale, not the billions. And even more detrimentally, we have discontinuity. A stop-start approach hovers over the market – indicative of a mind not made up. One-programme ends, which leaves a gap before the next one starts and then they change the rules. Right now while the world market is exploding, but in Britain people are being laid off in this industry.

I am not going to go through any more numbers. There is a lot of product development; a lot of innovation; a lot of design and Silicon Valley venture capital; lots of venture capital flowing into the company. For example, we have been able to extend from Solar PV into Solar Thermal using the same trays, so we can do solar combined heat and power on the roof; we have designed adaptors that can take this technology designed for concrete roofs in Britain and adapt it easily for tiles in Spain, France and Italy. This demonstrates perfectly that sadly in many respects the future of this company will lay in continental Europe not the UK.

'The solar revolution is coming. This is a global market, it will happen, the question is whether or not UK plc has any role really whatsoever in that. As it stands, we are missing out, big time. National government is squarely to blame for this.'

The solar revolution is coming. This is a global market, it will happen, the question is whether or not UK plc has any role really whatsoever in that. As it stands, we are missing out, big time. National government is squarely to blame for this. I cannot explain it, I have tried very hard for a number of years to persuade them that they are missing out and missing opportunities for us. I have failed, so have my friends in BP (British Petroleum) and elsewhere. I do not quite know what to do at this point.

However, I wish to conclude with a positive thought - history is not destiny. These tiny global markets are going to grow inevitably very fast. Things can turn on a sixpence in this regard. The Spanish government recently turned round and said to all its developers, 'You know what guys? You are not going to build another building unless it has got Solar Thermal on it. No complaints; even playing field. You are all going to do Solar Thermal.'

Ford's new focus

How Ford has been able to save energy and reduce waste in its manufacturing

Stuart Burn, Manufacturing Engineering Technical Specialist, Ford
Stuart has a BSc in Biology and MRes in Environment. In 2000 he joined Ford Motor Company, working in the Powertrain Manufacturing Engineering Department, which is responsible for all new programmes in Ford's European engine and transmission plants.

Stuart is a Technical Specialist in Environment and Hydrocarbons, implementing new strategies and improvements in environmental performance. He leads global teams to develop standard strategies on fluids and environment for Ford Powertrain. His team is focused on reducing oil usage, including implementing innovative renewable materials and recycling methods. They have also significantly reduced energy usage and minimised oily waste generation.

Their efforts have been recognised this year with the Business Commitment to the Environment (BCE) Management award, a Business in the Community (BITC) Big Tick for Eco-efficiency and they were a finalist in the BITC Excellence awards. Their work with BP Castrol on renewable lubricants also resulted in the team being awarded the 'Management Award' at the prestigious BP Castrol Helios Awards in 2006.

> *'My great-grandfather's vision was to provide affordable transportation for the world. I want to expand that vision for the 21st century and provide transportation that is affordable in every sense of the word – socially and environmentally, as well as economically. In other words, sustainable transportation.' Bill Ford, 2005*

I am the environmental specialist concerned with the manufacture of engines, transmissions, gearboxes for Ford globally. I am going to explain some of the initiatives that have been carried out in Dagenham Engine Plant, a huge facility 10 to 15 miles to the east from City Hall that employs a lot of people. I hope to demonstrate the environmental initiatives that have been put in place have a real business benefit. They are not there purely for the greening effect; they are there because they make financial sense.

The Dagenham Engine Plant

'1.3 million engines are produced every year making it the largest engine plant of Ford anywhere in the world and it is also the largest engine plant for any manufacturer in the UK. '

Built in 1931, the Plant is the oldest manufacturing facility for Ford in the UK. It has over 3 million square feet of manufacturing space and, with the new engine that has recently been put in there, over a million units per year.

In addition, there is the Dagenham diesel centre on the same site where all of those engines are assembled ready to be put into vehicles around Europe. All of Ford's diesel production for Europe is in this facility. We make several different types of engines right the way up to the 2.7 litre for Jaguar and Land Rover, down to the 1.4/1.6 engines for Fiesta and for Focus.

One point three million engines are produced every year making it the largest engine plant of Ford anywhere in the world and it is also the largest engine plant for any manufacturer in the UK.

Ford's environmental strategy at Dagenham

Dagenham has led the way in developing a sustainable strategy which you can replicate –being applied in Romania, in Mexico, in North America and across Europe, so business sense as well as environmental benefit. Dagenham's environmental strategy is now the global standard right across all of our engine and transmission plants around the world.

The strategy aims to tackle major manufacturing issues. For example, the biggest impact associated with manufacturing engines is in the use of oils. Anything that comes into contact with the oil becomes oily waste that is difficult and expensive to get rid of and of course in the end you have to get rid of the manufacturing oils as well. The major focus of our strategy was therefore, what could we do about all these oils and this volume of waste?

A key driver was new legislation with regards landfill, co-disposal of waste. As a business driver this was key in driving us to change how we had

behaved historically, but as I said, what we found was once we had tackled this issue successfully, it made more financial sense, irrespective of the legalisation. You needed the driver as a prompt but in the end the environmental technology drove itself.

Between 2002 and 2006 even though our oil usage had come down, our costs were still rising exponentially. We also had a new engine coming into the site and if we carried on doing things the old way we would have seen costs of around £500,000 a year. We introduced a series of innovations that reduced the oil usage by 90 per cent and therefore the waste generated by 90 per cent.

The first of these innovations was to basically recycle the oil generated by the wash fluid used to wash parts as they get covered in oil. For example, enabling those washing machines to recycle all of the oil so you had clean wash media going one way and reusable oil going the other.

The second innovation we did was to work with BP Castrol to tackle the problem of rendering different types of oil unusable once they may have got intermixed. We worked on the world's first 100 per cent compatible products right across the manufacturing facility. Hydraulic oils, lubrication oils, metal cutting oils, the wash medias, everything was chemically compatible. One mixed in with another, it did not matter you could recycle everything and reuse everything. This had never been done in the industry before.

These two initiatives got rid of 90 per cent of our waste stream. This proved cost effective - naturally the oil contracts were cheaper because we used so much less and we are able to do that now in every facility where we make engines round the world.

Ford's energy strategy at Dagenham

We have carried out a lot of initiatives on energy. The first and most visible one are the two wind turbines that currently generate 3.6 megawatts of electricity - enough power to power the engine-assembly building.

Putting in renewable energy is one thing but the cheapest energy is no energy at all. What we wanted to do was look at completely redesigning our facility to make it energy efficient.

When we started looking at this programme, every engine we made required 346 kilowatt hours of energy. By 2007 we are now on course for 237 kilowatt hours per engine. You multiply that up by 1.3 million engines; that is a lot of energy saved. This is purely from changing behaviour and redesigning equipment.

A key message that we wanted to drive home to staff was that energy was everybody's job. It was not up to one person to go round turning everything off or one person to redesign their equipment, everyone of the 3,000 people on site in Dagenham had to get involved.

A key component in our success was the redesign of our equipment. Very often when you are manufacturing large pieces of machinery, energy efficiency is sacrificed because you want quality parts, you want reliability; energy efficiency was always very low down the list. When we went back to our suppliers of equipment, it was actually very easy to redesign the equipment with energy in mind, with no on-cost on that equipment and that had a huge knock-on effect, sometimes 40 or 50 per cent energy efficiency.

Ford's waste-to-landfill strategy at Dagenham

The last area that we looked at was the disposal of waste to landfill. Our aim was to eliminate all of our oily waste that was going to landfill. In addition to the fluids I have already mentioned, there were also metal sludges where we remove metal in the machining processes; very thin powder sludges and oily filter media. They were our three remaining large waste streams.

We put in technology that turned sludges into the pucks which are usable as an input into the cement industry - an 100 per cent reusable innovation and it saves Ford £400,000 a year in landfill costs and is a practice being replicated now around the world. We had these powder sludges; we found a new technology that filters this powder and again can go through now and be made into brickettes for the cement industry. Our last waste stream was oily filter media. We are just now looking at a technology that shreds that and can be used actually in bumpers in vehicles and fully recycled as well.

Conclusion

When I started doing this, within Ford and I think within most industry, environment was seen as something that added cost and you had to do it if there was legislation there. Now, it is much, much more seen as an innovative business solution.

When our large company leaders see that there is business-benefit and cost-benefit to implementing sustainable solutions, the opportunity for it to snowball is very large and, like I say, initiatives in Dagenham are being seen today in Mexico, in North America and throughout Europe.

Re-making the east end

How London could learn lessons from Germany's new industrial revolution

Professor Sir Peter Hall

Peter Hall is Professor of Planning and Regeneration at the Bartlett School of Architecture and Planning, University College London. From 1991-1994 he was Special Adviser on Strategic Planning to the Secretary of State for the Environment, with special reference to issues of London and South East regional planning including Thames Gateway and the Channel Tunnel Rail Link. In 1998/99 he was a member of the Deputy Prime Minister's Urban Task Force. In 2004 he was appointed Chair of ReBlackpool, the Blackpool Urban Regeneration Company. He is author, co-author or editor of over 35 books on urban and regional planning and related topics – most recently, London Voices London Lives, published in July 2007. He received the Gold Medal of the Royal Town Planning Institute in 2003 and the Balzan International Prize in 2005.

If you want to find out what is really happening in the world, as distinct from the trivia you find in your morning paper or your evening television, you had better look elsewhere and in particular to material coming out of other countries that are doing differently, like Germany.

Germany, which has long been for at least 100 years a major competitor to the UK in the field of high technology industry is just light years ahead of us now in this whole new industrial revolution. It is significant that Angela Merkel (German Chancellor), who started her political career as Germany's Environment Minister, is a physicist by training and is able to tell journalists out of her head key figures.

'Germany has taken on the environmental challenge like almost no other country.'

Imagine what would happen if everyone did as she did and put low-energy light bulbs throughout her Chancellor's apartment. Germany has taken on the environmental challenge like almost no other country. It was one of the first countries to present a national timetable for reducing carbon dioxide; it has almost achieved its 2012 Kyoto targets now and it has used its recent six-month presidency of the EU (European Union) to push the Union into even bigger efforts.

The March 2007 summit committed us all in the EU to cut CO_2 emissions by 20 per cent and another 20 per cent by 2020. Germany has committed itself to go even further; a staggering 40 per cent cut in its energy consumption. For Germany this is a win-win formula because Germany, ever since the end of the 19th century, has been competing in the new hi-tech industries that make the next industrial revolution.

That old Audi slogan, some of you will remember, 'Vorsprung durch Technik' could almost have been a national slogan. Now, it sees a real prospect of again battling to be true with Japan and the US in achieving global technological leadership in these industries. There can be absolutely no doubt, as Jeremy Leggett has suggested, that the great economic driver in the coming industrial revolution will be these environmental technologies of solar power, wind and wave power and energy conservation techniques.

Already 12 per cent of all the electricity consumed in Germany comes from wind, solar and waterpower. Any visitor to Germany travelling, for instance, on one of their ICE (Inter City Express) high speed trains will see the landscape actually dotted, every hill, with windmills. Indeed I can confirm that having been on an ICE train quite recently. It is a staggering change already in the landscape.

'Already 12% of all the electricity consumed in Germany comes from wind, solar and waterpower.'

The contrast with the UK is marked. Whenever I go out to Blackpool, which I do once a month, and look out at the Irish Sea, which is one of the major areas of the UK identified as a wind power area, and see just one bunch of windmills out towards Barrow-in-Furness I wonder why we have so relatively few.

Germany is becoming virtually the world leader in this field. It is a major new industry. In Germany they have concluded that it will be the number one job engine employing by the year 2020, in 13 years time, more people than either mechanical engineering or the automotive industry. The company's order books are full.

It is evident that in terms of innovation therefore, Germany is taking an extraordinary lead. Furthermore it is creating new firms. In fact 15,000 new jobs will most likely be created in Germany's environmental sector this year, adding to over 214,000 already employed in the industry, and a projection by the federal minister of the environment that 150,000 new jobs will be created by the year 2020. The evidence, I think, here is overwhelming.

An official forecast is that by the year 2030 in Germany the green industries could be generating a turnover of €1 trillion. Already the Germans are proudly citing the largest installed wind power output, the most modern

power station technology and the leadership in the output of efficient household devices. Germany produces one third of all the solar cells and almost a half of all the wind turbines in the entire world. Renewable energy exports rose to €6 billion last year, a 30 per cent increase over the previous year.

What is happening is a worldwide phenomenon creating a huge demand for newly qualified workers, mechanical engineers, chemists, physicists and project developers. Again, in Germany, as you would expect with their long tradition of apprenticeship, companies and employer associations have already promised over 5,000 new training places last year alone. The degree courses in mechanical engineering often allows students to concentrate or specialise on fields such as renewable energy and materials technology, energy supply and renewable energies for power generation.

Traditional courses of a more vocational kind in electrical engineering and information technology now frequently offers specialisations in renewable energies and electrical energy systems. One could ask, 'Are we seeing the same thing throughout the higher and further education system in this country?' I very much doubt it.

'Germany has the most successful research promotion in the field of photovoltaics, is second only to Denmark in wind energy and comes in joint top position with Austria within the EU in low-temperature solar power research. '

The German Government has recently completed an evaluation of their fourth energy research programme that covered the period 1996 to 2005 in renewable energy. It has concluded that Germany has the most successful research promotion in the field of photovoltaics, is second only to Denmark in wind energy and comes in joint top position with Austria within the EU in low-temperature solar power research. I need not underline the point that Germany is now doing exactly what it did 100 years ago in new industries like the automobile and we should remember that although Henry Ford invented the low-cost car, the actual internal combustion engine was invented in Germany. It similarly took a world leadership role at that point in both electrical and then early electronic industries and in pharmaceuticals.

In that era this competition led tragically to two world wars. One could almost fairly say now, although it sounds almost over dramatic, that we are starting to see the first beginnings of World War III but World War III is going to be a war like no other war.

It is a war of all of us to save the world we live in. In this, other countries unfortunately are winning the battle. I could show, but I will not at this stage, a demonstration that also the United States, and in particular firms in Silicon Valley, are beginning to respond to this challenge also. Indeed the pattern in the US is clear, that it is the places that actually were the most innovative in the last industrial revolution, that is the IT industrial revolution,

places like above all Silicon Valley and its leading competitor Massachusetts, that are making the lead again this time. That, I believe, is important because it has lessons for us here in London.

'Where are we here in this country? I think the rather melancholy conclusion is not very far.'

Where are we here in this country? I think the rather melancholy conclusion, which Jeremy Leggett has already suggested to you, is not very far. Of course, we have strong research and we have application of research through consultancy. Over in China there is the development of Dongtan outside Shanghai, which is labelled as the very first world eco-city. Because we started later and because, as Jeremy Leggett suggested, we faltered on the way, we are running way behind the leaders.

If we want to remedy this, the answer is to go the German route systematically to promote research and research training in our universities, but we do lack, I think, at the very, very cutting edge the great strength of the German technical universities or in America an institution like MIT (Massachusetts Institute of Technology). In so far as we do have that capacity, it is highly concentrated in London. Of course the great northern civic universities are seeking to make waves in applied research through their science cities' programme, and quite right. Earlier this year the Northwest Regional Development Agency (NWDA) launched the Northwest Science Strategy based on Manchester and Liverpool universities and the Daresbury Research Complex in Cheshire. Alistair Darling (UK Chancellor of the Exchequer), who was then Industry Secretary in this game of constant musical chairs we have in Government in this country, reminded the audience on that occasion that the northwest region's three main universities numbered among them 28 Nobel prize winners, but Manchester's Vice-Chancellor at the same meeting confessed that we, 'Have a very big chasm to jump and it is getting wider.'

If only because of the great lead that Ken Livingstone has given to make London a world leader in urban sustainability, there is a huge opportunity here. As other speakers before me have said, there could not be a more logical location than East London for two reasons. Before I go onto that point though let me say that there is a model for what we could do in east London and it again comes from Germany.

The city of Dortmund is a city of old industry. In fact it is very comparable to many cities and towns in northern England. It lost a huge amount of its manufacturing and also mining base in the last 30 years. It has fought back in a remarkable way by creating new technology parks. The first, just over 20 years ago, next door to the Dortmund University, which is just being merged with the Bochum University next door into Ruhr University and that is being hugely successful. It is now being followed by a huge scheme on an

old steel plant, which has closed down and been dismantled, on 110 hectares, bringing in leading edge technologies including environmental technologies. Here, as elsewhere in Germany, is the obvious model.

The application of the lessons of Germany can, I think, be found in east London, specifically in two locations.

The Lower Lea Valley, where much of the regeneration activity in London is going to be focused as a result of the Olympics which gives us the chance for a huge concentrated regeneration in this area down from Stratford to the river. Of course the other location is the Centre for Manufacturing Excellence and the surrounding Ford plant and the new Sustainable Technologies Centre at Dagenham, which you have already heard about before coffee.

One of the most exciting features of this area is that next door to this sensational building in two and a half weeks time the Eurostar is going to be coming out of the tunnel from mainland Europe and passing these windmills and the CEME, before plunging down into the tunnel again to Stratford and St Pancras. There could not be a more dramatic location in the whole of London for a demonstration activity than this single location.

A little further on we have to remember that the Mayor's plan itself has a number of proposed manufacturing locations down the Lower Lea Valley and in particular in that southern half, south of the Olympic Park from West Ham down to Canning Town.

I think it is here in particular that we could hope to provide a location for new small- and medium-industry development on a new style of industrial park on the Dortmund model. However, here I must conclude, it is going to demand much more than just a huge effort from the Mayor backed by the Assembly. The GLA collectively can do so much but it does depend on national policies also. It is here, I fear, that we are now failing and even failing badly.

'The GLA collectively can only do so much but it does depend on national policies also.'

Critically important, as Jeremy Leggett has said, in Germany has been the feed-in-law which in effect has been a form of encouragement, massive encouragement, in the home market for individuals and companies to invest in the new technology by making it economically attractive to do so. There are abundant examples in economic history for such short-term massive assistance to promote the growth of a home industry for a home market that then progressively works its way out and becomes a major export industry to the entire world.

Sure, Germany, and us if we can make it, will find some of that manufacturing as the industry massively grows off-shoring itself to lower cost locations, but as German industry shows the country that promotes extremely high end manufacturing, starting with actually niche markets that grow rapidly into non-niche markets and then progressively off-shore, is the model for development because you will always keep what the Japanese call 'brain factories', those concerned with research development and prototype production, in the hi-tech core.

It is extremely important that this should be so. There was a great deal of bemoaning when James Dyson, of vacuum cleaner fame, relocated his manufacturing out of Malmesbury in Wiltshire to Malaysia, but the fact is that Dyson's headquarters will remain in Malmesbury. Similarly the industries that we begin here, if we can, in the Lea Valley and in Dagenham will remain there as technological leaders and as niche producers for yet new markets as the technology improves, and it will massively improve, before the series production goes off-shore to eastern Asia or elsewhere.

There is a model here, finally, but that model will hugely depend on government policies backing the initiatives taken by the Mayor and by the Assembly. Here, I fear, we are going to face an uphill struggle because the government is not fulfilling, it is backing away from the promises it made earlier and it needs to become, I believe, a truly national issue in the interest of all of us.

It is possible for this country to turn around and do things; occasionally it has taken a war to do it. It took something like a kind of national nervous breakdown at the end of the 1970s to make major changes in this country which I think are generally seen now as having been massively beneficial because they have been taken onboard by almost all political parties. I think it could take something like that crisis to do it. Meanwhile, I think it is a question of those of us who do understand and are desperately concerned of just keeping up the pressure.

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Hindi
यदि आपको इस दस्तावेज का सारांश अपनी भाषा में
चाहिए तो उपर दिये हुए नंबर पर फोन करें या उपर दिये
गये डाक पते या ई मेल पते पर हम से संपर्क करें।

Vietnamese
Nếu ông (bà) muốn nội dung văn bản này được dịch sang tiếng Việt, xin vui lòng liên hệ với chúng tôi bằng điện thoại, thư hoặc thư điện tử theo địa chỉ ở trên.

Bengali
আপনি যদি এই দলিলের একটা সারাংশ নিজের ভাষায় পেতে চান,
তাহলে দয়া করে ফো করবেন অথবা উল্লেখিত ডাক ঠিকানায় বা
ই-মেইল ঠিকানায় আমাদের সাথে যোগাযোগ করবেন।

Greek
Εάν επιθυμείτε περίληψη αυτού του κειμένου στην γλώσσα σας, παρακαλώ καλέστε τον αριθμό ή επικοινωνήστε μαζί μας στην ανωτέρω ταχυδρομική ή την ηλεκτρονική διεύθυνση.

Urdu
اگر آپ کو اس دستاویز کا خلاصہ اپنی زبان میں
درکار ہو تو، براہ کرم نمبر پر فون کریں
یا مذکورہ بالا ڈاک کے پتے یا ای میل
پتے پر ہم سے رابطہ کریں۔

Turkish
Bu belgenin kendi dilinize çevrilmiş bir özetini okumak isterseniz, lütfen yukarıdaki telefon numarasını arayın, veya posta ya da e-posta adresi aracılığıyla bizimle temasa geçin.

Arabic
الحصول على ملخص لهذا المستند بلغتك،
فرجاء الاتصال برقم الهاتف أو الاتصال على
العنوان البريدي العادي أو عنوان البريد
الإلكتروني أعلاه.

Punjabi
ਜੇ ਤੁਸੀਂ ਇਸ ਦਸਤਾਵੇਜ਼ ਦਾ ਸੰਖੇਪ ਆਪਣੀ ਭਾਸ਼ਾ ਵਿਚ ਲੈਣਾ ਚਾਹੋ, ਤਾਂ ਕਿਰਪਾ ਕਰਕੇ ਇਸ ਨੰਬਰ 'ਤੇ ਫ਼ੋਨ ਕਰੋ ਜਾਂ ਉਪਰ ਦਿੱਤੇ ਡਾਕ ਜਾਂ ਈਮੇਲ ਪਤੇ 'ਤੇ ਸਾਨੂੰ ਸੰਪਰਕ ਕਰੋ।

Gujarati
જો તમારે આ દસ્તાવેજનો સાર તમારી ભાષામાં
જોઈતો હોય તો ઉપર આપેલ નંબર પર ફોન કરો
અથવા ઉપર આપેલ ટપાલ અથવા ઈ-મેઈલ સરનામા
પર અમારો સંપર્ક કરો.

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