



Research & Analysis into the Environmental Technology Sector in the South East of England

Final Report to SEEDA

December 2003

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ANNEX 1 CONSULTTEES

EXECUTIVE SUMMARY

This report has been commissioned by SEEDA and prepared by Environmental Resources Management (ERM) Ltd. It is being used by SEEDA and regional partners in developing a Sector Strategy and Action Plan to support the development of the environmental industry in the South East of England.

1. AIMS

The report aims to provide a detailed analysis of sub-sector strengths, weaknesses, market growth potential and support needs of different parts of the environmental industry in the South East. The analysis is based on:

- Desk research using websites, industry databases and directories.
- Existing data on the environmental technology sector in the South East, for example the *Report on the Results of a Regional Survey* and SEEDA's database of surveyed companies.
- Extensive consultations with companies and research organisations.
- Review of existing research studies on the sector nationally, e.g. the work of the DTI's Innovation and Growth Team's Review of the UK Environmental Technologies Sector.

2. SECTOR OVERVIEW

As defined by the DTI and OECD, the environmental industry supplies technologies and services to control and prevent environmental damage to water, air and soil, as well as address problems related to waste, noise and eco-systems ⁽¹⁾. It comprises a wide range of sub-sectors, including:

- Waste management and recycling
- Water and wastewater management
- Air pollution control
- Contaminated land remediation
- Environmental consulting
- Marine pollution control
- Environmental monitoring & instrumentation
- Cleaner technologies and processes
- Noise and vibration control
- Energy management
- Renewable energy

The environment industry is a fast growing sector which generates significant levels of employment and income. In the UK, it currently employs approximately 173,000 people, having risen from 140,000 in 1994 ⁽²⁾. The UK market for environmental goods and services is currently worth £14 billion, and is forecast to grow to £21 billion by 2010. The world market is estimated to be worth \$515 billion ⁽¹⁾ and is forecast to rise to \$688 billion by 2010.

(1) OECD (1999), The Environmental Goods and Services Manual.

(2) "Global Environmental Markets and the UK Environmental Industry - Opportunities to 2010" - 2002, report prepared by ERM for JEMU.

3. *THE ENVIRONMENTAL INDUSTRY IN THE SOUTH EAST*

The environmental industry in the South East comprises approximately 1,200 companies, employing an estimated 25,000 people ⁽¹⁾ and generating significant levels of turnover and GDP within the South East.

Particular strengths of the environmental industry in the South East, compared to other UK and overseas regions, include:

- Environmental monitoring, instrumentation and analysis.
- Water and wastewater management.
- Waste recycling.
- Environmental consultancy.
- Marine pollution control.
- Energy management.
- Aspects of renewable energy – e.g. solar, photovoltaics and offshore renewables.

As well as businesses, research and development organisations involved in environmental technologies are also well represented in the South East. There are also a number of leading social enterprises involved in environmental activities.

4. *FUTURE GROWTH POTENTIAL*

As noted above, the DTI estimates that the UK market for environmental goods and services is forecast to increase from £14 billion today to £21 billion by 2010, and the world market is estimated to grow from approximately \$515 billion in 2000 to \$688 billion by 2010.

Market growth in the UK and overseas is being driven by a number of drivers, including environmental regulations and policies; growing concern over environmental problems such as climate change and resource use; and increasing awareness of cost savings achievable by industry through environmental good practice.

In the face of strong market drivers in the UK and overseas, growth prospects for the region's environmental industry are good. Estimates of future growth potential indicate that employment in the environmental industry of the South East could grow to approximately 35,000 by 2010 – representing annual growth of around 5%.

(1) Employment estimate based on a SEEDA survey of environmental businesses – Survey Report, August 2002.

Although markets for environmental technologies and services are seeing significant growth, consultations with businesses have highlighted a number of barriers and support needs for sector development. These include:

- **Commercialisation** - The need for support to businesses in developing and commercialising innovative environmental technologies and services.
- **Business Finance** - Support in accessing business finance and mentoring to enhance investor readiness and enable companies to capitalise on market opportunities.
- **Supply Chains** - Strengthening supply chains and networks amongst businesses and research organisations in key technology areas.
- **Marketing** - Support to businesses in marketing activities in the UK and overseas.
- **International Trade** - Support initiatives to help environmental suppliers in the South East to capitalise on overseas market opportunities, and also to support strategic inward investment activity where it provides clear benefits for the South East economy and the region's environmental industry.
- **Skills** development to enhance business competitiveness and to help businesses access market opportunities - including skills in marketing, commercialisation, businesses management and innovation.
- **Signposting to Support** - Improved signposting, raising awareness of and enhancing access to available business support.
- **Stimulating demand and reducing market uncertainties** - Actions to stimulate demand for environmental technologies and services amongst key end-users (e.g. public sector organisations) and to reduce potential delays in the implementation of environmental policies, e.g. in relation to waste recycling or renewable energy targets.

In order to address these challenges and capitalise on the sector's future growth potential, the Sector Action Plan is being developed by SEEDA and regional partners, and includes actions relating to:

- General business support for environmental businesses.
- Innovation support.
- International Trade.
- Skills development.
- Strengthening Supply Chains and Business Networks.
- Stimulating the regional 'demand-side' for environmental goods and services.

1 INTRODUCTION

This report has been commissioned by SEEDA and prepared by Environmental Resources Management (ERM) Ltd. It is being used by SEEDA and regional partners in developing a Sector Strategy and Action Plan to support the development of the environmental industry in the South East of England.

1.1 STUDY BACKGROUND AND AIMS

SEEDA has established the Environmental Industries Strategy Group, which is leading the development of a regional strategy and 3 year action plan for supporting the development and competitiveness of the environmental industry in the South East. The Strategy will contribute to SEEDA's objectives to promote economic development, business efficiency, innovation, competitiveness and employment in the region, by identifying clear strategic objectives and practical actions for supporting sector development.

This report aims to provide detailed analysis of sub-sector strengths, weaknesses, market growth potential and support needs. It aims to help to develop support actions and provide a sound basis for the Strategy Group's recommendations.

1.2 RESEARCH METHODOLOGY

The analysis is based on the following:

- Desk research into companies and research institutions within each sub-sector in the South East, using websites, industry databases and directories, and existing data on the environmental technology sector in the South East, for example the *Report on the Results of a Regional Survey* and SEEDA's database of surveyed companies.
- Discussions with companies and research organisations.
- Review of existing research studies on the sector nationally and in other regions, e.g. DTI Innovation and Growth Team's Review of the UK Environmental Technologies Sector.

The analysis of sub-sector and technology strengths and weaknesses is based on:

- the number, activities, size and profile of companies in each sub-sector in the South East compared to other UK regions (e.g. using information in various industry databases and directories);
- discussions with consulted companies and research institutions in the environmental industry in the South East;

- discussions with a number of organisations involved in supporting environmental industry development in the South East; .
- existing knowledge of the UK and international environmental industry, based on comparable studies undertaken in other UK regions and overseas.

The analysis of technology maturity and growth prospects draws on:

- work by the DTI's Innovation and Growth Team (IGT) for the environmental industries;
- views of consulted companies in the environmental industry in the South East;
- analysis of market drivers – e.g. regulations;
- existing understanding of environmental technology markets drawn from other UK and regional studies.

We are grateful for the assistance provided by consultees, listed in *Annex 1*.

1.3

STRUCTURE OF THE REPORT

The report is structured to provide a review of individual sub-sectors within SEEDA's definition of the environmental technology sector, as follows:

- | | |
|--|--|
| • Air pollution control | • Waste management, including recycling |
| • Contaminated land remediation | • Water and wastewater management |
| • Environmental monitoring and instrumentation | • Energy management and renewable energy |
| • Marine pollution control | • Environmental consultancy services |
| | • Noise and vibration control |

For each sub-sector, the following information is provided:

- Sub-sector definition.
- Overview of activities, size, scale etc.
- Examples of core companies, including company profiles.
- SWOT analysis.
- Market Growth Potential – opportunities and threats.
- Sub-sector support needs.

Section 2 summarises the main findings and subsequent sections present the analysis of different sub-sectors. In addition, research capabilities in the environmental industry in the South East are examined in *Section 13*.

2.1 ENVIRONMENTAL MARKET SIZES AND GROWTH POTENTIAL

2.1.1 UK Market Size

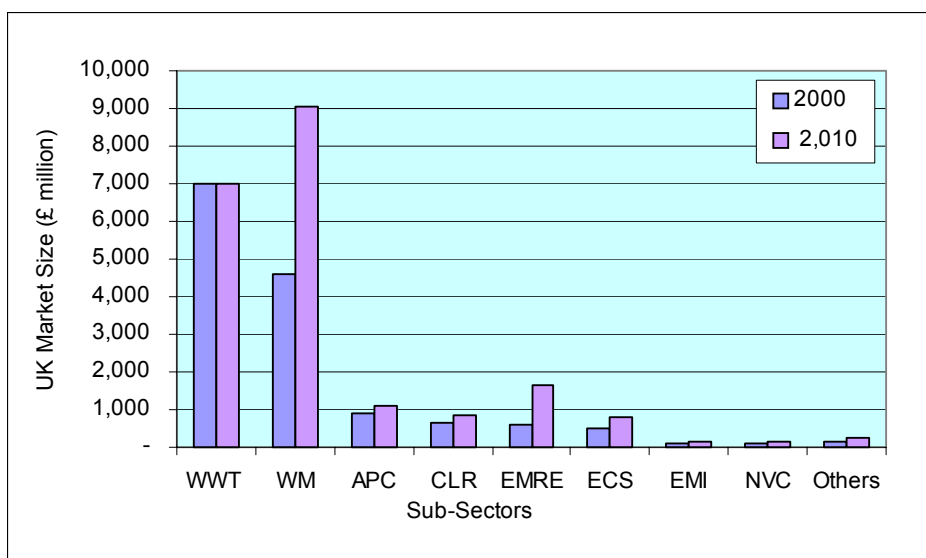
The UK environmental market is estimated to be worth approximately £14 billion per year, broken down by sub-sectors as shown in *Table 2.1*. The market has grown by approximately 15% since 1997. Market sizes and future growth forecasts are also shown in *Figure 2.1*.

Table 2.1: Estimate of UK Environmental Market (£ million)

Sub-Sector	UK Market Size 2000	% of total	Annual Growth Rate forecast to 2010:	Forecast market size 2010
Water & wastewater (WWT)	7,000	48%	7,000	33%
Waste management (W M)	4,600	32%	9,049	43%
Air pollution control (APC)	907	6%	1,106	5%
Contaminated land (CLR)	638	4%	857	4%
Energy Management & Renewable Energy (EMRE)	600	4%	1,673	8%
Environmental consulting (ECS)	500	3%	814	4%
Environmental monitoring (EMI)	100	1%	134	1%
Noise & vibration control (NVC)	77	1%	125	1%
Others	150	1%	244	1%
Total	14,572	100%	21,003	100%

Source: Estimates from JEMU, 2002.

Figure 2.1 Sub-Sector Breakdown of UK Environmental Market (2000 to 2010)



Source: DTI's Joint Environmental Markets Unit (JEMU), 2002 ⁽¹⁾

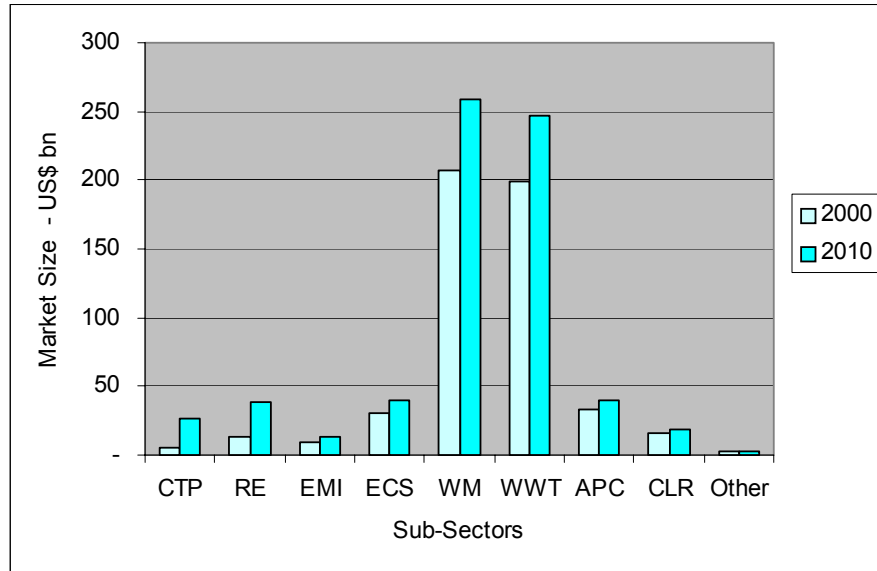
EMRE = Energy Management and Renewable Energy.

(1) Source: DTI JEMU "Global Environmental Markets and the UK Environmental Industry" - ERM, 2002.

2.1.2 International Market Sizes

The world market for environmental goods and services is estimated to be worth approximately \$515 billion ⁽¹⁾ and is forecast to rise to \$688 billion by 2010 – see *Figure 2.2*. More than 75% of this market is in the US, the EU and Japan, but there are high growth rates being experienced in developing markets, particularly Eastern Europe and Asia.

Figure 2.2: *Sub-Sector Breakdown of Global Environmental Markets – 2000 Actual and 2010 Forecast*



Source: JEMU “Global Environmental Markets and the UK Environmental Industry”, 2002.
(CTP = cleaner technologies and processes)

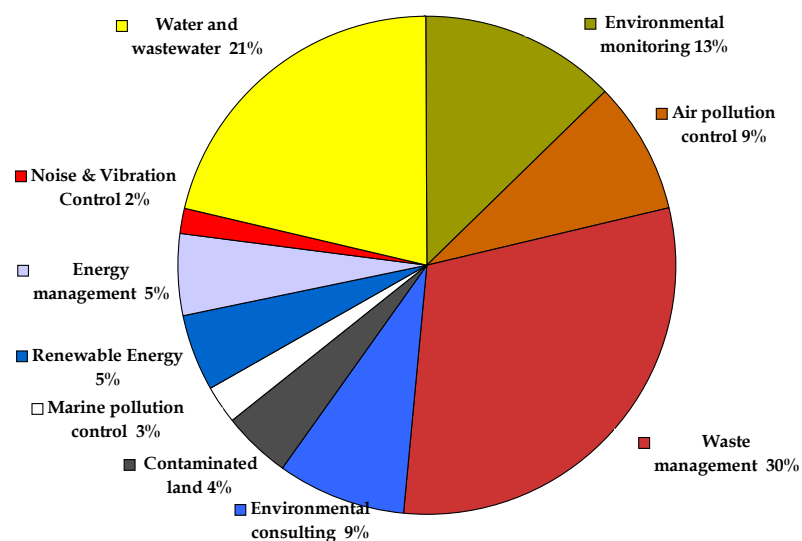
2.2 OVERVIEW OF THE ENVIRONMENTAL INDUSTRY IN THE SOUTH EAST

Based on existing data sources and research undertaken during this study, it is estimated that there are 1,170 companies in the environmental sector in the South East – see *Table 2.1* and *Figure 2.3*.

Table 2.1 Estimate Number of Environmental Companies in the South East

Sub-Sector:	No. of companies in the South East
Water and wastewater	250
Environmental monitoring & instrumentation	150
Air pollution control	100
Waste management	350
Environmental consulting	100
Contaminated land remediation	50
Marine pollution control	30
Renewable energy	60
Energy management	60
Noise & vibration control	20
Total	1,170

Figure 2.3 Environmental Businesses in the South East by Sub-Sector



Note: Sub-sector percentages of total number of environmental companies in the South East.

2.3 SOUTH EAST STRENGTHS

The analysis contained in subsequent sections on strengths and growth prospects of different sub-sectors in the region’s environmental industry is summarised in *Figure 2.4* and *Figure 2.5*.

Particular strengths of the environmental industry in the South East, compared to other UK and overseas regions, include:

- Environmental monitoring, instrumentation and analysis.
- Water and wastewater management.
- Waste recycling.
- Environmental consultancy.
- Marine pollution control.
- Energy management.
- Aspects of renewable energy – e.g. solar, photovoltaics and offshore renewables.

As well as businesses, research and development organisations involved in environmental technologies are also well represented in the South East. There are also a number of leading social enterprises involved in environmental activities.

Figure 2.4 Summary of South East Strengths and Growth Potential

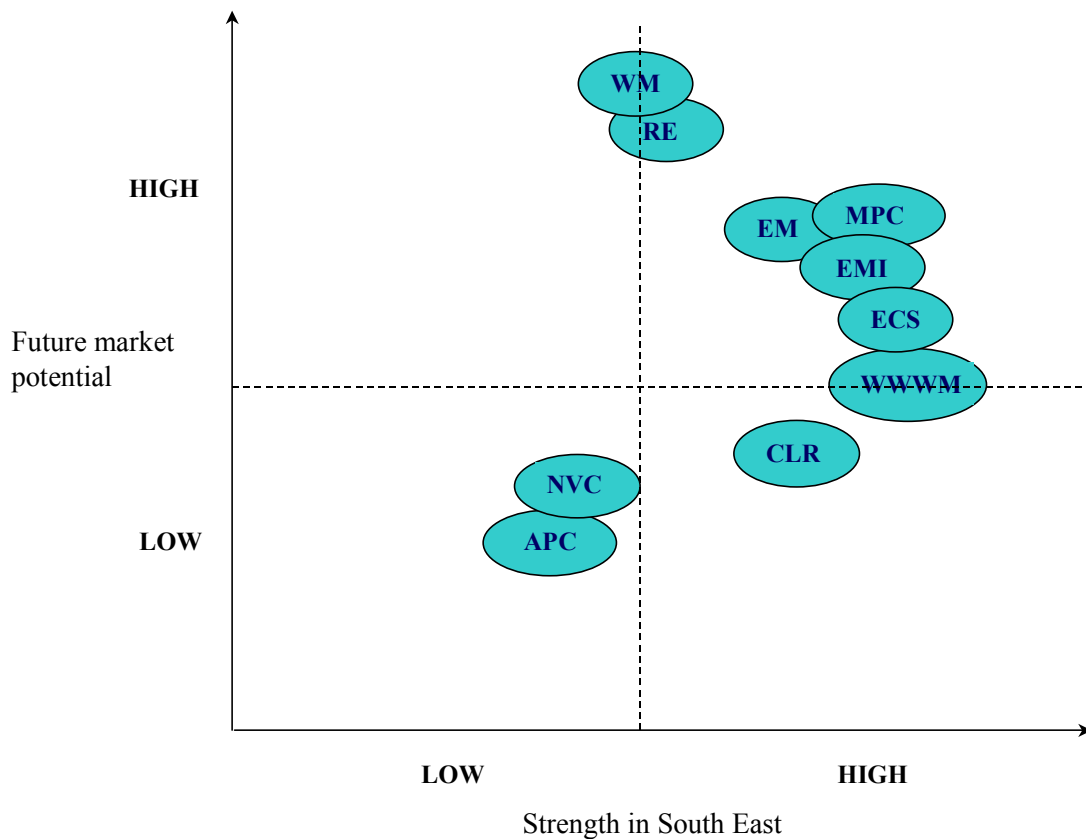
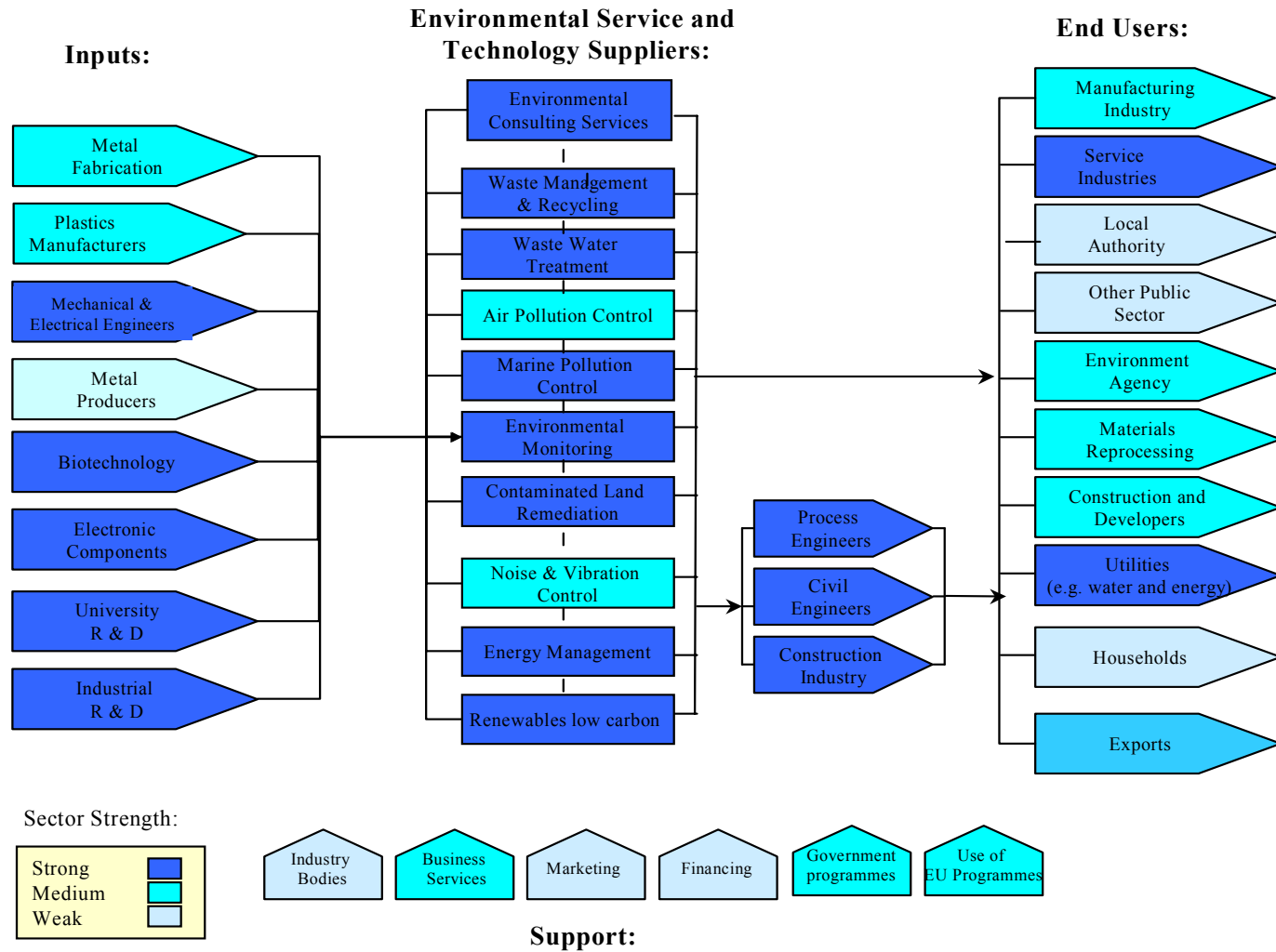


Figure 2.5 Summary of Environmental Industry Strengths in the South East



In identifying priority sub-sectors for supporting future development, account needs to be taken of existing South East strengths and market size and growth potential. As indicated in *Figure 2.4* potential priority sub-sectors for the region, therefore, could include:

- **renewable energy, energy management** and **waste management** because they are both high growth sub-sectors;
- **marine pollution control** and **environmental monitoring and instrumentation** because they are particular strengths of the South East and market growth prospects; and
- **water and wastewater treatment** because of the sheer size of this sub-sector market.

The analysis in later sections ‘drills down’ further to identify growth prospects for particular technologies in these different sub-sectors. That said, it is important to note that innovative companies with strong growth prospects exist in all sub-sectors. Whilst it is recommended that support initiatives should, therefore, include a sub-sector or even technology focus; support should also be available and targeted towards particular companies with high growth prospects and good business acumen in all sub-sectors.

The following sections identify support initiatives for particular sub-sectors – and incorporate needs identified by consulted companies and research organisations. These support actions cover a range of areas, including:

- Support for innovation.
- Support in accessing finance.
- Strengthening of clusters and links between companies and research organisations.
- Support for strengthening supply chains in particular sub-sectors or technologies.
- Support with marketing the capabilities of South East companies.
- Market development actions – e.g. specifying renewable energy technologies in SEEDA site developments and increasing the uptake energy management practices in the public sector.

3.1 *SUB-SECTOR DEFINITION*

The water and wastewater management (WWWM) sector spans a great variety of technologies. These include items designed for the handling of water and wastewater such as tanks, pipes and pumps; basic physical processing technologies (screens/strainers); chemical and biological systems designed for secondary and tertiary treatment purposes; advanced treatment technologies such as ozonation and UV. Also included are industrial WWWM equipment designed for de-watering and re-use of wastewater.

Services in the sub-sector include: design, installation, inspection, repair and maintenance services of wastewater treatment plant; on-site wastewater management, asset management and consultancy to the water industry.

3.2 *OVERVIEW – ACTIVITIES, SIZE, SCALE*

3.2.1 *Background*

The WWWM sector supports a large number of companies within the South East. These include technology specialists and contractors, and a large number of suppliers of specialist support services.

ERM estimates that there are approximately 250 companies involved in manufacturing / distributing WWWM technologies (approximately 150 companies) and providing related process engineering, contracting and consulting services (a further 100 companies).

3.2.2 *Focus*

The main areas of activity of WWWM companies in the region can be categorised as:

- **Equipment manufacturers with an interest in the WWWM sector** – A large number of companies in this market offer equipment for WWWM applications as well as for other sectors. This is especially the case with equipment used for processing and water supply/transmission and distribution, which can have dual role in the process industry applications.
- **Specialist equipment manufacturers specialising in the WWWM sector** – A large number of specialists designing and manufacturing equipment for the WWWM sector can also be found. Many of these companies target secondary or tertiary water treatment markets with chemical treatment, advanced water treatment and wastewater reuse technology companies all well represented.

- **Process Engineers/Contractors** – Process engineers and contractors are important companies within the market. Larger players in this sector will undertake both elements from design to construction. Smaller companies specialise in either sector with some large local concerns focusing more on contracting.
- **Integrated WWTM companies** – A peculiar feature of the WWTM market, compared to other environmental sub-sectors, is the existence of integrated companies, such as Southern Water. These companies typically offer various types of technology as well as services for the sector.
- **Consultancy and service companies** – Consultancy and service companies form a large segment of the market. Many such support companies specialise in particular services.

Features of the WWTM sub-sector in the South East include:

- Good mix of UK and internationally-owned enterprises.
- Well developed consultancy and support base.
- Wide range of equipment manufactured and designed in the South East.
- Strong presence of secondary or tertiary treatment businesses.

3.2.3

Examples of Core Companies

Alfa Laval – A subsidiary of Swedish Alfa Laval, Alfa Laval Ltd UK's base is in Camberley with its separate pumps operation headquartered out of Eastbourne. Alfa Laval is one of the UK's largest project management specialists with interests in the water/waste water and energy sectors.

Biwater – Biwater plc is one of the UK's largest process engineering companies with its UK headquarters in Dorking.

Esmil Process Systems – Based in High Wycombe, Esmil Process Systems is a recent winner of the Queen's Award for Environmental Achievement. It works with a number of technologies for the water treatment industry including odour control, clarifiers as well as the supply of treatment chemicals.

HR Wallingford Group – This is Wallingford-based group of companies, has extensive interests in the water and waste sector. Through its major subsidiary, HR Wallingford, the group undertakes consultancy, monitoring and analysis as well as being involved in a wide range of R&D projects.

MWH – MWH, or Montgomery Watson Harza, is one of the UK's largest project engineering practices. With its headquarters in High Wycombe, MWH is active throughout the southeast and UK specialising in water engineering, pollution control and environmental management.

Potter & Soar – This specialist wire mesh manufacturer, a subsidiary of Soar Engineering Group, is the largest supplier of wire mesh cloths and screens in the UK. Within the WWTM market, it is a major supplier of mesh for screens.

Quay Technologies – good example of one of the small specialist manufacturers in this sector. Quay focuses on the application of UV technology with SMART funding used for this purpose. With WS Atkins, it has formed a JV company to commercialise this product, Quay Environmental.

Southern Water – Southern Water (part of the Scottish Power Group) is responsible for supplying water and sewage treatment in Kent, Sussex, Hampshire and the Isle of Wight. It has approximately 104 water supply works collecting and cleaning water, and 390 wastewater

treatment works. Its pipe network covers 13,300 km. The company invested £1 billion between 1995-2000 and is now investing a further £1 billion from April 2000-2005.

Thames Water – part of the German RWE Group, serves 13 million customers in London and across the Thames Valley, from Kent and Essex in the east to the edges of Gloucestershire in the west. The UK business includes services groups Subterra and Engenica, and TerraEcoSystems (based in Reading) Thames Water’s specialist recycling arm.

Wallace & Tiernan – This Tonbridge-based company has been active in the UK since 1926. It is a subsidiary of the US company, USF, which in turn is part of the French water conglomerate, Veolia (formerly Vivendi). Wallace & Tiernan specialises in the design and manufacture of chemical metering equipment for water and waste water treatment as well as also supplying pumps and UV disinfection units.

Other leading companies active in the southeast market include Charles Austen Darcy Products, Edmund Nuttall, Pumps, Nalco and Titan Pollution Control.

3.2.4 *Other South East Companies active in the WWWM Sub-Sector*

AJG Waters (Equipment)	Flotronic Pumps	Nucat
Abacus Valves International	Frisfram Pumps	PCI Membranes, Whitchurch
Alfa Laval / Alfa Laval Pumps	GC Pillinger & Co.	Philmac UK
Aquazor	Hamworthy	Plenty
Bio-Bubble	Hilge Pumps	Potter & Soar, Banbury
Bioclere Systems	HMD Kentro	Pump Engineering
Biwater	HR Wallingford	Purite
BMT Marine Information	Hughes Pumps	Quay Technologies
Systems	Hydrachem	Rentokil Initial
BOC Gases	Jenton International	Rivertrace Engineering
Charles Austen Pumps	JM Softners	Robbins & Myers
Conder Products / Conder	John Laing	Selwood
Sewage Treatment	JP Pumps	Spraying Systems
Costain	Kalsep	Sterling Process Engineering
CPV	KEE Process	Sterling Softners
Culligan International	Keraflo	Sterling SPP
Darcy Products	Kinetica Industrial	Tekleen Filters
DIS Water	Kinetrol	Titan Pollution Control
Ecowater Systems	KK Water Purification	Tyler Engineering
Ecotechnics	KNF Neuberger	VA TECH Wabag
Edge Group	Lancy Water Engineering	Veolia
Edmund Nuttall	Landtec Products	Wallace & Tiernan Products
Electric Motor Co (inc. Totton	Larox UK	Wehrle MBR
Pumps)	Lee Products	WMEC
Emerson Process Management	Long products	Wouter Witzel Butterfly
ERG	Magniflux	Valves
Esmil Process Systems	Metso Automation	WPL
Essex Pumping Systems	M-Scan	Zarda Separation
Euro Iseki	MWH	
Euroby	Nalco	
Filedor Filter Systems	Naston	
Flexicote (Speciality) Coatings	Nation Water Treatments	

Note: Excludes water/waste water treatment companies. Only specialist consultants to sector are listed, rather than multi-disciplinary consultants that are also active in WWWM.

3.2.5 *Recent Performance*

The UK WWWM market remains relatively buoyant in large part benefiting from the investment programmes of the UK's water companies (AMP3, AMP4). Locally, the sector is supported by the investment programmes of water service companies such as Thames and Southern Water. Many of those active in the market also supply to other water/wastewater treatment companies throughout the UK and beyond. From the industrial perspective, the situation is a little less buoyant with much of the investment required to bring industrial users to standards demanded by water treatment companies having been made during the nineties.

Sub-contractor opportunities are important in this sector with the result that alliances between suppliers and process engineers/contractors and the client are also essential. This is especially important for companies active in emerging technologies in the South East.

3.3 *SWOT ANALYSIS*

3.3.1 *Strengths:*

- A large and diverse supply base able to offer a wide range of water and wastewater technologies and services.
- Specialisation in a number of areas (e.g. advanced WWT technologies such as membrane systems).
- Presence of a number of companies in emerging, high value, market segments such as tertiary treatment (e.g. ozone, UV, ultrafiltration technologies).
- Strong process design/contracting background in the region.
- Well educated workforce.
- Large group companies (e.g. Southern Water and Thames Water) with considerable expertise and technologies.
- Considerable water research expertise within higher education institutions such as Cranfield University and private sector players such as HR Wallingford, WRc, Thames Water and Southern Water.
- Also many small, niche technology suppliers (including manufacturers) and service providers.
- Strong presence of overseas operators in the South East (especially US and French), some of whom have purchased established UK companies over the last 5 years in order to access UK and European markets. (This generates opportunities and threats).

3.3.2 *Weaknesses:*

- Many smaller suppliers appear reliant on intermediaries and have weaker direct links to end-users.

- Weak links between the region's leading environmental/engineering consultancies and WWWM technology suppliers in the South East.

3.3.3 *Opportunities:*

- Investments are likely in the South East in order to avoid water resource shortages – e.g. further improvements in the water distribution / pipe networks, leakage reduction and monitoring, water reuse and recycling (longer-term).
- Increasing demand for water efficiency, re-use and recycling advice and technologies (e.g. membrane technologies) – especially in industry.
- Opportunities for WWWM technologies to be applied in cleaner processes – e.g. waste minimisation at source rather than end-of-pipe.
- Growth opportunities in overseas markets - including in the Middle East, Central & Eastern Europe, China, SE Asia, the US and parts of Africa.
- Links between South East companies and leading overseas companies (e.g. US and French) could provide opportunities for accessing world markets.
- Many niche market opportunities for innovative new WWWM technologies.
- Opportunities to capitalise on R&D expertise in the region (e.g. Cranfield and HR Wallingford).
- Scope to strengthen links between the region's leading environmental / engineering consultancies and WWWM technologies in the South East – especially in accessing overseas opportunities.

3.3.4 *Threats:*

- WWWM investments in the UK by the water industry may slow down after 2005 by which time many of the investment required to meet EU Directives such as the Urban Wastewater Directive will have been made.
- Strong UK / international competition within the UK and overseas markets.
- Threats that lower value / mass market WWWM components and technologies for the UK and overseas markets will increasingly be manufactured overseas in lower cost regions such as Central and Eastern Europe.
- Well-established South East companies are being acquired by overseas companies (e.g. USF and Veolia) – this may reduce R&D activity in the region and export activity by indigenous firms.

3.3.5 *Potential for Growth*

The UK WWT market is dominated by the activities of the water industry which generated revenues of approximately £6.7 billion and undertook capital

expenditure of £3.7 billion in 1998/99 ⁽¹⁾. In addition, UK manufacturing industries spend approximately £600 million per year ⁽²⁾ on capital and operating expenditure in relation to WWT.

It is expected that the water utility companies will spend approximately £8 billion between 2000 and 2005 on drinking water quality and environmental improvements ⁽³⁾. Opportunities will also be driven by water company investments in network management and leakage control.

Recent OFWAT reviews on water industry pricing have meant that water utility companies must reduce bills by 14% between 2000 and 2005. Consequently, future levels of environmental expenditure by water companies are uncertain.

Nevertheless, as indicated in the technology matrix below, opportunities exist for innovative technologies which can enhance technical or cost performance. Future overseas opportunities are also substantial.

3.3.6 *Technology Matrix*

Water & Waste Water Management:	Maturity	Market Growth Potential	South East Strengths	Potential for development in SE	Examples of companies:
Water handling equipment (e.g. tanks, pipes, pumps, flanges, valves, couplings),	Mature	●	●●	●	Alfa Laval, Charles Austen Pumps, KEE Process, Titan Pollution Control.
Screens/strainers	Mature	●	●●	●	Potter and Soar
Gravity sedimentation systems	Mature	●	●●	●	Biwater, Filedor Filter Systems
Aeration systems including DAF, CoCoDAFF	Mature	●	●●	●	Bio-Bubble
Chemical treatment systems (e.g. flocculation tanks etc)	Mature	●	●●	●	Esmil Process Systems
Biological treatment systems (e.g. bacteriological, enzymes)	Transition	●●	●●	●●	
Pipeline "pigging" equipment	Transition	●●	●	●	Euro Iseki
Advanced water treatment technology (e.g. ozone, UV, ultrafiltration)	Transition	●●●	●●●	●●●	Quay Technologies, PCI-Water, Southern Water
Wastewater reuse equipment (e.g. membrane technologies - reverse osmosis)	Transition	●●●	●●●	●●●	Biwater, CUNO, Esmil Process Systems
Dewatering equipment (e.g. centrifuges, filter presses, sludge driers)	Mature	●	●●	●	Bio-Bubble, Biwater, VA IECH Wabag
Flood protection equipment.	Transition	●●●	●	●	C-Wave, Flood Protection Systems
Summary	Transition-Mature	●●	●●	●●	

3.4 *SUB-SECTOR SUPPORT ISSUES*

Priority issues relating to future development of the WWT sub-sector in the South East, identified by consulted businesses, include:

-
- (1) Source: Water UK website, 2001. Data relates to England and Wales.
 - (2) Source: DEFRA "Survey of UK industry's environmental expenditure for 1999", 2001.
 - (3) Source: OFWAT, 2001.

- Assisting stronger links with academic and research institutions to give suppliers a leading edge. Focus here should be on emerging technologies – membranes, UV/ozonation etc.
- Establishing a water industry innovation forum in the South East in order to bring suppliers/research/end-users together to develop innovative WWWM technologies.
- Actions to strengthen supply chains in WWWM in the South East – involving technology SMEs, research organisations, water companies etc.
- Raising the profile of local suppliers to critical end-users in order to overcome visibility problems with major industrial end-users plus water plc's.
- Examining scope for building on geographic clusters already developing in some sectors -UV, pumps etc.
- Strengthening links between WWWM companies and leading environmental consultancies in the South East in order to access overseas markets.
- Assistance to SMEs in developing innovative new technologies – e.g. access the funding and awards.
- Regional partners could lobby for more stringent and consistent application of environmental regulations by the Environment Agency.

4.1 SUB-SECTOR DEFINITION

The environmental monitoring, analysis and instrumentation (EMI) market comprises technologies and services designed for measuring and analysing the environment (air, water, soil, noise, waste etc). Technologies range from the most basic data collection devices to sampling and detection devices/systems and to more leading edge technologies such as biosensors. Process and control systems (hardware and software) are also included. Applications include pollution control monitoring, process control systems and uses such as meteorology.

Services provided by those operating in this market range from data storage and modelling expertise to site-specific services such as sampling as well as off-site laboratory testing.

4.2 OVERVIEW – ACTIVITIES, SIZE, SCALE

The South East is well represented in detection, data collection, sensor and process control systems in all environmental media: air, noise, water/wastewater, waste, as well as in different end-user sectors of the market. The sub-sector includes particular expertise relating to meteorological monitoring, linked to the Met Office (formerly headquartered at Bracknell).

ERM estimates that there are approximately 150 companies involved in EMI technology design, manufacturing or distribution in the South East. In addition, there are approximately 50 companies involved in EMI consultancy / services. (This total excludes noise consultants covered in *Section 12*).

The well developed nature of the EMI sub-sector in the South East appears to reflect factors such as a history of research and development into instrumentation outside environmental applications, experience in military research in the region (e.g. Qinetiq) and the development of the electronics industry in the South East. Clusters and linkages between academic and business organisations have developed. R&D activities in EMI are often located in the South East, whilst the manufacturing may occur elsewhere (in UK or overseas) because of labour costs. Good access to the EU and overseas markets (using air links) has also attracted UK and overseas firms to locate in the South East.

4.2.1 Focus

The main areas of activity for southeast companies can be categorised as:

- **Multinational metering/detection and/or process/analytical businesses –**
The South East has a large number of multinational companies who use

the region as their UK base. Many are concentrated in the area to the west and southwest of London. For such companies, their location in the South East may be as a point for national distribution or a site for a UK/European manufacturing/assembly operation.

- **Building management system (BMS) specialists** – A large number of companies in the South East are involved in building management control systems and technologies – including control of the indoor environment, energy management and air quality.
- **Specialist detection and/or metering equipment developers** – This is perhaps the largest of the identifiable segments within the EMI market. It comprises a large number of specialist manufacturers of sensors, probes, detection and metering equipment. Many companies specialise in particular end-user segments. Those in this segment can be broadly split into fully-fledged commercial concerns and smaller, research-based concerns.
- **Instrument re-sellers** – Instrument re-sellers form an important part of the EMI equipment sub-sector throughout the UK. Like other regions, the South East has a large number of resellers, many with links to a single or small number of manufacturers/importers.
- **Testing/analysis/consultancy companies** – The testing /analysis /consultancy market is the largest part of the EMI market. It includes companies undertaking environmental monitoring, lab testing of samples and consultancy relating to environmental monitoring and/or analysis.

4.2.2

Examples of Core EMI Companies in the South East

Halma Group This diversified group has strong interests in the environmental monitoring market where it has two UK subsidiaries – Palintest in the water testing sector and Crowcon Detection Instruments in the gas analysis sector. Crowcon is located within SEEDA's region and specialises in remote detectors, personal/portable monitors and sampling units.

Learian Designs – Learian Designs, based in Farnborough, is typical of the research led companies in this sector. The company specialises in the development and commercialisation of pollution monitors with Streetbox monitor, with remote sensing capabilities, being an example of its work to date.

Servomex Group – This Crowborough based company, is one of the largest independently owned monitoring companies in the UK. It specialises in the design of gas analysis units for industrial and environmental applications.

Signal Group – Based in Camberley, the Signal Group has grown through acquisition over the past five years and now encompasses Signal Instruments, Rotork Analysis and ADC. It specialises in gas sampling and analysis equipment.

Water Quality Centre – This Reading-based company, is a subsidiary of Thames Water. It undertakes commercial analysis of waters, contaminated land and materials and is one of the larger regional players in the UK in environmental lab analysis for water.

Other companies of note in this sector include Acal Auriema, Delta Controls, Foxboro GB, GE Panametrics, Honeywell Control Systems, Perkin Elmer, Quantitech, Seres and Thames Laboratories.

Able Instruments & Controls	Oxford Hydrotechnics
Acal Auriema	Oxford Instruments
AGL European Lasers	Pall Gelman Laboratory
Amplicon Limeline	Panametrics
Azur Environmental	Papst
Barton Instrument Systems	Pascell Engineering Co.
Bedfont Scientific	Perkin Elmer Instruments
Control Research Laboratories	Pollution & Process Monitoring
Central Laboratory for the Research Councils	Pollution Monitors
Chatfield Applied Research Laboratories	QCL
Chelsea Instruments	Qinetiq
City Technology	Quantitech
Crowcon Detection Instruments	R&D Instromet
Datum Electronics	Radcom (Technologies)
Delta Controls	The Ranger Instrument Co.
Dionex (UK)	Redhill Analysts
Capital Controls	Rietschle (UK)
Ecotechnics	Rivertrace Engineering
Eden Scientific	Rohde & Schwarz
Energy Control Group	Rooney Laboratories
Environmental Monitoring Services	Rotork Instruments
Eurotest	Roxspur Measurement & Control
Eurotherm	Russell House Laboratories
Fluid Management Technology	Sandhurst Instruments
Foxboro GB	Sartec
Furness Controls	Sartorius
Gems Sensors	Scensys
Goyen Controls UK	Schneider Electric
Gradko International	Sesna
Hampshire Scientific Services	Seres
Harwell Instruments	Servomex Group
Honeywell Control Systems	Severn Trent Water Purification
Hydac-Flupac	Shawcity
Invensys	Signal Group
Invicta Analytical Services Keithley	Southern Testing Laboratories
Instruments	Spectrasyne
Keynes Controls	Storel & Intex Controls
Kistler Instruments	System Instruments
Klaschka (UK)	Testo
KSR Kuebler	Thames Laboratories
Lascar Electronics	Thermo Life Sciences
Learian Designs	Thermo Measurement
Litre Meter	Torbar Flowmeters
Lyold Instruments	TRADA Technology
Lovibond Water Testing	Trend Control Systems
M-Scan	Vision Engineering
Mayer International (UK)	Wallingford Software
MD Instruments	Water Quality Centre
Measurement & Control Services	West Instruments
Medline Scientific	Worcester Controls
Microgas	WRL
Micronics	Wyko Calibration Services
National Instruments UK Corporation	YSI
Odour-Net	Zeta Controls

Note: Only specialist EMI consultants/service companies listed – small noise consultancies are not included.

Key features of the EMI sub-sector in the South East include:

- High levels of research and development activities.
- Large number of emerging companies with niche technologies.
- Strong clustering of manufacturers/ distributors.
- Use of the region as a UK base by many multinationals.
- Presence of companies in broad range of environmental segments and end-user markets.
- Well developed EMI consultancy and support base.

4.2.4 *Recent Performance*

Demand for EMI equipment has been growing over the past two decades to meet both health and safety and environmental obligations for many industrial end-users, the water industry, waste management operators, brownfield land developers and public sector organisations such as local authorities. Regulators such as the Environment Agency, for example, are placing increasing requirements on industry to monitor emissions and environmental performance.

The mass market for basic monitoring equipment (e.g. local authority air quality monitoring equipment) is largely mature and is now dominated by replacement sales. Opportunities remain, however, for innovative monitoring solutions and equipment that offers performance and cost benefits over existing products – e.g. based on portability and remote communication features linked to telemetry systems.

The South East can be seen as a leading region in the UK in terms of EMI design, manufacturer and distribution. The region has attracted a number of leading international companies and is also the preferred location for many UK suppliers. Benefits of a skilled local workforce with experience in this industry, good transport links and the fact that EMI equipment is portable, and thus low cost to transport, favour the region.

4.3 *SWOT ANALYSIS*

4.3.1 *Strengths:*

- Large number of companies within the sector in the South East.
- Presence of companies in developing segments of market (gaseous sampling, analysis, software etc).
- High proportion of UK-owned companies.
- Strong R&D heritage for many manufacturers.
- Existence of regional cluster to west and south-west of London
- Well trained / highly skilled workforce.
- Preferred location for many foreign companies – because of presence of others already in sector and access to international markets.

4.3.2

Weaknesses:

- Highly competitive marketplace with considerable emphasis on price and new / innovative product development.
- High costs/timescale in moving from bench to commercial production.
- Competition from a international suppliers offering track record, branding, a wide product range and, in some cases, overseas manufacture in places such as China and SE Asia.
- Large number of foreign-owned companies in the region with R&D/assembly often taking place outside of UK.
- Sizeable number of those operating in south east market are equipment re-sellers.

4.3.3

Opportunities:

- Increasing emphasis on environmental and pollution monitoring from environmental regulators – e.g. water, air and soil quality.
- Opportunities for EMI technologies in cleaner technology / process applications which minimise emissions at source rather an end-of-pipe.
- The Environment Agency is driving industry to undertake more monitoring - including self monitoring - increasing demand for EMI services.
- Increasing public and regulator concern for the effects of ‘new’ pollutants such as ‘endocrine hormone disruptors’ and fine particulates.
- Significant opportunities in the area of integrating monitoring devices with process control and telemetry systems (ICTs). These systems are being introduced to provide better, real-time monitoring and control of processes (industrial, water industry etc). There are strong regulatory, risk minimisation and cost saving drivers for these applications.
- Market niches exist for novel EMI technologies.
- CO₂ instrumentation and control systems – for carbon trading regimes starting in 2007 (Servomex).
- New emissions regulations for power stations and incinerators relating to CO, NO, SO₂ will require new monitoring equipment (Servomex).
- New legislation regulating use of solvents (Signal Group).
- Development of landfill gas and other renewables will require gas analysers for turbines and engines (Signal Group).
- Exports of gas analysis equipment to the Middle East (Servomex).
- Cryptosporidium problem in the South East identified by Drinking Water Inspectorate and the Environment Agency – requiring investment in monitoring technology by water utilities (Severn Trent Water Inspection).

4.3.4

Threats:

- Potential slow down in water industry investment in the UK could reduce EMI demand in the home market.
- Four year cycle of water utilities investment means that there are extreme peaks and troughs of work (Severn Trent Water Purification).
- Environmental lab analysis and more standard EMI is becoming increasingly mature and price competitive.
- National product standards in overseas markets (often based on US and German standards) mean that UK monitoring equipment often needs to be certified and modified for operating in different overseas markets - representing a barrier to export.

4.3.5

EMI Technology Matrix

Environmental Monitoring, Instrumentation, Analysis & Assessment:	Maturity	Market Growth Potential	South East Strengths	Potential for development in SE	Example companies in the S E:
Metering/ data collection devices (e.g. emission probes, water meters, noise meters)	Mature	●●	●●●●	●●	Crowcon Detection Instruments, Litre Meter, Torbar Flowmeters.
Downhole probes & measuring devices	Mature	●●	●●	●●	Acal Auriema, Chelsea Instruments, Pollution & Process Monitoring.
Sampling systems (e.g. automatic sampling unit on effluent streams, continuous emissions monitoring)	Transition	●●●●	●●	●●●●	Energy Control Group, Learian Designs, Servomex.
Biosensors	Transition	●●●●	●	●●	Chelsea Instruments
Process & control systems - hardware	Mature	●●	●●	●●	Honeywell Control Systems
Process & control systems - software, SCADA	Transition	●●	●●	●●	Honeywell Control Systems, HR Wallingford
Data acquisition equipment (e.g. telemetry)	Transition	●●	●●	●	HR Wallingford
Navigational & positioning equipment	Transitional	●●	●●	●●	BMT Marine Information Systems
Gas detection monitoring equipment	Transition	●●	●●	●●	Crowcon Detection Instruments, Servomex, Signal Group
Metering devices (e.g. flowmeters) & gauges	Mature - Transitional	●●	●●	●●	Flowline Manufacturing, Micronics, Seres
Laboratory equipment	Mature	●	●●	●	Perkin Elmer
Summary	Transition-Mature	● / ●●●●	●●	●●	

4.3.6

Potential for Growth

The EMI industry reports that the UK market has flattened because of: limits imposed on water company investment programmes and weak demand for air monitoring equipment.

The long-term prospects for EMI in the water industry are, however, better because of the cost savings and increasing use of EMI technologies in controlling water and wastewater facilities and operations.

Industrial EMI demand may also increase because the Environment Agency and Local Authorities may in the future require industry to increase emission monitoring and reporting - in relation, for example, to emissions to air, ambient air quality, land contamination, solid waste monitoring, emissions to water and water quality.

The environmental laboratory analysis market has become increasingly competitive in the last three years because of the increases in supply capacity – driving down costs and profit margins in the more ‘routine’ parts of the soil, water and air monitoring markets.

4.4

SUB-SECTOR SUPPORT ISSUES

Priority issues relating to future development of the EMI sub-sector in the South East include:

- Support in strengthening R&D links both for those within the market and those in academic establishments. An RDA-sponsored forum for those in sector with links to other UK programmes / forums, for example BioWise, would also be helpful.
- Support in developing closer links with academic institutions regionally and nationally to develop innovative technologies.
- Help in grant applications (SMART etc) and technology transfer through use of IRC network, for example. Existing programmes should include a focus on EMI.
- Support to companies in adapting their products to comply with international product standards.
- Assistance with marketing and business development particularly in the area of segmentation, branding, international marketing – making use of existing, generic marketing support programmes in the South East.
- Build on and strengthen existing clusters in the South East – e.g. around Reading, Bracknell and Slough.
- Help for manufacturers in looking for opportunities in niche, high value, markets – inside and outside the environmental sector (e.g. personal safety, medical and defence/security sectors).

5.1 *SUB-SECTOR DEFINITION*

The air pollution control (APC) sub-sector includes both technologies and services designed to abate air pollutants and improve air quality. Technologies range from air handling equipment to specialist equipment suppliers (e.g. scrubbers, precipitators, odour control units etc). The sector also includes services relating to emission/air monitoring and modelling, assessment/planning as well as general air pollution control consultancy.

5.2 *OVERVIEW – ACTIVITIES, SIZE, SCALE*

5.2.1 *Background*

The APC sub-sector is not as significant/strong in the South East as some other sub-sectors of the environmental industry. In part this reflects both the dispersed nature of the APC sector throughout the UK, and its historic concentration in areas of heavy industry and/or raw material production such as filter media (e.g. North West, West Midlands, East Midlands). The existence of such regional clusters outside of the South East has resulted in those working in the region being broadly involved in generalists serving the day-to-day needs of the industrial and commercial sectors in the region.

It appears that those operating in the South East tend to be positioned at the higher specification end of the market. This comprises process design as opposed to fabrication/manufacturing. There is a strong emphasis on those in the region on the use of contractors for installation of their own or licensed technologies.

There are an estimated 50 manufacturers/process engineers involved in APC in the South East. In addition, there is a large APC service sector which comprises approximately 50 to 70 service companies and consultancies.

5.2.2 *Focus*

The main areas of activity for South East companies can be categorised as:

- **Specialist APC manufacturers** – A small number of APC manufacturers are found in the region. These are typically dealing with dust control and related applications. Although equipment may be fabricated on-site, there are often extensive upstream linkages to suppliers, many outside of the region.
- **Specialist APC process engineers** – A small but important part of the market on the grounds of added value. The South East has a number of

companies with expertise in catalytic, chemical recovery, scrubbing and purification sectors.

- **Broad-based dust collection and IAF process engineers** – Perhaps the biggest category in terms of company numbers. Those active here typically can undertake basic dust control and fume/odour control projects. They also often have interests in the indoor Industrial Air Filtration (IAF) market from the perspective of HVAC and clean room applications.
- **Consultancy and monitoring companies** – This sector forms a potentially very large segment within the market. Although the region supports a number of specialists, typically in monitoring services, the consultancy market spans a large number of companies each with variable interest and skills within the market.

5.2.3 *Examples of Core Companies*

Colt International Ltd. Based in Havant, Colt International is specialist in the air pollution control sector. The company undertakes the design and manufacture of technical solutions for both industrial and non-industrial end-users with solutions offered ranging from the most basic cyclones to gas and mist eliminators as well as process separation solutions.

CSO Technik. Based in Edenbridge (Kent), the company was established in 1995 and has subsequently become a major player in the process engineering sector. The company's two main areas of expertise are combined storm overflow equipment and odour control for water/wastewater and other sectors.

Griffin Cardwell. Acquired by US company, Griffin in 2001, Griffin Cardwell is a process engineering specialist, based in Fleet (Hampshire), capable of dealing with a wide range of projects. These range from fabric filtration and odour control to scrubbing and electrostatic precipitation.

Lurgi (UK), based in Woking is the UK arm of German multi-disciplinary engineering and APC concern, Lurgi-Lenjtes GmbH. The UK operation specialises in specific niches within the market offering dry and wet scrubbing technologies as well as more general technologies such as venturis.

Osprey Corporation, based in Whitstable, is an independent process-engineering specialist. The company specialises in process design and operates exclusively in the APC market. Its capabilities range from flue gas desulphurisation (FGD) to scrubbing and filters with a number of exclusive licences.

Viridian EHC is a specialist process design company based Whitstable. It is a subsidiary of PHC Inc (USA) with interest in solving niche problems within the air pollution control sector. Recently awarded SMART grant for biochemical treatment of VOCs.

Other notable companies in the region include Airpel Filtration Ltd (Newbury), ERG (Air Pollution Control) Ltd (Horsham), Nucat Ltd (Fareham) and Jarshire.Ltd (Slough).

5.2.4

Other Companies Active in APC in the South East

Airpel Filtration	General Combustion
Altair Filter Technology	Griffin-Cardwell
Amtec Filter Technology	Hardene Building Services (Engineers)
ATAC	Jarshire
Bassair	Lurgi (UJK)
Bigneat	Megtec Systems
BOC Process Gas Solutions	Nucat
Colt International	O'Heal
CPV	Osprey Corporation
CSO Technik	Perfectair
E Tech Enterprises	Porter Environmental Supplies
Ecotechnics	Saacke
Eden Scientific	Spraying Systems
EMCo Air Quality Consultants	Tennant
Enviromex	Tylers Engineering
Environ	Vaponics
Environmental Monitoring Services	Viridian EHC
ERG (Air Pollution Control) Ltd	
Fercell Engineering	

Note: Does not include environmental consultancies providing APC services. Includes companies also active in the industrial / indoor air filtration (IAF) sector. Only specialist consultants/service companies to the sector are listed.

Based on the above, key features of the APC sub-sector in the South East include:

- Emphasis from those in the market on added-value design services.
- Experience of those in the sector with a range of APC solutions.
- Strong presence from international businesses in niche end-user markets.
- Well developed consultancy and APC technical support base.

5.2.5

Recent Performance

The air pollution control market in the South East region, despite its relatively small size in comparison to other environmental sectors, appears to be performing somewhat better than in other parts of the UK. This largely reflects the focus on advanced equipment solutions being used for higher value product manufacturing sectors in the South East (e.g. IT, food, chemicals and pharmaceuticals).

Generally, market conditions for APC in the UK are relatively subdued – reflecting past investment during the nineties and slowdown of UK manufacturing activity, particularly among the heavier polluting process industries (e.g. iron and steel, chemicals and cement).

Growth areas within the market include chemical and solvent recovery, biofilters (e.g. for odour control), incineration technologies (for solvent management), new technologies for controlling vehicle exhausts and scrubbers (both wet and dry). However, suppliers note that demand is being held back by inconsistent / weak application of APC regulations.

5.2.6

Technology Matrix

Air Pollution Control:	Maturity	Market Growth Potential	South East Strengths	Potential for development in SE	Examples of suppliers in the SE
Air handling equipment (e.g. ducts, fans)	Mature	●	●	●	Porter Environmental, Waterloo Air Management.
Catalytic converters and other exhaust controls (i.e. for vehicles & industry)	Transition	●●	●	●●	General Combustion, Nucat, Wantzen.
Chemical recovery equipment (e.g. distillation, membrane technology, 'packed' towers)	Transition	●●	●●	●●	Colt International, Osprey Corporation.
Purification (e.g. cyclones, filter bags)	Mature	●	●	●	Amtec Filter, Bassair, Enviromex, Whatman International.
Scrubbers (e.g. wet/dry systems, Venturi scrubbers)	Mature	●	●●	●	CSO Technik, Fercell Engineering, Lurgi, Osprey Corporation
Precipitators (e.g. electrostatic precipitators)	Mature	●	●	●	Cardwell Europe
Incinerators (i.e. thermal oxidation - recuperative/regenerative)	Mature/Transition	●●	●	●	General Combustion, Saacke.
Odour control equipment (e.g. biofilters)	Mature/Transition	●	●●	●●●	Colt International, CSO Technik.
Flare systems (e.g. offshore, landfill, refinery)	Mature	●	●	●	
Summary	Mature	●	●/●●	●/●●	

5.3

SWOT ANALYSIS

5.3.1

Strengths:

- Focus of many South East suppliers on added-value segments of the APC market – specialist equipment, process design etc.
- Strong design base with use of outside contractors, both within and outside the region.
- A number of smaller companies have active RTD programmes.
- Ability of many companies to remain flexible in what can be a changeable market.

5.3.2

Weaknesses:

- Weak in volume areas of APC market such as filters which are considered as 'bread and butter' technologies in the sector in terms of replacement sales.
- Some APC technology sectors are over-reliant on foreign licences, for example scrubbing technologies developed by German manufacturers.
- Reliant on the industrial sector for many projects which is fragmented and subject to under/distress investment.
- Strong competition from outside of region from larger players (AAF, Donaldson DCE, Airmaster, Camfil-Farr).
- Large number of small companies in market presents possible problem in terms of growth, market profile and achieving economies or scale.

5.3.3 *Opportunities:*

- Increased application of air quality management regimes by UK local authorities, and wider application of IPPC by Environment Agency, stimulating sales of monitoring equipment and modelling systems as well as abatement technology.
- Increasing attention on odour control from manufacturing industries.
- Increasing awareness of the cost benefits of solvent recovery is increasing demand for APC technologies which deal with solvents (e.g. biofilters, thermal oxidisers).
- Opportunities for greater collaboration between companies, e.g. in overseas markets such as China, Middle East etc.
- Growing attention on issues such as fine particulate emissions and dioxins may drive future demand.

5.3.4 *Threats:*

- Reduction in heavy manufacturing industry based in the UK.
- High cost of living in the South East makes it difficult for existing companies to generate significant profit margins, and discourages new companies from locating in the region. This is particularly relevant for manufacturing/engineering companies.
- Increasing competition from low cost equipment imports.
- Overseas acquisition of well-established suppliers in the South East may reduce scope for exports if they are encouraged to focus on the UK market.
- Local Authorities may continue to be slow to enforce regulations - e.g. delays in enforcing VOC (volatile organic compound) emission reductions.

5.3.5 *Potential for Growth*

The UK APC market has been relatively quiet in the last 5 years and parts of the market appear to be reaching maturity - reflected in lower rates of annual market growth. This situation is similar to elsewhere in Western Europe and the US. Low rates of recent growth reflect closures of heavy industrial plants in the UK, and the fact that: much of the abatement equipment required by larger spending UK industries is already in place.

Potential drivers for future growth in the UK APC market include:

- increasing concern over urban air quality;
- the UK Air Quality Strategy which amongst other things requires local authorities to review local air quality;
- possibility of stronger future enforcement of Local Authority Pollution Control regulations;
- a possible increase in the number of waste incinerators in the UK;
- the EU Air Quality Directive;

- the EU Solvents Directive;
- increased emphasis by the Environment Agency on requiring industrial emission monitoring and reporting; and
- the drive to reduce greenhouse gas emissions.

5.4

SUB-SECTOR SUPPORT ISSUES

Priority issues relating to future development of the APC sub-sector in the South East include:

- Support to strengthen R&D links between businesses, academic establishments in the UK and programmes such as BioWise, to develop innovative technologies.
- Support with information exchange, eg to inform smaller companies of emerging new technologies.
- Help for manufacturers in looking for opportunities in niche, high value, markets.
- Help in accessing grants (SMART etc.) and technology transfer through use of IRC network, for example.
- Assistance with marketing and business development particularly in the area of segmentation, branding, international marketing.

6.1 SUB-SECTOR DEFINITION

The waste management and recycling sub-sector includes a wide range of technologies and services for the management, collection, treatment, disposal, of wastes, waste minimisation and regulatory advice, recycling (metals, plastics, oil, compostables, glass, demolition & construction wastes etc), and technologies such as bins, sorters, shredders, compactors, waste management vehicles. The development of new techniques for processing and reprocessing waste streams is also an important area of technical innovation. *Figure 6.1* illustrates the overall supply chain structure of the waste management and recycling supply sub-sector.

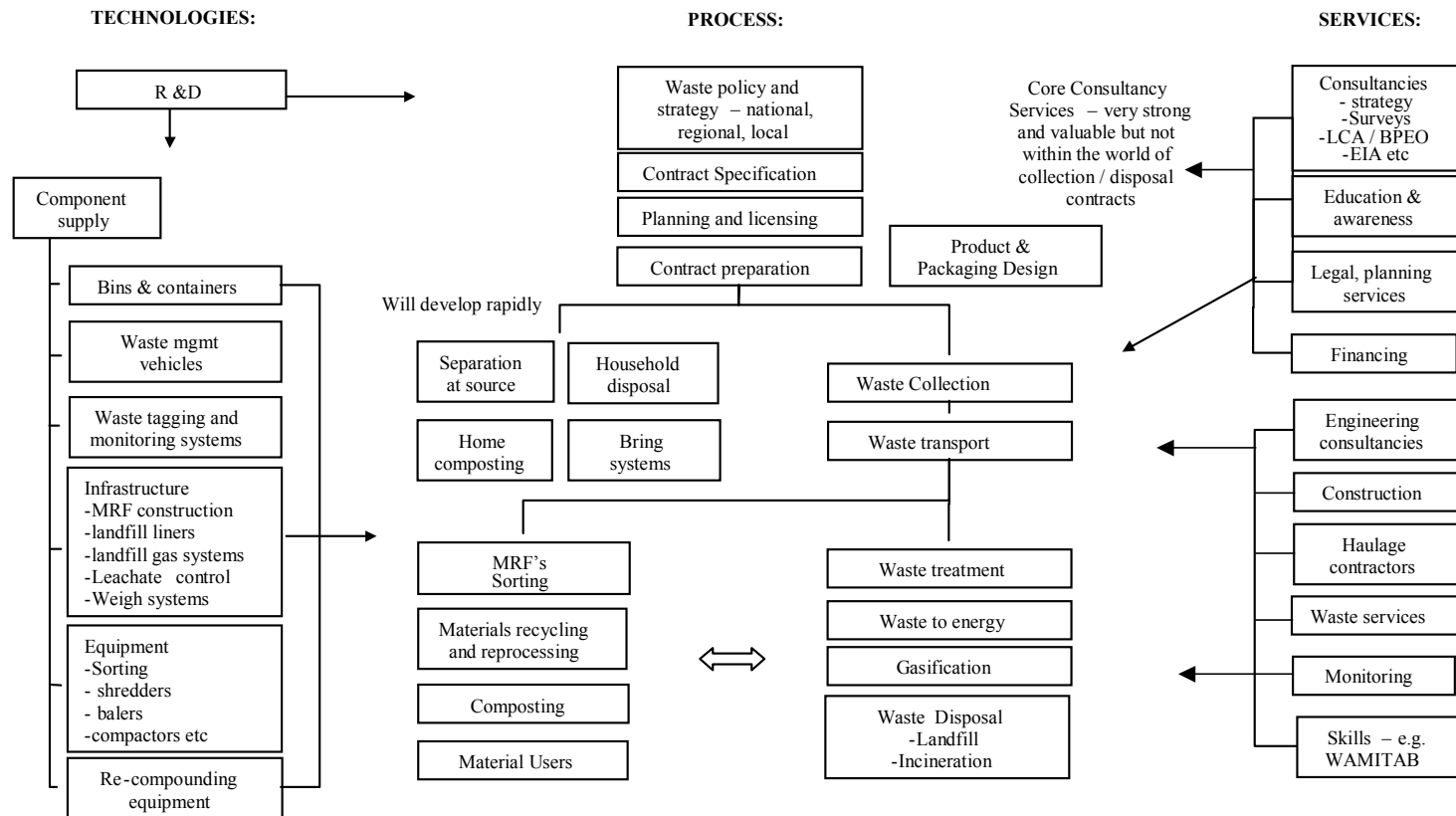
6.2 OVERVIEW – ACTIVITIES, SIZE, SCALE

This is one of the largest sub-sectors of the environmental industry in the South East (as in other UK regions). ERM has identified approximately 350 businesses involved in waste management and recycling in the region. In addition, there is a plethora of skip hire companies, many of which are becoming involved in recycling.

Within the sub-sector, the following types of waste management and recycling businesses are found:

- Large UK and international waste management businesses.
- Many regional and local waste management service providers.
- A relatively small number of suppliers of specialist waste technologies (compared to other regions). These include technologies for recycling, composting, waste to energy plants etc. The relatively small number of these equipment and technology suppliers is likely to reflect the relatively limited amount of heavy industry in the South East compared to other regions such as the West Midlands, North West and Wales.
- A range of consultancies providing waste minimisation expertise to industry.
- A number of social enterprises or community recyclers.

Figure 6.1 Summary of Supply Chain Structure in the Waste Management and Recycling Sub-Sector



Source: DTI's Innovation and Growth Team (IGT), 2002.

- **Shanks Waste**, with its corporate headquarters in Buckinghamshire, is one of Europe's largest independent waste management companies. With turnover of £551m in 2002-2003, Shanks Waste provides a range of services, including collection, incineration, landfill, recycling, chemical waste management, remediation, and local authority collection/disposal contracting. The company's turnover has more than doubled since 1999, with recent growth particularly strong in the Benelux region.
- **Island Waste Services** is the leading integrated waste management company on the Isle of Wight, and is a subsidiary of Biffa Waste Services. The company was awarded a contract for the collection, recycling and disposal of all household waste on the island in 1997, the first integrated contract of its kind in the UK, and provides a kerbside recycling service, civic amenity sites, street cleansing, a composting plant and a resource recovery facility.
- **Cordek Ltd**, based in Slinfold West Sussex, is Europe's largest manufacturer of specialist expanded polystyrene products for the construction industry. In particular, the company supplies Tipform, a patented expanded polystyrene shuttering system designed to facilitate the construction of smooth steep-sided walls to landfills contained in redundant quarries.
- **KK Balers Ltd**, based in Weybridge, manufactures and supplies waste handling equipment, designed to reduce volumes of general waste and for the compaction of recyclable materials. The KK Group, of which KK Balers is a subsidiary company, also supplies water treatment equipment.
- **Thames Waste**, based in Leatherhead, is the UK operation of RWE UmweltAG, one of the largest waste management companies in Europe. TWM provides dry and liquid integrated waste management and recycling services to local authorities, utilities and industrial and commercial waste producers. Core services of TWM include dry waste recycling and treatment, anaerobic digestion, energy from waste, composting, landfill, liquid waste transport and treatment, contaminated land remediation, and refrigerator recycling.
- **PD Rotomoulds Plc**, based in Thornton Heath, Surrey, supplies a range of waste banks, bins and composting systems.
- **Skipaway Environment Control Ltd**, based in Rochester, is Kent's premier waste collection company. Specific services include wheelie bin and trade waste collection, hire of rear-end load containers, skips and compactors, and special waste handling and consultancy.
- **Can Crush UK Ltd**, based in Edenbridge, supply can crushers featuring a range of designs and artwork for domestic and commercial use.
- **Prisimm**, based in Orpington, Kent, is a facilities and waste handling company working with all materials in the waste stream.
- **TerraEcoSystems** - part of the Thames Water Group and based in Reading. Provides industry and agriculture with waste recycling services, organic composting and fertiliser products.
- **Tetronics Ltd**, based in Faringdon, designs and supplies a technology (Tetronics Environmental Plasma System - TEPS) used for reducing, re-using and recycling materials from assorted industries including the waste, automotive and steel industries. Applications include: vitrification of municipal solid waste incinerator ash to reduce the amount of waste sent to landfill or to re-use the vitrified product as aggregate; smelting of steel dust to reclaim valuable metals and re-use them within the steel making process; treatment of used automotive catalysts to recycle the platinum group metals.
- **Magpie Recycling Co-Op** - A community enterprise in Brighton Domestic which provides commercial/office recycling collections, a furniture reuse scheme, and provides local authority recycling / kerbside collection services. As a social enterprise, Magpie generates social, employment and skills benefits for the local community and excluded groups.

-
- Accrete Limited, Newbury
 - Alan Hadley Limited, Reading
 - Arboga-Darenth Ltd, Erith
 - ARROW, Egham
 - Bio-Bubble Ltd, Emsworth
 - Bioclere Systems Ltd, Farnham
 - BKP Environmental Services Ltd, Romsey
 - BOC Edwards
 - Brett Aggregates Ltd, Shepperton, Middx
 - Britanica Crest Recycling Ltd, Hook Wood
 - Can Crush UK Ltd, Edenbridge
 - Cleansing Service Group Ltd, Southampton
 - Colas Ltd, Crawley
 - Cordek Ltd, Slinfold
 - Crane Environmental Ltd, Surbiton
 - DISAB UK Vacuum Tech Systems, Abingdon
 - Edge Enviro Services Ltd
 - EHC Viridian Ltd, Whitsable
 - Envirogreen Special Waste Services, Slough
 - Environmental Support Services Ltd, Dorking
 - Erith Group, Erith
 - Errington Ltd, Harrow
 - Esmil Process Systems Ltd, High Wycombe
 - Euro Environmental Containers, Wokingham
 - Fibre Fuel Ltd, Slough
 - Fineapply Ltd, Bicester
 - Fitzpatrick Contractors Ltd, Hoddesdon
 - Fosplant, Maidenhead
 - General Combustion Ltd, Billingshurst
 - Gifford and Partners, Southampton
 - Ground Solutions Group Ltd, Ashford
 - Grundon (Services) Ltd, Reading, Slough etc
 - Hadley Landsave, Reading
 - Hills Minerals and Waste Ltd, Marlsborough
 - Icoplastic, Banbury
 - INTEX Group, Fareham
 - Island Waste Services, Isle of Wight
 - Islip Enterprises Ltd, Islip
 - Jade Re-Marketing Ltd, Wantage
 - Kalsep Ltd, Camberley
 - Kendall Machinery UK Limited, Scaynes Hill
 - KK Balers
 - Landclean Ltd, Petersfield
 - LWM Ltd, Marlow
 - M J Gleeson Group Plc, Sutton
 - Magpie Recycling Co-op Ltd, Brighton
 - McLellan & Partners Ltd, West Byfleet
 - Metoc Plc, Liphook
 - Mouchel Consulting Ltd, West Byfleet
 - MTS Cleansing Services Ltd, Rochester
 - Nirex, Didcot
 - Organo (UK) Ltd, Crawley
 - PD Rotomoulds Plc, Thornton Heath
 - Passavant – Roediger, Milton Keynes
 - Peter Brett Associates, Reading
 - Prismm Ltd, Orpington
 - R H Ovenden Ltd, Canterbury
 - Reprotech (Persham) Ltd, St Leonards on Sea
 - Shanks Waste Solutions, Milton Keynes
 - Sulo MGB Ltd, High Wycombe
 - TerraEcoSystems, Reading
 - Tetronics Ltd, Faringdon
 - Thames Waste Management Ltd, Leatherhead
 - Trio Group, Milton Keynes
 - Viridor Waste Management, West Malling
 - Wessex Environmental Services, Southampton
 - Wilkie Recycling Systems Ltd, Tadley
-

6.3

SWOT ANALYSIS

6.3.1

Strengths:

- South East has traditionally been ahead of the rest of the UK in terms of recycling performance, driven by a lack of available landfill space, high per capita waste arisings, and strong NIMBYism. Consequently, waste management companies in the region have a good track record in innovative approaches to waste issues, eg Project Integra, the UK's first integrated waste collection and disposal contract.
- Large waste management companies have head offices in the region – e.g. Biffa Waste Services Ltd.

- Some well established waste management and recycling technology manufacturers – KK Balers and PD Rotomoulds plc, Bioclere Systems Ltd.
- Nuclear waste expertise – Nirex.
- Many specialist waste management operators.
- More social enterprise involved in waste management / recycling in the region compared to other parts of the UK.
- Recent growth in materials reprocessing activity (e.g. paper, glass, plastics).
- Strong R&D in waste management techniques in institutions such as Southampton University, Portsmouth University, University of Brighton and Qinetiq.

6.3.2 *Weaknesses:*

- Relatively few waste management equipment / technology manufacturers and suppliers.
- Many very small companies which lack the resources for business expansion.
- Limited materials recycling facilities - need to develop MRFs (materials recycling facilities) for waste transfer and separation.
- Low levels of export activity amongst waste management service and technology providers (common to all UK regions).

6.3.3 *Opportunities:*

- Strong future market drivers – especially EU and Government recycling targets, Landfill Directive, lack of landfill space, high regional growth in waste arisings etc (see *Box 6.3* below).
- Complexity of planning issues in the south east creates opportunities for planning/waste consultancies, eg advising at planning inquiries, expert witness etc.
- Enclosed technologies (eg green waste composting, anaerobic digestion) can have a reduced environmental impact/nuisance in comparison to other disposal approaches (eg landfill, incinerators, MRFs etc).
- Landfill Levy and Packaging Regulations are driving demand for waste minimisation and product re-design.
- Possible long-term increase in landfill tax.
- Emerging South East regional waste management strategy could drive future development of waste management facilities and demand in the region.
- Growing demand for waste conversion / reprocessing technologies.
- Investors are gradually becoming more interested in waste management businesses.
- Significant opportunities for developing social enterprises in waste management / recycling.

- Growing demand for waste minimisation advice to industry, as well as advice on compliance with many new waste regulations – e.g. WEEE, ELV, Packaging.
- Significant overseas market opportunities for waste management expertise and technologies (e.g. Central and Eastern Europe, the Middle East, Southern Europe, SE Asia).

Box 6.3 *Market Drivers for Waste Management and Recycling*

'No Time to Waste', the South East Regional Assembly's waste management strategy (out in consultation draft form in March 2003) proposes as its main policy objectives:

- Waste minimisation and awareness raising among consumers
- Self-sufficiency for all waste management authorities, in terms of waste management capacity (eg recycling, disposal etc)
- Recovery targets for all waste: 66% by 2005, 81% by 2015, 86% by 2025
- Recycling/composting targets for municipal waste: 25% by 2005, 45% by 2015, 60% by 2025

The 'UK Waste Strategy 2000' has set targets to reduce industrial and commercial waste going to landfill by 85% of 1998 levels by 2005; and to recycle or compost at least 25% of household waste by 2005 (rising to 33% by 2015). Similarly, the Government has set a target for 10% of electricity to come from renewable sources by 2010.

Landfill – The EU Landfill Directive contains targets to: reduce biodegradable municipal waste going to landfill to 75% of 1995 level by 2010, 50% of 1995 level by 2013 and 35% by 2020. Co-disposal of hazardous and non-hazardous wastes will be banned, as will the landfill of tyres (whole tyres by 2003, shredded tyres by 2006). Landfill of liquid wastes, infectious clinical wastes and explosive or highly inflammable wastes will also be banned.

Recycling and Recovery – Targets set by the Government will require local authorities to increase recovery and recycling or composting of waste sent to landfill. Recovery should reach 40% by 2005 and 67% by 2015; recycling or composting should reach 25% by 2005 and 33% by 2015.

Incineration – Potential increases in waste incineration and waste to energy schemes in order to achieve UK Waste Strategy targets.

Sewage Sludge – The EU Waste Water Treatment Directive brought an end to sea dumping of sewage sludge in 1998. This is driving the development of alternative sludge disposal strategies such as use as a fertiliser and incineration.

Economic instruments such as the existing Landfill Tax and proposed Aggregates Tax will drive waste minimisation, reuse and recycling.

Other regulatory drivers – Additional regulations will drive the development of recycling infrastructures and the recycling industry. These regulations include: the Draft End-of-Life Vehicles Directive which will require 80% of the weight of end-of-life vehicles to be recycled by 2007; the Packaging Waste Regulations; and the Waste Electrical and Electronic Equipment Directive (WEEE) expected to be implemented in 2006.

6.3.4 *Threats:*

- Slow progress towards meeting recycling targets and low public participation rates in most parts of the UK.

- Fragile markets for recycled materials (sometimes undercut by low costs of virgin materials).
- Difficulties in obtaining planning permission for waste management infrastructure, even when set out in local waste management plans. Strongly linked to local public opposition to the development of waste management/reprocessing facilities (eg incinerators etc).
- High land values make it difficult to establish new waste management / resource reprocessing facilities.
- Difficulties in attracting workforce to some activities such as recycling.
- Increasing competition in waste recycling and management technologies – from UK suppliers (based in Midlands, Wales and the North) and European suppliers (German, Scandinavian, French etc).
- Technical innovation from competitors in the EU, particularly Germany and France.

6.3.5 *Technology Matrix*

Waste Management and Recycling:	Maturity	Market Growth Potential	South East Strengths	Potential for development in SE	Examples of SE companies
Waste storage equipment	Mature-transition	●●●	●●	●●	PD Rotomould
Solid waste collection & handling / compaction equipment (e.g. bins, tanks etc.),	Transition	●●●	●	●●●	KK Balers, Cancrush UK Ltd Icoplastic Ltd
Waste collection vehicles and associated technologies (e.g. rear- & front-ends, hydraulics, controls/monitoring)	Transition	●●●	●	●●	
Solid waste separation (recycling) equipment (e.g. magnets, screens, shredders, plastics recycling)	Transition	●●●	●	●●●	
Materials / waste reprocessing and treatment technologies	Emerging	●●●	●●	●●●	Tetronics Ltd BOC Edwards
Pyrolysis & Gasification (emerging thermal waste treatment technologies)	Emerging	●●●	●●	●●●	Tetronics Ltd
Aerobic composting (e.g. windrow technology)	Emerging	●●●	●	●●	Thames Waste
Enclosed aerobic composting (i.e. in-vessel composting),	Transition	●●	●●	●●	
Anaerobic digestion equipment (e.g. sludge digestion),	Emerging	●●●	●	●●	DISAB UK Vacuum Tech Systems, Global Odour Control Ltd
Incineration equipment (i.e. fixed/rolling grate, fluidised bed, rotary kiln). Includes waste to energy plant.	Mature-transition	●●●	●	●●	LWM Ltd
Landfill (e.g. HDPE liners, leachate collection/treatment),	Mature	●●	●●	●●	Cordek
Summary	Emerging - mature	●●●	●/●●	●●/●●●	

6.3.6 *Potential for Growth*

The UK waste management market is facing substantial changes as a result of EU Directives and related UK policy (e.g. the UK Waste Strategy 2000 and use of the landfill levy; and European Regulations such as the EU Landfill

Directive. This will result in reduced reliance on landfill and increases in waste minimisation, recycling (including construction aggregates, plastics, glass, tyres, oils etc), composting, reprocessing and incineration – as shown in the technology matrix above.

In 2000, the UK waste management market was worth approximately £4.6 billion ⁽¹⁾. Strong market drivers, outlined in *Box 6.3*, are forecast to take the market up to around £9 billion by 2010 ⁽²⁾. Demand will increase for a very wide range of products and services including recycling and composting technologies and services, materials reprocessing, product design, energy from waste technologies, landfill gas systems, incineration equipment, waste minimisation advice, waste policy studies, waste management vehicles, shredders and compactors. The increasing sophistication of waste management, treatment and disposal operations will provide opportunities for companies with technology based expertise which enables value to be extracted from waste streams.

Changes in waste management practices have the potential to generate significant business and employment opportunities in areas such as:

- waste separation systems to enhance waste reprocessing;
- development of novel / higher value end-uses of secondary material;
- waste collection and reprocessing technology suppliers – MRFs, kerbside collection systems and vehicles, bins (e.g. underground bottle collection);
- technologies and services for recycling of plastics, metals, glass, wood, paper, construction and demolition wastes, waste oils, composting, tyres, textiles, electrical equipment and clothing, fridges, end-of-life vehicles etc;
- construction and operation of materials reprocessing facilities;
- community enterprises involved in waste reuse and recycling;
- collection and reprocessing of materials from end-of-life vehicles; and
- waste minimisation expertise and technologies.

Demand for recycling services and recycled materials will depend to a large degree on the development of markets for recycled products and prices in international commodity markets for paper, plastics and oil. It will be important to develop a strategic regional approach to the development of waste management and recycling activities and to enhance the financial viability of recycling through economies of scale. The role of the South East Waste Market Development Group will be important in this respect.

However, as noted in the SWOT analysis, waste management / recycling technology suppliers are not well represented in the region, compared to other parts of the UK and strong overseas competition. Therefore, although the drivers for growth in these technologies are very strong, the ability of the region to capitalise on them is questionable. **That said**, the sheer scale of the

(1) Source: Keynote Market Report on Waste Management, 2001.

(2) Forecasts based on growth rates associated with market drivers and Keynote Market Report on Waste Management, 2001.

opportunities associated with “sea-changes” required to meet EU and Government waste management targets, means that these remain important market opportunities where significant potential business development opportunities exist.

6.4 *SUB-SECTOR SUPPORT ISSUES*

Priorities for support to help the South East to capitalise on significant future waste management market opportunities include:

- Support for businesses developing innovative waste management technologies and techniques, e.g. separation, recycling technologies. In particular, funding for waste disposal techniques with smaller associated nuisance impacts, eg anaerobic digestion etc.
- Marketing support to waste technology producers to raise their profile amongst technology purchasers in the South East.
- Support for demonstration projects involving progressive waste management techniques (linked to initiatives such as Remade and WRAP).
- Scope for strengthening waste management technical R&D skills – examine potential for developing a centre of excellence on waste management technology R&D in the region.
- Upgrading skills in waste management (e.g. recycling) through vocational qualifications to attract and retain employees.
- Support for the development of social enterprises involved in waste management and recycling (e.g. community recycling).
- Actions to strengthen links between environmental consultancies involved in waste management strategic studies overseas, and waste management service and technology suppliers in the region. This will help to increase export activity to capitalise on substantial overseas opportunities in waste management.
- Public sector activities to accelerate South East progress towards UK Government waste management and recycling targets.
- Regional partners involvement in development of waste management infrastructure - e.g. Materials Recycling Facilities (MRFs). This will require co-ordinated actions across the region to take proposed projects through the planning process.
- Demand needs to be stimulated by public sector end-users in the market (e.g. drive by Local Authorities to meet recycling targets), though there are significant issues for Central Government here (including financing). The role of the South East Waste Market Development Group (led by SEEDA) will be important here.
- Further development of the Government’s WRAP (Waste and Resource Action Plan) programme activities in the South East to stimulate regional markets for recycled materials and also to assist in the development of products using recycled materials.

7.1 SUB-SECTOR DEFINITION

Services provided by environmental consultancies include environmental management systems, environmental audit, corporate environmental strategy, life cycle assessment, environmental impact assessment, environmental regulatory advice and technical advice in areas such as air quality, water quality and resources, waste management, contaminated land, noise and vibration, hazard/risk assessment and ecological management. Environmental consultancy services span all other sub-sectors of the environmental industry.

7.2 OVERVIEW - ACTIVITIES, SIZE, SCALE

Environmental consultancy is a distinct strength in the South East. The region has many internationally-recognised UK and overseas firms, specialist environmental consultancies (e.g. RPS, ERM and Casella Stanger) and environmental arms of multi-disciplinary engineering consultancies (e.g. Halcrow, WS Atkins etc). There are also many smaller consultancies providing specialist services. A number of the region’s universities also have environmental consultancy arms.

In all, we estimate that there are at least 100 environmental consultancy businesses based in the South East.

7.2.1 Examples of Core Companies

Bullen Consultants, with offices in Croydon, provides a range of engineering and environmental services including land remediation, waste management, and wastewater.

Casella Stanger, with offices in Southampton, offers individual and integrated technical environmental services including noise, land/water quality, industrial emissions, EMS, ecology, air quality and landscape planning design.

Environmental Resources Management Ltd (ERM), a global environmental consultancy with offices in 38 countries around the world, 250 UK employees and 75 based in ERM’s Oxford office. ERM service areas include: environmental audit, EMS, environmental and corporate social responsibility reporting, environmental impact assessment, waste management policy, water, air, international development projects, energy, renewable energy, environmental regulatory studies, life cycle assessment, site investigation and remediation, economics, regeneration and sustainable development for a wide range of private and public sector clients in the UK and overseas.

Halcrow Group Ltd, a global consultancy with offices in Crawley, Chichester, Snodland and Reading, provides ‘infrastructure-based business solutions’, including a range of environmental consultancy services as follows: planning/EIA, green transport plans, contaminated land, pollution control, landscape architecture, sustainable development, and waste management services. Halcrow employs 180 people across the UK.

Jacobs Environmental, part of JacobsGIBB Ltd the international consulting firm servicing the

transport, utilities, and construction sectors with its UK headquarters in Reading, provides a wide range of environmental consultancy services including land investigation and remediation, CSR, audit, EHS, environmental assessment, and risk assessment/management.

McLellan, based in West Byfleet and with 20 employees, provides environmental consulting services to private and public sector clients, including environmental assessments, audits/surveys, risk assessments, EMS, waste management services, and air pollution control systems.

Mouchel Consulting Ltd, based in West Byfleet, is a professional services group supporting clients in developing and managing their infrastructure assets and service delivery. In addition to technical work in assessment, auditing, social responsibility, waste management etc, the company also carries out policy, strategy and capacity-building activities on behalf of major corporate clients, financial institutions and development agencies.

MWH is a global consultancy specialising in power, water and wastewater issues, with its UK headquarters in High Wycombe.

RPS Group Plc offers professional advice and technical support services on a wide range of environmental disciplines, covering areas such as town planning, waste management, transport planning, impact assessment, engineering design and asset, resource and risk management issues. Its UK headquarters are in Abingdon.

WS Atkins PLC is a worldwide provider of professional, technologically-based consultancy and support services, which provides environmental consultancy services in eight broad areas: climate change; contaminated land; data management; environmental appraisal; environmental management and regulation; planning and land management; sustainability; and waste.

Table 7.1 *Environmental Consultancy Businesses in the South East*

ADAS Environment, Guildford	Metoc Plc, Liphook
AEA Technology Environment, Abingdon	Montgomery Watson, High Wycombe
AML Consultants, Caterham	Mouchel Consulting Ltd, West Byfleet
Ashdown Site Investigation Ltd, Lewes	MWH, High Wycombe
WS Atkins Environment, Epsom	PDS Environmental, Chichester
Black & Veatch Ltd, Redhill	Pira International, Leatherhead
BMT Cordah, Southampton	Pisces Conservation Ltd, Lymington
Bullen Consultants, Croydon	Q D S Environmental Ltd, Guildford
Casella Stanger, Southampton	R P S Group Plc, Abingdon
Crane Environmental Ltd, Surbiton	Raw Consulting, Sandhurst
Ecological Planning, and Research, Winchester	Reading Agricultural Consultants, Didcot
EM Consultants, Bordon	Scott Wilson, Basingstoke
Emrad Ltd, Church Crookham	Temple Environmental Consultants Ltd,
Environmental Resources Management (ERM)	Horsted Keynes
Ltd, Oxford	Terence O'Rourke, Bournemouth
Enviros, Abingdon	The IT Group Infrastructure &
Foster Wheeler Energy Limited, Reading	Environmental Ltd, Epsom
Geo-Environmental Services Ltd, Brighton	Tomorrow's Technology for Today (T ³)
Gibb Environmental, Reading	Transport Research Laboratory (TRL),
Gifford and Partners, Southampton	Crowthorne
Golder Associates, Maidenhead	University of Oxford Consulting Ltd,
Halcrow Group Ltd, Crawley	Summertown
Hyder Consulting, Guildford	Weeks Consulting, Maidstone
Jacobs, Reading	WRc, Marlow
M W H, High Wycombe	WSP Environmental Ltd, Basingstoke
McLellan & Partners Ltd, West Byfleet	

7.3 SWOT ANALYSIS

7.3.1 *Strengths*

- Many of the UK's leading environmental consultants are based in the South East.
- The region's environmental consultancies work for blue chip clients throughout the world.
- Many firms have a strong track record in export markets - e.g. WS Atkins, Scott Wilson, Halcrow, ERM etc.
- Good range of skills from technical (eg pollution control and remediation) to environmental policy.
- Many small, niche specialists.
- Strong in emerging market opportunities such as climate change, carbon trading, waste policy, waste minimisation, water and wastewater in overseas markets.

7.3.2 *Weaknesses*

- Scope exists for stronger links between environmental consultancies and other suppliers in the environmental industry of the South East.

7.3.3 *Opportunities*

- Environmental regulations and increasing stakeholder expectations for companies to improve their environmental performance are driving demand for a wide range of environmental consultancy services.
- Strong market drivers for, e.g. waste management advice, environmental management systems, contaminated land remediation consultancy etc.
- Opportunities for waste minimisation, life cycle assessment, integrated product policy, cleaner technology advice.
- Advice to industry on new regulations such as the climate change levy and carbon trading.
- Sustainable development issues for private and public sector clients are driving demand.
- Growing overseas opportunities.

7.3.4 *Threats*

- Uncertainties over the pace of implementation of some Government policies (e.g. waste management and renewables targets) may delay emergence of some market opportunities.
- Slower economic growth rates in the UK and internationally are denting demand for environmental consultancy services from large private sector companies.

7.3.5 *Potential for Growth*

There are good market prospects for environmental consultancies in the UK and overseas. Demand for a wide range of environmental consultancy services is expected to increase over the next ten years in line with tightening environmental legislation for industry, growing public expectations for environmental improvement in industry and industry's interest in reducing costs through environmental improvement. Overseas opportunities are also increasing – e.g. in Central and Eastern Europe / EU Accession States.

South East firms are extremely well placed to access these opportunities, but will need to compete with strong overseas competitors.

Consultancies often play important roles in designing abatement solutions or specifying particular environmental technologies. Stronger links / networking with the region's environmental technology suppliers could help the technology suppliers to access market opportunities.

7.4 *SUB-SECTOR SUPPORT ISSUES*

As noted above, environmental consultancies in the South East are already extremely strong – which indicates that they have the skills and existing market presence to capitalise on future market opportunities, without the need for significant support activities. However, further business growth could be supported by:

- Support in identifying and accessing overseas opportunities.
- Stronger networks between environmental consultancies and other environmental suppliers in the region would provide technology suppliers with early notice of opportunities.

8.1 *SUB-SECTOR DEFINITION*

The contaminated land remediation (CLR) sub-sector involves the supply of technologies and services for investigating and remediating contaminated land and groundwater; and bringing derelict land back into use. It includes services such as site investigation, remediation, monitoring and analysis. Technologies for remediating contaminated soils and groundwater include thermal techniques, bioremediation and soil washing, as well as the traditional 'dig and dump' techniques.

8.2 *OVERVIEW - ACTIVITIES, SIZE, SCALE*

Companies include environmental, geotechnical and engineering consultancies involved in contaminated land, site investigation and soil testing companies, remediation contractors, contaminated soil disposal companies and brownfield site developers.

Companies range from specialist CLR firms such as Biogenie Site Remediation Ltd, Edmund Nuttall, Ground Solutions Group Ltd and Ashdown Site Investigation Ltd, to multi-disciplinary environmental and engineering consultancies such as RPS, ERM, Halcrow and WS Atkins. In total, it is estimated that there are at least 50 companies providing CLR services or technologies in the South East.

Currently, the work of the majority of suppliers based in the South East focuses on the UK market. Overseas CLR activities by UK firms tends to be more limited, other than when working on behalf of multinational clients.

8.2.1 *Examples of Core Companies*

Ashdown Site Investigation Ltd, based in Lewes, East Sussex, is a geotechnical and environmental engineering practice offering expertise in ground investigation, soils laboratory testing, foundation design, environmental assessment and advice on the remediation of contaminated land.

Biogenie Site Remediation Ltd, with its UK offices located in Bracknell, is an international contaminated site assessment and remediation company, which specialises in the design, construction and operation of treatment processes, earthworks, landscaping and civil engineering infrastructures.

Costain Geotechnical Services, based in Maidenhead and part of the international civil engineering contractors Costain, provides consultancy and contractor services for onshore and offshore ground investigations, environmental investigations, and laboratory testing.

Edmund Nuttall Ltd, based in Camberley, is a civil engineering contractor, and a leading land regeneration contractor. Specific services cover initial site investigation and materials testing, through every type of remediation (eg bioremediation, soil washing, encapsulation and removal) to provision of full infrastructure engineering.

Environmental Resources Management (ERM) Ltd in Oxford is one of the UK's leading CLR consultancies, working for multinationals in sectors such as oil and gas, transport, property development and the city. ERM is also active in international CLR markets for multi-nationals throughout the world.

Ground Solutions Group Ltd, located in Ashford, Kent, provides environmental, geotechnical and surveying services, with a particular focus on identification, assessment and remediation of contaminated land.

Land Clean, based in Petersfield, Hampshire, provides project planning and hands on site remediation management, the supply and hire of specialist environmental equipment and plant, phased remediation programmes, emergency spillage response, and after-care and environmental land management contracting services.

Land and Water Remediation Ltd is a Guildford-based company which specialises in the recovery and treatment of contaminated dredgings, sludges and settlement lagoon arisings. Technologies used include screening and washing, dewatering, solidification and stabilisation with the beneficial reuse of treated materials being the prime objective.

Monarflex Geomembranes Ltd, St Albans supplies and installs geomembranes for protection from contaminated land

QDS Environmental Ltd, with its headquarters in Guildford, provides a comprehensive range of land remediation services for treating contaminated soil and groundwater.

Universities: Prominent university expertise in the region includes Oxford University, Reading University and Kent University.

Box 8.1

Contaminated Land Remediation Companies in the South East

Ashdown Site Investigation Ltd, Lewes	Inex Ground Remediation Ltd, Monks Brook
BAE SYSTEMS Environmental Ltd, Aylesbury	Land and Water Special Process, Guildford
Bedford & Eccles Partnership, Brighton	Landclean Ltd, Petersfield
Biogenie Site Remediation Ltd, Bracknell	M W H, High Wycombe
BOC Process Gas Solutions, Guildford	Monarflex Geomembranes Ltd, St Albans
Bullen Consultants, Croydon	Mouchel Consulting Ltd, West Byfleet
Casella Stanger, Swanwick	Mowlem Civil Engineering, Bracknell
Costain Limited, Erith	Mott Macdonald, Croydon
Crown Bio Systems, Sittingbourne	Q D S Environmental Ltd, Guildford
Darcy Products Ltd, East Malling	R P S Group Plc, Abingdon
ERM, Oxford	Scott Wilson, Basingstoke
Erith Group, Erith	Southern Testing Laboratories Ltd, East Grinstead
Foster Wheeler Energy Limited, Reading	Stevens & Bolton, Guildford
Foundation & Exploration Services Ltd, Basingstoke	Subadra Ltd, Stoke Mandeville
Geo-Environmental Services Ltd, Brighton	Symbio, Bookham
Geo-Services International (UK) Ltd, Witney	University of Oxford, Oxford
Gibb Environmental, Reading	University of Reading, Reading
Ground Solutions Group Ltd, Ashford	W S Atkins PLC, Epsom
Halcrow Group Ltd, Crawley	

8.3 SWOT ANALYSIS

8.3.1 *Strengths:*

- World class expertise in risk-based approaches and modelling.
- Although there are no major differences between the UK regions in terms of expertise, services provided, types of company etc, there many well established CLR firms in the region and considerable site investigation and geotechnical expertise.
- Significant experience in 'in situ' remediation techniques.
- Strong project management and civil engineering skills and experience.
- Concentration of larger UK consultancies in the South East.
- Includes some CLR technology suppliers – e.g. geo-membranes and other off-site technologies – as well as more traditional 'dig and dump' contractors.
- Research and development: national centre of excellence at FIRST Faraday, Oxford, with links to seven Universities, four research transfer organisations and 191 UK companies. In addition, there are a number of additional research centres (eg University of Kent, University of Greenwich at Chatham Maritime Campus).

8.3.2 *Weaknesses:*

- Relatively limited overseas activity by CLR businesses.
- Some European and North American remediation technologies and techniques are in advance of those commonly in use in the UK.
- Lack of statutory / regulatory guidance on land remediation results in inconsistent requirements being set by clients.

8.3.3 *Opportunities:*

- Strong policy setting which favour brownfield development rather than greenfield sites - driving demand for CLR.
- Housing and regional regeneration programmes on brownfield land will continue to drive demand.
- Some major sites in London and the South East requiring reclamation or remediation e.g. Thames Gateway, former oil terminals, former dockyard sites.
- Increasing attention paid by companies and investors to potential liabilities associated with contaminated land continues to drive demand for site investigation and remediation.
- UK approach to land remediation based around the use of risk assessments (as required by the Contaminated Land Exposure Assessment Regulations) is likely to be adopted in other parts of the EU. UK companies will be in a strong position to export their 'world class' expertise on risk-based approaches and modelling around Europe.

- EU regulations will prohibit the disposal of contaminated soils to landfill – which will reduce ‘dig and dump’ techniques and increase use of higher value ‘in situ’ remediation, which south east companies have a strong track record.
- In the short term, prohibiting the landfilling of contaminated soils is likely to result in the stockpiling of large quantities of soil, until less expensive forms of soil treatment are widespread.
- Emerging remediation approaches include: biological treatment, in situ chemical oxidation, in situ thermal treatment (ERM).
- Particularly strong growth is anticipated in the value of small site remediation contracts, where off-site remediation will become the standard approach (Biogenie).
- New requirements on Local Authorities to identify contaminated sites and develop strategies for remediation - should drive demand for CLR consultants.
- Opportunities for businesses that can develop innovative financial packages to cover / indemnify the costs of CLR.
- Overseas opportunities developing in Central & Eastern Europe, Middle East etc.

8.3.4

Threats:

- Land remediation activities in the South East and elsewhere in the UK could slow down if the economy and housing market slows down.
- Some strong UK, EU and US competing technologies and service suppliers already strong in growth markets such as Central & Eastern Europe.
- Some traditional ‘dig and dump’ contractors may be hit unless they can adopt more technology-based treatment and stabilisation approaches to CLR.
- Weaknesses public sector approaches to remediation. Short term, reactive development of brownfield sites can involve increased costs for the developer and the contractor.

8.3.5

Technology Matrix

Contaminated Land Remediation:	Maturity	Market Growth Potential	South East Strengths	Potential for development in SE
Absorbents (e.g. oil / chemical absorption pads)	Mature	●	●●	●
Geo-barriers	Mature	●	●●	●
Soil washing (in- or ex-situ), eg Edmund Nuttall, Biogenie, Ashdown Site Remediation	Transition	●●	●●●	●●
Bioremediation (in-situ), eg Edmund Nuttall, Biogenie, Ashdown Site Remediation	Transition	●●	●●●	●●●
Vacuum extraction (of groundwater/solvents/BTEX etc.)	Transition	●●	●●	●●
Air sparging (aka biosparging)	Mature	●●	●●	●●
Activated carbon adsorption	Mature	●●	●●	●●
Oil/water separation systems, eg Land and Water Remediation Ltd	Transition	●●	●●	●●
Summary	Mature - transition	●●	●●	●●

8.3.6 *Potential for Growth – Opportunities and Threats*

The South East has significant expertise in contaminated land remediation, which could provide the basis for future business growth in the face market drivers in the UK over the next 5 years.

The contaminated land remediation (CLR) market in the UK was estimated at approximately £640 million in 2000 ⁽¹⁾ and is currently a buoyant market, having grown by around 40% since 1994. Further growth is forecast in the next decade. Site investigation and risk assessment activities account for approximately 38% of the total market and actual remediation work 62%. Growth is being fuelled by factors such as:

- new regulations introduced in April 2000 under the Environment Act 1995 which require Local Authorities to undertake reviews of contaminated sites and to develop strategies for remediation;
- concern amongst companies about contaminated land liabilities and the need to record land liabilities in the balance sheet and increased availability of less risk averse finance for redeveloping land;
- increased construction activity on brownfield land and the Government's target for 60% of new housing to be on reclaimed land;
- the site development activities of public sector organisations such as the Regional Development Agencies, English Partnerships; and
- IPPC regulations which now cover land contamination issues.

Whilst the majority of remediation work in the UK has involved excavation and disposal of contaminated soils to landfill, more specialist *in situ* and *ex situ* techniques (including bioremediation) are gaining market share. This is likely to increase in the future with the forthcoming requirement to end landfill disposal of contaminated soils under the EU Landfill Directive; which will provide opportunities for suppliers of more innovative remediation techniques and technologies.

Therefore, the currently high levels of activity amongst CLR businesses in the region look set to continue. The importance of innovative remediation techniques (e.g. bioremediation) is likely to gradually increase. But relatively unsophisticated techniques ('dig and dump', capping, soil washing) are likely to continue to dominate the UK market.

(1) Source: based on an MSi estimate, 2000.

Initiatives to support the development of land remediation businesses in the region include:

- Provision of sites and assistance in accessing funding for remediation demonstration projects.
- Hosting of regular forums for dialogue between SEEDA and other developers and practitioners/research institutions in the region.
- Development of CLR technology clusters based around the region's university and consultancy expertise.
- Support to businesses in building links with venture capital companies, to develop and market new remediation techniques.
- Support for companies supplying promising new remediation techniques – including assistance in accessing technical R&D funding, establishing demonstration projects in the region and establishing licensing and agency agreements for new technologies.
- Potential for development of academic research expertise in relation to innovative CLR techniques – and link this to CLR businesses, including the FIRST Faraday project.
- Potential for initiatives to promote exports of South East CLR expertise to markets facing significant land contamination issues, e.g. Central and Eastern Europe.
- Develop stronger links between SEEDA and the CLR contracting industry (eg via the Civil Engineering Contractors Association) so that each side can better understand the needs and objectives of the other.
- Development of a common understanding on standards for remediation of land and promote that understanding to Local Authorities. The Environment Agency has an important role to play in this respect.

9.1 SUB-SECTOR DEFINITION

Marine pollution control (MPC) covers the supply of technologies and services for controlling and minimising marine pollution. It includes technologies such as oil skimmers, absorbents, dispersant spray systems, booms, vacuum recovery equipment, phase separators, spill control vessels etc; and services such as marine pollution prevention, monitoring, oil spill emergency response and clean-up services, training, modelling and risk assessment.

It links to a wide range of offshore activities such as oil and gas, shipping and maritime transport, offshore renewable energy installations, wastewater treatment and discharge control, fisheries and aquaculture.

Figure 9.1 indicates the overall supply chain structure of the marine pollution control technology and service sub-sector.

9.2 OVERVIEW – ACTIVITIES, SIZE, SCALE

It is estimated that around 30 companies in the South East provide MPC services or technologies. Most of the companies providing MPC technologies and services are niche suppliers. They include technology manufacturers and suppliers; marine engineering specialists; marine environment and technology research organisations; as well as services providers.

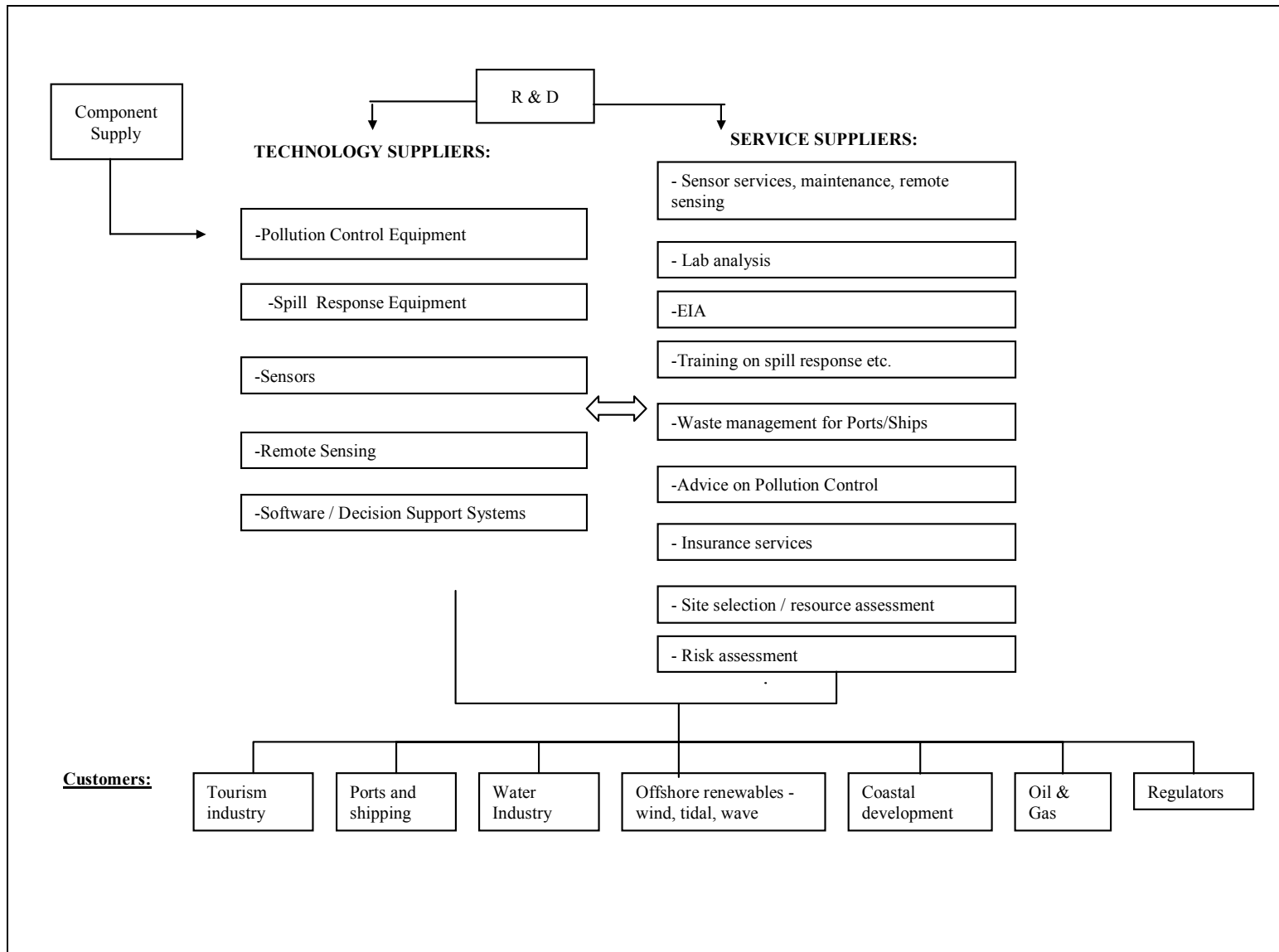
9.2.1 Examples of Core Companies

- **ABP Marine Environmental Research Ltd** – is a marine environmental consultancy based in Southampton, covering a wide range of areas including offshore wind, marine environmental management training, pollution control consultancy, modelling, environmental monitoring, environmental impact assessment etc.
- **Metoc**– based in Liphook, is a marine environmental consultancy which provides a wide range of services including work in areas such as offshore wind and renewable energy.
- **Callenger Oceanic** develops and supplies oceanographic chemical sensors and sampling systems for international research related to climate change and pollution.
- **Ayles Fernie International, based in Sevenoaks**, specialises in the supply of oil spill response equipment, and designs and manufactures a full range of dispersant spray systems which can be operated from boats or planes.
- **BMT Cordah Ltd**, based in Southampton, is a multi-disciplinary environmental and information consultancy. It provides consultancy, fieldwork, research and training in impact assessment, management systems, audit, waste management, aquatic and atmospheric modelling, EIA, data handling, environmental decision-making and institutional strengthening. It has considerable national and

international experience working for oil and gas companies, local authorities, industry and commerce and development agencies.

- **Edge Enviro Services Ltd**, based in Ramsgate, supplies a range of pollution control equipment, to the marine and industrial sectors. Products include: marine chemicals; safety equipment; spill kits for the shipping industry to meet International Maritime Organisation (IMO) requirements; large range of pollution control equipment for ports and terminals, including a range of booms, containment tanks, skimmers, pumps and spraying equipment. Services include: OPRC/IMO accredited training courses, spill containment training, contingency plans and consultancy, 24hrs rapid response unit for clean-up on land and water, environmental impact audits, decommissioning of chemical, oil and sewerage tanks.
- **Oil Spill Response Ltd (OSRL)**, based in Southampton and owned by 26 of the world's oil companies, is one of the largest global oil spill response operations, dealing with emergencies around the world. Its equipment includes high volume aerial delivery dispersant systems and large scale recovery systems. Training courses, addressing all aspects of planning, oil spill response and management, are offered to both member and non-member organisations. In addition, OSRL provides consultancy services including contingency planning, development and management of response exercises, audits and reviews.
- **Vikoma**, a UK firm based in Southampton, is a world leader in the design and manufacture of oil pollution control systems,. With more than 30 years experience, the company has trained agents in over 55 countries. .Vikoma's product range includes oil spill containment booms; oil recovery skimmers; floating, inflatable and self-supporting oil storage tanks. Vikoma also provide IMO and tailor-made training courses.
- **Ro-Clean Desmi** is a Danish owned company, with offices in Tonbridge, which designs, manufactures and supplies a wide range of equipment and services for the containment and recovery of marine/inland oil spills and industrial oily wastes including pollution response vessels used in spill incidents including "Sea Empress" and recently in Spain. The company has facilities in Tonbridge, Kent; Odense, Denmark (Head Office) and Norfolk, Virginia, USA. With sales to more than 100 countries, and a network of over 50 local agents and distributors.

Figure 9.1 Supply Chain Structure for Marine Pollution Control Technologies and Services



Source: DTI's Innovation and Growth Team (IGT), 2002.

Box 9.1 *Marine Pollution Control Companies in the South East*

ABP Marine Environmental Research Ltd	Southampton
Anthony G Greenwood & Associates	Lymington
Ayles Fernie International	Sevenoaks
BMT Cordah	Southampton
British Maritime Technology Ltd (BMT)	Teddington, Middx
Challenger Oceanic Systems & Services	Haslemere
Darcy Products Ltd	East Malling
Edge Enviro Services Ltd	Ramsgate
Frogmat International Holdings Ltd	IoW
GT Pollution Technology Ltd	IoW
Hydrosearch	Woking
Metoc Plc	Liphook
NEG Micon	IoW
Oil Spill Response Ltd	Southampton
Qinetiq	Gosport
Rivertrace Engineering Ltd	Redhill
RM Morgan	Ashburnham
Ro-Clean Desmi	Tonbridge
Vicoma	Southampton
Williams Shipping	Southampton

9.3 **SWOT ANALYSIS**

9.3.1 **Strengths:**

- The South East has leading UK MPC companies. With Scotland and the North East, the South East appears to be in the top three UK regions in terms of MPC.
- Well established MPC technology manufacturers and suppliers – e.g. Vicoma.
- Strong MPC consultancy and service providers – e.g. BMT, Metoc.
- Strong MPC research – including University of Southampton (e.g. separation and fluid treatment processes), University of Portsmouth and Qinetiq (satellite and remote sensing systems for MPC).
- Very strong maritime, shipping industry and marine heritage in the South East.
- Skills in offshore renewable energy company – e.g. NEG Micon.
- Many other parts of the supply chain are present in the region – e.g. cabling, engineering, control systems, submarine foundations, survey work, towers, telemetry etc.

9.3.2 **Weaknesses:**

- Weak links between different parts of the MPC supply chain – e.g. between technology end-users (shipping companies), MPC technology suppliers and technology research organisations in the South East.

9.3.3

Opportunities:

- Strong market drivers for marine pollution control – e.g. new regulations on ballast water treatment, and long-term trend towards ‘zero emission’ ships (e.g. IMO standards) – see the *Technology Matrix* below.
- Strong market drivers for offshore renewable energy – e.g. offshore wind turbine – around UK and worldwide. Some major sites around the South East have been earmarked for offshore wind development – e.g. Thames Gateway.
- Opportunities for transforming former port/shipping/oil terminal sites into sites for offshore engineering industry clusters.
- Opportunities for strengthening links between strong elements of the MPC supply chain in the South East; and for capitalising on the region’s R&D base in MPC.
- Market opportunities for risk management technologies.
- Opportunities for updating some of the more mature MPC technologies – e.g. booms and oil / water separators.
- Opportunities associated with international expansion of offshore oil and gas industry; and international demand for MPC relating to the development of coastal zone tourism.

9.3.4

Threats:

- Some market drivers may be slow to materialise into real market opportunities – e.g. delays in planning consents for offshore wind.
- Stiff competition from overseas and other UK regions in some growth areas – e.g. offshore wind and low emission shipping.

9.3.5

Technology Matrix

Marine Pollution Control (MPC):	Maturity	Market Growth Potential	South East Strengths	Potential for development in SE
Spill response equipment::Absorbents, booms and barriers	Mature	●	●●	●
Spray dispersant systems	Transition	●●	●●	●●
Oil/water separation systems, skimmers	Transition	●●	●●	●●
Ballast water treatment	Emerging	●●●	●●	●●●
On-board greywater recycling technologies	Emerging	●●●	●●	●●●
On-board waste management systems	Emerging	●●●	●●	●●●
Offshore wind installations	Emerging	●●●	●●	●●●
Offshore sensors / monitoring systems	Emerging	●●●	●●●	●●●
Risk assessment and decision support systems	Emerging	●●●	●●●	●●●
MPC vessels	Transition	●●	●●	●●
Summary		●● / ●●●	●●	●● / ●●●

9.3.6 *Potential for Growth*

The South East has significant expertise in MPC which could provide the basis for future growth in the face of strong market drivers in the UK and overseas over the next 5 years.

Future demand will be fuelled by:

- **Expansion of Offshore Renewable Energy** - The forecast long-term development of offshore renewable energy generation (e.g. wind, tidal and wave) is expected to drive demand for goods and services in relation risk assessment, monitoring, seabed and wind surveying, corrosion research and control systems during construction and operation of offshore installations.
- **Coastal Tourism** - The growing economic importance of tourism in many countries - coastal tourism depends on a clean, high quality environment and visitors are very sensitive to issues such as poor water quality, sewage, odour, hygiene and waste disposal issues.
- **IPPC** - Extending IPPC regulations to cover offshore installations.
- **Shipping** - Attention on the need to control the environmental impacts of shipping / maritime transport is increasing - e.g. new controls on ballast water treatment. This is driving demand for specialist waste management, effluent treatment, emission abatement and monitoring solutions to minimise the environmental impacts of shipping. There is also a trend towards the development of 'green' or 'zero emission shipping', particularly amongst Scandinavian countries. On-board waste management also reduces costs of waste disposal.
- **Oil & Gas** - Future international development of the offshore oil and gas industry will drive demand for environmental goods and services, as will decommissioning of offshore installations in more mature oil and gas fields (e.g. around the UK). NGO and public attention on the performance of the oil and gas industry is also driving demand.
- **Development of Fisheries** - The growth in aquaculture and management of fish stocks is driving demand for a clean marine environment as well as monitoring of the environmental impacts of aquaculture.
- **Investment by the water industry** - Investment by the water industry to control emissions from wastewater treatment (WWT) facilities into the marine environment is being driven by regulations such as the EU Bathing Waters Directive, development of coastal tourism, increasing public awareness and the need to deal with periodic events and diffuse discharges - e.g. stormwater surges. This is driving wastewater treatment investment and demand for environmental monitoring.

9.4 *SUB-SECTOR SUPPORT NEEDS*

Initiatives to support the development of MPC suppliers in the region include:

- Actions to strengthen regional networks between academic / research organisations and industry involved in MPC technology development.
- Actions to support technology development / demonstration projects for MPC technologies with good growth prospects - e.g. ballast treatment systems.
- Supply chain development projects in areas such as offshore wind turbine technologies.

It is important that support actions for the MPC sub-sector in the South East link closely to actions being developed by SEEDA's marine engineering sector group - there is overlap between the two groups in terms potential projects to support.

10.1 SUB-SECTOR DEFINITION

The renewable energy sub-sector provides technologies and services in areas such as wind energy, photovoltaics (the conversion of light to electricity), hydropower, biomass, solar, combined heat and power, landfill gas and tidal energy. It involves a broad range of component and service inputs including technologies such as furnaces, generators, steam raising plant, meters and control systems, grid interconnection etc.

In addition, low carbon technologies include fuel cells, hydrogen production and storage techniques, clean fuel systems and carbon sequestration techniques.

10.2 OVERVIEW – ACTIVITIES, SIZE, SCALE

ERM has identified approximately 60 companies in the South East involved in renewable energy and low carbon technologies. These include:

- Renewable energy technology design and manufacturing companies.
- Renewable energy project developers.
- Renewable energy design engineers and project managers.
- Renewable energy R&D organisations.

Box 10.1 Examples of Companies in the South East

Aelous Partnership, Ashford - Consultants and producers of liquid bio-fuels, specialists in wind and hydropower.

Alternative Fuel Systems Ltd - develops, designs and constructs Alkaline Fuel Cell generators; converts motor vehicles to autogas.

Bioenergy Technology Ltd, Uckfield - Manufactures, suppliers and installers of wood combustion systems for biomass.

Black and Veatch Consulting Ltd, Redhill - Design engineers, project managers and consultants in biomass, cogeneration, conventional and hydro-electric power plants.

Bowman Power Ltd, Southampton, - Designs and supplies small scale CHP systems. Based in Southampton in the United Kingdom, Bowman Power has international offices in the US and Japan.

BP Solar, Sunbury on Thames - design, marketing and installation of solar electric systems.

Bronzeoak Ltd, Caterham - Biomass, waste-to-energy, incineration, environmental and cogeneration projects.

BSRIA Ltd, Bracknell - Research and consultancy for energy and the built environment.

BTU Europe Ltd, Farnborough - Producers of PV manufacturing equipment.

Ceres Power Ltd, Crawley - Fuel cell developer (recently won a Carbon Trust award for fuel cell innovation).

City Heat Ltd, Newbury - Financing and developing company; total energy solutions; CHP/DH.

CLRC Rutherford Appleton Laboratory, Didcot - collaborative applied renewables R&D, especially wind.

Cummins Power Generation Ltd, Manston Ramsgate - Manufacturer of mobile and stationary gas and diesel powered generating sets - bioenergy, energy from waste, biofuels.

ERM, Oxford - renewable energy consultancy services.

Escovale Consultancy Services, Norwood Hill - consultancy on world energy generation and storage

AEA, Harwell - renewable energy consultancy services.

Fibre Fuel Ltd, Slough - Biomass, Biofuels and Energy from Waste, Applications, Energy from waste projects

Foster Wheeler Energy Limited, Reading - involved in renewable energy engineering.

FT Technologies, Teddington - Ultrasonic wind sensors for wind energy and turbine control applications

High Energy Services Ltd, Bognor Regis - solar/thermal water heating systems.

Hydrosearch, Woking - Project management, consultancy and field supervision for a range of marine survey activities, including offshore wind.

Hydrogen Solar Production Company Ltd, Reading - Renewable hydrogen via the Tandem Cell which performs direct solar electrolysis

Intersolar Group Plc, Oxford (taken over by Canadian company or gone into receivership ?)

IT Power Ltd, Basingstoke - consultancy specialising in all aspects of renewable energy engineering, R&D, financing and demonstration.

Lindley Associates Ltd, Beaconsfield - Consultancy for project development, markets, economics and financing of wind projects

Magpie Technologies Ltd, Crowborough - Manufactures a range of solar products and provides consultancy

Metoc Plc, Liphook, Hants - Project managers and environmental advisers for marine renewable energy projects

Mitsui Babcock Energy Ltd, Crawley - Turnkey, build, own and operate plant projects for renewable energies

Mott Macdonald, East Sussex - engineering consultancy, involved in RE projects.

National Wind Power Ltd, Bourne End - Leading UK wind farm developers, owners and operators

NEG Micon Rotors Ltd, IOW - Manufacturers of wind turbines for power generation 150kW to 1.5MW

NEG Micon UK Ltd, IoW - Manufacturers of wood/epoxy wind turbine blades; wholly owned subsidiary of NEG Micon

Nsure Renewables, Worthing - Arrange insurance for renewable energy projects

Orion Gold Corporation, High Wycombe - Design, sales and information of wind, PV, hybrid systems

Oxford Economic Research Associates, Oxford - economics consultancy involved in RE and energy.

PB Power Limited, Godalming - project management and engineering services in the renewables and energy sector

Progressive Energy Technology Limited, Lymington - Development of biomass conversion technologies

QinetiQ, Farnborough - Testing of PV technologies for space and terrestrial applications

Rayotec Ltd, Sunningdale - Suppliers and installers of solar heating systems

Regenesys Technologies Limited, Didcot - Suppliers of utility-scale energy storage systems, for RE applications

Renewable Energy Management Ltd, High Wycombe - Investment and management support to early-stage UK-based renewable energy companies.

Riomay Ltd, Eastbourne - Importers and distributors of NEG and Solec Solar evacuated tubes

Slough Heat & Power, Slough - Independent utility supplying electricity, steam and water using CHP systems

Solapak Ltd, High Wycombe - Design and supply of professional PV systems and components

Solar Century, Twycross - Design and supply of PV systems, components and consultancy services.

Solar Sevcies, Ringwood - Solar heating - domestic and commercial; appointed sole UK distributor for Stiebel Eltron.

Solar World, Southsea

Solarbuzz Europe, Woking

Sollatek (UK) Ltd, Slough - Manufacturer of DC lighting, charge controllers, inverters and PV systems

Stark Software International Limited, Horley- Suppliers of energy monitoring software, communications and datalogging equipment for industrial processes and commercial buildings.

Summerleaze RE-Generation Ltd, Maidenhead - Design, install landfill gas systems.

Sunpowered Energy Systems Ltd, Southsea - Design, installation and distribution of PV solar thermal and wind systems.

Tanaris Energy Ltd, Stokenchurch - Feasibility studies, design, build, O&M of CHP and energy projects.

Teksolar Ltd, Woking - Research and development in thin film photovoltaic technologies and development into pilot plants.

Thames Valley (TV) Energy Agency, Newbury - non-profit making organisation to promote energy efficiency and the use of renewable energy in the Thames Valley.

Merlin Group, Wallingford.

Solar Company, Eastbourne - Vacuum tube solar heating specialists suppliers, installers, DHW and pools

Voller Energy, Romsey - Produce portable fuel cells, largely for military use at present. Relocating to South Yorkshire.

Waste Gas Technology UK Ltd, Eastleigh - Research, development and commercialisation of a pyrolytic gasification process for application to waste and biomass streams

Wessex Windpower Ltd, Eastleigh

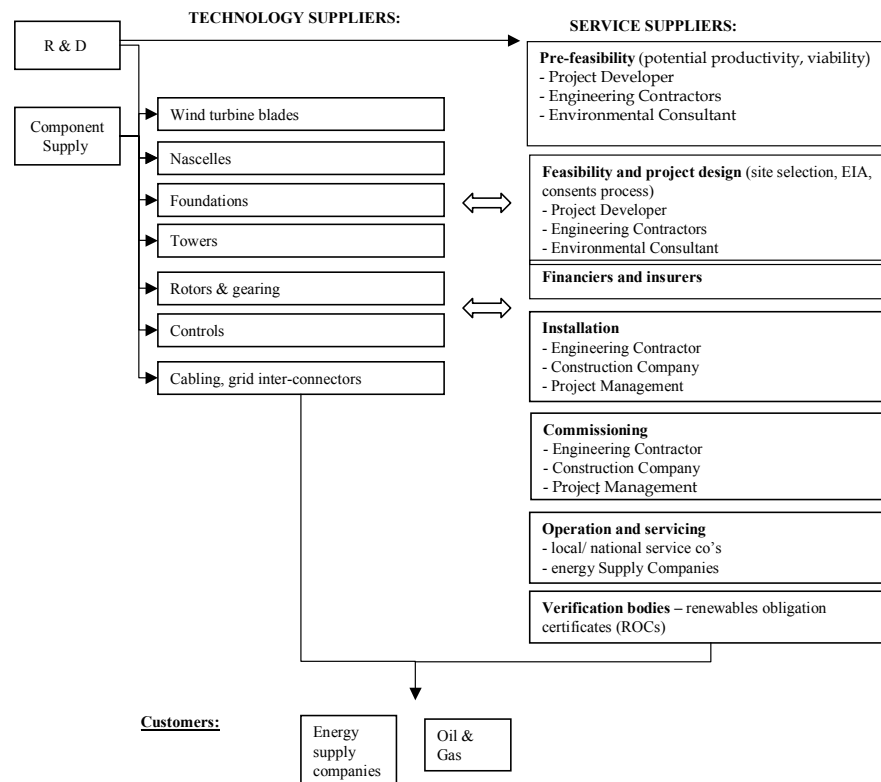
World Renewable Energy Network - WREN, Reading - Network of world-wide organisations promoting environmentally safe and economically sustainable renewable energy

Zetek, Slinfold, W Sussex - Fuel cell manufacturing company.

10.2.1 Supply Chains

As shown in *Figure 10.1*, which shows the typical structure of supply chains for offshore wind turbines, renewable energy supply chains involve a range of engineered and electrical control components, as well as services such as site developers and financing. Development of renewable technology businesses in the South East will therefore generate business opportunities for a wide range of suppliers.

Figure 10.1 Supply Chain Example – Offshore Wind Turbines



Source: DTI's Innovation and Growth Team (IGT), 2002.

10.3 SWOT ANALYSIS

10.3.1 Strengths:

- High tech skills base in the South East (e.g. electronics and military technology expertise).
- Good number of companies involved in solar and PV.
- Some few fuel cell companies – e.g. Ceres Power Ltd.
- Engineering and financing expertise in renewables projects.
- Strong academic R&D expertise – fuel cells and hydrogen storage and PV at Oxford University and Reading University; fuel cells at Cranfield and

Southampton; clean burn R&D at Cranfield; solar, wind, tidal and wave renewable technologies at Southampton University. This research strength is reflected in the high number of grant applications received by the Carbon Trust from institutions in the South East – the highest of all English regions.

- Good biomass expertise and many SMEs involved in biomass.

10.3.2 *Weaknesses:*

- Few of the UK's larger players in the energy and renewable field are based in the South East.
- Limited *manufacture* of renewable energy technologies in the region.
- Limited wind turbine businesses in the South East (apart from NEG Micon for example).

10.3.3 *Opportunities:*

- Strong policy drivers for the development of renewable energy.
- Fuel cells - military applications moving into consumer products.
- Some on-shore wind farms being developed in the South East – e.g. Westmill Farm in Oxfordshire (but turbines are being supplied from outside the region – e.g. by Vestas).
- Significant potential for future development of offshore wind farms around the UK – including in the Thames Gateway.
- Development of renewable energy flagship parks in the South East – e.g. Greenham Park.
- PV technologies are now being introduced on more housing and commercial developments, including social housing.
- Large volumes of putrescible waste and biomass in the South East that can be used for anaerobic digestion.
- Support programmes such as Action Energy which includes grants for low carbon technology R&D.

10.3.4 *Threats:*

- Grants available in other UK regions may entice companies (especially manufacturers) out of the South East.
- Other UK regions are more advanced than the South East in support activities to developing renewable energy clusters (e.g. NW, SW, NE, West Midlands, Yorkshire & Humberside).
- Stiff overseas competition where renewable energy markets are more mature than in the UK – e.g. Scandinavia and Germany for wind; Spain, Germany, Japan for PV.

- Funding gap between funding for initial research (e.g. SMART) and VC funding which typically funds technologies when they are more developed. This funding gap is being filled in other regions which benefit from EU Regional Development Funding (ERDF) or Regional Selective Assistance (RSA) status.
- Planning process is slowing the development of renewable energy installations in the South East and elsewhere in the UK.
- Insurance very expensive for SMEs developing new technologies.

10.3.5

Technology Matrix

Renewable energy / low carbon technologies:	Maturity	Market Growth Potential	South East Strengths	Potential for development in SE
Fuel cells	Emerging	●●●	●●	●●
Wind power (onshore & offshore)	Emerging	●●●	●●	●●
Solar Photovoltaics (PV)	Emerging	●●●	●●	●●●
Wave power	Emerging	●●	●●●	●●
Marine current generation	Emerging	●●	●●●	●●●
Biomass to energy (cultivation and energy generation equipment)	Transition	●●●	●●	●●
Small Hydropower	Mature	●	●	●
Large Hydropower	Mature	●	●	●
Geothermal	Mature	●●	●	●
Micro-CHP (for homes)	Emerging	●●	●	●●
Solar Thermal	Mature - Transition	●	●●	●
Summary	Transition - Emerging	●● / ●●●	● / ●●	●●

10.3.6

Potential for Growth

There is considerable growth potential in UK and global renewable energy markets. UK, EU and international policies to address climate change are likely to provide long-term drivers for market growth. *Box 10.2* summarises some of the key market drivers and *Figure 10.2* provides future market size forecasts.

Market Drivers for Renewable Energy: 2% of UK electricity currently comes from renewable sources. The Government's target is to increase this to 10% by 2010. The Renewables Obligation, which came into effect in April 2002, places a statutory requirement on all electricity suppliers to demonstrate that a percentage of their electricity sales come from a renewable source – this is currently 3%, rising to 10% by 2010. With these types of requirements, the Government expects to create a £1 billion market for renewable energy in the UK by 2010. In addition, the Government is providing support to facilitate the planning process for renewables and introducing a £260 million programme over the next three years to support development of renewable energy sources in the UK.

South East Regional Energy Efficiency and Renewable Energy Strategy (“Proposed alterations to Regional Planning Guidance, South East - Energy Efficiency and Renewable Energy”) is a regional framework which sets out a vision for the substantial increase in the efficiency of energy use and the proportion of energy supplied by renewable sources in the South East. By 2010 the South East should generate at least 5.5% of its electricity from renewable sources and by 2026 at least 16%.

Market Size Forecasts: Estimates vary as to how large international markets for renewables and low carbon technologies will become over the next few years - one estimate suggests that world markets could grow to \$82 billion by the end of this decade (illustrates predicted markets for some of the leading low carbon options) and DTI have suggested that investment in renewable energy alone could be worth £400 billion by 2010 ⁽¹⁾ – however, most commentators believe that these markets will be significant. During 2000 more than \$1.4 billion of equity investments were made in clean-technology companies by venture capital firms ⁽²⁾.

Other specific market projections suggest that:

- World wind markets (both on and off-shore) have the potential to increase to \$628.6 (£411.4 billion) per annum by 2020 ⁽³⁾ from a current level of £4.7 billion ⁽⁴⁾.
- The global market for PV was worth ~£1 billion⁽⁵⁾ in 1999 and is growing rapidly, estimated to reach £8 billion by 2010 ⁽⁶⁾.
- The market for energy efficiency goods and services – already US\$33 billion in the US – will grow by more than 8% a year for the next three years ⁽⁷⁾. The potential market for energy efficiency in a number of the less developed countries is particularly large and could be as much as \$60 billion in the former Soviet Union alone ⁽⁸⁾.

There are very few market estimates for low carbon options that are still under development, e.g. carbon capture and sequestration, wave and tidal power, however these technologies are all likely to play an important role over the longer term.

(1) DTI Press Release, new Renewables Body forges partnership for green prosperity, 21 May 2002

(2) Clean Tech: Profits and Potentials, 2001 www.cleantech.com/

(3) Wind Force 12, EWEA and Greenpeace, 2002

(4) Global Wind Energy Market Report, American Wind Energy Association, 2001

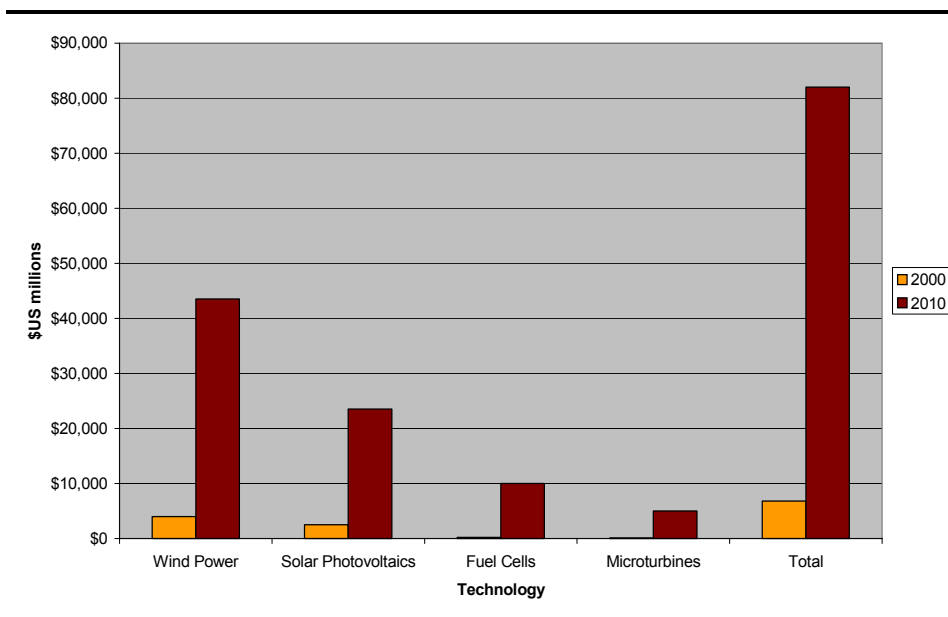
(5) PV in the UK: Facing the Challenge, PV Association, 1999

(6) Energy for the Future: Renewable Sources of Energy, White Paper for a Community Strategy and Action Plan, COM (97)

(7) Clean Edge: Profits and Potentials, 2001

(8) Clean Tech : Profits and Potentials, 2001

Figure 10.2 *Current and Future Global Market Estimates for Renewable and Low Carbon Technologies*



Source: Clean Edge: Profits and Potential, 2001.

10.4 SUB-SECTOR SUPPORT NEEDS

Initiatives to support the development of renewable energy businesses in the region include:

- Target support onto those renewable energy technologies which have most potential (in terms of costs per tonne of CO₂ reduced) to help make regional progress towards greenhouse gas emission reduction in the South East (e.g. offshore wind, as identified in the recent Regional Assembly report on renewable energy).
- Companies want SEEDA to provide a strong lead in advocating / guiding developers and public sector organisations to use RE technologies more in developments (especially in SEEDA's own development projects).
- The same applies to public sector procurement policies to increase purchasing of energy from renewable sources.
- SEEDA and others should support the strengthening of supply chains and clusters in key renewable energy technologies (e.g. PV, offshore wind).
- Support the development of skills in renewable energy installation and servicing (e.g. installation of photovoltaic equipment).
- Regional partners should also support pilot projects to demonstrate renewable energy technologies.
- Regional support activities to help environmental technology businesses to access finance should include a focus on renewable energy technology businesses with promising technologies.
- SEEDA and partners should examine the potential for extending the Thames Valley (TV) Energy model across the South East region in order to facilitate support for increased uptake of renewable energy technologies.

11 ENERGY MANAGEMENT

11.1 SUB-SECTOR DEFINITION

Energy management involves the supply of energy efficiency products and services. Products include: such as energy audits, monitoring, insulation in buildings, combined heat and power plants, operation and maintenance. Consultancies include 'one-man-bands' specialising in energy management issues, through to multi-disciplinary environmental and process engineering consultants. The sub-sector is linked closely to building management, architecture and industrial process control businesses.

11.2 OVERVIEW - ACTIVITIES, SIZE, SCALE

At least 60 suppliers of energy management products and services have been identified in the South East (excluding multi-disciplinary environmental or engineering consultancies which also provide energy management services).

These companies comprise many energy management consultancies and suppliers of metering / monitoring technologies.

Examples of core companies include:

- **Automatic Environmental Controls Ltd (AEC)**, based in Nutley, E Sussex, supplies systems and services to audit heat and energy demand, match control performance to it and implement enhanced control strategies to maximise building energy efficiency. These involve micro-processor systems which allow remote acquisition, manipulation, logging and transmission of data for energy management in buildings, processes and other energy using applications.
- **Energy Control Group**, based in Slough, comprises Energy Control Consultants Ltd and Energy Metering Technology which provides turnkey solutions for energy and waste management. ECCL undertakes surveys and monitoring into energy use within retail and industrial markets. Energy Metering Technology Ltd was recently awarded a SMART grant for the development of a low cost automatic metering system.
- **Stark Software International Ltd - Stark**, based in Horley, Surrey and with offices also in the US, supplies software tools and services for energy and utility management. Applications include monitoring & targeting, bill verification, rate analysis, electronic billing, tenant billing, environmental monitoring, automatic meter data collection and energy purchasing.
- **Invensys Climate Controls Europe** (formerly Satchwell), Slough – manufacturer of sensors, controllers and building management systems, for energy monitoring and management.
- **Dalkia** - Dalkia Utilities Services is a leading energy and utilities management company in the UK and is part of the Worldwide Dalkia Group. Services include

energy procurement and efficiency, Building Energy Management Systems, monitoring etc.

11.2.1 *Examples of Energy Management Companies in the South East*

Able Instruments & Controls Limited, Reading – energy management meters and systems

Aspect Contracts Ltd, Brighton

Automatic Environmental Controls (AEC) Ltd, Nutley -

Building Management Systems Integrators, Slough – building energy management systems.

Bush Nelson plc, Crawley – energy efficiency services and software

BSRIA Ltd, Bracknell – energy efficiency consultancy, building energy management.

Climate Care, Oxford

Colt Engineering in Havant – suppliers of energy efficiency technologies.

Creative Environmental Networks, Thornton Heath

Dalkia Energy and Technical Services Ltd, Portsmouth - international energy utilities and management company (UK head office in Staines).

Econopower Cel, Slough

Electrotech Control Design Services Ltd, Banbury

Energen Ltd, Uxbridge – energy management and efficiency consultancy.

Energy Advantage Options Ltd, Godalming

Energy Control Group, Slough

Energy Matters Plc, Farnham

ETC Ltd, Lewes.

Eurotherm Ltd, Worthing

Foster Wheeler Energy Limited, Reading

Future Energy Solutions (AEA Technology), Didcot – energy management consultancy

Gentec Energy Limited, Slough

Heap & Digby Ltd, Carshalton

Honeywell Control Systems, Bracknell – building energy management systems.

iLight Limited, Tonbridge - Manufacturers of energy saving lighting control products.

IMServ Europe Ltd, Crawley – energy management and metering supplier (part of the Invensys Group).

Invensys Climate Controls Europe (formerly Satchwell), Slough – manufacturer of sensors, controllers and building management systems, for energy monitoring and management.

Invensys Process Systems, Crawley

Miconics Ltd, High Wycombe – designs, manufacturers and supplies flow and energy monitoring technologies to control and monitor energy consumption.

New Building Technologies Ltd – energy efficiency for buildings.

Palcon Systems Ltd, High Wycombe – building management systems, including energy management.

Saacke Ltd, Portsmouth – energy efficiency services.

Schneider Electric Ltd, Maidenhead

Setsquare, Tonbridge - manufacture occupancy and light level sensors for the control of lighting.

Siemens Energy Services Ltd, Dartford – energy management services.

Stark Software International Limited, Horley – supply software and services for energy efficiency.

Tanaris Energy Ltd, Stokenchurch

Thames Valley (TV) Energy Agency, Newbury – a not for profit organisation which promotes energy efficiency and renewable energy – public, private and voluntary sector funded.

Trend Control Systems Ltd, Horsham – manufacturers of building and energy management systems.

York International Ltd, Newbury.

11.3 SWOT ANALYSIS

11.3.1 *Strengths:*

- Strong energy management, technical expertise in the region.
- Many energy management consultancies.
- High number of suppliers of energy management / monitoring equipment and meters, some with innovative new technologies.
- High number of suppliers of energy management software and building energy management systems, including innovative applications (e.g internet based energy management systems / software).

11.3.2 *Weaknesses:*

- Apparent lack of companies in the South East in certain technology areas – e.g. energy efficient construction materials, low energy lighting technologies.

11.3.3 *Opportunities:*

- Energy costs in the UK are forecast to increase over the short and medium term. This will drive demand for energy management.
- Over the longer term, the Government's Energy White Paper has identified the need for significant improvements in energy efficiency in order to reduce greenhouse gas emissions by 60% by 2050, projected in order to address climate change issues. Long-term increases in energy prices are also likely – providing further incentive for energy efficiency.
- The Climate Change Levy will drive industrial demand for energy management.
- The development of carbon trading activities (e.g. the EU Emission Trading scheme) will improve the business case for improving energy efficiency for large companies.
- The Government (DTI and DEFRA) has recently made available £100 million of funding for energy efficiency and low carbon technologies. The Action Energy programme also provides support for improvements in energy efficiency in businesses and the development of energy management technologies.
- The Energy White Paper has identified the possibility of doubling grants for domestic energy efficiency technologies between 2005 and 2008.
- International opportunities are being driven by the Kyoto Protocol ⁽¹⁾.
- Clear opportunities in the South East for incorporating energy efficiency into new buildings – commercial and housing – though economies of scale are needed in order to reduce costs and building purchasers and tenants need to become more aware of the cost benefits.

(1) Kyoto Protocol instruments for promoting investment in energy efficiency technologies include the Clean Development Mechanism (CDM) and Joint Implementation (JI).

- Gradual increase in awareness and considerable opportunities for greater uptake of energy management and efficiency techniques amongst public sector organisations in order to reduce costs.

11.3.4 *Threats:*

- Low energy prices reduce the cost incentive for energy management and efficiency.
- Potential delays in the implementation of CO₂ reduction targets.
- Slow uptake of energy efficiency amongst public sector organisations and some businesses.
- Slow down in UK manufacturing industry could further reduce industrial demand in the UK.

11.3.5 *Potential for Growth*

Despite the threats outlined above, there is good long-term potential for growth in the energy management sub-sector because of the market drivers such as:

- The need to address the potential long-term social, economic and ecological impacts of climate change.
- The Kyoto Protocol which establishes targets for reducing greenhouse gas emissions and mechanisms such as the Clean Development Mechanism (CDM) and Joint Implementation (JI).
- The UK and EU Emissions Trading Scheme and the UK Climate Change Levy are likely to increase incentives for investment in energy efficiency.
- Implementation of the EU IPPC directive, which requires companies to consider energy efficiency when identifying the 'best available technique' to be used in a range of regulated industrial processes.
- European drivers include: the EU Climate Change Programme; the EU Draft Directive on Emissions Trading; the Large Combustion Directive; and the EU National Emissions Ceiling Directive (NECD).

These drivers are generating opportunities for:

- low energy / energy efficient technologies - e.g. domestic appliances, motors, industrial processes etc;
- energy management services and technologies;
- energy metering, monitoring and control devices and services;
- energy efficient buildings and construction materials;
- energy management software.

Energy efficiency / management technologies:	Maturity	Market Growth Potential	South East Strengths	Potential for development in SE
Energy efficiency / management software	Transition	●●●	●●	●●●
Energy / heat recovery systems, CHP	Mature	●	●	●
Energy meters	Transition	●●●	●●	●●●
Energy efficient construction materials	Emerging	●●	●	●●
Energy efficient lighting technologies	Transition	●●	●	●
Condensing boilers	Mature	●	●	●
Efficient electric motors	Transition	●●	●	●
Insulation / reflectors	Transition	●●	●	●
Summary	Transition - Emerging	●●	●/●●	●●

11.4

SUB-SECTOR SUPPORT NEEDS

Initiatives to support the development of energy management businesses in the region include:

- The need to target R&D support onto small low carbon technology companies.
- Provide support to assist technology suppliers to have their products registered on the Action Energy technology database of energy efficient products. Registration provides tax breaks to the end-users.
- Support businesses in exploring opportunities for new energy efficient technologies.
- Assist energy management technology suppliers in the South East to make best use of available overseas trade support – e.g. the DTI’s Export Promoters scheme.
- Assistance to companies in accessing finance for technology development.
- Continue to develop Action Energy support to businesses to improve energy efficiency through the South East’s 7 Sustainable Business Partnerships.
- SEEDA and other public sector organisations should provide a stronger lead in incorporating energy efficiency into site development projects and their own buildings.
- Public sector organisations in the South East should increase the uptake of energy management techniques – reducing costs and greenhouse gas emissions.
- Scope exists for meet the buyer events with major ‘buyers’ such as housing developers and public sector building managers.
- SEEDA and partners should examine the potential for extending the Thames Valley (TV) Energy model across the South East region in order to facilitate support for uptake of energy management technologies.

12.1 SUB-SECTOR DEFINITION

The noise and vibration control sub-sector supplies technologies and services for monitoring and reducing noise and vibration, including barriers, mufflers and silencers and services such as noise monitoring, mapping and noise reduction action plans. Clients are mainly industrial, but also in the transport industry (e.g. road, rail, airports) and the public sector (notably local authorities).

12.2 OVERVIEW – ACTIVITIES, SIZE, SCALE

Approximately 20 specialist NVC businesses have been identified in the South East, including:

- Manufacturers and distributors of acoustic and vibration, measurement / analysis systems, software and accessories.
- Internal acoustic control systems (e.g for manufacturing industry and construction industry).
- Equipment testing.
- Well established NVC technical and policy consultants.

12.2.1 Examples of NVC Companies in the South East

AC Soft Ltd	Aylesbury
Acoustic Design Services Ltd	Havant
Accrete Limited	Inkpen
Amelec Instruments	Crowhill
Colas Ltd	Crawley
Cole Jarman Associates	West Horsley
DC White & Partners Ltd	Dogmersfield
Eurovib (Acoustic Products) Ltd	Redhill
Firespray International Ltd	Aldershot
Gramm Barrier Systems Ltd	Seaford
IAC	Winchester
Ixthus Instrumentation Ltd	Reading
K C Controls Ltd	Crawley
Material Measurements Ltd	Reigate
Moir, Hands & Associates	Amersham
Proskon Environmental Ltd	Southampton
Scensys Ltd	Aylesbury
SJK Scientifics Ltd	Southampton
Stevens & Bolton	Guildford
Symonds Travers Morgan	East Grinstead
Transport Research Laboratory (TRL)	Crowthorne
W S Atkins Plc	Epsom

12.3 SWOT ANALYSIS

12.3.1 *Strengths*

- Many of the UK's largest market-leading noise consultancy businesses are located in the South East, such as WS Atkins, ERM and Symonds Travers Morgan, with a strong international track record.
- Some large equipment manufacturers (eg IAC), as well as smaller specialist manufacturers operating in a fluctuating and fragmented market.
- Very strong regional specialist skills in noise mapping and modelling.
- Leading academic research institutes – eg the Institute of Sound and Vibration Research at the Institute of Southampton and the Transport Research Laboratory in Berkshire.

12.3.2 *Weaknesses*

- Limited suppliers of vibration control technologies.
- Limited manufacturers of noise buffer equipment.

12.3.3 *Opportunities*

- South-East consultancy companies are very well placed to provide services to implement the EC Directive 2002/49 on Assessment and Management of Noise, into which the Government will have invested £13m by 2005. The Directive will require local authorities and developers to undertake:
 - increased noise mapping and modelling, and wide area noise monitoring;
 - the development of noise action plans and strategies.
- New IPPC (Integrated Pollution Prevention and Control) regulations are covering noise (in addition to other sources of pollution), which will provide new opportunities for manufacturers and service providers.
- The South East faces considerable noise pressures due to density of population and transport infrastructure (eg roads, airports etc).

12.3.4 *Threats*

- Strong European competition on noise modelling, eg development of software.

12.3.5 *Potential for Growth*

There are good prospects for growth in the NVC sub-sector because of increasing noise problems and public concern over noise in the region, increasing awareness of noise hazards in industry, and the recognition of noise as a form of pollution in urban and rural areas. Regulations such as the

EU Noise Directive will require local authorities to map noise levels in urban areas and is likely to generate increased demand for noise control services and technologies.

12.4

SUB-SECTOR SUPPORT ISSUES

- Development of joint research contracts involving practitioners and research institutions.
- Support in accessing finance to fund the development of innovative technologies in emerging areas such as noise modelling software.

This section examines the strengths and weaknesses of environmental technology research in the South East. *Table 13.1* summarises the region's research strengths across different environmental technology sub-sectors, described further in the following sub-sections.

Table 13.1 *Summary of Environmental Technology Research in the South East*

Sub-Sector:	Strengths:	Comments:
Water and wastewater	***	Particular strengths in Cranfield; and some in Southampton University. Large companies (e.g. Southern Water) also undertake technology research. Plus HR Wallingford and WRc .
Environmental Monitoring	**	Portsmouth U, Oxford U, Southampton Oceanographic Inst., Cranfield U, Qinetiq.
Air Pollution Control	*	There is very little evidence of air pollution control research underway within the region.
Waste Management	**	The University of Brighton has significant expertise in applied waste management. Southampton and Portsmouth also have research and offer services in this area.
Contaminate Land Remediation	**	Reading and Greenwich Universities both have centres for contaminated land remediation. A Faraday partnership that includes Oxford and Cranfield is also a widely respected research centre.
Marine Pollution Control	***	There is a strong centre of expertise in Marine Pollution Control at Southampton's Oceanography Centre and also at Portsmouth University. Some research is also underway at Brighton and Southampton Institute.
Renewable Energy	***	Southampton University's Sustainable Energy Research Group (SERG) is leading research into developing marine turbines, and there is a strong hydrogen and PV research centre at Oxford, and Cranfield.
Energy Management	**	Energy management is not a particular strength of the region's institutions, although there are pockets of research at Cranfield, Brighton, Reading, Portsmouth and at the Oxford Environmental Change Institute.
Noise and Vibration Control	**	Southampton's Institute of Sound and Vibration Research (ISVR) is the region's (and Europe's) leading centre of expertise in noise and vibration technology research.

*** = high; ** = medium; * = low.

13.1 WATER AND WASTEWATER TREATMENT

Research strengths in the South East include:

- The School of Water Sciences at Cranfield University is one of the UK's leading centres of water and wastewater treatment technology research. It undertakes cutting edge research, teaching and training in technology and associated scientific, engineering and policy issues for the treatment, use

and management of water. The School works closely with leading companies and government agencies in the water and waste sector. The School holds an EPSRC Technology Platform in recognition of its international standing. It is the first British university department to be awarded American Water Works Association Research Foundation (AwwaRF) funding. Dedicated facilities include a pilot-plant hall at Cranfield's own sewage treatment works and state-of-the-art laboratories.

- The Environmental Sciences department at Southampton University has research interests in wastewater reuse, water quality management and anaerobic digestion of domestic waste.

Membrane bioreactors are the major area of current research interest. Although the technology is sound and there are fully functional installations worldwide, the major challenge is to develop more cost-effective ways of producing the membranes. Research at Cranfield includes looking at new membrane materials and adjusting the operational conditions to improve the efficiency of the process.

Other research is also underway examining chemical treatments, - particularly as some modern pollutants are not biologically degradable. A technology called Super Critical Water Oxidation could be one of the solutions – again a technology in which Cranfield is leading.

Other national centres of expertise include Imperial College, and UCL.

Other leading water and wastewater research organisations in the South East include HR Wallingford, WRc, Southern Water and Thames Water.

13.2

ENVIRONMENTAL MONITORING AND ANALYSIS

Particular expertise in environmental monitoring and analysis exists at Portsmouth University, Oxford University and Southampton Oceanography Institute. Cranfield University also has experience in monitoring technologies for water and wastewater.

- Reading University has a strong, nationally renowned centre for meteorology, which is regarded as having strong potential for future commercialisation of meteorological monitoring technologies.
- A new passive water sampling technology has been developed through an international partnership led by Portsmouth University's School of Biological Sciences. Passive sampling offers potential benefits for the monitoring of water quality in a range of aquatic environments including wastewater, rivers, ground water and the sea. The current technology is based on spot or grab sampling and provides only a snapshot of levels of pollutants at the time of sampling. In contrast, passive sampling provides time-averaged concentrations over periods of days to weeks, and is less

expensive to use.

Negotiations are underway with a Swedish company to extend the commercial application of the technology to Scandinavian markets, and they have also been invited to incorporate their samplers in a major Australian monitoring programme.

Operating units within the faculty's commercial division offer services such as GIS and remote sensing for environmental monitoring.

- Oxford University is developing its capabilities in environmental monitoring and analysis, with new technologies such as the remote satellite detection of pollution, and seasonal forecasting.

13.3 *AIR POLLUTION CONTROL*

Whilst there is limited academic research on air pollution control within the South East, a number of pockets of research exist, for example: the School of Medicine at Southampton University has research underway to investigate the link between various forms of particulate air pollution, and the incidence of asthma.

13.4 *WASTE MANAGEMENT INCLUDING RECYCLING*

Waste management expertise in the South East is focussed in the Universities of Portsmouth, Brighton and Southampton. There is also research in waste management at Oxford's Environmental Change Institute. Activities by these organisations tend to focus on ways of converting and re-using waste streams or waste minimisation; rather than actually developing new waste management technologies / equipment.

- The University of Brighton has a large range of applied research into waste and waste management, including: monitoring the success of community recycling schemes; waste analysis such as materials flows into landfill; waste timber recycling, and shredder residue analysis.
- In 1999 the University of Brighton's Waste and Energy Research Group (WERG) established "Brighton Environmental Body", as one of the registered environmental bodies set up to manage projects funded by the landfill tax credits scheme. Recent research by the group has included developing products / markets for post consumer plastics, and monitoring kerbside recycling schemes in the area. WERG is able to collaborate with local businesses via the Brighton University's Knowledge Transfer Partnership (KTP) scheme.
- The University of Portsmouth offers services to industry in Environmental Engineering and Waste management, available via the University's

business development office. The department has worked with a number of private sector clients, providing waste audits, training, environmental impact assessments, and help with legislative compliance.

- The University of Southampton's Centre for Environmental Sciences is conducting research on waste management – examining the influence of social psychological, socio-economic and structural factors on household recycling rates. This research project is designed to monitor the effectiveness of a kerbside recycling collection service.
- The University of Southampton is also a research partner on a project to identify uses for waste vehicle tyres in engineering projects, in partnership with HR Wallingford Ltd, Pevensey Coastal Defence Ltd, and Posford Haskoning.
- The commercial research business Quinetiq has developed an automated waste separation system at Farnborough, which has considerable national commercial potential.

13.5

ENVIRONMENTAL CONSULTANCY SERVICES

Many of the research institutions within the South East offer various consultancy services in the area of environmental technology.

- Oxford University Consulting, (OUC) has recently launched a new sub group called Oxford Environmental, which offers consultancy services in areas such as modelling and GIS, sustainability policy, remediation and clean technologies.
- Southampton University's spin-off consultancy Geodata offers expertise in environmental data analysis, and GIS services.
- ISVR Consulting – see noise and vibration section.
- The Centre for Sustainable Design (CfSD) within the Faculty of Design at The Surrey Institute of Art & Design, University College undertakes research, training, organised conferences and workshops on eco-product development and sustainable product design.
- Researchers from the University of Reading's Department of Meteorology formed a spin-out company, Weather Informatics Ltd. The company uses the most recent scientific advances to provide customer-specific, long-range weather forecasts and expert consultancy to help businesses improve their management of weather risks.
- Brighton University offers consultancy services via the Brighton Environment Body (BEB), and is also currently considering setting up a stand-alone consultancy.

13.6 CONTAMINATED LAND REMEDIATION

Research expertise in contaminated land remediation in the South East includes Oxford University, University of Reading, Cranfield, Brighton and Sussex Universities.

13.6.1 *Examples of Research Underway*

- The DTI-sponsored FirstFaraday project involves a collaboration of institutions – including Oxford and Cranfield within the SEEDA region – which are working on methods, technologies and tools for the assessment, remediation and management of contaminated land. This aims to improve technology transfer and promote the position of the UK as a global player in contaminated land (see *Box 13.1*).
- Reading University’s Soil Science department is a nationally renowned centre which includes research on contaminated land remediation. A number of projects focus on specific processes involved in movement of soil and / or water contaminants (including metals, plant nutrients, pesticides and hydrocarbons). The department received a rating of 5 in the recent REA assessments, and has a broad array of collaborations with national and international organisations (public and private sector).
- The University of Greenwich has a Centre for Contaminated Land Remediation (CCLR) focussing on research, development and teaching of science, engineering and technology related to contaminant immobilization and transport in soil, rock and water. The CCLR work with a number of private businesses and government departments.
- In a joint project, Brighton and Sussex Universities have developed and patented a novel electrokinetic method for soil remediation and groundwater protection called Ferric Iron Remediation and Stabilisation (FIRS). The process separates and extracts heavy metals, radionucleotides and organic contaminants from clay-rich soils and sediments under the influence of an applied electric field.

Box 13.1 FirstFaraday

FirstFaraday is one of 24 Faraday Partnerships established with the aim of promoting improved interaction between the UK science, engineering and technology base and industry. These alliances of organisations and institutions –including Research and Technology Organisations, Universities, Professional Institutes, Trade Associations and Firms, are widely recognised for their technological expertise, and are well respected by industry as an important driver for increased UK competitiveness.

Projects proposed under the Faraday Partnership are more likely to be favourably considered by the research funding councils, because of their high degree of inter-institute collaboration, and applied commercial nature.

The project emphasises identifying and meeting industry needs. Each Faraday Partnership employs a number of technology translators - people with broad experience of knowledge transfer - who can facilitate projects between Partnership members and industry.

13.7 *MARINE POLLUTION CONTROL*

Leading academic research in Marine Pollution Control is centred around Southampton University's Oceanography Centre (a joint collaboration with NERC), and at the University of Portsmouth. There is also research at Brighton University on tracking the source pollution of marine water, and a small centre of expertise in shipping and anti-fouling technology at the Southampton Institute.

13.7.1 *Examples of Research Underway*

- Southampton University's Centre for Oceanography conducts research in a number of cross-cutting themes that incorporate the technologies and processes important for marine pollution control and monitoring.
- At Portsmouth University's faculty of the Environment, research is underway into the effects of pollution on the marine environment, and is particularly directed towards developing real-time, cost-effective monitoring methods for contaminants such as toxic metals, radionuclides and organic pollutants.
- Southampton's Centre for Environmental Sciences has research underway on a number of topics related to marine pollution – such as the effects of tributyl tin, and hydrocarbons on coastal marine ecosystems.
- Quinetiq, in partnership with the UK oil industry, recently developed technology called OilWatch to remotely monitor oil slicks at sea using a network of satellites and remote sensing techniques. OilWatch is already used to monitor the waters of the UK, France, Spain, Portugal and Italy.
- Environmental Science and Physical Geography faculty at the University of Sussex have just received the go-ahead to work on a major £850k project on the management of contaminated estuarine sediments - RIMEW, or Rives-Manche Estuarine Watch. The project, led in the UK by Dr. Andy Cundy, is funded by the INTERREG III programme and will involve work in the Seine, Authie, Ouse and Medway estuaries. Overall, eight universities and research organisations from the southeast of England and northern France are involved in the project.
- The Beaches At Risk project, an Anglo-French research collaboration, is being led in the UK by the University of Sussex. It will highlight the importance of effective beach management for coastal defence, dune rehabilitation, tourism and biodiversity conservation. Two UK companies, Pevensey Coastal Defence Ltd and Posford Haskoning Ltd are also partners in the project.

Major opportunities exist in relation to R&D into technologies for marine risk management and modelling. Southampton University and Portsmouth University are world leaders in this field, which has a growing global market.

The principle barrier to capitalising on this opportunity is a lack of strategic regional coordination in MPC research (involving academia and businesses). SEEDA could play an important role in helping to bring about this co-ordination. SEEDA could help encourage links between the research centres, and encourage research consortia to develop to push forward the agenda and capitalise on the considerable expertise in the region and future market opportunities.

13.8 *RENEWABLE ENERGY*

The South East has a strong base in renewable energy research. This strength is reflected in the high number of grant applications received by the Carbon Trust from institutions in the South East – the highest of all English regions.

Examples of renewable energy research organisations include:

- Southampton University’s Sustainable Energy Research Group (SERG) has two main areas of research in marine energy – on wave power and marine turbines. Research is focussed on improving blade design, reducing the damaging effects of cavitation, and also on flow modelling.
- SERG also has a number of research strengths in solar PV design.
- Reading University’s School of Construction Management and Engineering undertakes research on the development and utilisation of renewable energy, having been involved with the development of wind, solar PV, hydro and biomass for the last two decades. Includes collaboration with BP Solar.
- Sussex University’s Science and Technology Policy Research Unit (SPRU) is an organisation coordinating various programmes of research – including the programme “Experiments in Alternative Technology” which has a focus on wind power.
- At Cranfield University, one of the Department of Materials and Medical Science’s main activities is the research on sulphonic co-polymer materials. These offer excellent performance as the electrolyte in Solid Polymer Fuel Cells. The department is being funded by EPSRC, to develop new and cost effective polymer electrolytes and ways of using these new materials more efficiently in fuel cells.
- Headed by Prof. Brian Hayden, the Surface Science group at the University of Southampton has carried out extensive research in areas related to fuel cells.

- At the University of Portsmouth, the department of Mechanical and Design Engineering includes some research on combustion of bio-fuels and other mechanical research for renewable energy.
- There is also significant expertise in fuel cell, hydrogen technologies and photovoltaics clustered at Oxford University. There is also research into novel materials for fuel cells at Cranfield.

There are significant future opportunities for R&D in marine renewables. Expected installations of offshore wind, tidal flow, and wave power generators will require a large range of skills including seabed surveying, installation and maintenance capacity, distributed asset managements in a hostile environment, corrosion management, the capability to monitor the assets (a major challenge). There are also opportunities to look at new technologies for power storage, for example through the generation of hydrogen during times of excess capacity. However, the commercialisation tends to be slow and pre-competitive R&D investment is difficult to obtain.

13.9

ENERGY MANAGEMENT

Energy management technology R&D is also a strength of the research institutions of the South East region. This includes expertise at Cranfield, Brighton, Reading, Portsmouth and at the Oxford Environmental Change Institute.

Examples of energy management research organisations in the South East include:

- The University of Reading has expertise on energy policy, clean and efficient use of energy, and sustainable construction (see *Box 13.2*).
- The University of Portsmouth's Department of Mechanical and Design Engineering is engaged in research on cleaner combustion of hydrocarbons, modelling combustion processes and the efficiency of engines. The department is keen to pursue the potential for collaboration with industries.
- Cranfield's School of Mechanical Engineering has expertise in improved and cleaner combustion technologies, of particular application to gas turbines and catalytic converters.
- Brighton University's Knowledge Transfer Partnership (KTP) has a programme with the Tonbridge firm Omnova Wallcovering to develop an energy saving wall-covering products to reduce the energy consumption of a room by 10-15%. The university is strong in sustainable construction.
- The Oxford Environmental Change Institute has a research programme on "Lower Carbon Futures".

Box 13.2 *Energy Savings in Refrigeration Systems - JTL Systems Ltd, Newbury, and the University of Reading*

As a result of their KTP Programme with the University of Reading's Department of Cybernetics, JTL Systems, a small company in Newbury, launched a range of suction pressure optimisers that save up to 20% of the energy used by refrigeration compressors in supermarkets.

In addition to the overall environmental benefits of this project, JTL has achieved an annual sales increase of £500,000 and an average annual profit increase of £300,000. The TCS Programme also helped the company to develop 'PREDICT', the JTL 'defrost on demand' system. The company's 'Suction Pressure Optimiser' was selected by the Design Council as one of its 'coveted' Millennium Products.

13.10 *NOISE AND VIBRATION CONTROL*

Southampton's Institute of Sound and Vibration Research (ISVR) is the region's (and perhaps Europe's) leading centre of expertise in noise and vibration technology research.

- The ISVR has programmes that include research into noise modelling, High Frequency Vibrations, Railway noise and vibration, Fluid Dynamics and Acoustics, Gas Turbine Noise, Bioacoustics and Biomechanics, Hydroacoustics and Underwater Acoustics. It was awarded a 5* grade in research in the 2001 Research Assessment Exercise.
- The ISVR also has a stand-alone consultancy arm, ISVR Consulting who are a separate organisation undertaking commercial work for the engineering industry and government departments, agencies and local authorities.

NVC research relating to transport is also undertaken at the Transport Research Laboratory in Berkshire.

13.11 *TECHNOLOGY COMMERCIALISATION AND TRANSFER*

Most of the consulted institutions are developing divisions or separate organisations tasked with the commercialisation and licensing of their research and intellectual property (IP). For example:

- Oxford University's Centre for Environmental Technology (CET).
- Isis Innovation - wholly owned subsidiary of the University of Oxford established to promote technology transfer, - patenting, marketing and licensing technologies to the commercial sector, and on occasions spinning out companies to exploit the innovations (equity retained by the University and the inventors).

- Cranfield Creates has been established as Cranfield University's response to the government challenge to reach out to business and the community. Its role is to act as the focal point for regional activities, especially with the Small and Medium sized Enterprises (SMEs), as well as commercialising the Intellectual Property of the university.
- Brighton University has a Business Services Information Desk to provide access to services offered to business and the public services across the whole university, including research, consultancy and opportunities for collaboration and partnership.
- Southampton University's Centre for Enterprise and Innovation (CEI) is the focus of entrepreneurial activity within the University, focusing on the commercialisation of University intellectual property through the creation of start-up companies and opportunities for license. It provides business advice, IP protection and management, commercial legal advice and contract negotiation.
- The Sussex Innovation Centre (SINC) is a business incubator and support centre in which Sussex University has a major holding. SINC offers tenancy to high-growth, start up technology and knowledge-based companies.
- Reading University has an environmentally-focussed 'Enterprise Hub' which offers commercial accommodation to small businesses, especially those in the Environmental Technologies and Services sector. The hub aims to provide an effective interface between the business, the University knowledge base and the local community.

All consulted academic institutions also have Knowledge Transfer Partnership programmes (KTP). KTP is a government programme designed to enable private and public sector research organisations to apply their research knowledge to important business problems. Research students are seconded to commercial organisations for a year to develop novel technologies and processes.

