UK TRADE & INVESTMENT

Market opportunities in environmental goods and services, renewable energy, carbon finance and CATs

Country report: Turkey

October 2008

Fast track to the world UK

Contents

This report is one of seven on the opportunities for exports to, and direct investment and joint ventures in, the markets for environmental goods and services (EGS), carbon abatement technologies (CATs), renewable energy and carbon finance in selected countries (see Annex A for definitions of these sectors). It should be noted that the nuclear sector was excluded from the review. The other countries are Australia, Brazil, China, India, South Africa and the USA – representing a mix of emerging/high growth and developed overseas markets in these sectors.

The findings from the reports have been fed into an overview report which:

- provides an assessment of the UK's competitive advantage in EGS, CATs, renewable energy and carbon finance,
- maps this onto the market opportunities as revealed from the case studies, and
- suggests the opportunities for UK exporters and direct investors by market and sector.

The report considers the general market opportunities presented in the selected countries. It is based on desk research that drew on the most readily available and accessible information sourced from within the country concerned and from international agencies.

It provides background designed to be helpful in focusing the more detailed investigations that will need to be carried out by anyone interested in selling to or investing in the relevant markets and countries.

The report does not assess specific opportunities for UK exporters and/or investors – or their appropriate route to market. However, it shows where there are significant market opportunities in environmental goods and services, renewable energy, carbon finance and CATs.

Summary of market opportunities in environmental goods and services, renewable energy, carbon finance and CATs

Opportunities

1 There are significant opportunities in Turkey for exports and/or direct investment in hazardous waste management, solid waste management, water and wastewater treatment, as well as in advanced conventional energy generation and renewable energy. There are future opportunities in air pollution control, cleaner technologies, generation technologies and asset management. A map of current and future opportunities in the environmental and low carbon markets in Turkey is set out below.

Sector	Current opportunities*	Future opportunities	Policy framework (current)
Environmental Goods and Services (EGS)			
Air pollution & control	☹	☺	Poor
Cleaner technologies	😐	☺	
Energy management			Fair
Environmental consultancy	😐	☺	Good
Environmental monitoring		☺	Poor
Marine pollution	☹	☺	Poor
Noise & vibration			
Land remediation			
Waste management	☺	☺	Fair
Water supply	☺	☺	Fair
EGS overall	😐	☺	Good
Carbon Abatement Technologies (CAT)			
CCS	☹	😐	
Generation technologies	☺	☺	Good
Low carbon fuels	😐	😐	
Asset management	😐	☺	Fair
CAT overall	😐	☺	Fair
Other opportunities			
Renewable energy	😐	☺	Good
Carbon finance	☹	😐	Fair

Key		
	☺	Relatively large market size and activity, relatively demanding regulation, relatively high public expenditure in this sector and relatively liberal trade and investment regime
	😐	Mix of modest market size and activity, modestly demanding regulation, modest public expenditure and liberalising but still restrictive trade and investment
	☹	No or minimal market size and activity, no regulation, and restrictive trade and investment regime
		No or inadequate information

** The assessment of current opportunities is based on the most recent official data and information on market size and sector activity. In many cases this can refer to 2005 figures and as such certain conclusions in this report may not capture very recent developments in some sectors or announcements concerning the near future. A variety of sources, methods and time-frames was drawn on to assess future opportunities – covering the next five-ten years based on government policies and/or budget allocations and/or independent forecasts and projections.*

MARKET ENTRY OPTIONS

2 The trade and inward investment regime in Turkey has become generally liberal and favourable to the possible market entry routes and this will be further improved by the changes that Turkey will need to introduce on its route to accession to the European Union. It is possible, however, that certain specific terms and conditions are imposed by the Turkish authorities regarding imports, inward investment and/or joint ventures in the markets reviewed in this report. The availability of possible market entry strategies is summarised below:

Route to market	Availability	Comment
Export	•	Turkey imports much of its needs for EGS and CATs
Foreign direct investment (FDI)	•	FDI is strong and generally on an upward trend
Joint venture (JV)	•	Turkish firms actively seek foreign partners for build-operate-transfer and build-own-operate contracts

Source: SQW Consulting

Gaps in the evidence base

3 A thorough trawl of readily available reports, studies and policy statements with regard to the markets under review and consultations with stakeholders found little evidence on the opportunities in Turkey in the following markets:

- Energy management (EGS)
- Environmental monitoring (EGS)
- Marine pollution (EGS)
- Noise and vibration (EGS)
- Land remediation (EGS)

4 This is not to say that this evidence is unavailable. More information could undoubtedly be found on specific market opportunities and constraints from specialised and technical policy statements/guidance, journals and trade press. However, it was beyond the terms of reference for this review to investigate the opportunities in this degree of detail.

5 The report should be read as an introduction to the most significant opportunities in the Turkish markets. It has been designed to provide a focus for the more detailed investigations that will need to be carried out by anyone interested in selling to or investing in the markets.

1: Introducing the Turkish market

This section provides background information on the Turkish economy and the drivers and international legal dispositions affecting the growth of the market of the environmental goods and services, renewable energy, carbon finance and CATs in Turkey.

Key facts

1.1 Turkey is a large economy with a population of over 70 million and a gross domestic product of £250 billion (US$440 billion) in 2006, which made it the 17th largest in the world. Annual growth of GDP has averaged 5 per cent since 1981 with particularly rapid growth in recent years after recovery from the financial and political crisis in 2001. This was associated with a significant expansion in foreign trade volumes which more than doubled over the three years to 2005. There has also been an increasing level of foreign direct investment which reached £5.4 billion in 2005 (US$10 billion)[1]. Key facts about the Turkish economy are presented below:

TURKEY – KEY FACTS (2001-2006)

	2001	2002	2003	2004	2005	2006
GDP growth (annual %)	-7	8	6	9	7	6
Gross capital formation (% GDP)	17	21	23	26	25	27
Energy intensity (oil equivalent per unit GDP)	8.7	7.4	7.0	7.4	9.2	10.4
Energy imports – net (% energy use)	66	68	70	71	—	—
Carbon dioxide emissions per capita	2.8	2.9	3.0	3.1	—	—
Imports of goods/services (% GDP)	31	31	31	35	34	34
FDI – net (current US$ billion)	3.4	1.1	1.8	2.9	9.8	—

Source: World Bank (2006) and Turkish Statistical Institute (TurkStat) (2006)

Market drivers

1.2 The increase in trade and direct investment flows can be largely attributed to the government's liberalisation policies and structural reforms that enhanced the role of the private sector (especially deregulation of the electricity, natural gas and petroleum markets).

1.3 In addition, an important economic driver, with particular regard to the demand for environmental protection, is Turkey's negotiations for EU accession, in which environmental protection and standards feature prominently. A series of legislative measures have been introduced as a result.

1.4 Demand for energy has been increasing as a consequence of economic growth but primary energy production decreased between 1990 and 2004, resulting in a high dependency on imported energy. Plans are now in place for substantial investments in electricity generation and distribution.

1.5 Turkey's rapid industrialisation and its related urbanisation resulted in a doubling of its greenhouse gas emissions (GHG) between 1990 and 2004 which added to the complexity of the environmental problems and increased awareness of environmental issues and the demand for solutions. Challenges are particularly acute in public services such as water supply, wastewater treatment and waste management. Consequently, government agencies and local authorities have launched a number of environmental prevention and protection initiatives.

1.6 Foreign financing through the World Bank, the European Investment Bank and individual country export credit institutions and commercial lenders underpins most of the large environmental projects. This is creating a serious demand for environmental expertise, products and services, which foreign firms are well placed to fulfil. Technical support for capacity building and financial assistance is particularly needed as Turkey seeks to develop its own capacity.

[1] *Exchange rates are valid as of 08/09/2008. This approximates to 1 US Dollar = 1.22 Australian Dollars*

International legal dispositions

1.7 Turkey has over 50 international legal dispositions in the area of the environment. Its status against some key ones is presented in Table 1-1:

Table 1-1: Status of Turkey against key international conventions relating to the environment

International convention	Turkey's status
UN Framework Convention on Climate Change	Ratified
Kyoto Protocol	**Not** ratified
Ramsar Convention	Ratified
Long-range Transboundary Air Pollution Convention	Ratified
Montreal Protocol	Ratified
Convention on Biological Diversity	Ratified

Source: SQW Consulting

2: The market for environmental goods and services in Turkey

This section describes the growth market for environmental goods and services (EGS) in Turkey and outlines the drivers of this growth. It then provides more information on those segments presenting significant market opportunities.

Market growth and its drivers

Growth

2.1 Total environmental expenditure in 2003 was 1.6 per cent of GDP and was slightly less at 1.3 per cent in 2004 (which saw a particularly rapid growth in GDP). Total environmental expenditure by the public sector in Turkey in 2005 was 5.45 billion YTL (US$4.42 billion)[1] of which 3.41 billion YTL (US$2.77 billion) was current expenditure and 2.04 billion YTL (US$1.66 billion) investment (TurkStat, 2006). Central government contributed 36 per cent of the funding with the remainder provided by local government.

Table 2-1 Environmental expenditure of public sector in 2005

Environmental expenditure	YTL (New Turkish Lira) (million)	US$ (million)
Total environmental expenditure of public sector	5,452	4,432
Environmental investment expenditure of public sector	3,412	2,774
Environmental current expenditure of public sector	2,040	1,658
Protection of ambient air and climate	—	—
Water management	412	335
Wastewater management	771	627
Solid waste management	85	69
Protection of soil and ground water	2.7	2
Protection of biodiversity and landscape	5.1	4
Energy	0.1	0.1
Research and development	4.3	4
Other environmental protection activities	7.7	6
Activities leading to indivisible expenditure	7.5	611

Source: Turkish Statistical Institute (TurkStat) (2005) Press Release, Environmental Employment and Expenditure of Public Sector .

2.2 There are some 150 companies in the Turkish environmental market whose capabilities are mostly in contracting, with generally limited capacity to undertake comprehensive environmental projects. Problems faced by indigenous firms are lack of agreed standards with sector specific solutions being adopted, deficiencies in the inspection of treatment and recycling plants and lack of clarity between the roles of central and local administrations.

2.3 Local firms tend to look for foreign partners to undertake larger projects and the regulations have become increasingly favourable to inward investment. Foreign companies have undertaken projects in various areas such as water, wastewater and solid waste management to the value of approximately US$817 million in 15 municipalities.

2.4 However, there will be limits to the extent to which requirements can be met by domestic suppliers, even with the assistance of overseas businesses. Hence, the total value of imports of environmental goods by Turkey increased significantly to reach £890 million in 2006 of which 60 per cent – £520 million – was from EU countries.

[1] *Exchange rates are valid as of 08/09/2008. This approximates to 1 US Dollar = 1.23 New Turkish Lira.*

Drivers

2.5 The growth of the Turkish economy, its industrialisation and urbanisation have increased the need to deal with the environmental consequences – particularly with regard to waste management, water supply and management and air pollution. The National Environmental Action Plan (NEAP) of 1999 outlined some essential activities and interventions, which are most relevant to environmental management, with indicative budget requirements of at least US$300 million over the short to medium-term (up to 2010) (NEAP 1999).

2.6 According to a 2006 report by the US Commercial Service, the projected spend required to achieve harmonisation with EU standards is between €50 and €100 billion (US$74 billion – US$148 billion) over the period up to 2024, of which the majority is to be spent on capital projects and a small share on technical support; at least €30 billion (US$44 billion) is to be spent by 2014. It is expected that the public sector will provide up to 70 per cent of this investment (primarily local government and to a lesser extent central government) and 30 per cent will come from private sector sources.

2.7 Up to 50 per cent of this long-term investment will be in the areas of air pollution control, water supply, wastewater treatment and waste management. Upgrading the drinking water supply systems to EU standards alone is estimated to require approximately £10 billion (US$18.5 billion) of investment.

2.8 To assist Turkey's enforcement efforts, the EU established the Environmental Heavy Cost Investment Planning (EHCIP) Project in January 2004. The project provided funding to Turkey's Ministry of Environment and Forestry for capacity building aimed at establishing a high level of environmental protection and regulatory compliance to meet the EU environmental requirements.

Market segments

2.9 The main market opportunities in Turkey in environmental goods and services (EGS) are in **waste management** and **water supply, treatment and management.** Significant future opportunities are likely to exist in **air and marine pollution control.**

2.10 Other EGS sectors will provide good opportunities in the future, including environmental monitoring, environmental consultancy and cleaner technologies, but it is difficult to predict whether these will develop as niche markets (ie highly specialist and lower volume) or become mainstream (ie lower margins but high-volume).

OPPORTUNITIES IN ENVIRONMENTAL GOODS AND SERVICES IN TURKEY

Waste management

According to World Bank studies carried out in 2005 (World Bank Turkey Office 2006) for Turkey, the market volume for waste and wastewater disposal technologies is US$1.4 billion annually. The total market value for waste recycling equipment is approximately US$280 million, with 75 per cent made up from imports.

About 30 million tonnes of **solid waste** is produced in Turkey annually. Nearly all of household waste is stored untreated in municipal waste storage and landfill. There is only one incineration facility in Turkey. However, in recent years there has been a rise in the amount of solid waste that has been disposed of through the use of composting facilities.

There is a need for solid waste handling equipment and waste treatment and technologies for collection, separation, recycling and incineration. However, the public finances in Turkey for this are limited. Although there has been an increase in public finance from £70,000 in 2001 to £1.34 million in 2005, the scale is still very small.

Turkey produces 1.8-2.6 million tonnes of **hazardous waste** each year (EHCIP 2005). There is only one facility that treats the waste. It has a capacity of 50,000 tonnes. Due to the shortage of treatment facilities and a high demand for them, five zones for hazardous waste have been created. Each zone will have its own central storage facility and an incinerator and it is estimated that 27 stations will be required for the five zones. This strategy will address about one million tonnes of hazardous waste per year, both through landfill and incineration.

Most of the investment required will be made between 2012 and 2018, when about €100 million will be spent annually. In addition, the state owned petro-chemical company is planning to build a new facility to manage its own waste. Environmental companies engaged in the consultancy, engineering or equipment aspects of hazardous/medical waste treatment are likely to be very active in Turkey in the near to medium term.

In order to generate alternative energy, initial steps are underway in waste-to-energy projects at some of the landfills in Turkey. There are not enough landfills for storing solid waste across Turkey. The construction of new ones will start incrementally, and companies interested in the construction and management of new landfills could be instrumental in this area. Solid waste handling equipment for use in collection or at the landfills is also needed.

Water supply and management

Nearly 80 per cent of the population are served by the drinking water network. The number of drinking water plants has increased from 60 in 1994 to 140 in 2005 but there is still a serious shortage. Only 304 out of 3,225 municipalities had drinking water treatment plants in 2004 (following mergers, in March 2008 there are now 2,103 municipalities in Turkey). This served just 34 per cent of the population. Existing facilities are in need of improvement. This creates a large opportunity for development.

In 2005 the public spend on water supply was £165 million. There is an increasing demand for both domestic and industrial water supply but a diminishing supply of easily exploitable fresh water which is putting pressure on the budget. The government has responded by introducing new principles in legislation, including the Regulation on Water Pollution Control.

Turkey produces 769,000 tonnes of **industrial wastewater** annually. The number of municipalities served by wastewater treatment plants in 2004 was 319 covering 36 per cent of the population. Development of **municipal water/wastewater treatment** is taking place more rapidly than the other areas of environmental protection. There are still thousands of municipalities that do not have proper water/wastewater treatment systems. Some of the smaller towns, due to their limited financial capability, may not be able to undertake large projects with international players, but there are still cities with 250,000+ populations without a treatment facility.

This creates a large potential opportunity for development although currently public expenditure on water is limited. Foreign consultancy or equipment manufacturers are likely to find major business opportunities in this area if there is tighter implementation of the regulations and increased public funding.

Air pollution

Air quality monitoring in Turkey is currently limited. Only some 1,000 facilities comply with air pollution regulations. Turkey is working towards improving air policy and controlling energy management. It is currently considering the adoption of EU integrated pollution prevention and control. So far there has been limited action from the public sector on air pollution issues. Data from TurkStat on environmental expenditure shows there was no public spend on protection of ambient air and climate in 2005.

However, the Ministry of Environment and local municipalities will need to invest in additional testing stations to supplement the 171 air quality control stations that have already been established in 69 provinces. There will be a derived demand for electronic displays and monitoring devices for heating installations and a growing market for manufacturers of emission control devices.

Marine pollution

The National Environmental Action Plan (1999) outlines the main issues facing marine resources as being waste from tourism and industrial wastewater. At present, growth is not managed in a way that controls waste levels, and accidents and spills threaten marine resources. According to NEAP, growth needs to be managed more effectively and there need to be tighter controls on waste.

In terms of pollution of the seas, annual discharge into the Mediterranean from rivers and sewage canals is 363 billion cubic meters. This contains highly toxic substances including lead, mercury, chromium and zinc with the largest amount of pollutants coming from agricultural activities.

Source: SQW from various sources

3: The market for carbon abatement technologies, renewable energy and carbon financing in Turkey

This section summarises the readily available evidence on the market for carbon abatement technologies (CATs), renewable energy and carbon financing in Turkey. It describes the general growth in the sectors and its drivers and presents information on those segments within the three sectors where there are significant opportunities.

Market growth and its drivers

3.1 Demand for energy in Turkey has been increasing by about 4 per cent annually over the last decade, with the demand for electricity increasing at double that rate. Natural gas consumption has also been growing fast, causing a significant change in the Turkish energy market.

3.2 Total greenhouse gas (GHG) emissions in 2004 were 357 million tonnes of carbon dioxide equivalent ($MtCO_2e$) – an increase of 110 per cent since 1990 when emissions were 170 $MtCO_2e$. The largest contributor is the energy sector (64 per cent), followed by industry (24 per cent) and waste (8 per cent). Carbon dioxide emissions were estimated at 241 $MtCO_2$ in 2004 of which 92 per cent were due to fuel combustion. The sectoral breakdown was as follows: energy sector – 32 per cent, manufacturing – 28 per cent and transport – 17 per cent. Turkey is ranked worst of the OECD countries and EU 15 countries for CO_2 emission intensity with 3.4 tCO_2 per capita in 2004.

3.3 Despite the growth in demand for energy and specifically electricity, primary energy production in the country decreased by 8 per cent between 1990 and 2004 from 25.5 million tonnes of oil equivalent (mtoe) to 23.4 mtoe respectively. As a consequence, the country has become highly dependent on energy imports.

Market segments

3.4 The most active market segments currently and in the short to medium term are likely to be in **efficient conventional power generation capacity, asset management**[2] and some segments of the renewable energy sector, namely **hydroelectric** and **geothermal power**; and renewable energy research and development (R&D).

Carbon abatement technologies

3.5 The total investment required for electricity generation and distribution up to 2010 is estimated at around US$45 billion of which US$19 billion is to be provided under the build-operate-transfer (BOT) and build-own-operate (BOO) models. The huge size of this investment makes it impossible for funding to be drawn from public finances. Private capital has to be introduced into Turkey's electricity sector to meet these requirements. Combined Heat and Power (CHP) technology is being introduced with governmental support to help meet the need for additional electricity generation.

OPPORTUNITIES IN CARBON ABATEMENT TECHNOLOGIES IN TURKEY

More efficient conventional (fossil fuel-based) power generation

New generation capacity is required to meet the growing electricity demand and also to increase/maintain levels of energy security. Higher-efficiency and lower-carbon technology will be deployed on the basis of better lifecycle-cost performance and future-proofing (as minimum performance standards become ever tighter). This is true for all categories of fossil fuel generation – coal, gas, oil – when comparing new and old technology for the same fuel (ie not fuel switching).

[2] *There is limited hard evidence on asset management in Turkey as such but consultations carried out for this review suggested a good current and future potential in this area.*

Renewable energy

3.6 Renewable energy was 12 per cent of total primary energy supply in Turkey in 2004. Electricity generated from renewables was 31 per cent in 2004 – dominated by hydropower and biomass. The contribution of wind and solar is limited but is expected to increase in the future.

Table 3-1: Alternative energy sources in Turkey

Fuel	Potential	The extent of development to date
Hydropower	130 TWh	35%
Geothermal	510 MW	2 plants with 15 MW and 9 MW currently exist. 52,000 dwellings are serviced by geothermal energy
Wind Energy	10,000 MW	A wind atlas was compiled to identify the potential for wind energy but, due to the high cost of investment, wind power is not considered to be a particularly viable option
Solar Energy	87 mtoe	Total solar collector capacity is 11mtoe, (0.4 mtoe was produced in 2004). Approximately 30,000 solar water heating systems have been installed since the 1980s
Biomass Energy	15 mtoe	40% (6 mtoe) is being used

Source: Information gathered from UNFCCC (2007) Turkey Country Report p43

OPPORTUNITIES IN RENEWABLE ENERGY TECHNOLOGIES

Hydroelectric power

Turkey has significant hydroelectric power resources, with more than 100 plants and total installed capacity of 12.6 GW. New hydro plants are being developed as part of the US$32 billion Southeastern Anatolia Project (GAP) along the basin of the rivers Tigris and Euphrates. GAP, considered one of the most ambitious water development projects ever undertaken, will add around 7.5 GW of new generating capacity. This will be delivered through constructing 22 dams, 19 hydropower plants and an extensive network of tunnels and irrigation canals covering 1.7 million hectares of land. GAP is scheduled to be completed by 2010 and by the end of 2005, eight hydropower plants had been completed (74 per cent of total planned installed capacity).

Geothermal energy

Turkey also has a track record in large-scale geothermal district heating systems and since the 1980s this has been a mainstream solution with 52,000 dwellings currently on the grid and with plans for connecting nearly 300,000 more dwellings. Forecasts show that total installed geothermal capacity in 2010 will reach 3,500 MWt (megawatt thermal) for space heating and 500 MWe for electricity. By 2020 capacity will have grown to 8,300 MWt (137 per cent) and 1,000 MWe (megawatt electric) (100 per cent).

Research and development in renewables

Between 1980 and 2005, Turkey spent a total of US$120 million on government energy research and development (R&D) (in 2005 prices and exchange rates). In this period, 15.6 per cent of its total energy R&D budget (US$17.4 million) was allocated to renewable energy. Of that, most funding was committed to geothermal energy which received US$6.1 million (37 per cent of the renewables R&D funding). Turkey also participates in international collaborative R&D in Photovoltaic Power Systems through the IEA Implementing Agreements.

The IBRA funded US$502 million Turkey Renewable Energy Project, which runs between 2004-2010, aiming to increase privately owned and operated distributed power generation from renewable sources, without the need for government guarantees, and within the market-based framework of the new Turkish Electricity Market Law.

Source: SQW from various sources

Carbon finance

3.7 Turkey is not currently party to the Kyoto Protocol. Recent developments suggest that the government is planning to ratify the Protocol in the near future, but this is expected to take place only when the country's per capita energy supply reaches the EU average (through ongoing investments in conventional and renewable energy capacity).

3.8 Ratification will have the objective of putting Turkey in position to negotiate post-2012 carbon agreements and solutions. Therefore, regardless of the exact timing of ratification, Turkey will not adopt a national carbon cap and will not be able to host Clean Development Mechanisms (CDM) or Joint Implementation (JI) projects before 2012. This will limit the potential growth in carbon markets and finance.

3.9 Nevertheless, Turkey is already a player in carbon finance and trading through the voluntary carbon market route and this activity is growing. Thus, two wind energy projects developed in Turkey were the first in the world to be registered as Gold Standard Voluntary Emission Reduction (VER) projects. The wind farms are the 30 MW Anemon in Çanakkale province and the 40 MW Mare wind farm in Izmir province. Both are operated by the local company Demirer Enerji.

4: Policy and regulatory frameworks

This section describes: a) the policy and regulatory regime as it relates to the treatment of importers, inward investment and joint ventures with overseas suppliers; b) the extent to which environmental policies and regulation have become more demanding – and the nature of the requirements; and c) the governance institutions responsible for trade, investment and environmental policy and regulation.

Structural reforms – trade and direct investment

4.1 Turkey has been pursuing a structural reform agenda in which deregulation is being prompted in a wide range of activities – trade liberalisation, financial management and control, public procurement, the opening up of key markets to competition (especially in the electricity, natural gas and petroleum markets) and improving the investment environment (including foreign direct investment).

STRUCTURAL REFORMS IN TRADE AND INVESTMENT

Trade

The most significant feature of Turkey's foreign trade policy is the 1996 Customs Union between the EU and Turkey with which both its import and export regimes have been made consistent with the EU regulations.

The Import Regime Decree effective from 2003 embodies the various agreements established between Turkey, the WTO and the EU, and various countries (to set up free trade agreements), and the preferential treatments granted under the Generalised System of Preferences (GSP).

Free Zones have been established as sites within Turkey deemed to be outside the customs territory of the country. They are regions where regulations relating to foreign trade and other financial and economic policies are not applicable or only partially applicable. The intention is to develop a more convenient business climate to increase mutually beneficial trade and investment flows.

The liberalisation of the trade regime has been associated with a tripling of Turkish exports over 2000-04 and an almost doubling of imports.

Foreign direct investment

The foreign investment regime in Turkey is regulated by the Foreign Direct Investment Law of 2003. It is based on the principle of equal treatment of domestic and foreign investors and the encouragement of foreign direct investments by protecting investors' rights and the application of recognised international standards. There are incentives for direct investment through customs & duties exemptions, investment allowances and VAT exemptions on machinery/equipment.

The Technology Development Zones Law (2001) provides incentives for tenants of the 200 industrial zones and 17 high-technology business incubators in Turkey – incentives in the form of exemptions and waivers.

Source: SQW Consulting

Public procurement and project financing

Public procurement

4.2 As a result of Turkey's Customs Union with the EU and the country's EU accession process, Turkey is on track to applying EU common commercial policy measures in all sectors. Recent reforms in Turkey's business and investment environment improved prospects for foreign firms and have greatly reduced bureaucratic processes and procedures. Improvement is still needed in the areas of transparency and predictability in public sector projects. The Turkish market requires long-term commitment by overseas traders and investors and co-operation with local partners and a network of contacts both in the public and private sector.

4.3 The Ministry of Environment and Forestry may buy the services or equipment required for national projects but the main buyers of equipment and services in the Turkish environmental market are local authorities (municipalities) and industrial organisations. Municipalities are mainly responsible for the construction and management of solid waste, water and wastewater treatment services.

4.4 The public tendering system often requires that a locally established company take part in the consortium tendering. Build-operate-transfer (BOT) and build-own-operate (BOO) contracts are a good opportunity for consortium collaboration where foreign firms provide not only the know-how, but also access to finance. The private sector, especially mining and manufacturing firms, have faster and simpler procurement systems. Tenders are announced in the Official Gazette, business magazines, and websites of the related organisations.

Private procurement

4.5 The Turkish private sector businesses are also potential buyers of industrial waste treatment and recycling technologies and equipment, as well as air pollution prevention products and services. They have limited domestic supply capacity to draw on. There are some 150 companies in the Turkish environmental market whose capacity is largely confined to contracting and is limited with respect to undertaking comprehensive environmental projects, due to their lack of experience.

4.6 Joint ventures with foreign partners are commonly pursued to undertake larger projects. Local firms provide civil works and basic technological provisions for many projects in industrial wastewater treatment systems, flue gas desulphurisation systems in power and composting plants, incinerators and remediation technologies. However, they generally lack project financing. For these requirements, and for hard engineering equipment, local suppliers must import the required technology and equipment and services, and must often team up with a foreign partner for the required financing of BOT/BOO projects in the public sector.

4.7 Turkish companies generally establish joint ventures and partnerships with experienced foreign companies. Creating bilateral market dynamics in this sector is commonplace. The environmental market is dominated mainly by EU, US and Japanese firms providing environmental technology, services and equipment.

Project financing

4.8 The main mechanism for funding government projects is through EU financing instruments. Infrastructure projects defined under the Environmental Heavy Cost Investment Programme are currently at the stage of feasibility studies and some have proceeded to implementation, to be financed through the IPA (Instrument for Pre-accession Assistance).

4.9 Various twinning projects, which refer to technical support via co-operation of an EU state organisation with a Turkish governmental organisation, have also been implemented in partnership with EU-member states. Recent twinning projects have been conducted in air quality, chemicals and solid waste management fields. The Implementation of the Water Framework Directive is a live project in which the Environment Agency (England and Wales) is a partner.

4.10 Various other projects financed through EU funds in the environmental sector include upgrading occupational health and safety, establishing environmental standards in the textiles sector, and capacity building in the environment sector (including environmental education, heavy cost investments, and waste management projects).

4.11 The European Investment Bank (EIB) is also an important financing agency. Along with foreign direct investment and private sector activities, the EIB also gives particular importance to social sector projects such as health, education and environmental protection. So far, financial support from the EIB for infrastructure development in Turkey has mainly been for environmental projects and construction activities following the 1999 earthquake.

Environmental regulation and policies

4.12 At the same time as Turkey is liberalising its economy and markets, it is also bringing in new regulations relating to environmental protection and pollution prevention.

ENVIRONMENTAL REGULATIONS

Renewable Energy Law (2005) aims to expand the use of renewable energy sources for generating electrical energy, to reduce carbon emissions and to stimulate the renewable technology industry. The Law guarantees the purchase of all generated renewable energy and licensed energy supply companies are required to supply the equivalent of at least 8 per cent of the total energy they have supplied the previous year, subject to sufficient renewable electricity being available on the market.

Environmental Law (April 2006) provides much stronger fines and penalties to prevent individuals and industries from polluting the environment. As an incentive to reduce and prevent industrial pollution, the government plans to offer industrial plants a reduction in their electricity bills if they set up their own waste treatment facilities. With respect to fines, typically under the former law, companies that dumped and buried their waste illegally were fined approximately £3,000. The new law makes them liable for fines of up to £800,000. All new investment projects now have to conform to the EU environmental protocols in order to receive permission for operations.

Energy Efficiency Law (2007) comprises the organisation, principals and procedures for increasing energy efficiency in industry, electrical power plants, transmission and distribution systems, building, and transport sectors. It sets the rules for energy management in industry and in big buildings, project supports, voluntary agreements, etc. The Law also establishes renewable electricity purchase obligations. Renewable electricity is purchased for 5.0-5.5 Euro-cent/kWh and the price is fixed for ten years. This incentive is available to plants installed before the end of 2011. The government can extend this date for two years.

An energy efficiency strategy is being compiled. The General Directorate of Electrical Power Resources Survey and Development Administration is prepared to publicise an inventory of energy efficiency in industrial resources.

Planned developments

A draft bylaw on Air Quality Assessment and Management has been prepared to improve monitoring of air pollutants. The EU Large Combustion Facilities Directive has imposed limits on emissions from large facilities. Air quality is not yet monitored on a national basis, but major municipalities are beginning to track emissions to improve enforcement.

International policy on Marine Pollution Control is being developed involving 21 countries to protect the Mediterranean to which Turkey is a party.

National Climate Action Plan Strategy is at the planning stage. It will aim to reduce the emissions of three GHGs: Carbon Dioxide (CO_2), Nitrogen Oxide (N20) and Methane (CH4). It will involve all economic sectors. Climate change mitigation is financed through the Global Environment Facility (GEF). A key focus is the promotion of public transport and insulated buildings to reduce CO_2.

EU Integrated Environmental Approximation Strategy 2007-2013

This strategy was produced in 2006 by the Ministry of Environment and Forestry.

Sectoral Operational Programme Environment

This programme identifies how and where EU funding will be spent. It was produced in 2007 as a requirement by the EU and is of key importance to both local and foreign businesses in the EGS area.

Source: SQW Consulting

Key institutions

KEY GOVERNMENT DEPARTMENTS AND AGENCIES INVOLVED IN TRADE, INVESTMENT AND THE ENVIRONMENT

Ministry of Environment and Forestry is responsible for environmental legislation and policy in Turkey.

Ministry of Energy and Natural Resources is responsible for energy legislation and policy in Turkey.

Investment Support and Promotion Agency of Turkey (ISPAT) is the official body encouraging and promoting investment in Turkey. Within it, the General Directorate of Foreign Investment assists with foreign investor liaison, permit issuance and incentives.

State Planning Organisation creates five-year plans; the current plan is the 9th Development Plan which runs from 2007-13. A National Environmental Strategy and Action Plan supplements the five-year plan. In general Turkey aims to develop environmental policies in line with EU environmental policies.

Energy Markets Regulatory Authority (EMRA) is responsible for licensing new energy projects, including renewables.

Central Finance and Contracting Unit (CFCU) is responsible for implementing EU funded projects.

Local authorities are responsible for environmental services such as air pollution control, solid waste management, water and wastewater treatment. They are major shareholders in local utilities, eg water, such as the ISKI for Istanbul, ASKI for Ankara and IZSU for Izmir. Some governmental agencies and non-governmental organisations also co-ordinate environmental activities such as recovery and recycling of waste, water and wastewater treatment services and equipment procurement by municipalities.

General Directorate of State Hydraulic Works is the primary executive state agency responsible for overall water resources planning, managing, execution and operation.

Iller Bank is a bank that manages a €212 million loan to Turkey agreed by the World Bank in 2006, with the objective of supporting the Government's sustainable environmental services in selected municipalities.

Source: SQW Consulting

Annex A: Definitions of environmental goods and services, renewable energy, carbon finance and CATs

A.1 The Defra/BERR Environmental Industries Unit has defined the individual EGS sectors as follows:

Table A-1: Constituent sub-sectors of the Environmental Goods and Services sector

Sub-sector	Description	Examples of types of activity
Air Pollution Control	Defined as products, systems and services for the prevention, reduction and removal of gaseous and particulate pollutants from air	External and internal emissions and odour control, filters and catalytic converters
Cleaner Technologies and Processes	Defined as products, systems or services for cleaner more resource efficient technologies, processes or products which are not covered elsewhere	
Decommissioning/Decontamination of Nuclear sites	Defined as products, systems and services required for the decommissioning of existing nuclear liability sites and structures	Consultancy, decontamination, recycling and compaction technologies, waste collection and containment
Environmental Consultancy	Defined as services to provide assessment and advice relating to environmental issues	Environmental audits, environmental impact assessment, corporate environmental responsibility
Environmental Monitoring, Instrumentation and Analysis	Defined as products, systems and services for measuring and monitoring environmental parameters	Water, air and soil quality, meteorological conditions and flow rates
Energy Management/Efficiency	Defined as products, systems and services for energy management and energy efficiency	Energy consultancy/audits, building energy management systems, energy efficient products and efficiency advice
Marine Pollution Control	Defined as products, systems and services for controlling, clean up and minimising marine pollution	Products such as oil absorbents and booms and services such as marine pollution preventing techniques
Noise & Vibration Control	Defined as products, systems and services for monitoring and reducing noise and vibration	Noise meters, monitoring systems, acoustic buffers, enclosures and barriers and silencers
Recovery and Recycling	Defined as products, systems and services for waste segregation, recovery and recycling	Paper, organics, metals, plastics, glass, demolition and construction wastes, vehicles and white goods
Remediation and Reclamation of Land	Defined as products, systems and services for the identification, assessment and remediation/reclamation of land and buildings, including prevention of contaminant dispersal	Absorbents and injection equipment, monitoring systems and proprietary treatment processes and sampling/analysis and site investigation/engineering
Waste Management	Defined as products, systems and services for the minimisation, collection, treatment (not recycling) and disposal of waste	Advice on waste minimisation, landfill, mechanical and biological treatment, regulatory advice and technologies such as specialised containment, shredders, compactors and waste management vehicles
Water Supply and Wastewater Treatment	Defined as products, systems and services for the management of the fresh water environment, provision, treatment, distribution and storage of clean water and wastewater for industrial and domestic users	Resource development, demand management, manufacture of wastewater treatment equipment, design, construction, installation and operation of water and wastewater treatment facilities

Source: DEFRA, Sustainable Consumption and Production – Development of an Evidence Base: Annex 1, UK Government Definitions of the Environmental Goods and Services Sector (Draft Review September 2006)

A.2 For the purposes of the study, we have taken Renewable Energy and Carbon Finance out of the definition of EGS and CATs and treated them as separate sectors.

A.3 Definitions for the individual CATs sectors are available from different sources including BERR's Strategy for CATs (2005), certain trade associations and prominent market leaders.

Table A-2: Constituent sub-sectors of the Carbon Abatement Technologies sector

Sub-sector	Description	Examples of types of activity
Carbon Capture & Storage (CCS)	Defined as a multi-stage process where carbon from power generation is captured either before or after combustion and transported to a long-term storage in geological formations. This approach can reduce emissions by up to 85 per cent depending on the type of non-capture plant displaced	The entire supply chain for CCS technologies from R&D to demonstration and deployment. This includes manufacturing, as well as engineering and financial/business consulting services across the three main stages: • Carbon capture at plant • Transportation to a storage • Storage in a geological formation
Generation technologies that provide higher conversion efficiency	Defined as higher efficiency conversion processes, where the amount of fuel consume and the associated emission of CO_2 are reduced and the conversion processes are made more efficient (eg emission reductions of 10-30 per cent are possible depending on the performance of the old and replacement plant. Even higher levels can be attained by adding co-firing with biomass (typically a 5-10 per cent mix)	The entire supply chain for renewable technologies from R&D to demonstration and deployment. This includes manufacturing, as well as engineering and financial/business consulting services. Main technologies are: • Supercritical boilers • Integrated Gasification Combined Cycle (coal) • Combined Cycle Gas Turbine (gas)
Substitution to low carbon transport fuels	Defined as fuels used for transport based on the fermentation and distillation of replenishable organic matter, such as agricultural crops (eg sugar cane or beet, rapeseed) or woody material. Commonly known as biofuels, the main commercial varieties are bioethanol and biodiesel, where the former can be used as the main fuel and the latter is typically mixed with standard diesel in different proportions. Currently, there are second and third generation biofuels	Production of crops and other organic matter to be converted into fuel. The design of technology and equipment for producing biofuels. The production of different types of low-carbon fuels including bioethanol and biodiesel
Asset Management	Defined as planning, procurement and maintenance of energy generation facilities	Business planning, condition assessment, data gathering, technical maintenance

Source: BERR, British Biogen, Energy Asset Management plc

A.4 Renewable energy is defined broadly in all sources consulted and a generic definition is as follows:

Table A-3: Renewable energy

Sub-sector	Description	Examples of types of activity
Renewable energy	Defined as energy technologies that use natural resources such as sunlight, wind, flowing water, tides and waves, biomass and geothermal heat. The availability of these resources is either unaffected by energy capacity installed (eg solar and wind energy) or can be replenished in the short-term (eg hydro and biomass)	The entire supply chain for renewable technologies from R&D to demonstration and deployment. This includes manufacturing, as well as engineering and financial/business consulting services. Main technologies are: • Wind (onshore and offshore) • Solar (thermal and electric) • Hydro (smaller scale) • Biomass (heat and power) • Geothermal • Marine (wave and tidal)

Source: various sources

A.5 Carbon Finance is also a term which is not standardised across the literature and a definition reflecting the content attributed to it by several sources is as follows.

Table A-4: Carbon finance

Sub-sector	Description	Examples of types of activity
Carbon finance	Defines as the investments in greenhouse gas emission reduction projects, the creation (origination) of tradable commodities on the 'carbon market', and the provision of financial and business services associated with all of the above	Trade in carbon commodities and derivatives on different markets and exchanges, such as CERs, EAUs, VERs and others CDM and JI project assessment, registration, finance and development

Source: various sources

Annex B: Bibliography

Environmental Heavy Cost Investment Planning (EHCIP) Project (2004-present). Various information and data

EU (2006) *Turkey Accession Progress Report*

Ministry of Environment and Forestry of Turkey (2006) *EU Integrated Environmental Approximation Strategy 2007-2013*

Foreign Affairs and International Trade Canada (November 2007) *Environmental Goods and Services Market Sector Profile – Turkey*

National Environmental Action Plan (NEAP) of Turkey (1999)

One Carbon (2008) www.onecarbon.com

Regional Environmental Centre for Central and Eastern Europe (2002) *Turkey's Environment, A Review and Evaluation of Turkey's Environment and its Stakeholders*

SEEurope.net (2006) *Turkey Investment Guide* (http://www.seeurope.net/files2/pdf/ig2006/Turkey.pdf)

Turkey Investor Relations Office (2006) T*urkish Economy, Recent Developments and Prospects* (http://www.hazine.gov.tr/iro_files/Reports-Presentations/20060531sunumeng.pdf)

Turkey State Planning Organisation (1999) *National Environmental Action Plan*

Turkey State Planning Organisation (2007-13) *Ninth Development Plan*

Turkey State Planning Organisation (2007) *Turkey Energy Strategy*

Turkish Ministry of Environment and Forestry (2007) *Environment Operational Programme 2007-2009*

Turkish Ministry of Environment and Forestry (2007) *First National Communication of Turkey on Climate Change to UNFCCC*, The Ministry of Environment and Fishery, General Directorate of Environmental Management

Turkish Statistical Institute (TurkStat) (2005) *Press Release, Environmental Employment and Expenditure of Public Sector*

Turkish Statistical Institute (TurkStat) (2006) *Turkey's Statistical Year Book*

US Commercial Service (July 2006) Turkey: *Environmental Technologies Market*

World Bank (2006) *Data and Statistics for Turkey*

World Bank Turkey Office (2006) – *country programmes and updates*

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