

Opportunities and Risks for CO2 Intense Sectors in Turkey

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Introduction

In the year 2011, invitation was sent to 100 companies constituting Istanbul Stock Exchange's ISE-100 index. A total of 17 ISE 100 companies responded.

In 2012, CDP Turkey aims to enlarge its scope to cover both listed and non-listed firms in carbon intense industries through voluntary disclosure in collaboration with sector organizations.

The Carbon Disclosure Project (CDP) is an independent not-for-profit organization holding the largest database of primary corporate climate change information in the world.

Over 3,000 organizations in some 60 countries now disclose their greenhouse gas emissions, water management and climate change strategies through CDP, in order that they can set reduction targets and make performance improvements. This data is gathered on behalf of institutional investors, purchasing organizations and government bodies, then, made available to CDP signatories for integration into business and policy decision-making. Since its formation in 2000, CDP has become the gold standard for carbon disclosure methodology and process, providing essential climate change data to the global market place.

Since the beginning of the year 2010, Turkey is included in Carbon Disclosure Project with the support of Akbank and Ernst & Young-Turkey. The project is managed and controlled by Sabanci University Corporate Governance Forum, which has become a centre of expertise on corporate disclosure over the years.

50 companies, which constitute the Istanbul Stock Exchange's ISE-50 index, have been invited by CDP Turkey in the year of 2010 to disclose climate change related information, 10 of those companies responded to CDP's invitation and presented their carbon emission levels and risk management strategies to international investors through the CDP platform. Additionally one company joined the CDP voluntarily.

In the year 2011, the invitation is extended to 100 companies constituting Istanbul Stock Exchange's ISE-100 index. A total of 17 ISE 100 companies responded to CDP, including two ISE 100 firms whose international parent companies answered the questionnaire on their behalf. In addition, there are three voluntary responses outside the ISE 100 sample, which increased the number of direct CDP responses from Turkish companies to 20.

In 2012, CDP Turkey aims to enlarge its scope to cover both listed and non-listed firms in carbon intense industries through voluntary disclosure in collaboration with sector organizations. This report discusses the conditions in CO₂ intense sectors of Turkey, in terms of market conditions, current & potential regulatory risks and opportunities.

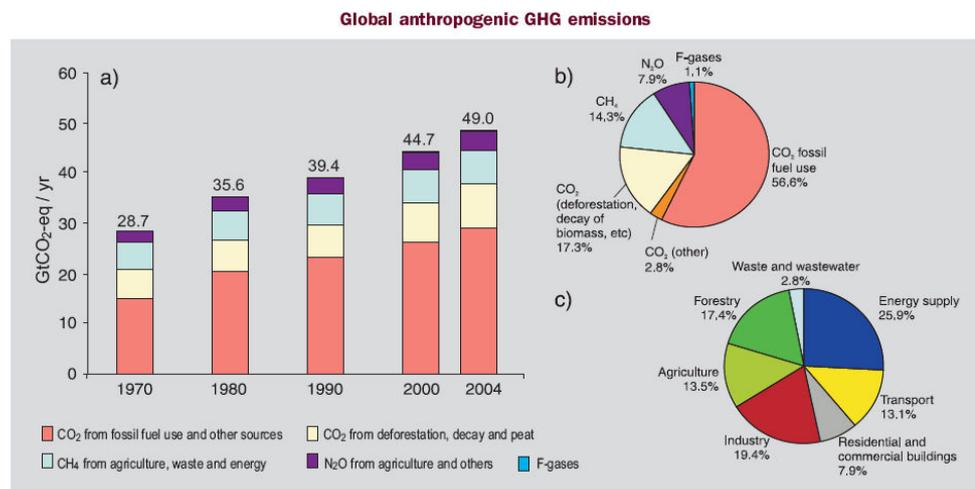
The first sections of the report elaborate on comparative GHG emission trends in Turkey. The second section lays down leading firms in the largest industries and the most CO₂ intensive sectors in Turkey. The third section draws attention to the market dynamics in carbon intense industries. And the last section, points out risks and potential opportunities for those industries, including EC legislation and initiatives to transform consumption and production patterns.

Greenhouse Gas Emission Trends by Sector

Global Trends

According to 2007 Climate Change Report of Intergovernmental Panel for Climate Change (IPCC), energy supply, industry and transport sectors have the major share in global anthropogenic Greenhouse Gas (GHG) emissions, where Carbon Dioxide (CO₂) emissions from fossil fuel use have the largest impact. Below Figure 1 a) indicates that CO₂ emissions have the lion-share (77%) and the fastest growth (80%) during the period between 1970 and 2004, among other GHG emissions. Figure 1 b), on the other hand, lays down the share of different anthropogenic GHGs by 2004 in terms of CO₂ equivalent. In this respect, one can clearly see that CO₂ emissions from fossil fuel use are the main emission factor, with a share of 56.6%, causing climate change. The third graphic, Figure 1 c), shows the sectoral distribution of GHG emissions (CO₂eq.); where the category of energy supply corresponds to the emissions from activities including power and heat generation, the category of industry includes emissions from manufacturing industry, such as iron and steel, chemicals, petroleum refining; lastly, the transport category implies GHG emissions from activities such as aviation, road transport, maritime transport and railway usage¹. In this context, power and heat generation activities accounts to 25,9 % of global GHG emissions, which is followed by manufacturing activities (19,4 %) and Transportation sector (13,1 %).

Figure 1: Global anthropogenic GHG emissions



Source: [Intergovernmental Panel on Climate Change \(IPCC\) Climate Change 2007 Synthesis Report](#)

¹ See [IPCC Fourth Assessment Report: Climate Change 2007, Working Group III, Mitigation of Climate Change](#)

Emission trends in Turkey are similar to the global trends, where energy generation/supply, manufacturing and transport are the major sources of CO₂ emissions.

Trends in Turkey

The statistics of the Turkish Statistical Institute (TSI) indicate that emission trends in Turkey are similar to the global trends, where energy generation/supply, manufacturing and transport are the major sources of CO₂ emissions. However, economies of scale (i.e. production figures and capacities) and market dynamics, which will be elaborated in further sections, are also important factors in terms of CO₂ intensity.

Distribution of direct GHG emissions (%) by sector

Figure 2/A and B present the amount of CO₂ emissions (gross tonnes) by sectors from the year of 2000 until 2009. Energy Consumption includes total CO₂ emissions from stationary and mobile energy activities (fuel combustion as well as fugitive fuel emissions), including power and heat generation, petroleum refining, manufacturing industries, transportation and others. Industrial Processes category, on the other hand, corresponds to by-product or fugitive emissions of greenhouse gases from industrial process employed in the production of minerals, metals and chemicals. The figures indicate that the sectors contributing the most to CO₂ emissions in Turkey are as follows:²

Figure 2/A: Major CO₂ Emitting Sectors (According to National GHG Emission Inventory of 2009)

Sector	CO ₂ Emissions (*1000 Tonnes)	Industrial Process Emissions (*1000 Tonnes)
Power and Heat Generation	96,286.35	N/A
Road Transport	39,535.80	N/A
Cement	Mentioned in "others" category	25,494.43
Iron and Steel	12,663.30	N/A

In addition to the industries mentioned above, aviation is also worth to consider in terms of growth rate of its emissions. Although, the amount of total CO₂ emissions is relatively low, compared to other sectors, emissions from the aviation industry are nearly doubled during the period between 2000 and 2009.

When we look at the changes of emission trends in years, Figure 2/B also shows us the effect of economic turmoil in 2001 and 2008 on CO₂ emissions. Especially, the industries including aviation, chemicals, iron and steel and cement are severely affected from the crisis.

Apart from contribution to emissions, industry concentration and the size of emitting companies are also considered in the final analysis to define the main CO₂ intense sectors. For example; although road transport is the second source of CO₂ emissions, the size of companies in this sector is relatively small. Notably there is no road transport firm in the first 200 of 500 list of Capital Turkey and Fortune Turkey magazines and the source of transport related emissions include individually owned vehicle and company fleets.

Figure 2/B: GHG Emission Inventory of Turkey 2000 – 2009 (*1000 tonnes)

GHG Emission Sources	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Energy Consumption	207.054,44	190.878,73	198.951,36	212.964,27	222.283,61	236.355,33	253.150,17	282.833,96	270.862,11	271.109,03
1. Energy Industries	76.779,72	79.722,48	74.055,79	74.195,58	76.184,85	88.556,87	90.602,20	106.602,75	105.940,85	102.516,14
a. Power and Heat Production	72.089,38	74.515,39	68.814,72	68.973,26	70.499,47	83.679,69	85.311,75	100.661,51	101.473,20	96.286,35
b. Petroleum Refining	4.690,34	5.207,09	5.241,07	5.222,32	5.685,38	4.877,17	5.290,45	5.941,24	4.467,65	6.229,79
2. Manufacturing Industries	59.874,86	46.893,54	58.082,79	67.360,25	68.302,43	67.406,33	77.232,58	80.374,14	55.973,17	55.097,39
a. Iron and Steel	10.087,73	9.384,12	8.906,24	9.587,73	9.520,93	9.629,28	9.385,62	10.337,56	12.769,35	12.663,30
b. Non-Ferrous Metals	1.953,72	1.960,61	2.142,74	1.955,54	2.274,57	2.369,23	2.728,15	9.957,46	265,2	1.144,63
c. Chemicals	3.152,32	3.288,62	3.256,88	3.129,48	3.140,11	4.352,26	4.433,33	2.410,85	492,45	1.382,08
d. Others	44.681,09	32.260,20	43.776,93	52.687,50	53.366,82	51.055,56	60.685,49	57.668,27	42.446,16	39.907,39
3. Transportation	34.968,90	35.026,30	36.044,33	37.765,48	40.457,82	40.525,92	43.738,06	51.010,66	47.048,07	46.707,15
a. Aviation	3.058,29	3.322,73	3.745,02	4.128,06	4.798,68	4.054,36	4.534,42	6.063,69	5.180,76	5.104,18
b. Road	30.822,24	30.541,22	31.113,55	32.368,94	34.077,86	34.517,38	37.081,73	42.934,09	39.882,43	39.535,80
c. Rail	477,72	377,44	379,52	394,58	374,27	676,75	682,23	424,12	450,3	437,19
d. Maritime	610,65	784,9	806,23	873,9	1.207,01	1.277,43	1.439,67	1.588,76	1.534,59	1.629,98
4. Other Sectors	35.430,96	29.236,41	30.768,46	33.642,96	37.338,52	39.866,22	41.577,33	44.846,42	61.900,02	66.788,34
a. Housing	26.891,55	21.065,09	22.471,30	25.218,56	28.284,91	30.639,47	31.667,43	34.051,06	48.223,92	53.380,06
b. Agriculture/Forestry/Fisheries	8.539,41	8.171,33	8.297,17	8.424,40	9.053,60	9.226,75	9.909,91	10.795,35	13.676,10	13.408,29
Industrial Processes	18.377,83	18.111,75	19.090,30	19.676,86	21.150,82	23.250,15	23.566,26	25.081,67	26.261,83	27.997,04
1. Mineral Products	18.114,49	17.831,22	18.363,96	18.961,56	20.332,97	22.549,22	23.279,83	25.081,67	26.261,83	27.997,04
a. Cement Production	15.059,97	14.953,84	15.345,19	15.823,96	17.051,64	18.925,90	19.870,45	21.632,64	23.269,35	25.494,43
b. Lime Production, Limestone and Dolomite Use	2.826,66	2.678,20	2.794,07	2.895,49	3.025,77	3.290,75	3.409,38	3.449,03	2.992,48	2.502,60
c. Sodium Carbonate Production and Use	227,86	199,17	224,69	242,11	255,57	332,57	(*)	(*)	(*)	(*)
2. Chemicals Industry	152,64	169,42	613,84	601,65	702,64	592,93	178,42	(*)	(*)	(*)
a. Ammoniac Production	104,01	130,62	585,04	563,14	641,25	592,93	178,42	(*)	(*)	(*)
b. Carbide Production	48,63	38,8	28,81	38,5	61,38	(*)	(*)	(*)	(*)	(*)
3. Metal Production	110,7	111,11	112,5	113,65	115,2	108	108,01	(*)	(*)	(*)
a. Aluminum Production	110,7	111,11	112,5	113,65	115,2	108	108,01	(*)	(*)	(*)
Total	225.432,27	208.990,49	218.041,67	232.641,13	243.434,42	259.605,48	276.716,43	307.915,64	297.123,94	299.106,06

Source: [Turkish Statistical Institute](#)

Leading Firms in High Emission Sectors

The following list contains leading firms in CO₂ intense sectors and large scale industries based on the first 200 firms of Fortune 500-Turkey (2010) and Capital 500 (2011) - Turkey indexes published by Fortune Turkey and Capital Turkey magazines. Both indexes list the firms in Turkey in accordance with net sales figures. The financial sector is excluded from our list due to their low contribution to emissions.

Figure 3: Major listed and non listed companies in large scale industries and CO₂ intense sectors

Sector	Company Name	Listed	Net Sales
Automotive	FORD OTOMOTİV SANAYİ A.Ş.	Yes	7.649.411.637
	OYAK RENAULT	No	6.449.317.844
	TOFAŞ TÜRK OTOMOBİL FABRİKASI A.Ş.	Yes	6.410.219.000
	MERCEDES BENZ TURK	No	3.484.149.811
	TOYOTA OTOMOTİV	No	2.351.102.279
	OTOKOÇ OTOMOTİV TİC. VE SAN. A.Ş.	No	2.186.367.468
	BMC SAN. VE TİC. A.Ş.	No	645.026.587
	KARSAN OTOMOTİV SANAYİİ VE TİC. A.Ş.	Yes	553.947.257
	KOLUMAN MOTORLU ARAÇLAR TİC. VE SAN. A.Ş.	No	804.278.920
	Iron& Steel	EREĞLİ DEMİR VE ÇELİK FABRİKALARI T.A.Ş.	Yes
İÇDAŞ ÇELİK ENERJİ TERSANE VE ULAŞIM SAN. A.Ş.		No	3.523.477.228
BORÇELİK ÇELİK SANAYİ VE TİCARET A.Ş.		No	1.620.095.727
KROMAN ÇELİK SANAYİİ A.Ş.		No	1.589.424.210
TOSYALI DEMİR ÇELİK SANAYİ A.Ş.		No	1.465.616.532
KİBAR DIŞ TİCARET A.Ş.		No	1.338.843.693
DİLER DEMİR ÇELİK ENDÜSTRİSİ VE TİC. A.Ş.		No	1.217.159.606
KAPTAN DEMİR ÇELİK ENDÜSTRİ VE TİC. A.Ş.		No	1.190.615.948
YAZICI DEMİR ÇELİK SANAYİ VE TURİZM TİC. A.Ş.		No	1.010.061.100
KARDEMİR KARABÜK DEMİR ÇELİK SAN. VE TİC. A.Ş.		Yes	1.008.861.255
BORUSAN MANNESMANN BORU SAN. VE TİC. A.Ş.		Yes	981.080.746
İZMİR DEMİR ÇELİK SANAYİ A.Ş.		Yes	919.944.663
YÜCEL BORU VE PROFİL ENDÜSTRİSİ A.Ş.		No	861.538.097
NOKSEL ÇELİK BORU SAN. A.Ş.		No	623.401.875
EKİNCİLER DEMİR VE ÇELİK SANAYİ A.Ş.		No	596.878.971
NURSAN ÇELİK SAN. VE HADDECİLİK A.Ş.		No	578.530.733
NURSAN DEMİR PAZARLAMA A.Ş.		No	534.794.718
ÖZKAN DEMİR ÇELİK SANAYİ A.Ş.		No	442.760.894
Cement	AKÇANSA ÇİMENTO SAN. VE TİC. A.Ş.	Yes	817.352.286
	NUH ÇİMENTO SANAYİİ A.Ş.	Yes	773.963.850
	ÇİMSA ÇİMENTO SAN. VE TİC. A.Ş.	Yes	708.480.015
	ÇİMENTAŞ İZMİR ÇİMENTO FABRİKASI T.A.Ş.	Yes	478.489.000
	BURSA ÇİMENTO FABRİKASI A.Ş.	Yes	413.961.137
	LİMAK ÇİMENTO SANAYİİ VE TİC. A.Ş.	No	401.809.628
Power Gen.	ÇİMKO ÇİMENTO VE BETON SAN. VE TİC. A.Ş.	No	400.942.635
	EÜAŞ ELEKTRİK ÜRETİM A.Ş.	No	12.412.470.314
	AKSA ENERJİ ÜRETİM A.Ş.	Yes	911.279.485
	ENERJİSA ENERJİ ÜRETİM A.Ş.	No	724.284.387
	ZORLU ENERJİ ELEKTRİK ÜRETİM A.Ş.	Yes	433.996.000
AKENERJİ ELEKTRİK ÜRETİM A.Ş.	Yes	428.354.752	

CARBON DISCLOSURE PROJECT

Refining	TÜRKİYE PETROL RAFİNERİLERİ A.Ş.	Yes	26.218.720.000
Aviation	TÜRK HAVA YOLLARI A.O.	Yes	8.422.771.140
	PEGASUS HAVA TAŞIMACILIĞI A.Ş.	No	1.102.910.642
	ONUR AIR TAŞIMACILIK A.Ş.	No	669.613.017
	ATLASJET HAVACILIK A.Ş.	No	516.700.716
Chemicals	PETKİM PETROKİMYA HOLDİNG A.Ş.	Yes	2.909.391.891
	GÜBRE FABRİKALARI T.A.Ş.	No	1.385.502.669
	AKSA AKRİLİK KİMYA SANAYİ A.Ş.	Yes	1.304.312.000
	TOROS TARIM SAN. VE TİC. A.Ş.	No	1.018.407.276
	HAYAT KİMYA SANAYİ A.Ş.	No	812.473.113
	TÜRK HENKEL KİMYA SAN. VE TİC. A.Ş.	No	675.123.584
	SODA SANAYİİ A.Ş.	Yes	660.193.700
	SASA POLYESTER SANAYİ A.Ş.	Yes	641.108.000
	BETEK BOYA VE KİMYA SANAYİ A.Ş.	No	538.401.116
	ARÇELİK A.Ş.	Yes	6.936.420.000
Household appliances and Electronics	VESTEL ELEKTRONİK SAN. VE TİC. A.Ş. ^a	Yes	5.289.967.000
	BSH EV ALETLERİ SAN. VE TİC. A.Ş.	Yes	2.384.507.157
	İNDESİT COMPANY BEYAZ EŞYA SAN. VE TİC. A.Ş.	No	695.731.773
	İHLAS EV ALETLERİ	Yes	-

The figure above indicates that petroleum refining, power generation and aviation industries include the three largest CO₂ emitting companies in Turkey, two of which are government controlled enterprises (Elektrik Üretim A.Ş. and Türk Hava Yolları A.O.). When we look at the private sector companies on the other hand; we see that automotive, **iron & steel and household appliances** sectors include the largest industrial firms. Cement and chemicals, on the other hand, are relatively small but highly emitting sectors.

Therefore, considering the GHG emission trends and industry composition it can be concluded that power generation, petroleum refining, cement, iron and steel, chemicals, aviation, automotive, household appliances and electronics are the key sectors in Turkey to reduce CO₂ emissions. The following section elaborates on the market conditions of those sectors.

Market Conditions

Chemicals

Due to hidden production and lack of inspections on compliance with environmental protection standards, there is an unfair competition problem in the sector, which creates a disadvantage for those firms investing in environment-friendly production technologies. Another issue faced by the firms in this sector is bureaucratic barriers to investing in new production sites. Due to the fact that chemicals industry is a heavy polluting industry, competent authorities are reluctant to grant permits to new production plants².

On the other hand, it is also pointed out by the representatives of the industry that harmonization with the legislation of European Community (EC), i.e. Regulation for **Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)**, will create a self-control mechanism within the industry, which might help to overcome the problem of hidden production and inspection. Also explained above, REACH is a regulatory framework making the producers responsible for the character and quantity of chemicals produced or used during the production process.³ According to the information obtained from the Ministry of European Union (EU) Affairs, Turkey is planning to harmonize its legislation with REACH within the next couple of years. However, an additional period of transition for the sector might be necessary. Not surprisingly, complying with such a complex framework will require new investments. In this case, one can conclude that those firms investing in green production technologies will obtain a competitive advantage.

Chemicals are one of the most energy intense sectors in manufacturing industry². Rising energy prices is a concern for the sector. In this respect, firms investing in energy efficiency technologies, such as advanced optimization systems and reduction of gas flaring will not only create a cost advantage but also reduce GHG emissions.

Chemicals industry is also in the supply chain of paper and pulp sector, which is covered by Emissions Trading System (ETS) of the European Union (EU)⁴. In this respect, lowering the CO₂ content of products is also important for the sector in order to secure competitive advantage in the EU.

Iron and Steel

As the production of Iron and Steel has gradually been decreasing in the EU market, the export rate of Turkish producers to European countries has been rising. However, as a high emitting and energy intense industry, making the necessary investments to reduce emission rates is vitally important for the firms in Turkey, in terms of complying with the EC Legislation in the long run⁵.

Iron and steel is one of the 5 key sectors which are highlighted in the national export strategy. As the World's 7th biggest exporter and 2nd biggest producer of Europe, Turkish

² [TUSIAD, Turkish Industry: A Sectoral Overview, 2007](#)

³ Ibidem

⁴ See PAGEV, [Chemicals Industry Sector Platform, Action Plan and Strategy Paper for Chemicals Industry Sector \(2011-2015\)](#)

⁵ Also verified by the head of Iron and Steel Producers Association, see [TUSIAD, Turkish Industry: A Sectoral Overview, 2007](#)

iron and steel industry aims to increase its export volume to 55 billion USD by the year of 2023. Turkish Iron and Steel Industry Competitiveness Report indicates that in order to develop its export potential, Turkish iron and steel industry needs to improve product differentiation, reduce energy costs and increase R&D investments for high value added products. The same report also indicates that local supplier quality, domestic competition intensity, enhancement of technology at company level, business management and training of labour force are the main factors behind the domestic market volume. Whereas the foreign market volume is mainly affected by barriers to foreign trade and custom procedures⁶. It is also important to note that steel is one of the inputs for the automotive industry and a key component to reduce CO₂ emissions.

Automotive

Production of motor vehicles is not only the largest sector in manufacturing industry, but also has the highest share of exports (15% in 2009). Four of the country's top 10 overall exporters are automotive firms, reflecting the importance of the industry to the economy. Turkey is one of the production bases for major European car manufacturing companies such as Renault, Fiat, Opel and Mercedes. Thus, not surprisingly, EU countries are the main destination of export for the sector⁷.

Due to its high trade volume with the EU countries the sector mostly complies with the EC legislation⁸.

Although the year of 2010 has been a recovery year for the sector, following the global crisis in 2008; Turkish automotive industry has still not yet reached the production and export figures of the period before the crisis. The amount of units exported in 2010 is still 23% below the pre-crisis period figures⁹.

Research and development (R&D) is the main driver of the industry for competitive advantage. The sector needs more R&D investment to reach to keep its market share¹⁰. In this context, one cannot disregard the importance of reducing CO₂ emissions.

Aviation

Turkish civil aviation sector is a developing industry at a fast pace since its opening up in 1983. Privatization, which went hand in hand with globalization and economic growth in Turkey, has opened the way for a significant growth in Turkish aviation sector. Notably, the compound annual growth rate (CAGR) of this sector, between 2003 and 2010, was 10.94% for flight traffic and 14.16% for passenger traffic¹¹.

Turkish Airlines is the largest airline company in Turkey, which has the biggest international network. Although it is a listed company by the Istanbul Stock Exchange it is state-owned. However, it is expected to be privatized soon, in accordance with the national privatization program¹².

⁶ Prof. Dr. Ülengin, Füsün, Assoc. Prof. Dr. Önsel, Şule, Ass. Prof. Dr. Çekyay, Bora, Özaydın, Özay, Dr. Aktaş, Emre, Ass. Prof. Kabak, Özgür; "Demir Çelik Sektörü Rekabet Gücü Raporu", TÜSİAD – Sabancı Üniversitesi Rekabet Forumu – Sektörel Dernekler Federasyonu, İstanbul, November 2011

⁷ Op. Cit. TUSIAD, 2007

⁸ Ibidem

⁹ Ibidem

¹⁰ Ibidem

¹¹ <http://www.marketresearch.com/Synergyst-v3387/Aviation-Sector-Turkey-Trends-Opportunities-2822026/>, date of entry 09.12.2011

¹² [Republic of Turkey Prime Ministry Investment Promotion Agency, Transportation Sector Report, January 2010](#)

Currently there is no active legislation in Turkey, regarding the mitigation of CO₂ emissions¹³. However, the Emissions Trading Scheme, applied in the EU, covers the aviation sector, as of this year. Considering the fact that EU countries constitute a significant part of the international network of Turkish aviation sector, the legislation will directly affect the sector.

Directorate General of Civil Aviation (DGCA) has efforts to reduce CO₂ emissions, with voluntary participation of the sector. In this context, DGCA is conducting a project in cooperation with Directorate General of State Airports Authority to reduce taxi during take off. In addition, DGCA has also efforts for bio-fuel usage and fleet renewal¹⁴.

Household appliances and electronics

As the provider of 4 % of global household appliance exports, Turkey is the 5th biggest exporter of household appliances and electronics in the World, after China, Germany, Italy and Mexico. During the year of 2008, the worth of household appliance production in Turkey was 8 billion USD; 70 % of which was exported. According to the predictions of Economic Intelligence Unit, the sector will continue to grow in mid-term coming future (until 2013). The main destination of exports in this sector is the EU countries, including UK, France, Italy and Germany¹⁵.

Turkish electronics industry, on the other hand, is mainly composed of consumer electronics (32 % production in Turkey during the year of 2010). In this context, television and computers have the major share in production. Different from household appliances, Turkey imports more than it exports in electronics industry. According to the statistics of Turkish Electronic Manufacturers Association, the value of production in electronic goods is 11.286.852.000 USD, 5.585.804.000 USD of which was exported, whereas the value of imports is 14.510.248.000 USD¹⁶.

Quality oriented approach in the sector creates a competitive advantage for Turkish producers in foreign markets. This is also proven by increasing amount of R&D spending. Notably, household appliances and electronics is the number one sector in terms of the number of patents.

The sector is mostly in compliance with the EC legislation. However, regulations and directives on environment are still not fully applicable in Turkey. Compliance with those standards will require a high spending on infrastructure¹⁷.

Cement

Turkey is the biggest cement exporting country in the World and among the main export destinations of industry there are Italy and Spain¹⁸. In this respect, complying with the EC legislation, including REACH and IPPC, is vital for the sector to keep its competitive advantage in the EU market.

Nevertheless there is a closed cooperation between TÇMB and the Ministry of Environment and Forestry to improve the sectors' compliance with the environmental standards. In this context, the Ministry and TÇMB have signed "Declaration of Environment for Cement Industry", which opened the way for restructuring efforts within the sector. As a part of

¹³ Confirmed by the Ministry of EU Affairs

¹⁴ Information obtained from Directorate General of Civil Aviation

¹⁵ [Republic of Turkey Prime Ministry Investment Promotion Agency, Turkish Home Appliances and Electronics Industry Report July 2010](#)

¹⁶ Turkish Electronic Manufacturers Association (TESID), Electronic Industry Almanac, 2011

¹⁷ Op.Cit. TUSIAD 2007

¹⁸ Ibidem

those efforts, The Council for Quality and Environment, a certification institution working for the industry, was founded in 2006. Carbon Disclosure Project might be a valuable asset for the industry to prove its efforts, which will not only create positive influence on potential investors, but also a good image on the eye of consumers¹⁹.

Similar to any other energy intensive industry, high energy costs create a competitive disadvantage for the sector, especially against firms from Brazil, China, Iran and Mexico where the energy costs are lower.

Petroleum Refining

Turkey is a net importer of oil and oil products. Notably, the amount of imported petrol is ten times higher than the amount of refined petrol. During the recent years there has been a shrink of capacity utilization, which is replaced by imports²⁰.

Refining industry in Turkey is not a competitive market. TUPRAŞ is the only refining company in the sector²¹. The company operates 4 refining plants located in Izmir, Izmit, Batman and Kırıkkale with a total capacity of 600 000 b/d. TUPRAŞ also has a dominant position in the supply of fuels and lubricants. The formerly government controlled company was acquired by a consortium led by Koç Holding A.Ş. in association with Shell Co at a cost of USD 4.4 billion²².

It is possible to expect the sector to become more competitive, with the entry of new firms in a few years. Notably, PETKİM, was recently granted refining license by the Energy Market Regulatory Authority (EPDK). The new refining plant, which will be operated in association with Socar-Turcas, is expected to become operational by the year of 2014²³.

Power Generation:

According to the latest sector report of EÜAŞ (Electricity Generation Co.), the shares of electricity generation sources in 2010 are as follows:

Natural gas: 45.9%

Domestic Coal: 18.4 %

Hydro-electric centrals: 24.5%

Import Coal: 6,9 %

Liquid fuels: 2,5 %

Wind: 1,35 %

Biogas and Geothermal: 0,47 %

Natural gas: 45.9%
Domestic Coal: 18.4 %
Hydro-electric centrals:
24.5%
Import Coal: 6,9 %
Liquid fuels: 2,5 %
Wind: 1,35 %
Biogas and Geothermal:
0,47 %

As it is seen from those figures, natural gas is the main raw material used as a generation source in Turkey. Turkey has the highest consumption increase in natural gas after China. In the global context, the significance of the role of natural gas in power generation is expected to continue until 2020. With the rising costs of fossil fuels and ecological

¹⁹See www.tcma.org.tr, date of entry 09.12.2011

²⁰Energy Market Regulatory Authority , Petroleum Market Sector Report 2010

²¹Competition Authority, Petroleum Sector Report 2008

²²Republic of Turkey Prime Ministry Investment Promotion Agency, Energy Industry Report, August 2010

²³www.petkim.com.tr, 09.12.2011

concerns, a global trend towards renewable sources is expected²⁴. Considering the fact that Turkey is a dependent country on natural gas supply (mainly to Iran and Russia), efficiency investments will lower the costs of energy.

Power generation market is not fully competitive. The privatization of the sector is yet not completed. EUAS (government controlled company) has the dominant position, with a share 45.4 %, in the market²⁵.

The sector development will continue with the privatization of state-owned generation assets and horizontal and vertical mergers of electricity, natural gas and water distribution, to allow synergy between regional utility companies.

Exposed Risks and Potential Opportunities

As a major trade partner and a candidate country to EU, Turkey is affected by EC regulations and directives.

Although Turkey is a party to United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol and the current international negotiations for a new climate regime, there is no legislation in force, foreseeing the mitigation of CO₂ emissions by the industry²⁶. However, as a major trade partner and a candidate country to the EU, Turkey is affected by EC regulations and directives. Figure 6 lays down an outline of relevant EC legislation and affected sectors.

Figure 4: Relevant EC Legislation and Affected Sectors

Name of the EC Legislation	Affected Sectors
Eco-Design Directive	Household appliances and Electronics
Eco-Label Regulation	Household appliances and Electronics
Council Directive 2003/96/EC on Taxation of energy products and electricity	All energy intense sectors
Proposal for a Council Directive on amending Directive 2003/96/EC restructuring the Community framework for the taxation of energy products and electricity	All energy intense sectors
Emissions Trading System	Energy generation, oil refining, metal and mineral products (including cement, iron and steel), aviation
REACH Regulation	Household appliances and electronics, oil refining, automotive,
Integrated Pollution Prevention and Control Directive	Energy generation, mining, production and processing of metals, chemicals
Regulation (EC) No 443/2009 of the European Parliament and of the Council of 23 April 2009 setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO ₂ emissions from	Automotive

²⁴ EÜAŞ, Elektrik Üretim Sektör Raporu, 2010

²⁵ Ibidem

²⁶ Information provided by the Ministry of EU Affairs

light-duty vehicles Regulation (EU) No 510/2011 of the European Parliament and of the Council of 11 May 2011 setting emission performance standards for new light commercial vehicles as part of the Union's integrated approach to reduce CO ₂ emissions from light-duty vehicles	Automotive
Directive (EC) No 2009/30 on Quality of Petrol Diesel fuels	Petroleum Refining
Directive (EC) No 2009/28 on Promotion of use of energy from renewable sources	Aviation, Petroleum Refining, Power Generation

EC Legislation

EC legislation is not only important for the Turkish private sector in the sense that it may become a barrier for exports, but also because of the fact that it gives an idea for the conditions in the long run. Some of the regulations and directives may not directly affect the industry for the time being. However, Turkey has to harmonize its national legislation with the EC Aquis in the long term as a candidate country. The following part provides an overview of the EC legislation affecting the CO₂ intense industries and respective measures in Turkey.

Eco-Design Directive²⁷

The legislation lays down rules aiming to improve environment performance of energy related products. According to the directive, energy related products to be placed on the Common Market must have the CE (Conformité Européenne) mark, which reflects the conformity of goods in question with the eco design standards. The eco-design standards are defined in accordance with environmental aspects of lifecycle phases of production (including, raw material selection, manufacturing, packaging transport and distribution, installation and maintenance, use and end of life), where the following aspects will apply: consumption of energy and other materials (such as fresh water); emissions to air, water or soil, expected generation of waste; possibilities of reuse, recycle or recover; pollution through physical affects.

With the aim of harmonizing the Turkish legislation to the directive in question, Ministry of Industry and Technology has adopted the "Regulation on the Ecological Design of Energy Related Products" at 7th of October 2010. Similar to the EC Directive, the regulation defines a general framework on the matter. The details concerning the scope of the regulation and standards are defined by implementing regulations²⁸. In addition to this, the Ministry adopted 10 implementing regulations covering: household appliances and electronic products including; washing machines, dishwashers and cooling devices for houses, televisions and lamps²⁹.

²⁷[Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related product](#)

²⁸[Istanbul Chamber of Industry. "Avrupa Birliği'ne Uyum Sürecinde Sektör Rehberleri: Elektrikli ve Elektronik Ürünler Sanayii", October 2010.](#)

²⁹<http://sgm.sanayi.gov.tr/NewsDetails.aspx?newsID=2090&lng=tr>, date of entry 09.12.2011

Eco- Label Regulation³⁰

The regulation establishes a voluntary regime, aiming to encourage the use of environmentally friendly products. It covers any goods or services which are supplied for distribution, consumption or use on the Community market, except medicinal products for human use. The Regulation foresees that products meeting the standards; which are based on environmental performance of goods in respect of product development, raw material selection, manufacturing, distribution, consumption and end of life; will be awarded with the eco-label reflecting the green performance of the product in question. The standards are developed by European Union Eco-labelling Board, which is composed of representatives from the competent authorities of each member state and the interested parties (including manufacturers, importers, consumer organizations, environmental protection groups etc.), considering:

- (a) *the most significant environmental impacts, in particular the impact on climate change, the impact on nature and biodiversity, energy and resource consumption, generation of waste, emissions to all environmental media, pollution through physical effects and use and release of hazardous substances;*
- (b) *the substitution of hazardous substances by safer substances, as such or via the use of alternative materials or designs, wherever it is technically feasible;*
- (c) *the potential to reduce environmental impacts due to durability and reusability of products;*
- (d) *the net environmental balance between the environmental benefits and burdens, including health and safety aspects, at the various life stages of the products;*
- (e) *where appropriate, social and ethical aspects, e.g. by making reference to related international conventions and agreements such as relevant ILO standards and codes of conduct;*
- (f) *criteria established for other environmental labels, particularly officially recognized, nationally or regionally, EN ISO 14024 type I environmental labels, where they exist for that product group so as to enhance synergies;*
- (g) *as far as possible, the principle of reducing animal testing³¹.*

The current eco-labelling standards apply to relevant product groups including cleaning products, appliances, paper products, textile and home and garden products, lubricants and services such as tourist accommodation. But further groups are continuously added.

Taxation of Energy Products and Electricity

Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity, sets minimum rates of taxation for motor fuel, motor fuel for industrial or commercial use, heating fuel and electricity. According to this directive the "levels of taxation" applied by the EU Member States may not be lower than those minimum rates. The directive also encourages energy efficiency and the use of renewable energy sources via providing with the possibility of tax exemptions or partial

³⁰ [Regulation \(EC\) No 1980/2000 of the European Parliament and of the Council of 17 July 2000 on a revised Community eco-label award scheme](#)

³¹ [Regulation \(EC\) No 66/2010 of the European Parliament and of the Council of 25 November 2009 on the EU Ecolabel](#)

reductions in cases of:

- Using taxable products for pilot projects to develop environmentally friendly products or in relation to fuels from renewable sources
- Cogeneration of heat and power
- Power generation from renewable sources³².

In March 2011, the European Commission proposed a new energy taxation directive, which will revise the legislation currently in force. In this context, the proposed directive introduces a new mechanism, which foresees the taxation of energy products based on energy content and CO₂ emissions. In this context, CO₂ related tax will only apply to industrial plants not covered by the ETS. The new measure is projected to enter into force as of January 2013³³.

Emissions Trading System (ETS)

The Directive 2003/87 established an emissions trading framework within the EU, which foresees the capping and trading of the CO₂ emissions. This means every year the operators receive a particular amount of allowances to emit GHGs. The allowances are tradable between the operators. In order to be eligible to obtain allowances the installations or aircraft operators are obliged to monitor, report and verify their emissions to competent authorities. Thus, every year, each installation has to surrender equal amount of allowances to its GHG emissions. In case of excessive GHG emissions operators receive heavy fines for each extra tonne of GHG emission. Until this year, the system covered energy generation, oil refining, metal and mineral products, and paper and pulp sectors. It applies to CO₂ emissions and Nitrous Oxide (N₂O) emissions from certain processes.

As of this year, aviation sector is also covered by the system³⁴. In this respect, the system covers flights which arrive at or depart from the airports of the EU Member States. At the end of each period, Airline companies will have to surrender equal number of allowances to CO₂ emitted during those flights. Emissions are calculated as: fuel consumption³⁵ * emission factor (in accordance with 2006 IPCC Inventory Guidelines). In the beginning of every calendar year the competent authorities will allocate allowances based on the annual average of CO₂ emitted during 2004-2006³⁶.

A crucial issue for the industrial sector is the share of allowances which is allocated free of charge. Tighter rules on emissions might drive factories to relocate abroad, leading to a threat of 'carbon leakage'. To prevent carbon leakage, the EU granted exemptions for industries deemed to be at risk. These industries will get 100% of their allowances free of charge. Other medium-risk sectors will get 80% of allowances free of charge, and the percentage will be decreased over time. As of 2012 airlines receive 85% of EU ETS allowances for free. Allowances above this limit are auctioned. Free allocations in aviation aims to facilitate adoption of environmentally friendly practices and technology by airline companies.

³² [Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity](#)

³³ [Proposal for a Council Directive on amending Directive 2003/96/EC restructuring the Community framework for the taxation of energy products and electricity](#)

³⁴ [Directive 2008/101/EC of the European Parliament and of the Council amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community \(19 November 2008\)](#)

³⁵ Fuel consumption is calculated as : The amount of fuel in the tank of the aircraft before departure – The amount of fuel in the tank of the air craft after arrival.

³⁶ [Directive 2008/101/EC of the European Parliament and of the Council amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community \(19 November 2008\)](#)

The Commission guidelines for monitoring and reporting of greenhouse gas emissions lay down a set of rules for monitoring, reporting and verifying the amount of CO₂ emitted during the process of activities covered by ETS. Those guidelines mainly define boundaries (i.e. all emission factors and emission flows within the context of production), monitoring methodology (measurement or calculation based methodology), the content of information to be reported to the competent authorities (i.e. identification of installation, emission totals, chosen methodology, activity data -energy use-, emission factor -in accordance with IPCC 2006 guidelines- and oxidation factor – to what extent the carbon content of used fuel is oxidized and emitted as CO₂) and verification rules³⁷.

Turkey is planning to harmonize its legislation with ETS and put it into force during the period between 2014 -2019. Within the context of preparation efforts to ETS, the Ministry of Environment has recently published a draft regulation on Monitoring, Reporting and Verification of GHG emissions. The proposed legislation transposes the relevant parts of ETS to domestic law. According to the draft regulation; heavy industry facilities including cement, chemicals, petroleum refining, power production, paper and pulp, ceramic, glass, iron and steel, aluminum and coke plants are obliged to report their GHG emissions to the Ministry of Environment and Urbanization as of 2015³⁸.

Promotion of the Use of Energy from Renewable Sources

EC Directive 2009/28 on the promotion of the use of energy from renewable sources established a common framework, aiming to increase the share of renewables within the gross final consumption of energy and energy used in all means of transport. In accordance with the Community goal of increasing the share of renewable sources in gross energy consumption to 20% by 2020, the Directive sets mandatory national targets and obliges Member States to adopt Renewable Energy Action Plans. To fulfill the targets in question, Member States will use support schemes and cooperation measures with other Member States and third countries³⁹.

Unlike its predecessor, Directive 2001/77/EC on the promotion of electricity from renewable sources, Directive 2009/28 sets a wider scheme, also covering the transport sector.

Although Turkey has not yet set a national target on the share of renewables on gross energy consumption and transport, it did make some commitments within the context of the National Climate Change Action Plan adopted by the Ministry of Environment and Urbanization in July 2011, including:

- Ensuring that at least 20% of the annual energy demand of new buildings is met via renewable energy resources as of 2017
- Ensuring technological development by 2023 for energy production from renewable energy resources⁴⁰

In addition, The Law on Energy Efficiency, adopted in 2007, lays down the measures for energy management; increasing and promoting energy efficiency in buildings, industrial plants and power generation plants⁴¹.

REACH Regulation

³⁷[2007/589/EC: Commission Decision of 18 July 2007 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council](#)

³⁸[Draft Regulation on Monitoring, Reporting and Verification of GhG Emissions](#)

³⁹[Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC](#)

⁴⁰[Ministry of Environment and Urbanization, National Climate Change Action Plan, July 2011](#)

⁴¹[Law No: 5627 on Energy Efficiency of 18.04.2007](#)

Regulation for **R**egistration, **E**valuation, **A**uthorization and **R**estriction of **C**hemicals foresees that all firms manufacturing or importing chemicals are responsible to manage the risks of those substances posing danger to human health and the environment. The chemicals over 1 tonne per year manufactured in the EU or imported from 3rd countries must be registered. The regulation also bans the use of certain hazardous chemicals⁴².

The scope of REACH covers three types of goods: Those are chemical substances, mixture of chemical substances and articles - which is defined as: “*object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition*” – such as household appliances, electronic goods, cars and some car parts.

According to the REACH Regulation (Regulation 1907/2006/EC), manufacturers or importers of articles are obliged to register any chemical substance contained in case both of the following conditions:

- The substance is present in those articles in quantities totaling over one tonne per producer or importer per year;
- The substance is intended to be released under normal or reasonably foreseeable conditions of use⁴³.

Turkey has not yet fully harmonized its national legislation with REACH. However, the Annex of REACH Regulation concerning the restriction or ban of import, use or manufacture of certain chemicals became applicable in Turkey via the *Regulation Restricting the Use, Production or Releasing on the Market of Certain Dangerous Chemicals and Goods*⁴⁴. In addition to this, *By Law on Inventory and Control of Chemicals* lays down the rules and principles concerning the establishment of an inventory and control of chemicals with the aim of minimizing their negative effects on human and the environment. While the regulation is fundamentally in line with the REACH, it has a simpler categorization and does not include processes on evaluation and restriction of substances concerned.

Integrated Pollution Prevention and Control Directive (IPPC)

IPPC obliges installations with high polluting potential, from a variety of industries including energy generation, mining, production and processing of metals, chemicals and agriculture to have a permit for operation. In order to be able to have a permit, firms must meet certain standards such as:

- Applying all necessary measures (best available techniques) to prevent pollution (recycling, producing least amount of waste, using less hazardous substances)
- Energy efficiency
- Return the production site to its original condition when the operation of the installation is over⁴⁵.

⁴²http://ec.europa.eu/enterprise/sectors/chemicals/documents/reach/index_en.htm#h2-1, date of entry 09.12.2011

⁴³[Regulation \(EC\) No 1907/2006 Of The European Parliament And Of The Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals \(REACH\) establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation \(EEC\) No 793/93 and Commission Regulation \(EC\) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC](#)

⁴⁴ Op. Cit. Istanbul Chamber Industry, October 2010

⁴⁵<http://ec.europa.eu/environment/air/pollutants/stationary/ippc/index.htm>, date of entry 09.12.2011

Turkey is planning to harmonize its legislation with IPPC in the next couple of years. Some components (such as waste incineration facilities) of the directive are already covered within secondary legislation.

CO₂ Emissions from Passenger Cars and Light Duty Vehicles

In accordance with the goal of reducing CO₂ emissions from road transportation Regulation (EU) No 510/2011 and Regulation (EC) no 443/2009 set emission performance standards for new passenger cars and light duty vehicles registered in the EU Member States. The Regulation (EC) 443/2009 aims to reduce the average CO₂ emissions from passenger cars to 130g CO₂ /km by the year of 2015. The legislation has entered into force as of the beginning of 2012 and will be gradually phased in. The Regulation also sets a long term goal of reduction to 95g CO₂ / km. The cap for average of CO₂ emissions from light duty vehicles on the other hand, dealt under the Regulation (EU) No 510/2011, is set to be 175g CO₂ /km, which will be phased in as of January 2014 and fully enter into force by the beginning of 2017. The Regulation (EU) No 510/2011 also sets a long term goal of reducing the average emissions to 145g CO₂/Km.

Quality of Petrol and Diesel Fuels

Environmental standards applied to fuels to be used by road vehicles, non-road mobile machinery (inland waterway vessels when not at sea) and tractors used in agriculture and forestry; are originally regulated under the Directive No 98/70/EC. Following its amendment by the Directive 2009/30/EC the new legislation obliges certain suppliers to monitor and report GHG emissions per unit of energy from fuel and energy supplied. Moreover, they are also required to report the GHG intensity of supplied fuels and reduce lifecycle GHG emissions at 10 % by 2020.

Discussions on Future Regulations on CO₂ Content of Imported Goods

The EU has been taking new legislative measures to decrease the CO₂ emissions sourced by the industry. Those measures do not have a direct affect on foreign competitors from less regulated countries. This situation does not only bring a competitive disadvantage on EU firms but also weakens the environment policy of the Union. Notably, the volume of CO₂ intense goods imported to EU has been increasing in recent years. There is a discussion in the Union to form a new legislation, establishing a border tax for imported goods depending on the amount of CO₂ emitted during the production process⁴⁶. In addition, European Commission is currently negotiating at the World Trade Organization on a positive measure to favour low CO₂ products to be imported in the EU⁴⁷.

Initiatives to Transform Consumption and Production Patterns

As it has been acknowledged in many platforms, our current habits, which are shaping the economy, tend to consider the environment as an externality and hence create catastrophic effects on the earth such as deforestation, changing climate patterns and etc. In order to ensure healthy growth and preservation of natural resources to go hand in hand, there must be a transformation in production and consumption patterns. In this respect, there are some initiatives to transform consumption and production patterns in a way that will create new market opportunities and ensure sustainable growth.

⁴⁶Gros, Daniel, Egenhofer, Christian, "*Climate Change and Trade Taxing Carbon at the Border?*", Centre for European Policy Studies, Brussels, 2010

⁴⁷<http://ec.europa.eu/trade/wider-agenda/environment/climate-change/>, date of entry 09.12.2011

Changing Consumption and Production Patterns

Discussions on climate change have been rising sharply; the number of conscious consumers on environment and international voluntary standards such as ISO 14000 (Environment Management Standard) are increasing equally fast. Therefore, developing eco-friendly products and production processes is not only a concept of corporate social responsibility but also a matter of marketing strategy⁴⁸. Studies indicate that consumption patterns have a major affect on environmental degradation. Producers have the ability to affect consumer choice, via;

- Innovation – business processes for the development of new and improved products, services and business are shifting to incorporate provisions for maximizing societal value and minimizing environmental cost,
- Choice influencing – the use of marketing and awareness-raising campaigns to enable and encourage consumers to choose and use products more efficiently and sustainably,
- Choice editing – the removal of “unsustainable” products and services from the marketplace in partnership with other actors in society⁴⁹.

On the other hand, self regulatory practices, such as the Responsible Care programme applied in the chemicals sector, appear as another instrument applied by the industry to improve efficiency, managerial practices and public image. However, critics point out that lack of standardized reporting indicators is a major obstacle to monitor the actual performance of companies⁵⁰.

Green Growth Strategy

In June 2009, 34 members of OECD, including, Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, the United States and the European Community, signed a declaration to “*Strengthen their efforts to pursue green growth strategies as part of their responses to the crisis and beyond, acknowledging that green and growth can go hand-in-hand.*” The signatories of the declaration also mandated OECD to develop a green growth strategy bringing together economic, environmental, social, technological, and development aspects into a comprehensive framework.

According to the definition of OECD “*Green growth means fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies. To do this, it must catalyze investment and innovation which will underpin sustained growth and give rise to new economic opportunities*”. Strategies aiming green growth mainly include framework policies enforcing economic growth, which also protects environment capital. Those include fiscal and regulatory measures such as tax and competition policy, aiming to maximize efficient allocation of resources. On the other hand, the strategy also foresees incentive measures encouraging efficient use of natural resources and making environmental pollution more expensive through tax measures, regulations, technology support and voluntary

⁴⁸See Alagöz, Başaran, Selda, Yeşil Pazarlama ve Eko Etiketleme, Akademik Bakış, issue 11, January 2007

⁴⁹World Business CouncilforSustainable Development, SustainableConsumptionFactsandTrends, December 2008

⁵⁰Niskanen, Toivo, “A Finnish Study of Self-Regulatory Discourses in the Chemical Industry’s Responsible Care Programme”, Business Ethics: A European Review, November 2011

approaches⁵¹.

In this context, it is important to note that Turkish Government plans to increase the support for investments in low carbon technologies including renewable energy projects, low CO₂ emitting engines and the usage of alternative fuels as part of its National Climate Change Action plan⁵² and Industrial Strategy⁵³.

Voluntary Carbon Markets

Voluntary carbon market is a system, which encourages the voluntary reduction of individuals', institutions', firms' and NGOs' CO₂ emissions. Similar to the flexibility mechanisms in Kyoto Protocol, in voluntary carbon markets, projects opening the way for GHG emission reduction are certified, registered and traded within the context of voluntary standards (such as Gold Standard). However, different from the mechanisms in Kyoto Protocol, the system works on a voluntary basis, independent from the obligatory national emission targets⁵⁴.

Although voluntary carbon market has a very limited share in the context of global carbon markets compared to obligatory emissions trading mechanisms such as the EU ETS, it is seen as a credible alternative instrument for financing CO₂ emissions, especially for the case of Turkey, which cannot be a part of flexibility mechanisms in Kyoto Protocol as a country which did not make any commitment on emission reduction⁵⁵.

Although, there are some deficiencies of institutional infrastructure, voluntary carbon market in Turkey made a significant progress so far. Currently there are 109 projects in Turkish voluntary carbon market with an annual reduction capacity of 8 million tonnes of CO₂. Currently the estimated volume of Turkish market is 83 Million USD. It is also worth to note that, unlike the USA (the biggest voluntary market in the World), the value of certificates in Turkey has increased during the crisis period, which proves that Turkish private sector has a growing interest in the market⁵⁶.

⁵¹[OECD, "Towards Green Growth", May 2011](#)

⁵² Op. Cit. Ministry of Environment and Urbanization, July 2011

⁵³[Ministry of Industry and Trade, "Turkish Industrial Strategy Document", December 2010](#)

⁵⁴[Ministry of Environment and Forestry, "Karbon Piyasalarında Ulusal Deneyim ve Geleceğe Bakış", January 2011](#)

⁵⁵ Ibidem

⁵⁶ Ibidem

Conclusion

In the year 2011, invitation was sent to 100 companies constituting Istanbul Stock Exchange's ISE-100 index. A total of 17 ISE 100 companies responded.

In 2012, CDP Turkey aims to enlarge its scope to cover both listed and non-listed firms in carbon intense industries through voluntary disclosure by privately held companies in collaboration with sector organizations.

Based on the findings laid down above, it can be concluded that the main regulatory risk in front of the CO₂ intense sectors in Turkey is the EC legislation. As a candidate country to the EU, Turkey will have to harmonize its legislation with EC directives and regulations in the long run. In addition, some parts of the EC Legislation directly affect Turkish companies, due to the fact that EU is the main trade partner of Turkey. On the other hand, changing consumption and production patterns, voluntary carbon market and subsidies for environment friendly R&D projects provide an opportunity for a green growth perspective.

Currently, the main piece of the EC legislation which directly affects Turkish industry includes the new amended version of ETS and REACH Regulation. As of January 2012, emissions made during flights to and from EU airports are capped. In this case, Turkish airliners also have to comply with the Directive. In addition to this, firms producing goods covered under REACH are also affected by the Regulation in terms of their exports to the EU. On the other hand, regulations and directives including especially IPPC and ETS (the rest of its scope covering sectors other than aviation) lay down future standards to reduce CO₂ emissions, to which the industry will eventually have to comply. Thus, it might be argued that, making the necessary investments right now will create competitive advantage in the long-run.

Moreover, the amount of CO₂ intense products imported to the EU is increasing. In this respect, new measures are being discussed in the EU to favour the import of low carbon products into the Community. This would not create any new opportunity for the Turkish industry, simply because of the fact Turkey is in the Customs Union. However, unless Turkish producers invest in CO₂ abatement technologies, they might face with the danger of losing their competitive advantage to environment friendly products from other developing countries.

In order to ensure sustainable development, i.e. continuing economic growth without polluting the environment, changing patterns of production and consumption in an environment-friendly way is a must. Being aware of this fact, countries are taking new policy measures such as tax incentives, support policies for R&D etc. Such measures are also planned by Turkey. Moreover, studies also indicate that, with the increasing consumer consciousness on environment, producers started to use green technologies as a new marketing strategy. In this respect, abandoning CO₂ intense production technologies is not only an opportunity for the future but also a must in terms of retaining competitive advantage. Lastly, voluntary carbon market in Turkey provides another important opportunity to acquire finance for CO₂ emission reduction. There is a growing interest of Turkish private sector towards the market.

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