



# The Iron and Steel Industry in Turkey

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December 2013



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# Glossary of Terms

<b>Acronym</b>	<b>Definition</b>	<b>Acronym</b>	<b>Definition</b>
<b>ASU</b>	Apparent Steel Use	<b>M&amp;A</b>	Mergers and Acquisitions
<b>BMI</b>	Business Monitor International	<b>MTA</b>	General Directorate of Mineral Research and Exploration
<b>BOF</b>	Basic Oxygen Furnace	<b>N/A</b>	Not Available
<b>CAGR</b>	Compound Annual Growth Rate	<b>OECD</b>	Organization for Economic Co-operation and Development
<b>CE</b>	Communauté Européenne	<b>RINA</b>	Registro Italiano Navale
<b>ÇEBİD</b>	Turkish Steel Pipe Manufacturers Association	<b>RoHS</b>	Restriction of Hazardous Substances Directive
<b>CIS</b>	The Commonwealth of Independent States	<b>TC</b>	Republic of Turkey
<b>DÇÜD</b>	Iron and Steel Producers Association	<b>S&amp;P</b>	Standard and Poor's
<b>DRI</b>	Direct Reduced Iron	<b>TOBB</b>	Union of Chambers and Commodity Exchanges of Turkey
<b>EAF</b>	Electric Arc Furnace	<b>TS</b>	Turkish Standards
<b>EU</b>	European Union	<b>TSE</b>	Turkish Standards Institute
<b>EU ETS</b>	European Union Emissions Trading System	<b>TSE EN</b>	Turkish Standards Institute Quality Certificate
<b>GDP</b>	Gross Domestic Product	<b>ISO/IEC</b>	True Steel Use
<b>GİTES</b>	Input Supply Strategy	<b>TSU</b>	Turkish Statistical Institute
<b>HBI</b>	Hot Briquetted Iron	<b>UK</b>	United Kingdom
<b>IEA</b>	International Energy Agency	<b>USA</b>	United States of America
<b>IISI</b>	World Steel Association	<b>USD</b>	United States Dollar
<b>İMMİB</b>	Istanbul Mineral & Metals Exporters' Associations	<b>VAT</b>	Value Added Tax
<b>ISI</b>	Internet Securities, Incorporated		
<b>ISO</b>	International Organization for Standardization		
<b>ISP</b>	Integrated Steel Plant		
<b>JCR</b>	Japan Credit Rating Agency		



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# Executive Summary

- The Turkish government's economic growth program had exceptional results as Turkey experienced a robust GDP growth in recent years and is expected to show continuous growth in the near future. According to OECD forecasts, real GDP growth is projected to be around 4% in 2014 and 2015, while EIU, also, expects an annual average growth rate in real GDP to be about 5% in the short term.
- The iron and steel industry grew in parallel to the growing economy. BMI expects further growth in the Turkish iron and steel industry in a climate where much of Europe will see slight increases or no growth at all in the industry.
- Turkey's success in the iron and steel industry is evident as it is among the top 10 crude steel producing countries in the world. Crude steel production is expected to continue and reach 47 million tonnes, which is an increase of approximately CAGR 5.5% by 2017.
- The cost of production is among the lowest in all of Europe.
- Turkey provides a level playing field in terms of access to raw materials. It has already established pertinent trade legislation for investors so they can easily access necessary raw materials and boost their competitiveness in international markets.
- Domestic and international investors are ramping up their investments for qualified steel and finished steel products to capitalize on Turkey's economically attractive iron and steel industry. Capacity expansion and new plant capacity will reach more than 7 million tonnes between the years 2013 and 2015.
- Strong growth is expected in steel-dependent industries such as auto manufacturing, infrastructure and construction, which will increase the demand for finished steel products.
- Turkey also has a highly skilled workforce within the industry that graduates from vocational training schools and universities, able to serve the needs of the iron and steel industry.
- Turkey is fostering innovation through technology centers, where it will promote research and development along the whole value chain of the steel industry.
- Turkey has transparent and liberalized foreign direct investment laws that help international companies to easily establish companies within Turkey. International companies such as Posco and ThyssenKrupp are reaping the benefits of Turkey's sustainable growth and both are either building or expanding their steel production in Turkey.



# I. General Overview of the Iron and Steel Industry



# A. An Overview of the Industry in the World and in Turkey

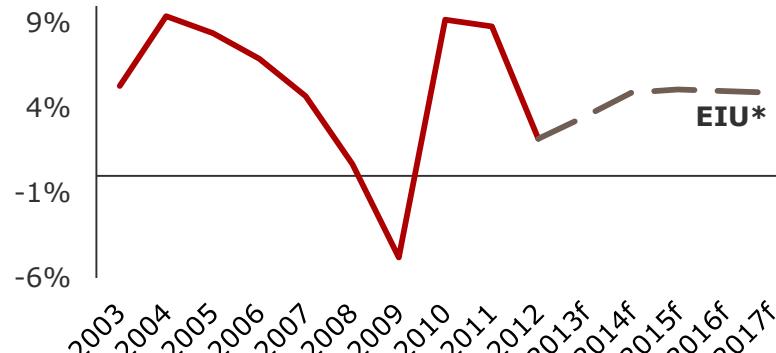
- i. Turkey's Macroeconomic Outlook
- ii. The Global Outlook for the Iron and Steel Industry
- iii. A Macroeconomic View of the Iron and Steel Industry in Turkey
- iv. Iron and Steel Intensive Industries in Turkey
- v. FDI in Turkey



# Turkey's fast-growing economy is expected to attract increasing amounts of FDI in the coming years

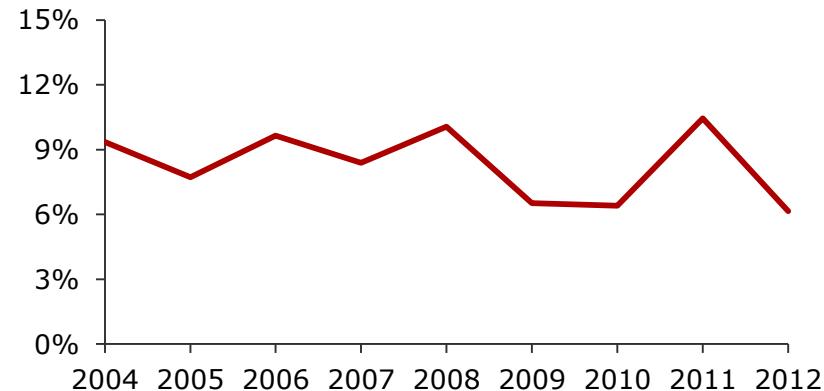
- Turkey has undergone profound economic transformation over the last decade and its economic fundamentals are quite solid. It is the 17<sup>th</sup> largest economy in the world and the 6<sup>th</sup> largest economy in Europe with a current GDP of approximately USD 786 billion in 2012.
- Having grown as fast as 9.3% and 8.8%, in real terms, in 2010 and 2011, OECD projects a real GDP growth of around 4% in 2014 and 2015, while EIU projects on average 5% growth until 2017.
- Monetary policy played a vital role in reining in inflation over the recent years. Turkish inflation has stayed under 10% since 2004 and year end inflation was realized as 6.2% in 2012. EIU forecasts that the average inflation will further ease to 4% by 2018.

**Figure 1: GDP Growth Rate (constant prices)**



Source: Turkstat, OECD, EIU  
f:forecasts

**Figure 2: Inflation, 2004-2012**

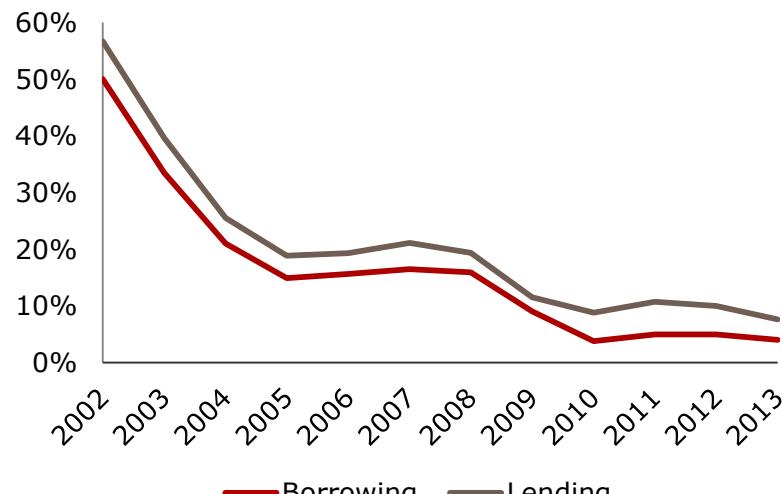


Source: Turkstat



# Capitalizing on its economic policies, the investment environment in Turkey has become increasingly more welcoming to foreign investors

**Figure 3: The Central Bank of the Republic of Turkey O/N Interest Rates**



Source: CBRT

- The overnight lending rates have been steadily decreasing over the years and was around 7.5% in September 2013, which is a 500 basis point decrease from 2002.
- Fitch Ratings announced Turkey's investment grade rating as BBB in November 2012 and Standard & Poor's announced it as BB+ in March 2013. These events signal further upgrades and are expected to boost the inflow of institutional funding.
- Moody's raised Turkish government bond ratings to Baa3 and revised its outlook to stable from positive in May 2013.

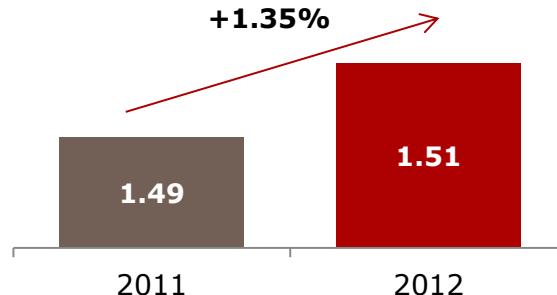
**Table 1: Turkey's Credit Ratings**

	Rating (Local Currency)	Outlook (Local Currency)	Rating (Foreign Currency)	Outlook (Foreign Currency)
<b>Standard &amp; Poor's</b>	BBB	Stable	BB+	Stable
<b>Fitch</b>	BBB	Stable	BBB-	Stable
<b>Moody's</b>	Baa3	Stable	Ba1	Positive
<b>JCR</b>	BBB-	Stable	BBB-	Stable



# Global crude steel production is expected to increase over the coming years

**Figure 4: Global Crude Steel Production (billion tonnes)**

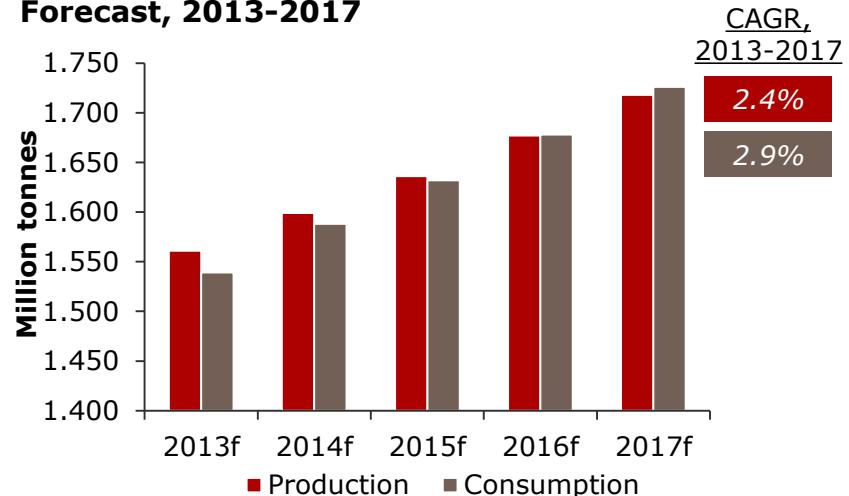


Source: World Steel Association

- 62 countries produced a total of 1.51 billion tonnes of crude steel in 2012. Asia was the leader in crude steel production with 982 million tonnes followed by the European Union and North America.
- China has the highest production and consumption amounts of crude steel. It produces more than 45% of the world's crude steel.
- Industry consultant, Laplace Conseil, indicates that 80% of the growth in the steel industry can be attributed to growth in the Chinese economy.
- Most of the growth in demand will come from developing countries. Worldsteel expects an increase of 3.3% in global demand, from 2013 to 2014.

- Europe's recovery from economic uncertainty and austerity measures will affect steel demand that were put into effect in 2012. According to Eurofer, steel demand's pace will slowly pick up and is expected to grow modestly in 2014 for Europe.
- The Turkish iron and steel industry's strong growth will continue as domestic metal-intensive sectors continue to show strong demand for the products of the industry.

**Figure 5: Global Crude Steel Production Forecast, 2013-2017**

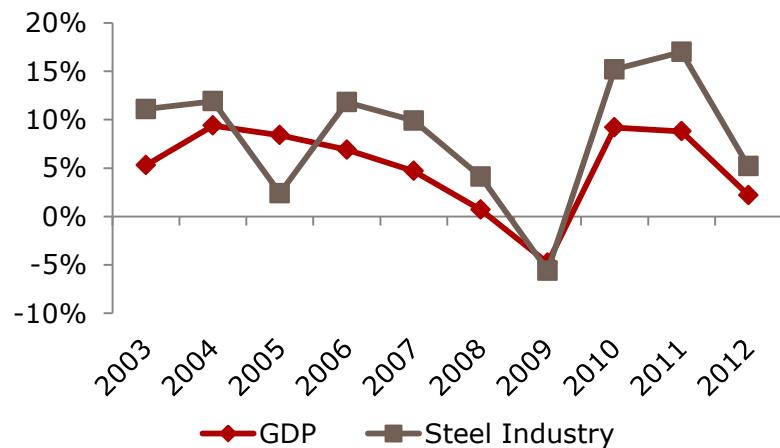


Source: BMI  
f: forecast



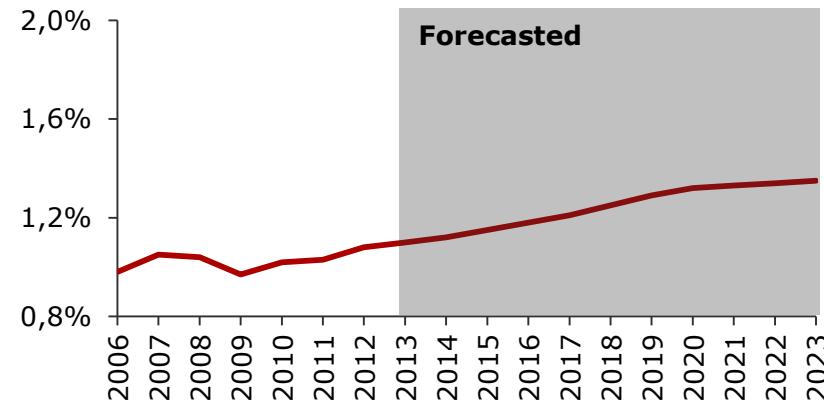
# The iron and steel industry has maintained an impressive growth rate over recent years

**Figure 6: Turkey's GDP and the Iron and Steel Industry Growth, 2003-2012**



Source: Turkstat, DÇÜD

**Figure 7: The Iron and Steel Industry's share in the GDP in Turkey, 2006-2023**



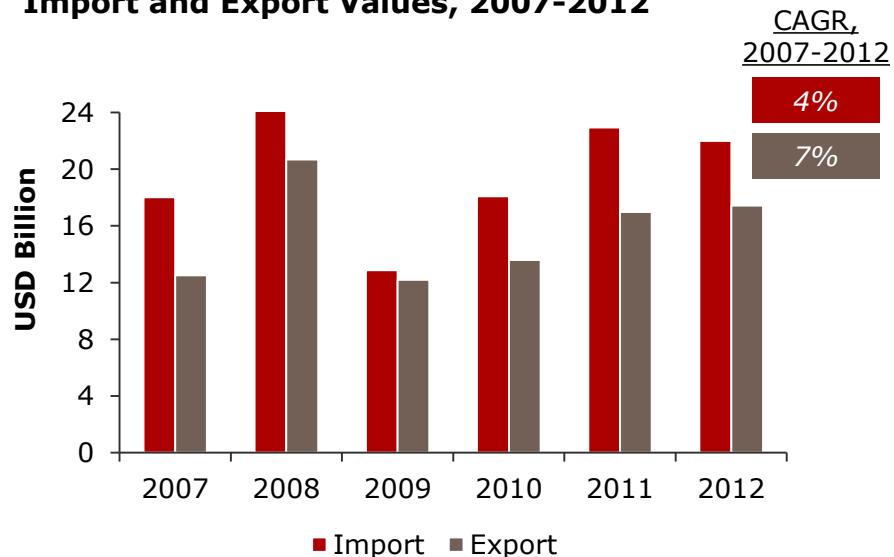
Source: Emerging Markets Insights

- Even though iron and steel makers around the world are being challenged by weak global demand, Turkey's iron and steel industry continues to grow, increasing its presence in the global arena. The iron and steel industry had an impressive growth rate of more than 5% in 2012, surpassing the GDP growth rate of 2.2% in the same period.
- Turkey maintained significant iron and steel industry growth rates between 2003 and 2009. The dip in 2009 indicates weak market conditions due to the global economic crisis, but the industry quickly recovered and continued growing strongly after the global economic crisis.
- In 2012, the iron and steel industry's contribution to the GDP was 1.08%, up from approximately 1% in 2006.
- The iron and steel industry's share in the GDP is expected to continue to increase as new opportunities arise in the industry and is projected to gain a share of 1.35% by 2023.



# The growth in the industry was reflected in the foreign trade volume as exports grew a CAGR 7% in 5 years

Figure 8: The Iron and Steel Industry Import and Export Values, 2007-2012



Turkey imports mainly from the US and Russia with a 14% share each. These countries are followed by Ukraine with 12% and the UK and Romania with 6% each.

Source: Turkstat

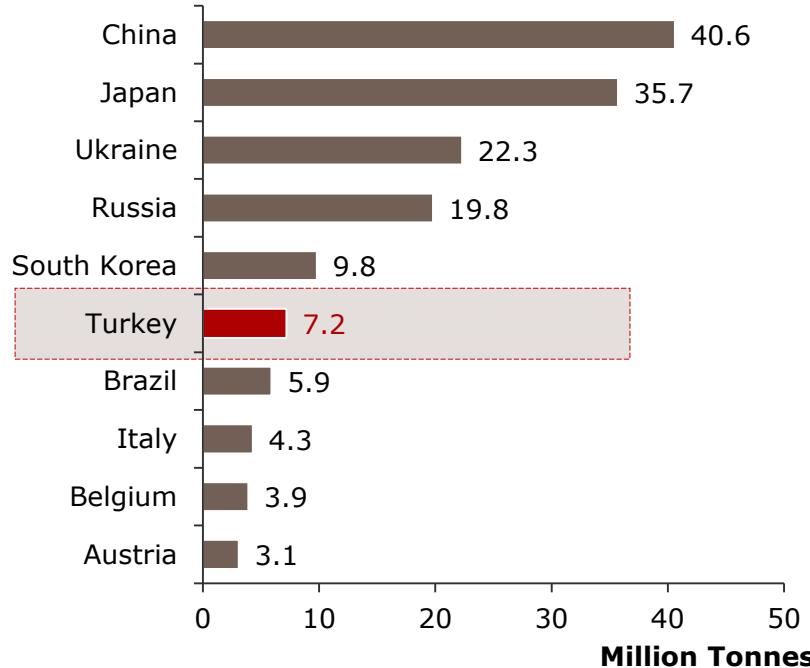
Note: Chapters 72 and 73 of Turkstat's data are included.

- The iron and steel industry is one of the pillars of Turkey's foreign trade. It had the second largest export share coming in after the automotive industry in 2012.
- Imports displayed a CAGR of 4% for the period of 2007 to 2012, surpassing USD 22 billion, while exports grew with a CAGR of 7% to more than USD 17 billion.



# The industry's foreign trade volume is expected to reach USD 55 billion by 2023

**Figure 9: Net Exporter Countries for Iron and Steel, 2012**



Source: DÇÜD

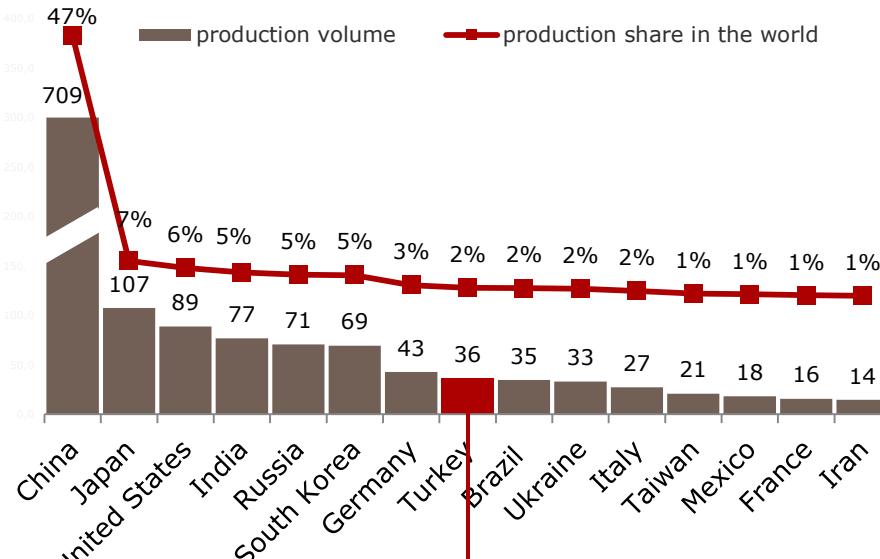
- Turkey has performed spectacularly in the iron and steel trade and is now among the top producers. It is the 6<sup>th</sup> largest net exporter of iron and steel coming in after Russia and South Korea with 7.2 million tonnes of net exports in 2012.
- Exports grew at a **CAGR of 7%** between 2007 and 2012, surpassing USD 17 billion in 2012. Approximately 59% of the exports were long steel exports, followed by billet and slab (15%), pipe (10%), flat steel (9%) and other types (7%).
- In 2012, Saudi Arabia and Iraq had the highest shares of iron and steel exports with 12% and 10%, respectively. Followed by the EU with 12%, the UAE with 7% and the USA with 6%.
- Despite its political instability, the Middle East has been the fastest growing export market for Turkey. These countries are in need of restructuring more than ever before. Turkey will be able to take advantage of these markets in the near future. The second and third largest increases in the export market was in the USA and the North African countries.

***Investment Tip: Turkey's proximity to emerging markets allows for low cost export opportunities as well as being able to cater to a growing local market.***



# Turkey is among the top 10 producers of crude steel in the world...

**Figure 10: Crude Steel Production, 2012**



Source: World Steel Organization

**Figure 11: Crude Steel Production Turkey, 2007-2017**



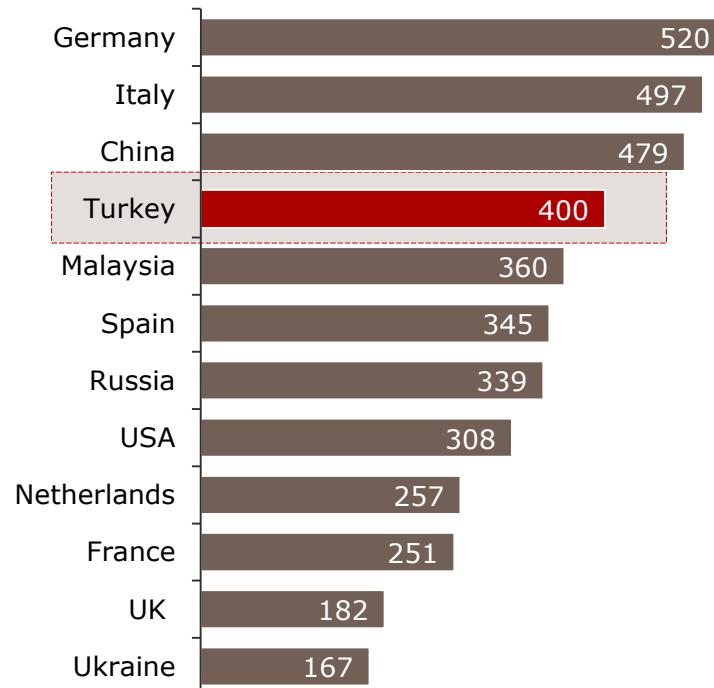
Source: World Steel Organization, BMI  
f: forecast

- Turkey has enjoyed an uninterrupted annual growth of crude steel production from 2007 to 2012. Turkey's crude steel production growth has been impressive with a **CAGR of 6.8%** during this period and is expected to show strong growth of 5.5% from 2012 to 2017. Turkey experienced the third highest growth rate among the top 10 steel producers after China and India.
- Turkey moved up from 10<sup>th</sup> position in 2010 to 8<sup>th</sup> position in 2012 leaving Brazil and the Ukraine behind. The country aims to be among the top 5 crude steel producers in the world, which includes China, Japan, the USA and India.



# ...and also outperforms most of the leading economies in crude steel per capita consumption

**Figure 12: Crude Steel Consumption Per Capita (in kg), 2012**



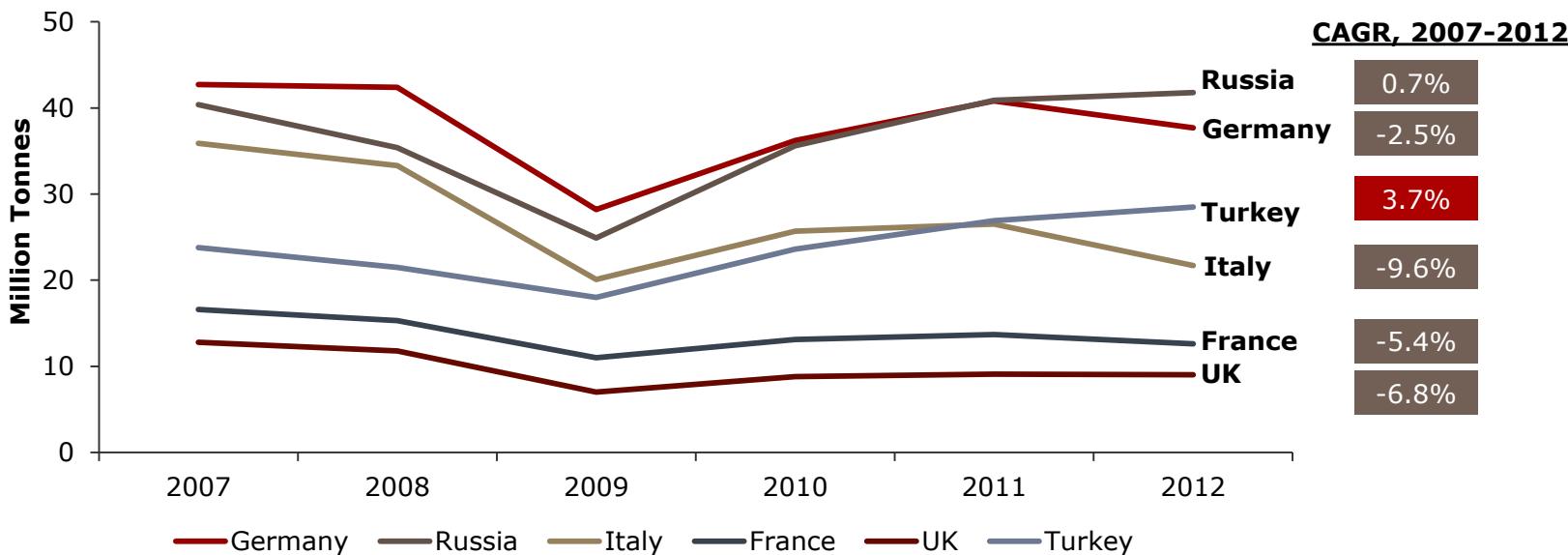
Source: OECD, DÇÜD

In Turkey, crude steel consumption per capita is 400 kg with a 2% CAGR from 2007 to 2012, surpassing both emerging economies like Russia, the Ukraine and Malaysia, and developed economies such as the USA, the UK and France.



# Turkey's apparent steel use is one of the fastest growing in Europe

Figure 13: Apparent Steel Use (Finished Steel Products), 2007-2012



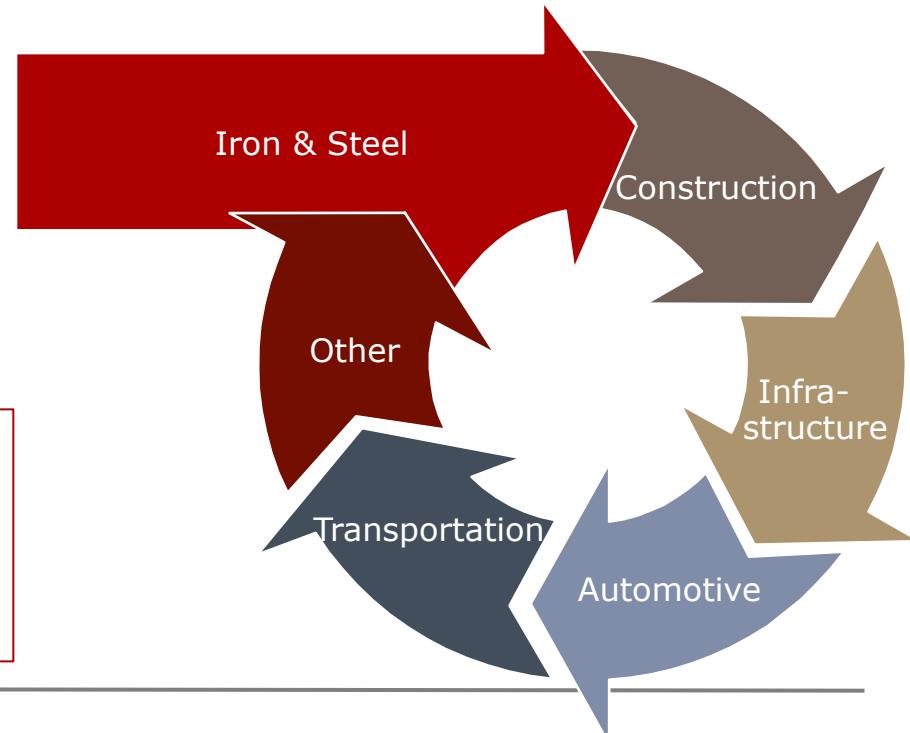
Source: World Steel Organization

- The values in the graph refer to the apparent steel use of each country. The apparent steel use is tallied from the production of steel within a country, plus imports, and minus exports.
- Turkey's finished steel production grew strongly between 2007 and 2012 with a **CAGR of nearly 4%**, reaching 28.5 million tonnes. During the same period the EU 27 average contracted with a negative CAGR of almost 7%.
- In 2012, Turkey ranked **5<sup>th</sup> in apparent steel use per capita** in Europe with 381.9 kg, behind Austria, Germany, the Czech Republic and Belgium-Luxemburg, while the EU countries' apparent steel use per capita was 278.5 kg. This means Turkey had a **CAGR of 9%** from 2010 to 2012.



# Steel is at the heart of the supply chain for many other industries

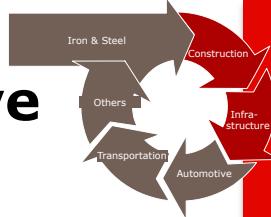
- Steel is used in many sectors including buildings and construction, automotive, machinery and home appliances among others. Even the slightest growth in other industries, such as 3-4%, can increase growth in the iron and steel industry up to 15-16% in the short term.
- Steel-intensive sectors will drive demand for Turkey's iron and steel industry.
- Turkey will ramp up infrastructure, construction and transportation spending in the coming years with major projects such as the third airport in Istanbul, the North Marmara Highway and new high speed railways across Turkey.



***Investment Tip: The automotive sector is projected to manufacture four million vehicles and export three million of these annually by 2023. Hence, the sector will need a vast supply of finished steel products.***

Source: Emerging Markets Insights





# The construction and infrastructure industries have a significant impact on steel demand...

**Figure 14: Construction and Steel Industry Growth, 2005-2012**



- Turkey's construction sector uses 40% of steel that is produced in Turkey.

- Apart from the 2009 global economic crisis, the construction sector showed a steady increase in production.

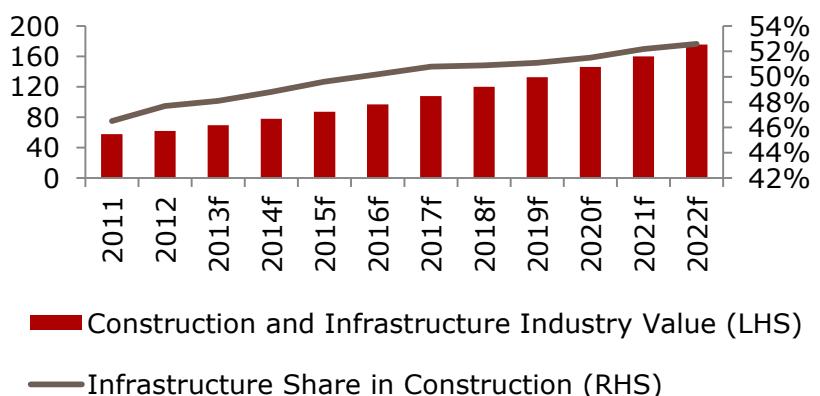
- As urbanization continues in Turkey, there will be a high demand for building construction, thus resulting in a need for steel.

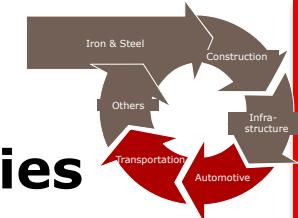
- According to BMI, the value of the construction industry, which comprises infrastructure value, residential and non-residential building values, is forecasted to grow by a **CAGR of 11%** from 2011 to 2022.

- Also, a major urban redevelopment plan, which will demolish some 6.5 million buildings, will further increase the need for new buildings. Therefore, the industry will present great opportunities for iron and steel producers who cater to construction projects.

**Investment Tip: A nationwide urban transformation project will cover 6.5 million buildings and will cost over TL 400 billion. Earthquake resistance requirements for these new buildings call for a considerable level of steel use.**

**Figure 15: Construction Industry Value and Share of Infrastructure, 2011-2022**

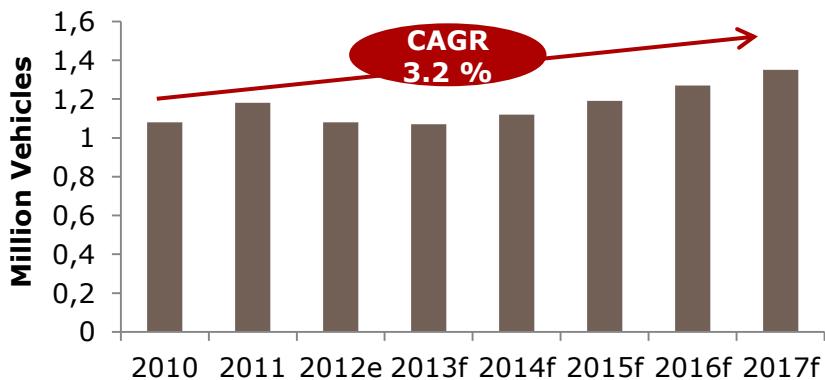




## ...as do the automotive and transportation industries

- Turkey is the largest bus manufacturer in Europe and according to the Ministry of Industry and Technology, it expects to become the third largest auto manufacturer in Europe by 2015. Turkey has attracted many foreign investors to the country including Toyota, Ford, Hyundai, MAN, Renault, Fiat, Mercedes and Isuzu.
- Steel has various uses in vehicle manufacturing. 20% of the steel used in the Turkish automotive industry is produced in Turkey.

**Figure 16: Vehicle Production in Turkey, 2010-2017**

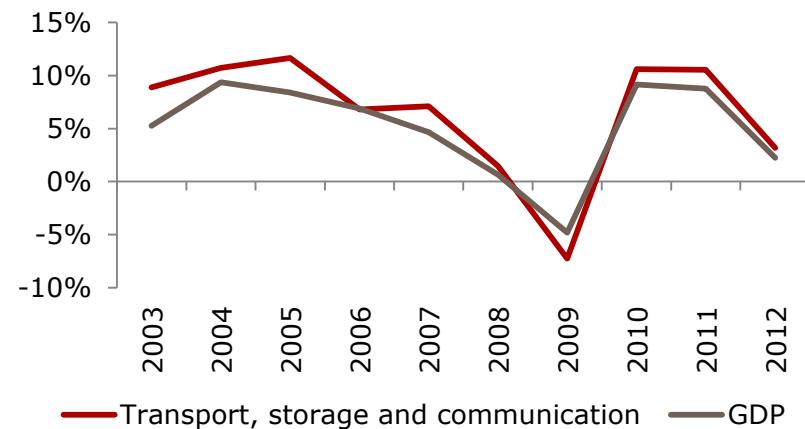


Source: Deloitte Analysis with BMI growth rates

f: forecast

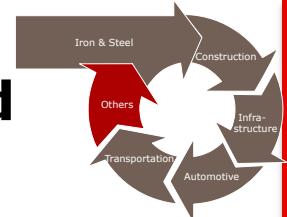
- The industry will benefit from major projects and investments in transportation such as: the North Marmara Highway project, the third Istanbul airport, the third Bosphorus Bridge and a high speed railway network that is projected to reach 10,000 km by 2023.
- There will be increased investments in Turkey's natural gas sector as projects like TANAP kick-off requiring additional production of steel as demand for steel increases in the near future.

**Figure 17: GDP and Transportation, Storage and Communication Growth Rates, 2003-2012**



Source: Economist Intelligent Unit, Turkstat

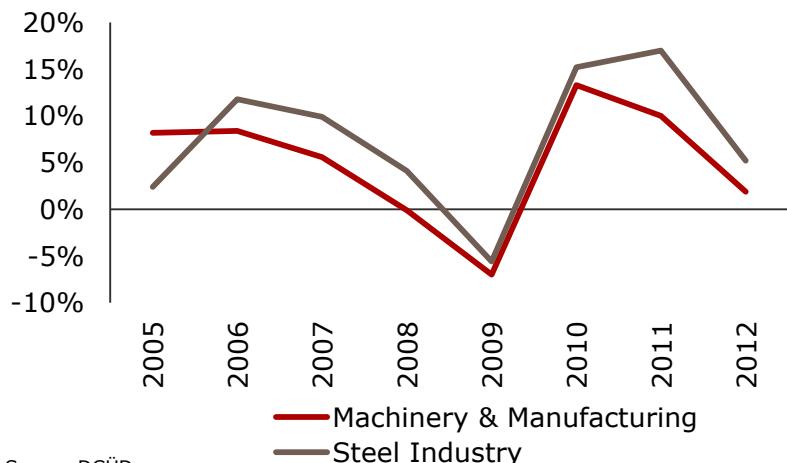




# Turkey has significant advantages in the iron and steel industry due to the positive synergies with various other industries

- Iron and steel products are also used in the machinery and manufacturing industry. According to the Swiss financial services institution UBS's Mining and Steel Primer Report, 15% of all steel produced worldwide is used in machinery.
- The machinery and manufacturing industry shows signs of continued growth as the industrial production index continues to improve in Turkey.
- The Turkish machinery industry is projected to have a **CAGR of 17.8%** between 2012 and 2023.

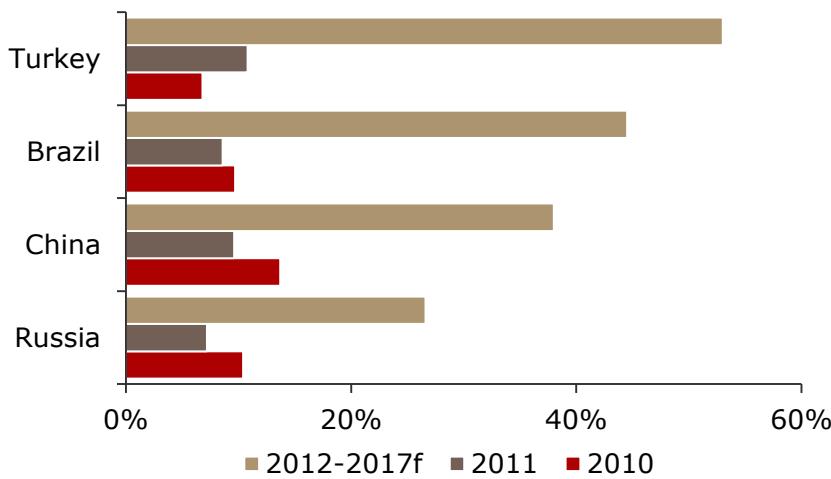
**Figure 18: Machinery and Manufacturing and Steel Industry Growth, 2005-2012**



Source: DÇÜD

- In the home appliances sector, Turkey has become one of the top manufacturers in the world. Turkey's home appliances sector is expected to grow more than such emerging markets as Brazil, China and Russia. This also is an indicator of the potential within the sector for the iron and steel industry.
- Domestically manufactured iron and steel used in home appliances will increase more than 50% from 2012 to 2017.

**Figure 19: Growth in Home Appliances**

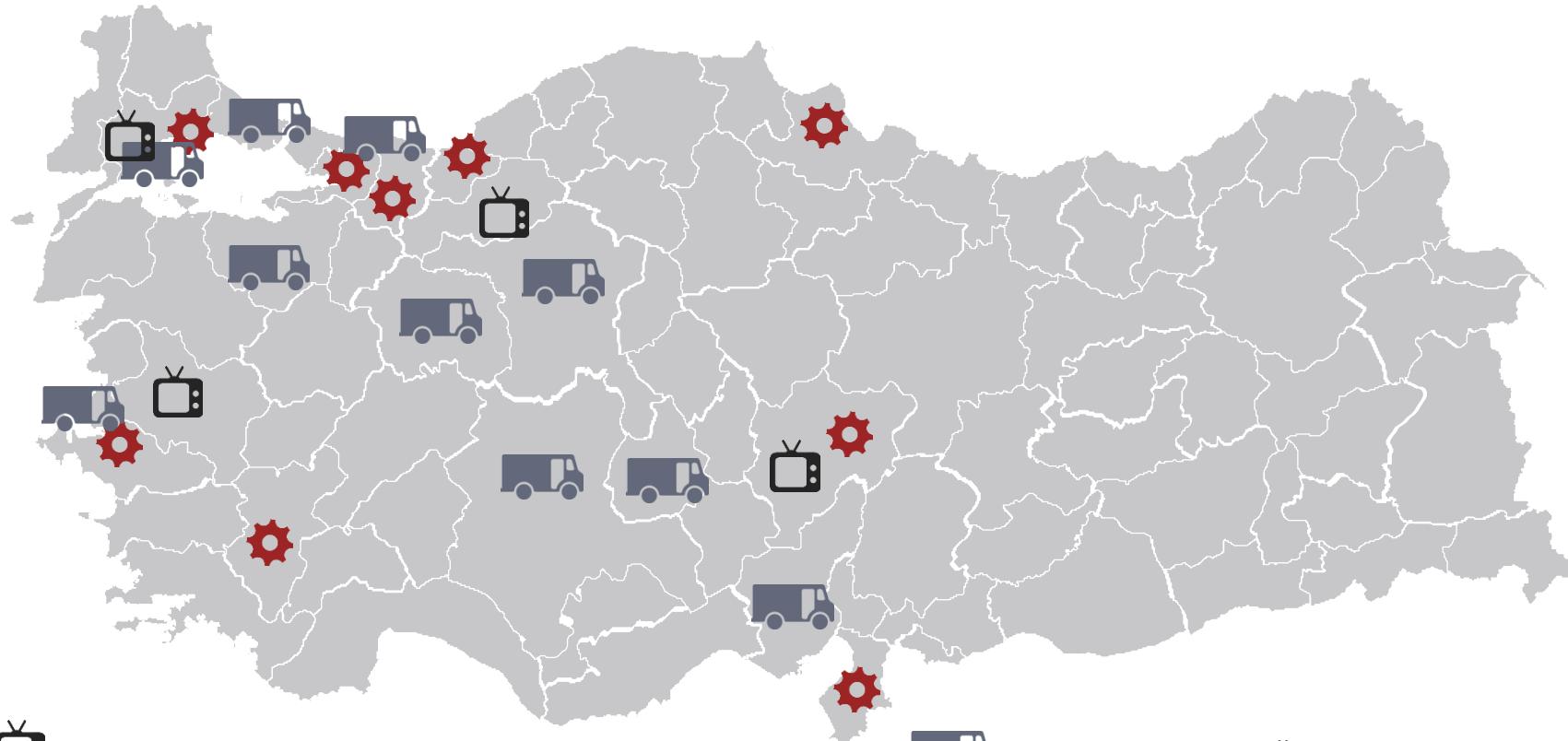


Source: Euromonitor  
f: forecast



# Location of major metal intensive industries

Figure 20: Major Metal-Intensive Industries



**Home Appliances;** Tekirdağ, Bolu, Kayseri, Manisa

**Machine Manufacturing;** Tekirdağ , Kocaeli, Sakarya, Zonguldak , Samsun, Hatay, Izmir , Denizli, Kayseri

**Automotive;** Tekirdağ, İstanbul, Kocaeli, Bursa, Eskişehir, Ankara, Konya, Aksaray, Adana, İzmir

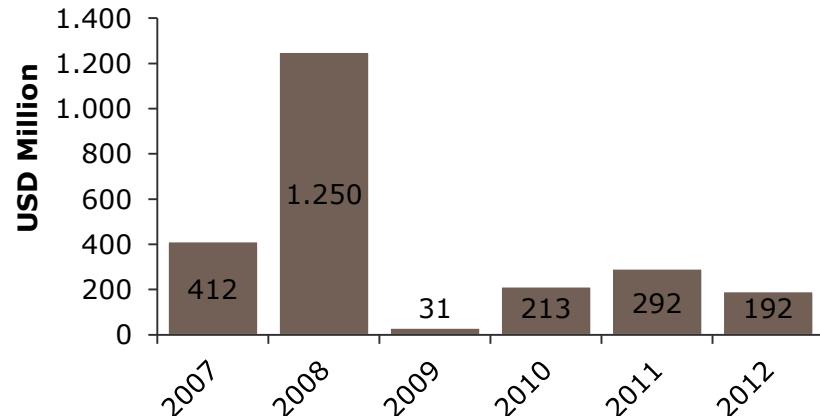
Source: Deloitte Analysis



# **FDI in the industry has slowly started to pick up from a major dip in 2009 due to the global economic crisis**

FDI in the manufacture of basic metals and fabricated metal products has fluctuated over the years in Turkey. The total FDI from 2007 to 2012 was more than USD 2.3 billion.

**Figure 21: FDI in the Manufacture of Basic Metals and Fabricated Metal Products**



Source: Central Bank of the Republic of Turkey



# Major mergers and acquisitions from 2007 to 2009 accounted for more than USD 245 million

**Table 2: M&A's Between 2007-2009**

Acquirer	Origin	Target	Stake	Deal Value (USD million)	Year
Taiyuan Iron & Steel Group and Shanxi Jinzhong	China	CVK Group	50.0%	N/A	2009
Wanbang Industrial					
Zeman International	Austria	Alfa Çelik	80.0%	N/A	2009
SK Networks	Korea	Daiyang Metal Sanayi	30.0%	37.8	2008
Ada Metal	Turkey	Demrad Döküm	100.0%	24.0	2008
Magnitogorsk Iron and Steel Works (MMK)	Russia	Atakaş Metalurji	50.0%	102.0	2007
Metallink Metal	Turkey	Ferro Döküm	56.7%	81.9	2007
ArcelorMittal	Luxembourg	Rozak Demir Profil	51.0%	N/A	2007

Source: Deloitte Annual Turkish M&A Review



# Whereas, major mergers and acquisitions from 2010 to 2012 accounted more than USD 565 million

**Table 3: M&A's between 2010-2012**

Acquirer	Origin	Target	Stake	Deal Value (USD million)	Year
Kayseri Metal Center	Turkey	Meko Metal	100%	N/A	2012
Magnitogorsk Iron and Steel Works (MMK)	Russia	MMK-Atakaş Metalurji	50.0%	485.0	2011
Ada Metal Çelik	Turkey	Bilecik Demir Çelik	92.0%	3.4	2011
Cronimet Alloys India	India	Atlanta Madencilik	50.0%	3.0	2011
VTG Nikel Madencilik	Turkey	Sardes Nickel Madencilik; Turmad Madencilik	100.0%	40.0	2011
Kerim Çelik (Borusan Holding)	Turkey	Borçelik Çelik	9.3%	33.0	2010
Mechel Steel Group	Russia	Ramateks	100.0%	3.0	2010

Source: Deloitte Annual Turkish M&A Review



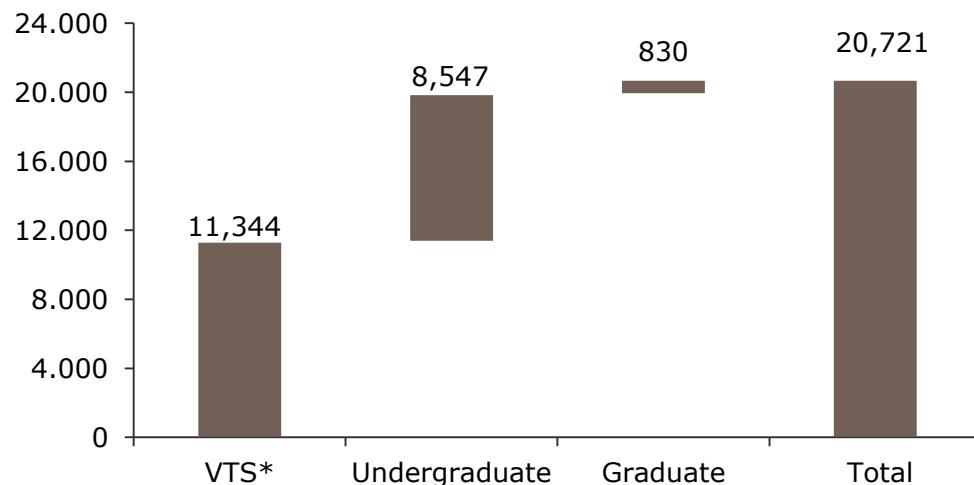
# B. Turkey's Competitive Position

- i. The Skilled and Cost Effective Labor Force of the Industry
- ii. Steel Mill Costs
- iii. Energy and Logistics
- iv. Industry Profit Margins
- v. Industry Certificates
- vi. The Industry's R&D Centers



# Turkey provides a superior, skilled workforce dedicated to improving the steel industry

**Figure 22: Skilled Steel Industry Workforce, 2011-2012 Graduates**



Source: ÖSYM, Deloitte Analysis

\* Vocational Training Schools

- More than 11,000 students graduated from vocational training schools in 2011-2012.
- Besides 4 year university degree programs that train students in the sub-sectors of steel industry, there are many university programs specifically designed for the iron and steel industry. These programs include mining engineering, materials engineering, metallurgical and materials engineering, machinery and the like.
- Moreover, there are also a variety of graduate programs specifically designed for advancement in the industry.

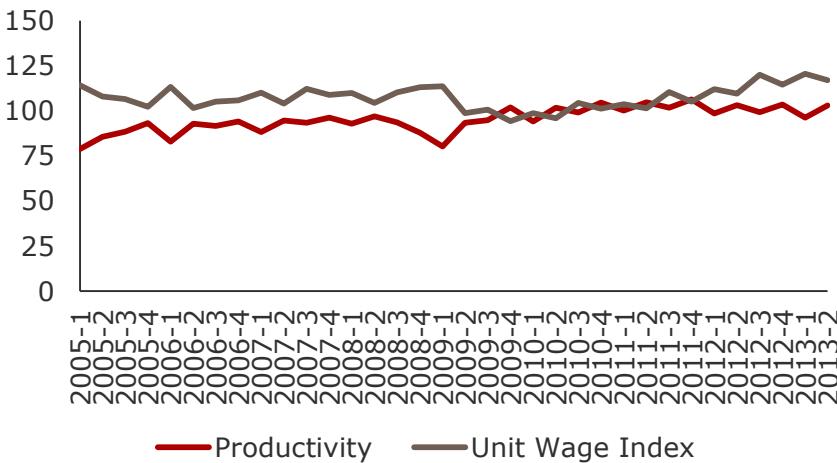
- A total of over 20,000 students graduated from either the vocational training schools or university programs of these programs.

- The number of people that graduate every year from vocational high schools and universities is quite high in Turkey. As shown in the above figure, a sizable skilled workforce is available to meet the needs of the iron and steel industry.



# Turkey offers an easily accessible, cost effective labor force to the industry

**Figure 23: Productivity and Unit Wages Index in Industry in Manufacturing of Basic Metals (2010=100)**



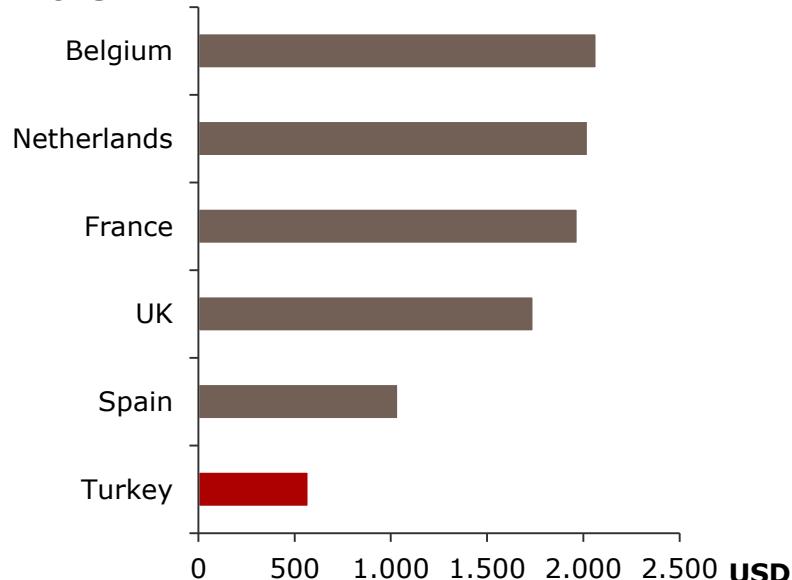
Source: Ministry of Development, TURKSTAT

- Turkey's monthly average minimum wage as of September 2013 was USD 572, which is lower than most of the EU countries. Low labor costs allow Turkey to compete with major steel producers in Europe

**Investment Tip: Labor costs in Turkey are much lower than that of the EU countries. Therefore, it is possible to hire a highly skilled workforce at competitive costs.**

- Turkey has a productive and cost-effective labor force. The unit wage index increased 17% from 2010 to the second quarter of 2013, while productivity increased almost 3% during the same period.
- Turkey's unit labor costs are below of those of the European countries. The unit labor cost based competitiveness index turned in favor of Turkey

**Figure 24: Monthly Minimum Wage, October 2013**



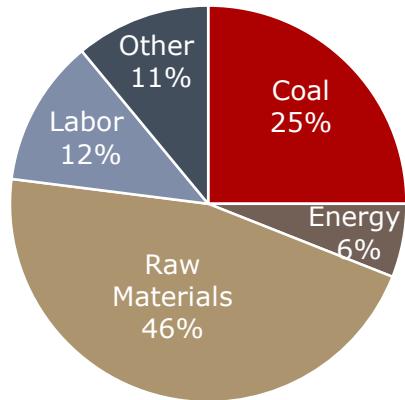
Source: Eurostat

Note: The data was last updated on 23 October 2013 and was converted to USD using the EUR/USD FX rate on 31 December 2013.

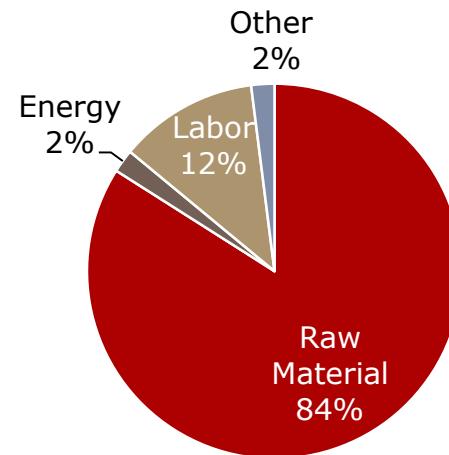


# Raw materials constitute the major costs in production processes

**Figure 25: Cost Breakdown for Basic Oxygen Furnace (BOF)**



**Figure 26: Cost Breakdown for Electric Arc Furnace (EAF)**



Source: Erdemir

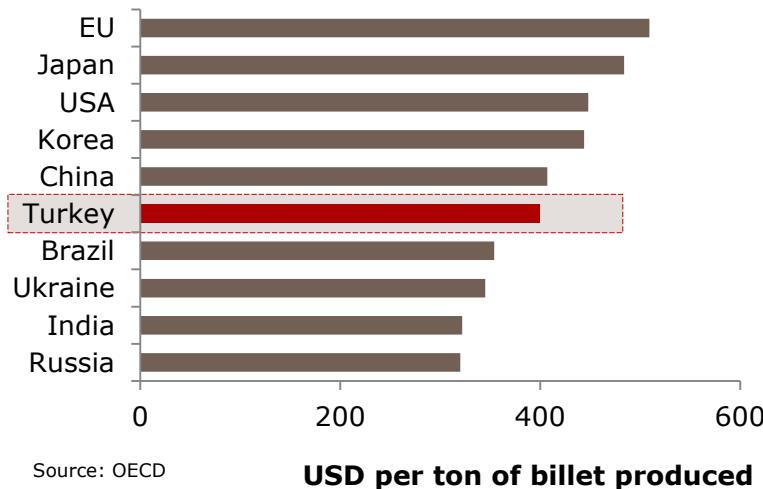
Source: Erdemir

- Raw materials constitute a major portion of both production processes. The main raw materials used in producing steel are iron ore and scrap metal. Approximately 115 kg raw material is needed to produce 100 kg of steel.
- Production with EAF is known to be more advantageous in terms of investment cost and duration as well as creating less damage to the environment.



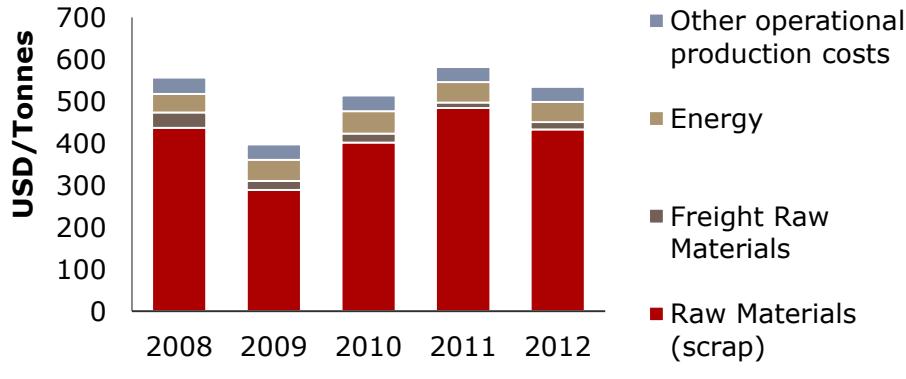
# However, Turkish mills are cost competitive relative to major steel producing countries

Figure 27: Operating Cost for BOF Processes



Source: OECD

Figure 28: Operational Production Cost/Tonne Billet, Turkish EAF Mill



Source: SteelConsult

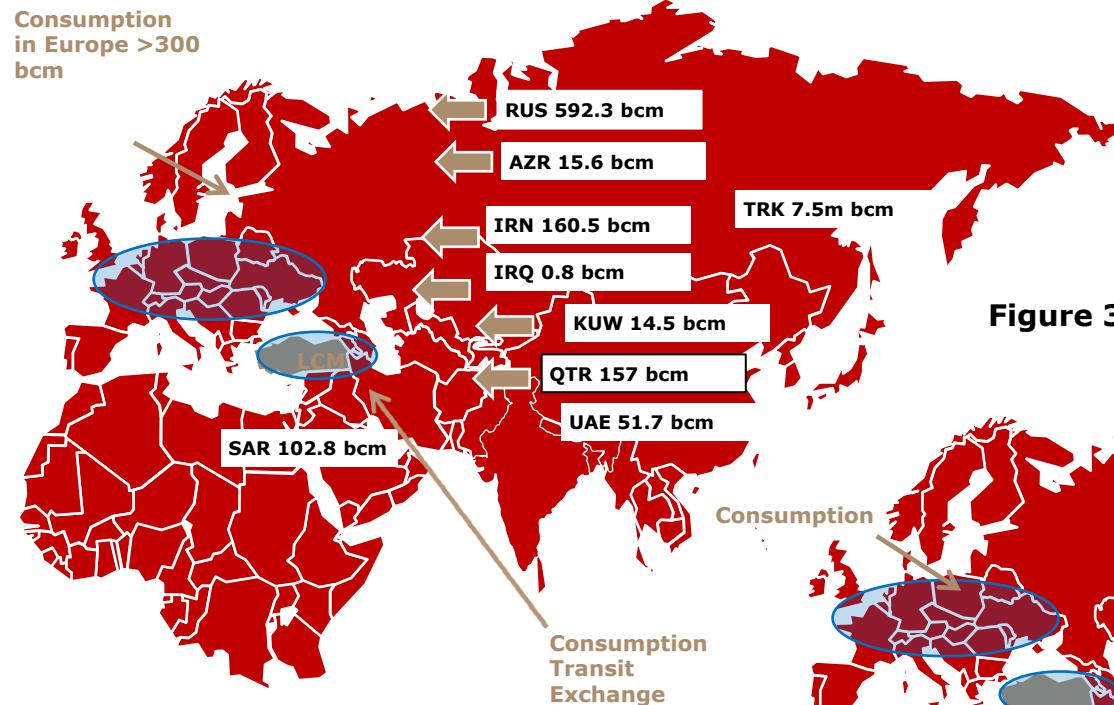
- 70% of world steel production is done via the BOF method, which is the process that uses coal in the form of coke. The BOF method accounts for only 26% of Turkish steel production, whereas the rest is done via the EAF method.
- Turkey offers a cost effective BOF process per tonne of billet produced.
- The cost of the BOF process for processing a tonne billet is lower in Turkey than the developed markets of the EU, Japan, the US and Korea. Moreover, it is lower than the world's largest steel producer China.

- Operational production costs of EAF based mills have 4 components, namely, raw material, which makes up the largest cost, energy, freight of raw materials and other operational production costs.
- In the EAF method, the raw material is steel that is recycled from scrap metal. The operational costs are directly related with the cost of electricity.
- Turkish EAF based mill costs per tonne of billet decreased from USD 557 per tonne in 2008 to USD 535 per tonne in 2012. That is almost a decrease of 4%.



# One of the significant costs of the mills are for energy, but Turkey has easy access to energy as it is at the crossroads of supply and demand

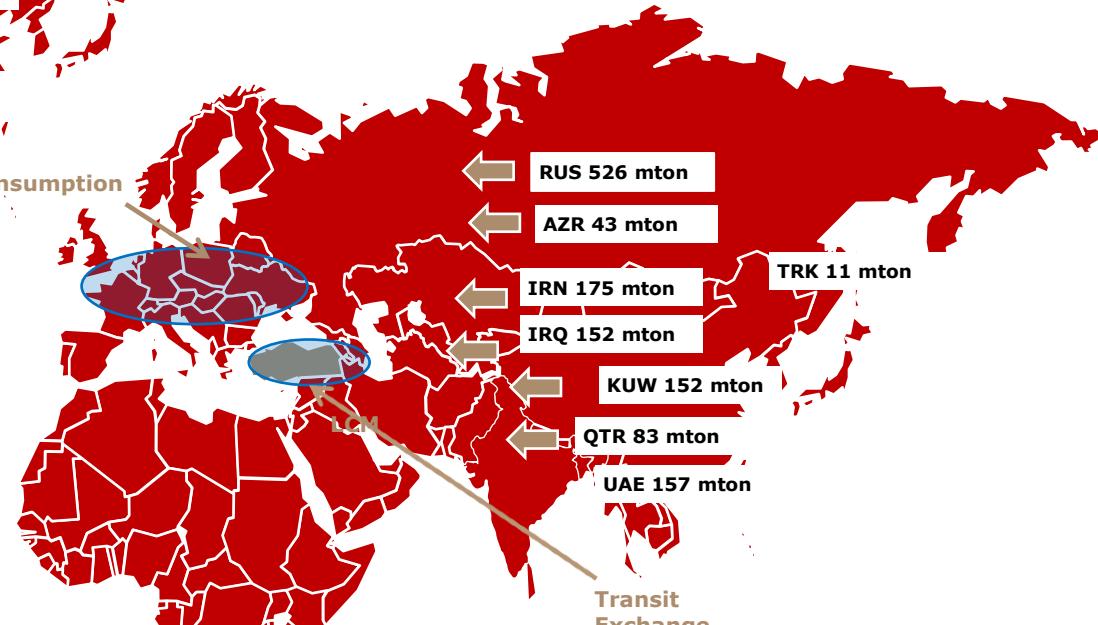
**Figure 29: Gas Production**



Source: BP Statistical Review 2013

- Baku-Tbilisi-Ceyhan Pipeline and Iraq-Turkey Pipeline pass through Turkey to carry oil. Blue Stream Pipeline is used for transporting natural gas, while Trans Anatolian Natural Gas Pipeline Project (TANAP) aims to transport natural gas that is produced in the Shah Deniz-2 field and other fields in Azerbaijan through Turkey to Europe .

**Figure 30: Petroleum Production**



Source: BP Statistical Review 2013

- Turkey's position is critical for the export and import of petroleum as it straddles the demand-rich west and the supply-rich east.



# Turkish ports are also very cost effective compared to major ports around the globe...

- Exports and imports are key drivers of the industry and are mostly conducted via sea ports.
- Nominal tariffs per day are significantly cheaper in Turkey compared with other major ports around the globe.
- Prices for handling containers can be as much as **USD 293 in ports such as Marseille**. Even the most expensive port in Turkey, the Mersin port, is cheaper than the port of Singapore, which is the cheapest among benchmarked countries.

**Table 4: Container Handling and Warehouse Costs**

	Singapore	Trieste	Hamburg	Rotterdam	Marseille	Haydarpasa	Izmir	Mersin
<b>Terminal-Handling Container</b>	USD 148	USD 200	USD 240	USD 200	USD 293	USD 85	USD 85	USD 120
<b>Warehouse per day</b>	USD 12 (3 days free)	USD 20 (3 days free)	USD 47 (3-5 days free)	USD 47 (3-5 days free)	USD 29 (5 days free)	USD 9	USD 7	USD 7

Source: TÜSİAD



# ...they provide different storage options for different types of containers at reasonable prices...

- Turkish ports have many choices in terms of storage and cost-effective solutions to storage problems of businesses. Even in the ports that are in pivotal locations, which are easily accessible, investors can find rates as low as **USD 7 per day**.
- Table 5 indicates the prices of cargo in each port in terms of USD.

**Table 5: Costs of Cargo Handling in Turkish Ports (USD)**

Size	Ambarlı	Gemlik- Borusan	Mersin	Limak Iskenderun	Izmit-Evyap	Izmir Port
<b>20' dry</b>	13 to 23*	10 to 15*	7 to 18*	10 to 15*	10 to 15*	7 to 12*
<b>40' dry</b>	23 to 33*	15 to 20*	11 to 27*	18 to 23*	18 to 23*	12 to 18*
<b>45' dry</b>			12.5 to 30.5*	N/A	N/A	30
<b>20' OOG</b>	60	30 to 40*	N/A	N/A	N/A	N/A
<b>40' OOG</b>	80	40 to 50*	N/A	N/A	N/A	N/A
<b>OOG Cargo</b>	N/A	N/A	+%50 of service price	+%50 of service price	N/A	N/A
<b>20 IMO</b>	35	12 to 18*	N/A	N/A	12 to 18*	8.40 to 14.40*
<b>40 IMO</b>	40	18 to 24*	N/A	N/A	20-26*	24.40 to 21.60*
<b>IMO Cargo</b>	N/A	N/A	+%20 of service price	+%20 of service price	N/A	N/A
<b>Non-OOG Cargo</b>	N/A	N/A	N/A	Same as dry tariff	N/A	N/A

Source: TÜSİAD

- \* Price varies according to the number of days spent in the port
- Each row shows different types of containers with different sizes. Generally 20'(20 foot long) and 40'(40 foot long) container types can be found in every port.
- Dry** is a storage container in which the interior is kept at a low humidity.
- Reefers** are refrigerated containers used for the transportsations of temperature sensitive cargo.
- OOG** abbreviation is used for loads which is higher/wider than standard containers.
- IMO** type container is generally for hazardous goods.



# **...and lower operating costs coupled with Turkey's proximity to Asia and Europe make Turkey an ideal market**

- Turkey is situated between Europe and Asia, allowing the country to create a link between three continents with over 1.5 billion people and a GDP of USD 25 trillion.
- As major airway hubs in the region, Istanbul and Ankara airports provide a practical route of travel with a maximum 4 hour direct flight to the business capitals in Europe, Western & Central Asia, the Middle East and Africa.
- Turkey's geographical location and logistics capabilities, its unique positioning at the intersection of trade routes and its rapidly progressing investment climate are the major factors contributing to Turkey's strategic and regional importance.

**Figure 31: Turkey's geographical position**



**Table 6: Total Foreign Trade Volume of Turkey by Regions**

Regions	Trade Volume (USD billion)
Free Zones in Turkey	3.34
Europe (EU)	146.65
Europe (Non-EU)	51.78
North America	21.75
Central & South America	8.11
Middle & Near East	63.86
Africa	19.28
Asia & Pacific	61.53
Others	12.71
<b>Total</b>	<b>389.01</b>

***Investment tip: Turkey's proximity to chemical product markets and main raw material producer countries creates a huge opportunity for potential investors.***

Source: Turkstat, Deloitte Analysis



# Export and import supply chain costs in Turkey are relatively low compared to peer countries

**Table 7: LPI Cost Data by Country**

Countries	Export Cost		
	Port or airport supply chain (USD)	Land supply chain (USD)	Total (USD)
Russia	2,000	5,000	7,000
Germany	1,500	1,784	3,284
Turkey	806	1,670	2,476
UK	1,000	1,414	2,414
Romania	707	1,225	1,932
Ukraine	866	1,061	1,927
France	500	500	1,000
Poland	N/A	N/A	N/A

Countries	Import Cost		
	Port or airport supply chain (USD)	Land supply chain (USD)	Total (USD)
Ukraine	5,000	1,732	6,732
UK	1,225	2,466	3,691
France	1,500	1,500	3,000
Poland	1,500	1,500	3,000
Germany	1,500	1,145	2,645
Romania	750	1,061	1,811
Russia	3,162	N/A	N/A
Turkey	250	N/A	N/A

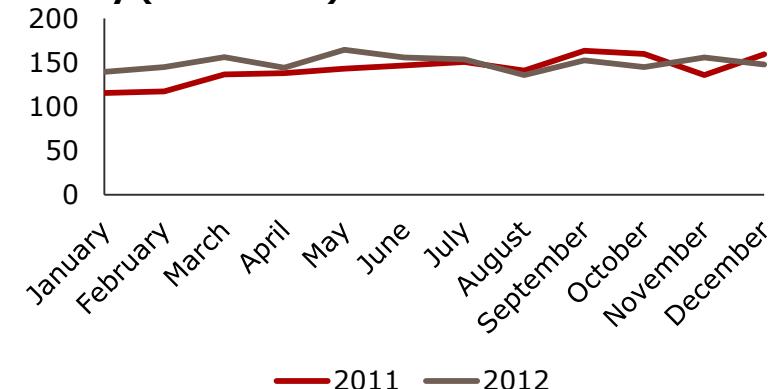
Source: Logistics Performance Index 2012 Report

- The above table measures Turkey's supply chain performance in terms of export and import costs.
- Turkey's geographic location enables to have low importing costs compared to most CIS countries and European countries such as UK, France and Germany.
- Export costs are relatively higher than import costs compared with the same countries.



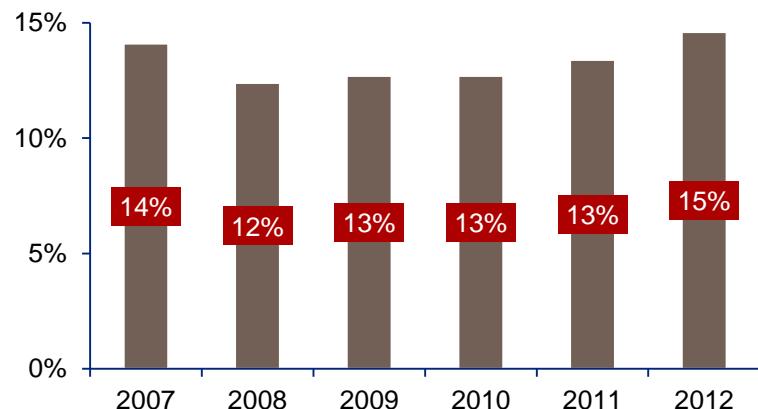
# The industry's profit margins have increased in recent years

**Figure 32: Metal Industry Revenue Index, Turkey (2010=100)**



Source: Ministry of Science, Industry and Technology

**Figure 33: Profit Margins, 2007-2012**



Source: Euromonitor

- The metal industry is a key driver for many other industries.
- The revenue index increased in the first half of 2012 compared to the same period of 2011. The index average in 2012 was 149.6, an increase of 5% from 2011.

***Investment Tip: Turkey's geographic advantage provides investors an advantage through transportation and logistics. Moreover, steel production costs are much lower in Turkey than in the EU countries. Therefore, steel makers can take advantage of lower costs.***

- It should be noted that the sector's profitability is increasing. A downward trend was observed after the global crisis, but the sector has quickly recovered.



# There are many highly qualified steel production facilities in Turkey...

- There are approximately 150 companies within the iron and steel industry. Among these, there are electric arc furnace facilities with capacities ranging from 50,000 tonnes to 3.5 million tonnes and integrated facilities with a total capacity of 8.5 million tonnes. Other facilities operate with purchases of billet from outside the country and produce profile, wire rod, and ribbed and round rebars.
- There are many companies in Turkey that have global production standards and top of their class management certificates.

## Certificates of Iron and Steel Production Facilities

 TS EN ISO 9001:2008 Quality Management System Certification	 Turkish Standards Compliance Certificate (EN 10025-2)	 TS EN ISO 50001 Energy Management Certificate
 TS EN ISO 14001:2004 Environmental Management System Certificate	 Ship Plate Manufacturing Approval Certificate - Lloyd's Register	 Approval Certificate for Ship Plate Factory - BV
 TS EN ISO Management System Certificate	 TS 18001 Occupational Health and Safety	 TSE Laboratory Certificate
 ISO TS 16949 Quality Management System Certificate for Automotive Production and Service Organizations	 High & Normal Strength Ship Plate Manufacturing Approval Certificate	 TS 9016 Product Compliance Certificate
 Registry Certificate for Material in Contact with Food	 CE Certificate of Structural Steel	 TS 9914 - Steel Billets, Square Crossed Product Compliance Certificate
 Material in Contact with Food Production Certificate	 CE Certificate for Pressure Vessels (DIN EN 10028)	 Certificate of Factory Production Control
 Turkish Standards Compliance Certificate (TS EN 10202)	 RINA Normal and High Strength Construction Steel Manufacturing Approval Certificate	 TC Ministry of Environment Recycling Certificate for Scrap Sales
Turkish Standards Compliance Certificate (TS EN 10130)	RoHS Certificate	



# To increase profitability, Matil A.Ş was launched as an R&D center to support the industry

- Matil A.Ş was founded by the Steel Exporters Association in November 2012.

## The Mission of Matil A.Ş

- Promote the production of high quality steel and related products.
- Increase competitiveness.
- Increase R&D, activities that lead to innovation as well as laboratory programs that enhance product and technology developments.
- Reduce costs.
- Create renovation plans in order to comply with international standards.
- Engage in consultation and documentation activities.
- The company's future plans include training for employees and focus groups that will involve company executives working in different departments at manufacturing firms.
- Matil A.Ş is expected to contribute to innovation and efficiency within the industry, while providing sustainable development.

- Through accredited labs, stress testing and a variety of mechanical and chemical tests, materials' damage analyses will be conducted to avoid difficulties including incurring high costs. Also, a system of national standards within the industry will be created to enhance Turkey's overall reputation on a global scale.
- These labs will help determine the technical appropriateness of imports before they are allowed into the country. Thus, inflow of low quality and substandard goods will be avoided.
- Along with the iron and steel industry, non-ferrous metals, pipes and profiles, construction steel, the environmental and the energy sectors will all be a part of these labs. These activities will be carried out along with R&D activities to enhance innovation.
- These labs have TS EN ISO/IEC 17025 accreditation. This accreditation used to be acquired abroad. However, as it now available in Turkey the process has become more efficient time and moneywise within the sector.



# C. Government and Public Agency Support

- i. 2023 Targets
- ii. GITES Strategic Plan



# Turkey's iron and steel industry is building a road map for itself

## Global Demand

- The increase in China's steel production is expected to slow down, and Europe is expected to lower demand due to tight fiscal policies. However, the growing construction, infrastructure and industry sectors within the Middle East and other developing countries is expected to increase global demand.
- Turkey's iron-steel export goal for 2023 is USD 55 billion, securing a 4% share of the global iron-steel market and growing annually 7.4% on average. Turkey aims to reach 85 million tonne year capacity and 70 million tonne/year production.

## Explicit Goals

- The 2023 export goals for the sub-sectors of iron and steel can be summarized as follows:
  - **Long product - USD 23.6 billion,**
  - **Flat product - USD 15.7 billion,**
  - **By products - USD 3.9 billion,**
  - **Pipe - USD 7.9 billion and**
  - **Construction parts - USD 3.9 billion.**

## Strategic Decisions

- Major transportation and infrastructure projects such as the North Marmara Highway which encompasses the third Bosphorus bridge and the third Istanbul Airport will continue to boost the industry's growth. Moreover, investments in high speed railway including the Ankara to Istanbul high speed railway project will demand large amounts of finished steel products in its construction phase. According to BMI, these projects will make Turkey the second largest steel consumer at 43.3 million tonnes in 2017.
- Turkey's short term goals include solving the flat/long steel supply-demand disequilibrium and the problems that arise from it, including the deficit that arises from net export losses suffered in the iron-steel industry. The long term goals include increasing the share of high value added steel products (construction, stainless, etc.) in both production and consumption. As a result of Turkey being in a highly seismic region, construction steel is expected to become a consumer necessity, which in turn will ensure a dramatic rise in production capacities.

Source: Turkish Exporters Assembly, Ministry of Science, Industry and Technology, Sabancı University



# The Government's GITES Strategic Action Plan for iron, steel and other metals introduces further opportunities

- Turkey has developed strategic action plans in order to increase local production and decrease import dependency of the industry. The strategic plans form synergies among exports, production, investments and employment policies. Moreover, its aim is to manufacture value added products that will allow Turkey to increase its exports.

Strategic Goals	Definition
1 Alliances in the Iron and Steel Industry and Maximizing Synergy	There are relatively few supplier companies that shape the global market in the scrap metal trade. Turkey, as the biggest importer in the market, could increase its procurement efficiency by building global alliances.
2 Increasing Domestic Scrap Metal Supply	Scrap metal is the second largest import product of the country due to the nature of Turkey's scrap metal-intensive iron and steel production. Taking the importance of scrap metal to the industry and the accelerating demand for it into consideration, a need to increase the domestic scrap metal supply becomes urgent.
3 Evaluation of Alternatives for Scrap Metal	It is of great importance to develop and make use of alternative sources of scrap metal to reduce import dependency as the need for scrap metal will increase in the long term.
4 Reducing the Dependency on Mineral Supply, Increasing Efficiency and Productivity	The domestic supply of industrial minerals remains insufficient against domestic demand, a more efficient use of domestic resources and of our country's mining potential is needed. On the other hand, in addition to domestic investments, foreign investments in sustainable procurement of critical raw materials is needed for ensuring both cost and competitive advantage, and the long-term security of supply lines.
5 Creating Investment Opportunities for Products that have Zero or Insufficient Production	In Turkey's iron, steel and non-ferrous metals industry, some products, which have high-energy demanding production structures are not produced locally or have excessive overall costs, mostly because of the country's prevailing cost of energy. Thus, these result in import dependency for the industry.



# **Legislation aims to take advantage of synergies in the iron and steel industry...**

1

## **Alliances in the Iron and Steel Industry and Maximizing Synergy**

Action	Explanation
Encouraging steel manufacturing firms to establish regional scrap metal importing companies.	<ul style="list-style-type: none"><li>• Regional scrap metal importing companies will be established by at least three iron and steel producing companies. Scrap metal importing companies will cooperate by exporting larger quantities together and, if necessary, by managing strategic inventory.</li></ul>
Feasibility studies for overseas investments with scrap metal suppliers.	<ul style="list-style-type: none"><li>• Overseas investments are vital to prevent price speculation, supplying scrap metal with more advantageous pricing and ensuring the safety of the supply chain.</li></ul>



# **...while decreasing import dependence on scrap metal and creating alternatives for its supply**

2

## **Increasing Domestic Scrap Metal Supply**

### **Action**

Up-to-date data of regional domestic scrap metal production and capacity data will be entered, production and consumption projections will be published.

Modernization of scrap gathering methods that can be monitored by regional administrations.

Free zones or industrial districts will be allocated for scrap metal breakdown and processing.

A comprehensive study for increasing the amount of scrap metal collected from obsolete ships.

### **Explanation**

- The organization will compile and quantify scrap production and consumption data and suggest policies that will improve its production capabilities and efficiency.
- The organization and monitoring of scrap metal gathering will significantly increase the breaking down process and the supply in hand.
- To ensure that the scrap metal business will become a branch of industry and in order to improve its efficiency; scrap dealers will be localized within industrial districts that will store, process and manufacture products using scrap metal.
- Sector analyses and future projections will be made for ship dismantling facilities in order to increase capacity and effectiveness while taking various peripheral factors into account.

3

## **Evaluation of Alternatives to Scrap Metal**

### **Action**

Feasibility studies will be conducted regarding alternatives to scrap metal like sponge iron (DRI) or hot briquetted iron (HBI).

### **Explanation**

- Depending on the results of these feasibility reports possible investments will be supported in this sector according to their international viability.



# In order to achieve these goals the public sector will be reorganized...

4

## Reducing the Dependency on Mineral Supply, Increasing Efficiency and Productivity

Action	Explanation
MTA (The General Directorate of Mineral Research and Exploration) will be reorganized.	<ul style="list-style-type: none"><li>There has been an increasing number of requests from relevant sides for MTA to be restructured so it can satisfy the demands of Turkey's developing industry by increasing activities supplying the raw materials that are needed to reach Turkey's goals of 2023. The new version of MTA is foreseen as a performance-based entity that focuses on the importance of searching for mines, publishes the inventory of metals and minerals that are most sought after by the industry and increasing the annual number of drilling sites that search for metals.</li></ul>
A model will be created to realize mining investments that ensures a sustainable supply chain of ores that are mostly imported and strategic ores that are projected to be in demand in response to national demand.	<ul style="list-style-type: none"><li>Turkey's top priority is to utilize domestic raw material resources to a maximum. A system resembling those in developed countries is needed to lead international operations (such as exploration, drilling, direct investment for manufacturing, acquiring a foreign company, entering a partnership with a foreign company, etc.) with entities from the mining or metal working sector if domestic reserves prove to be insufficient. This system will be carried out with the combined support of the private sector and the MTA's technical expertise.</li></ul>
Iron ore enrichment facility investments and developing technologies concentrating on manufacture from low grade ore will be encouraged.	<ul style="list-style-type: none"><li>Turkey's known iron ore reserves aggregate to 113.3 million tonnes. Turkey's economically operable iron reserves can satisfy demand only for the next 10 years and the quantity of high grade ore that is used in the sector is limited. Turkey imports USD 1 billion worth of iron ore every year because of the lack of supply. Costly enrichment facilities are needed to work low grade/harmful iron ore reserves.</li></ul>



# **...to create new opportunities for products that have a limited amount of production**

5

## **Creating Investment Opportunities for Products that Have Zero or Insufficient Production**

Action	Explanation
Preparing feasibility reports for ferrous production that is used for iron-steel production.	<ul style="list-style-type: none"><li>Turkey barely produces ferro-alloy that is needed for iron-steel production so it imports nearly USD 700 million of ferro-alloy, 70% of the import is made up of ferro-silico-manganese and ferro-silisium. Even though these products are not within the scope of steel products, depending on the feasibility reports suitable support will be provided for domestic and foreign investments.</li></ul>
Feasibility reports will be conducted for domestic investments in copper smelting facilities.	<ul style="list-style-type: none"><li>In 2010, an amount of concentrated copper that would worth USD 750 million if processed was exported because of its high energy consuming production process. Depending on the outcome of feasibility studies, investments in this area may be provided support.</li></ul>
Preparing feasibility reports of primary aluminum production.	<ul style="list-style-type: none"><li>Turkey's installed capacity for primary aluminum has only met 10% of domestic demand because of its high energy consuming production process and as a result, the country imported USD 1.8 billion of this product in 2010. Depending on the outcome of feasibility studies, investments in this area may be provided support.</li></ul>
Product based projects will be developed for attracting foreign investment, aiming at graphite electrode production.	<ul style="list-style-type: none"><li>There is no graphite electrode production in Turkey. The production process of graphite electrode is technologically advanced, very expensive and consumes a high amount of energy. There are very few producers in the world. Turkey is one of the biggest importers in the world with its EAF facility capacity and has a market to attract graphite electrode investment.</li></ul>



## II. A Detailed Look at the Iron and Steel Industry in Turkey



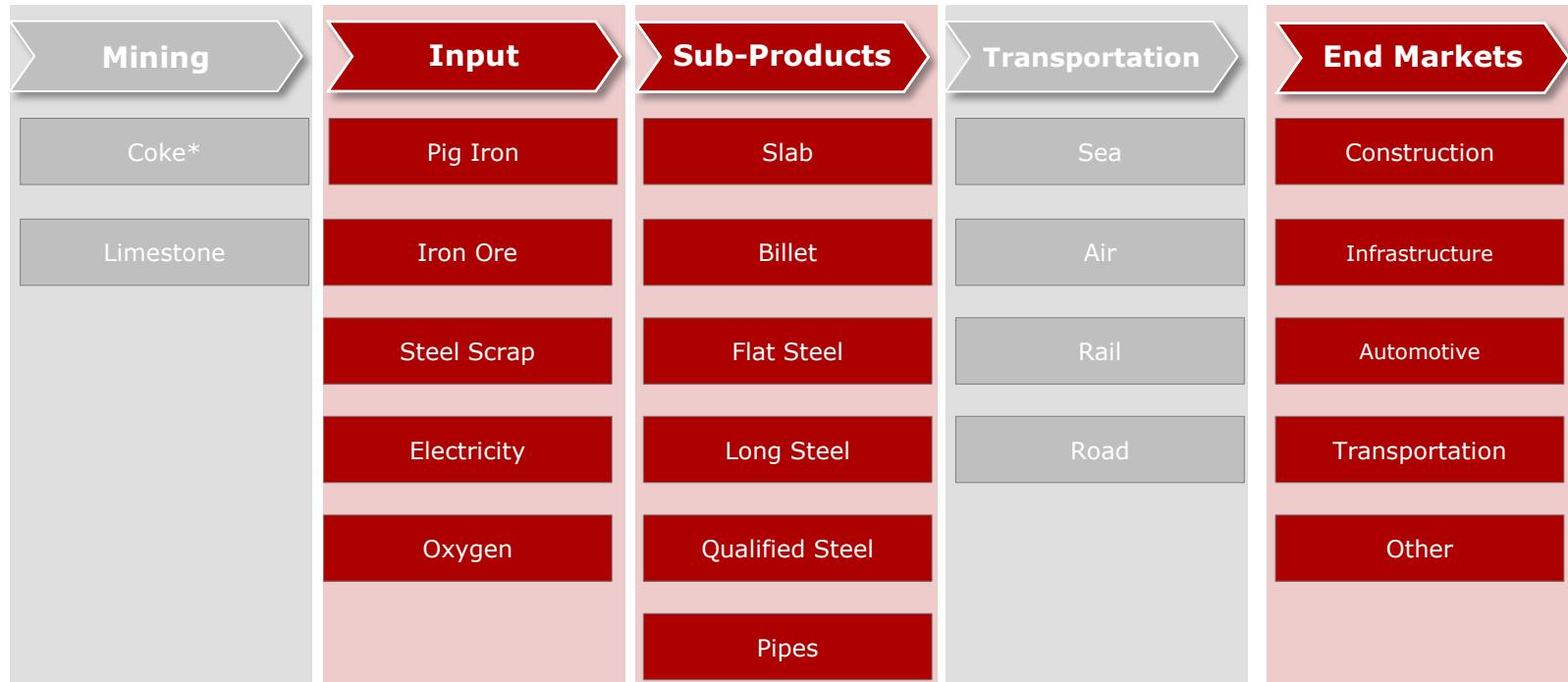
# A. Analysis of the Iron and Steel Sub-Sectors

- i. The Industry Value Chain
- ii. Crude Steel Facts and Figures
- iii. Raw Materials – Iron Ore, Pig Iron, Scrap Steel
- iv. The Production Process and Capacity Utilization Rates – BOF and EAF
- v. Articles Made of Iron and Steel – Semi-Finished Products, Finished Products, High Quality Steel



# Iron and Steel Industry Value Chain

Figure 34: Iron and Steel Industry Value Chain



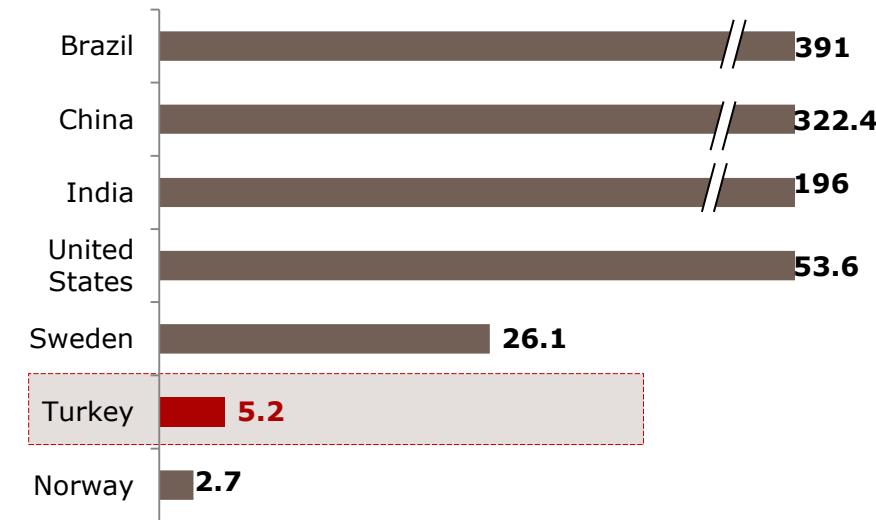
Source: Deloitte Analysis

\* Coke in the form of coking coal



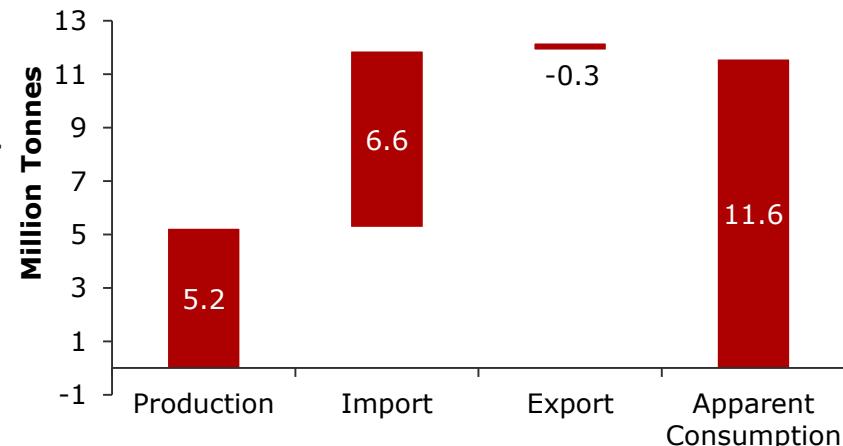
# Turkey is the second largest producer of iron ore in Europe and 6<sup>th</sup> in the world...

**Figure 35: Top Iron Ore Producing Countries, 2011** (Values in million tonnes)



Source: World Steel Organization

**Figure 36: Iron Ore Consumption in Turkey, 2011**



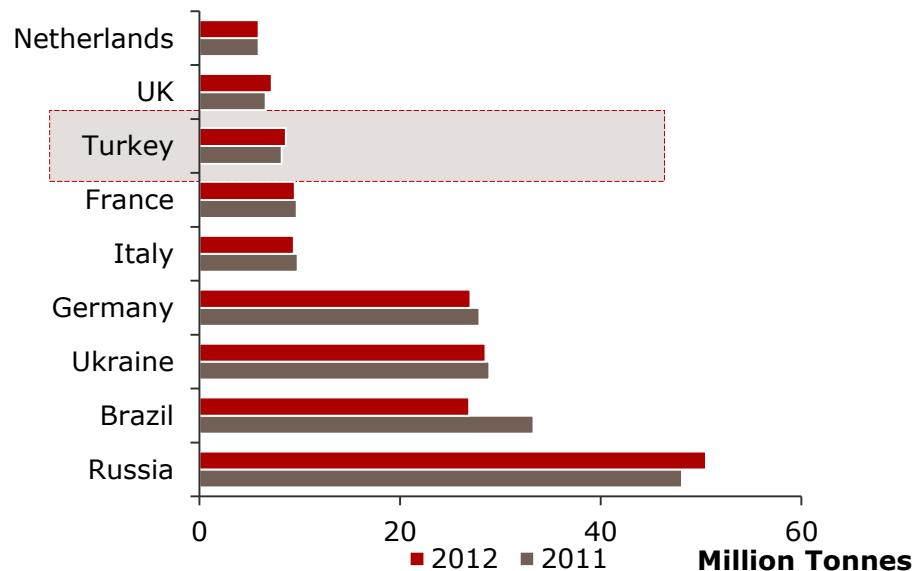
Source: World Steel Organization

- Iron ore is one of the essential ingredients used in the production process of steel. Total global iron ore production was 1.9 billion tonnes in 2011. Turkey, with a production amount of 5.2 million tonnes of iron ore in 2011, was the second largest producer in Europe after Sweden.
- Turkey's apparent consumption of iron ore, which is production plus imports minus exports, is 11.6 million tonnes. Turkey has a 7% share in total iron ore consumption in Europe and is ranked 5<sup>th</sup> in Europe.
- Turkey also has 1 billion tonnes reserve of average 19.49% grade iron deposits in Hasangelebi, Malatya that were not extracted in the previous years because of high technology costs that were needed to operate low-grade iron. Ermaden, mining subsidiary of Erdemir Group has plans to build a new facility in with the new government incentives and will invest USD 500 million for the project. The sustainable facility will be ready by 2017 and will have 64 years life-span. It will have the capacity to produce 3 million pellets per year.



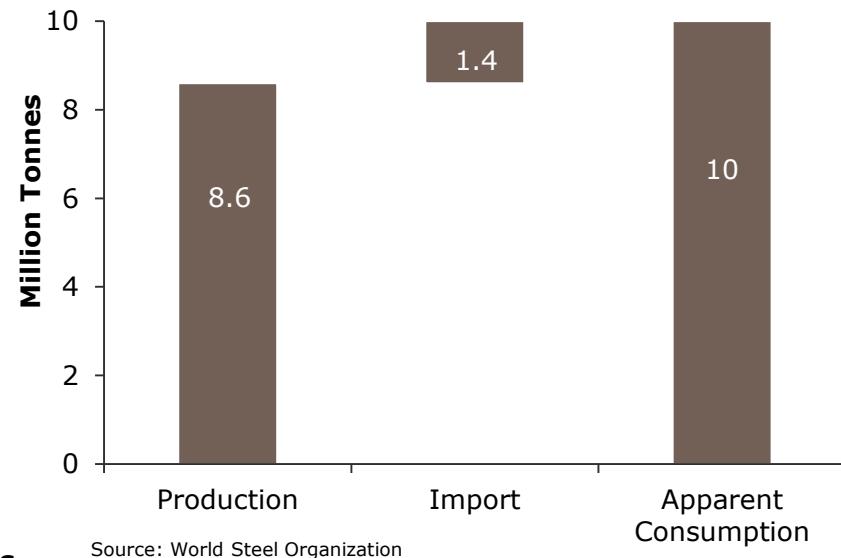
# ...and 4<sup>th</sup> largest pig iron producing country in Europe

**Figure 37: Pig Iron Production, 2011-2012**



Source: World Steel Organization

**Figure 38: Pig Iron Consumption in Turkey, 2012**



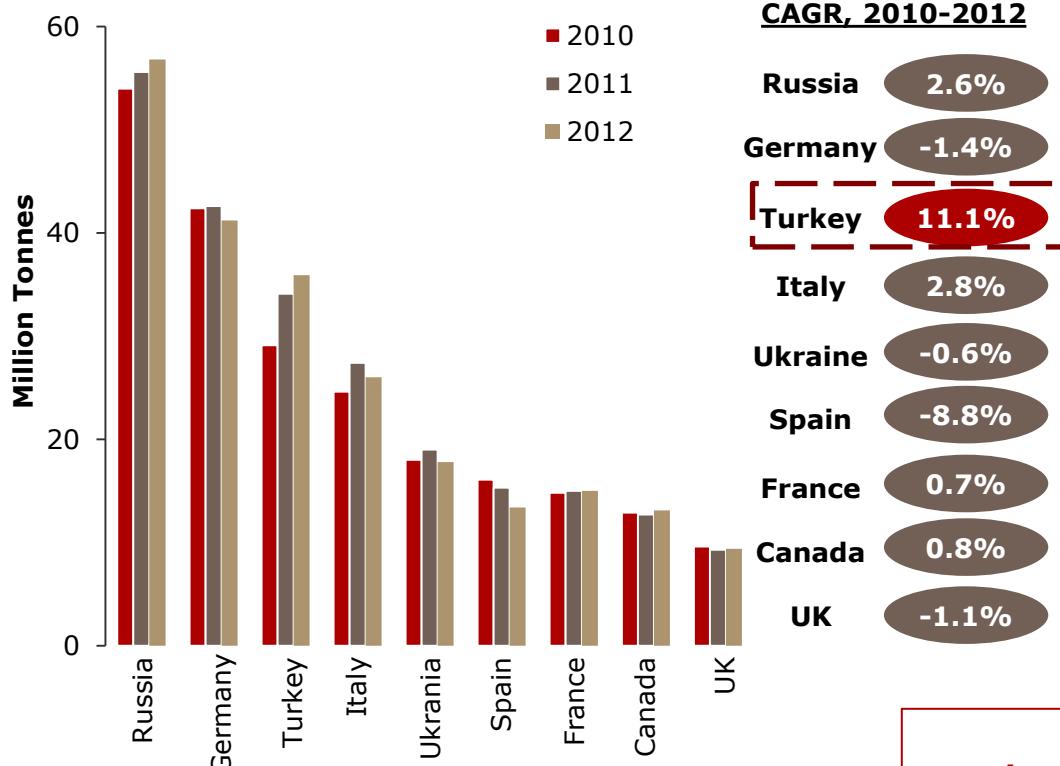
Source: World Steel Organization

- Production of pig iron in the world was 1.1 billion tonnes in 2012.
- Turkey was one of the few countries that increased its production rates from 2011 to 2012. Turkey's pig iron production showed an increase of 5% from 2011 to 2012, reaching 8.5 million tonnes, while most European countries displayed a decrease in production.
- Moreover, Turkey imported 1.4 million tonnes of pig iron in 2012. Thus, the apparent consumption of pig iron was a total of 10 million tonnes, ranking Turkey as the 12<sup>th</sup> largest pig iron consuming country in the world.



# Turkey's continuous cast steel production has proven to be remarkably robust, achieving high growth rates

**Figure 39: Continuous-Cast Steel Output, 2010-2012**



## CAGR, 2010-2012

- China is the largest producer of continuous cast steel with an output of 704.7 million tonnes. That is approximately half of the world's continuous cast steel production in 2012.
- Turkey is gaining speed in continuous cast steel production. It shows a constant increase in continuous cast steel output over the years and is ranked 8<sup>th</sup> in terms of output in 2012, globally.
- Turkey had the highest compounded growth rate among countries such as Russia, Germany, Italy, Canada, the Ukraine and the like with a CAGR of more than 11% between 2010 and 2012.

***Investment Tip: Turkey's increasing production and output figures promise new opportunities for investors in the industry.***

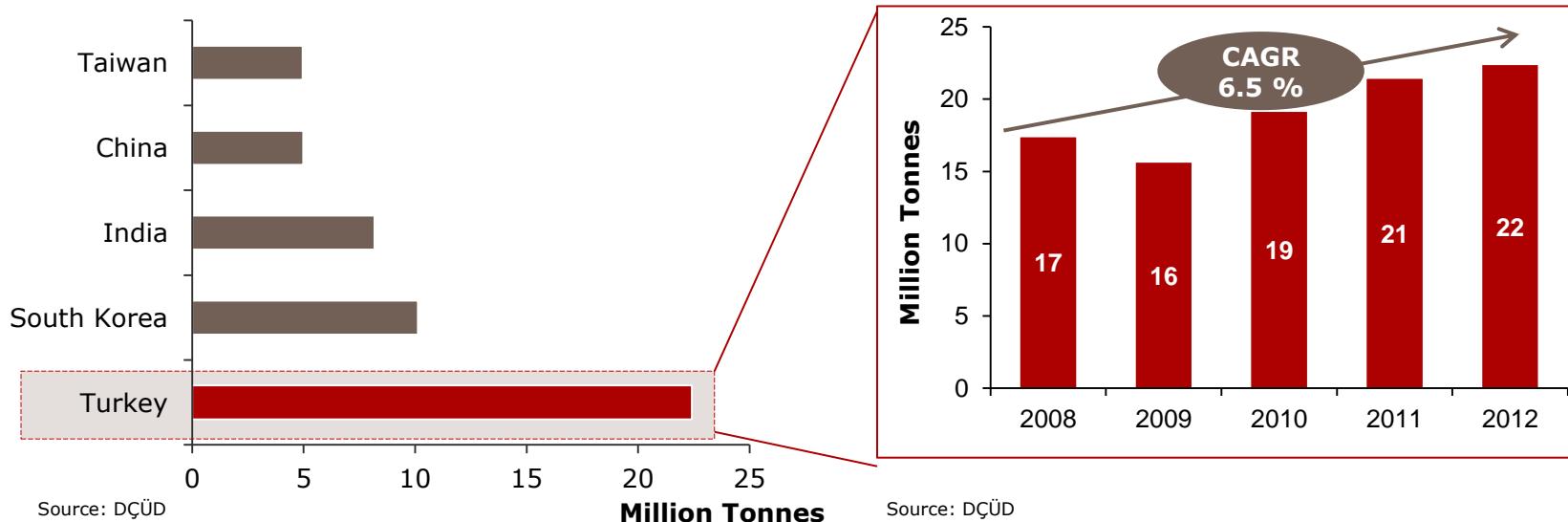
Source: World Steel Organization



Investment Support and Promotion Agency of Turkey

# Turkey's steel export depends on the import of scrap steel and Turkey is by far the largest importer of scrap steel

Figure 40: Imports of Scrap Steel, 2012



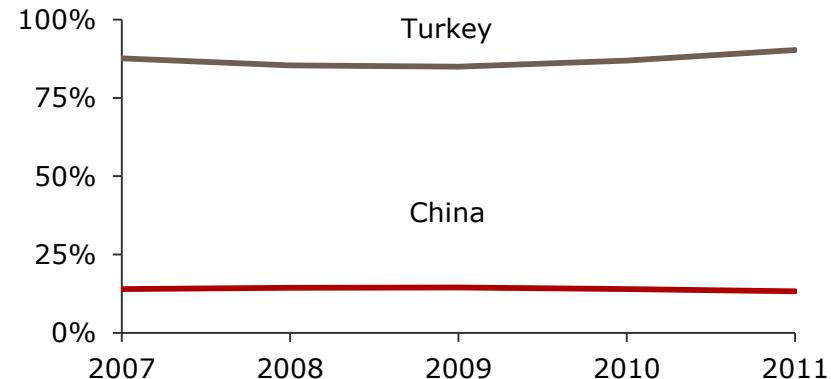
- Scrap steel is an essential part of making steel, especially when producing steel using EAFs.
- It is not surprising that Turkey is the largest importer of scrap steel in the world with over 22 million tonnes, since mostly EAFs are used in the production process in Turkey. Turkey accounts more than 20% of the international market for scrap steel.
- Turkey's long steel export business model depends on importing scrap mainly from the USA, CIS countries and Europe.



# Apart from importing scrap, Turkey uses its own steel resources for recycling

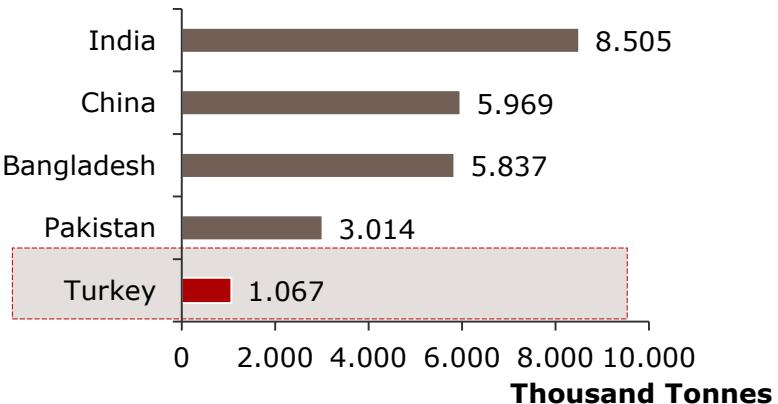
- Ship steel scrap falls into the “old steel scrap” (or “capital scrap”) category which is scrap steel from obsolete products that can be collected, traded and sold to steel plants for re-melting.
- The world’s biggest crude steel producer, China, uses between 13%-14% of scrap in steel production, while Turkey uses between 80%-90% of scrap steel in the production process.
- Turkey has been optimizing its steel production costs, including raw material usage. Turkey is the single largest importer of scrap steel in the world, but the Turkish government has started to promote local scrap production to diminish importation.
- Ships are recycled primarily to recover their steel. The recycling process recovers non-ferrous metals, machinery, equipment, etc. Non-ferrous metals (eg. steel, iron or copper) can recover for the recycling company up to 10% to 15% of the price paid for the ship. Turkey is ranked as the 5<sup>th</sup> largest steel recycler among recycling countries in the world.
- The annual rate of ship recycling picked up after 2008. The calculated CAGR from 2005 to 2011 was 41%, while the CAGR from 2008 to 2011 was as high as 96%.

**Figure 41: Scrap Usage Percentage in Crude Steel Production**



Source: IHS-Fairplay & International Maritime Organization

**Figure 42: Annual Ship Recycling Volume in the Top 5 Countries, 2011**



Source: IHS-Fairplay & International Maritime Organization

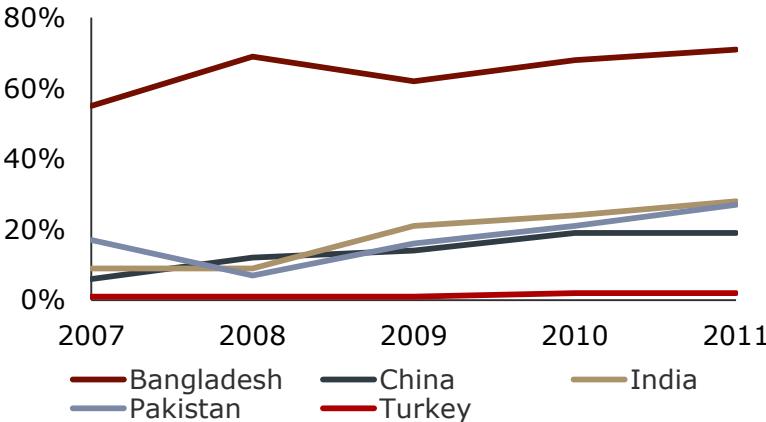


Source: International Maritime Organisation

Investment Support and Promotion Agency of Turkey

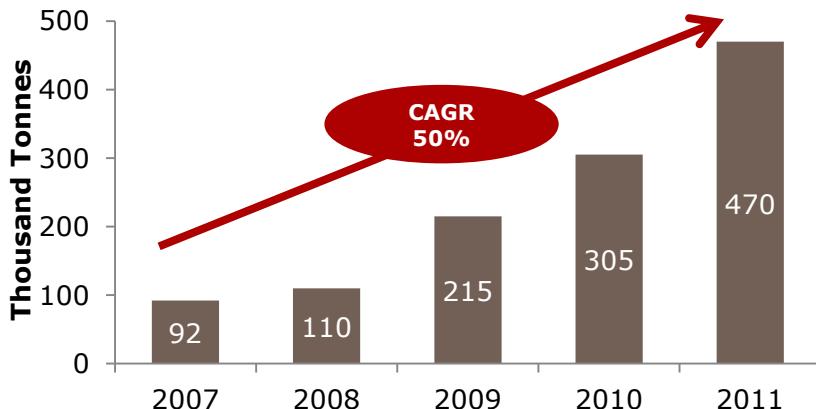
# This recycling strategy serves to secure a supply of scrap for Turkey's steel industry

**Figure 43: The Ratio of Ship Melting Scrap to Imported Ferrous Scrap**



Source: International Maritime Organization

**Figure 44: Ship Melting Scrap in Turkey**



Source: International Maritime Organization, Ship Recycling Markets and the Impact of the Honk Kong Convention

- In the case of Turkey, the imported melting steel scrap provided by Turkey's ship recycling industry is low reaching a rate of only 2%. As Turkey's growth in steel production continues, there will be much greater need for steel scrap. Thus, there lies great opportunity in melting scrap from ship recycling.
- When the ratio of ship melting scrap to imported ferrous scrap of the top 5 countries that recycle is given, it is observed that Turkey's share of melting steel scrap from ship recycling is quite low.
- It is obvious that Turkey has the potential of becoming an even larger ship recycling center. Turkey is ranked as the 8<sup>th</sup> largest steel producer and the largest importer of scrap steel in the world.
- Ship melting scrap grew with a stunning CAGR of **50%** from 2007 to 2011 reaching 470 thousand tonnes in 2011.

***Investment Tip: More than 85% of crude steel produced in Turkey includes scrap metal. Turkey is trying to reduce its scrap metal imports through recycling and melting ship scrap.***



# Case Study: Disassembly of ships to produce scrap metal

- Aliağa Port, located in Izmir, has a facility for the disassembly of ships where ships are divided into parts in order to create scrap metal to be used in the production of iron and steel.
- In 2012, Izmir Gemi Geri Dönüşüm was the sector leader in ship disassembly in Turkey with 145,000 tonnes of ship disassembled.
- Recently, Turkey has invested in two big ship disassembly projects.

## Pacific Princess

- The Pacific Princess was bought by a Turkish disassembly company for Euro 2.5 million.
- The ship was brought to Turkey on August 6, 2013.
- It weighs 13,500 tonnes and its disassembly is planned to be completed in 8 months.

## Ark Royal

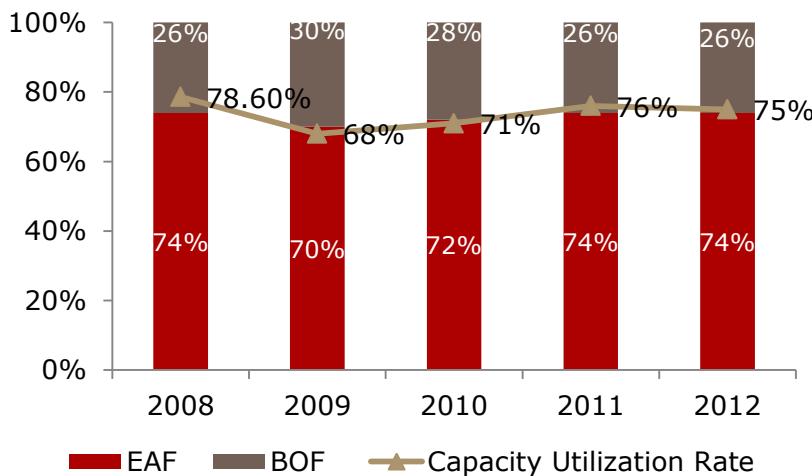
- The Ark Royal was an aircraft carrier and flagship of the Royal Navy. When retired from duty, a Turkish company bought for TL 10 million for scrap.

Source: Ministry Of Development, Izmir Gemi Geri Dönüşüm



# Steel: The capacity utilization rate is being ramped up as steel demand grows

**Figure 45: Turkey's Capacity Utilization Rate, 2008-2012**



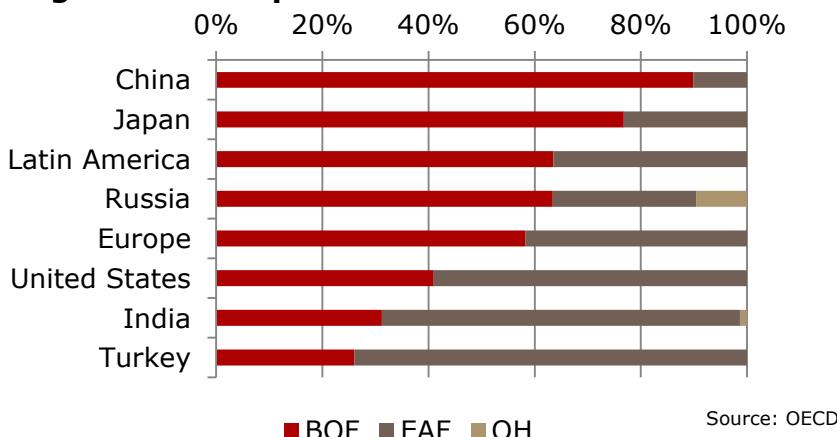
Source: DÇÜD, Ministry of Science, Industry and Technology, Credit Suisse

- Globally, the BOF method accounts to more than 70% of total production, whereas the rest belongs to EAFs. But EAFs are catching up and represent the fastest growing segment in the industry. EAFs increased their market share from 15% to 28% during recent years. Turkey already had a high share of EAFs with 74% as of 2012.
- Capacity utilization picked up after the global economic crisis of 2009 as spending in both manufacturing types e.g. EAF and BOF increased.

- As the global economy recovers, the capacity utilization rate is expected to increase to 76% in 2013 and total capacity is expected to be 51 million tonnes. By 2015, the total capacity of the industry is expected to reach 59 million tonnes. Turkey has one of the highest shares of Electric Arc Furnace (EAF) output in the world. Moreover, Turkey owns the biggest electric arc furnaces in the world.

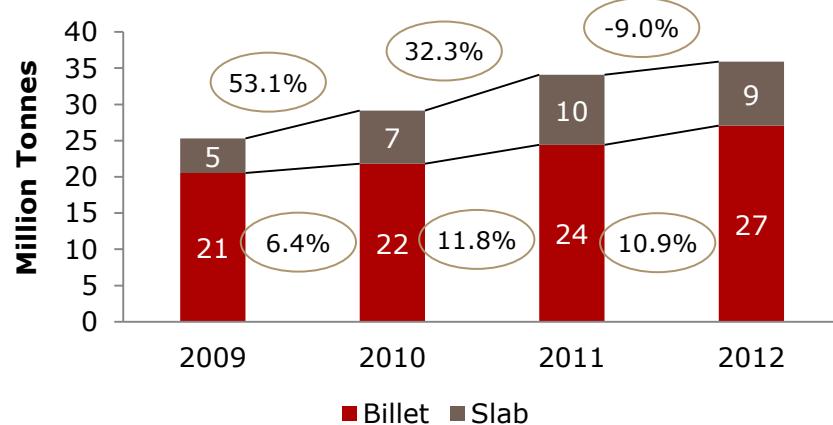
- The percentage of EAFs, when compared to BOFs, is much larger than the world's average percentage, which is 69.6% for BOF, 29.3% EAF and 1.1% for the Open Hearth process. Turkey can be considered as an Electric Arc Furnace hub for steel production. The ratio of BOFs in Turkey is 26%, while the rest of the production is made via EAFs.

**Figure 46: Comparison of the Production Process**



# **Semi-finished goods: Production of semi-finished goods continue to grow**

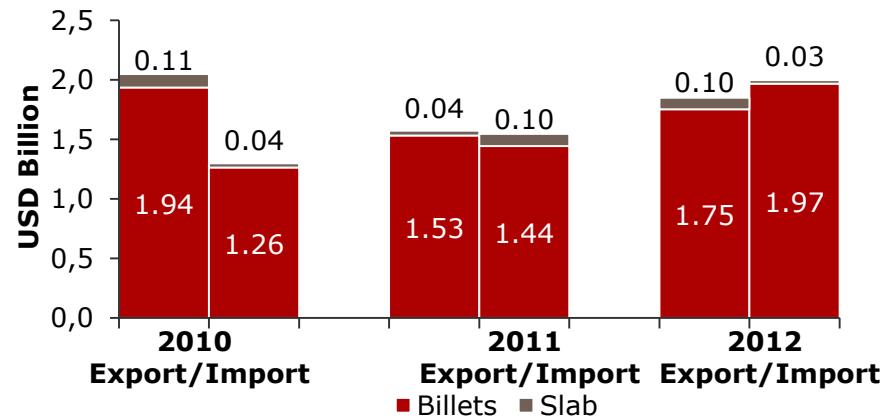
**Figure 47: Production of Semi-Finished Products, 2009-2012**



Source: Turkstat, the Ministry of Science, Industry and Technology, TOBB

- Molten steel is cooled down to either a billet or a slab, which are called semi-finished by-products of steel.
- A slab is a semi-finished good that is used to make flat steel, whereas a billet is used to make long steel.
- The total production of semi-finished products increased with a **CAGR of 12%** from 2009 to 2012. The largest increase in 2012 was of billet by 11%

**Figure 48: Import/Export of Semi-Finished Products, 2009-2012**



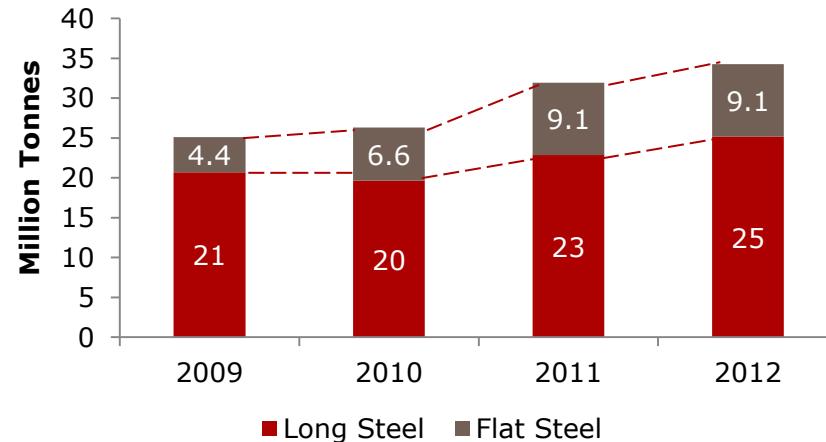
Source: Turkstat, the Ministry of Science, Industry and Technology, TOBB

- Imports of semi-finished products gradually increased between 2010 and 2012 totaling more than USD 1.9 billion.
- Exports of semi-finished products started to decline during the same period.
- Turkey turns its heavy dependence on imports of semi-finished products to an advantage by producing high quality iron and steel products that have more value added as semi-finished goods.



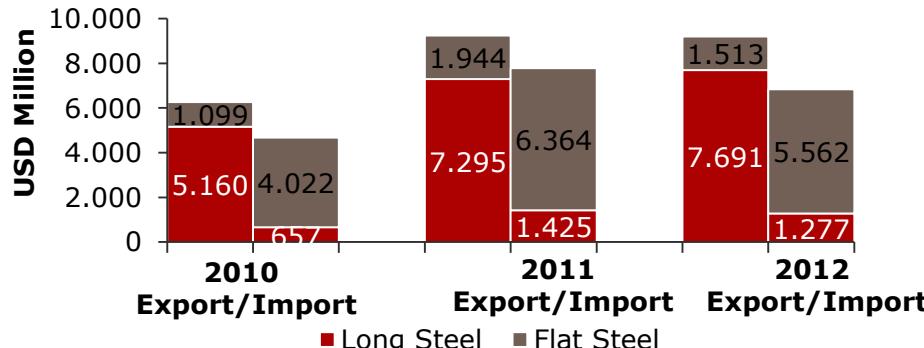
# **Finished goods: The consumption driven need for finished products will increase both production and foreign trade**

**Figure 49: Production of Finished Products, 2009-2012**



Source: Turkstat, the Ministry of Science, Industry and Technology, TOBB

**Figure 50: Export/Import of Finished Products, 2010-2012**



- Long steel production constitutes the major portion of total finished products with approximately 74% of total finished product manufacturing.
- Turkish flat steel production has been increasing from 2009 to 2012 with a **CAGR of 27%**. As capacity and production growth in the industry continues, Turkey will become a net exporter of flat steel.
- Long steel production has been increasing at a steady pace since 2009 with a **CAGR of 7%**.

- Turkey is moving forward in finished steel products as production and foreign trade picks up. The total volume of foreign trade increased a CAGR of 11% from 2010 to 2012.

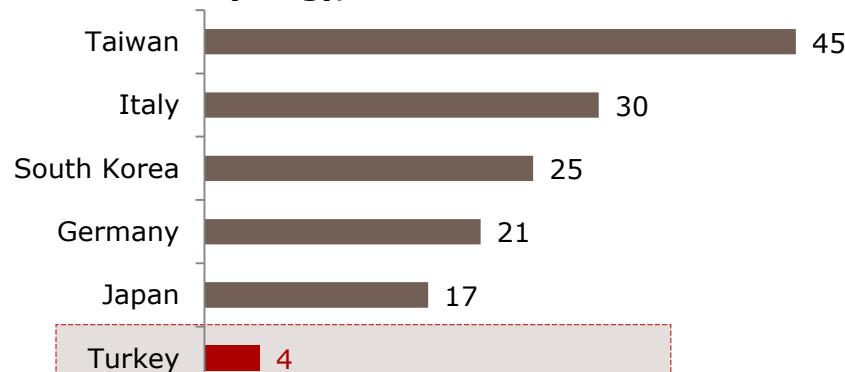
***Investment Tip: With government backed support and the consumption driven need for iron and steel, both production and total volume of foreign trade is likely to increase over the coming years.***



# **Stainless Steel: Foreign investors are attracted to stainless steel production opportunities in Turkey**

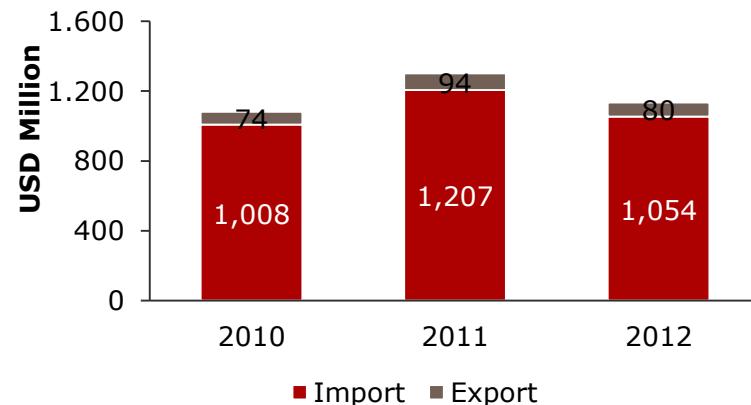
- There is no integrated production facility for stainless steel in Turkey, but consumption keeps increasing. Consumption tripled from 2000 to 2011. Stainless steel is imported at high volumes, but new facilities are expected to be built. Thus, Turkey will have a part in the worldwide production of stainless steel.
- Stainless steel consumption in Turkey is more than 4 kilograms per person. In order for Turkey to catch up with developed markets, stainless steel consumption has to rise to 18 kg per person. Therefore, there is considerable room and opportunities for investment in the stainless steel sub-sector.
- There are international companies that are already evaluating opportunities in stainless steel production in Turkey. One such company is the South Korean steel producer POSCO. The facility for a cold rolled stainless flat steel facility started operation in the second quarter of 2013. The facility's total investment was USD 350 million and its capacity is 500,000 tonnes of stainless steel per year.

**Figure 51: Stainless Steel Consumption Per Person (in kg), 2011**



Source: SteelOrbis

**Figure 52: Stainless Steel Import & Export**



Source: Turkstat, the Ministry of Science, Industry and Technology, TOBB



# ***Stainless steel: A Success Story - POSCO Assan TST***

“Today is not only an important day for our company, but also an important turning point for Turkey. It is a new era in the stainless steel sector. Turkey doesn't have to meet its need for stainless steel through importation any more.”

*Jong Won Kwon, CEO of POSCO Assan TST on June 2013*



Source: Dünya Gazetesi

- The South Korean steel company POSCO and Turkish Kibar Holding are constructing a stainless steel producing plant in Turkey with a total investment amount of USD 350 million.
- The plant will have a capacity of 200,000 tonnes per annum and help reduce the Turkey's dependence on stainless steel imports.
- The plant is expected to meet 40% of Turkey's stainless steel demand.
- The capacity of the plant will be gradually increased to 1 million tonnes.

***Investment Tip: Turkey currently consumes 4 kg of stainless steel per capita. However, to reach developed market standards, it needs a consumption amount of 18 kg per capita. Therefore, more qualified steel production is needed in Turkey.***



# Chrome: Turkey has many proven chrome reserves

## Chrome Mining in Turkey

Total Export in 2012

USD 418.8 million/2.12 million tonnes

Chromium Production, (million metric tonnes)

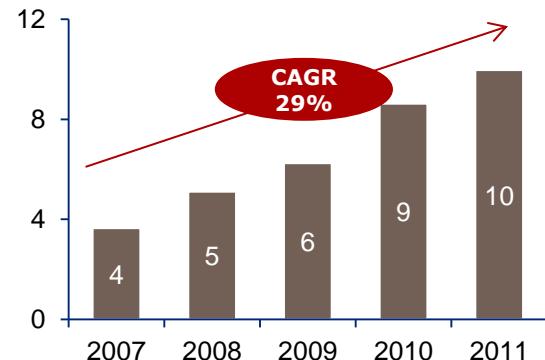


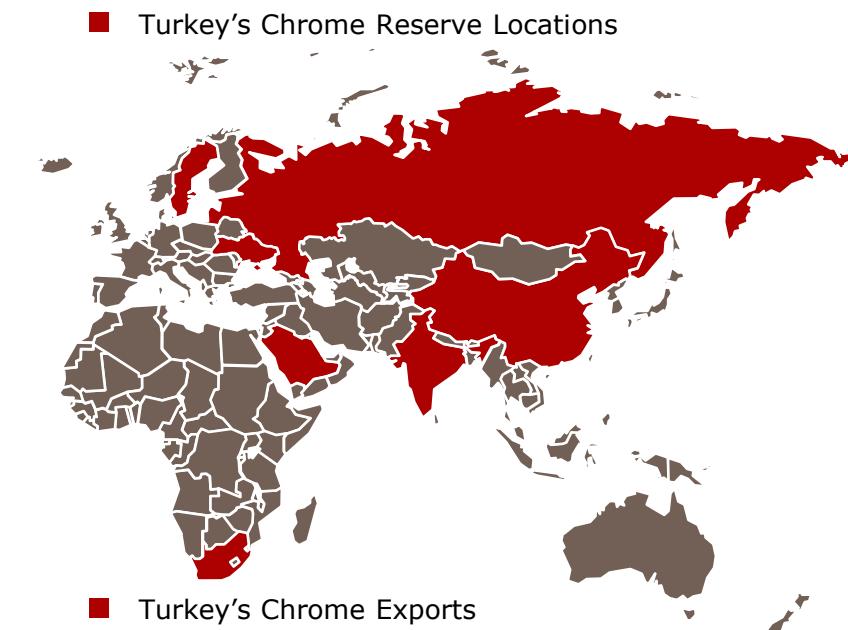
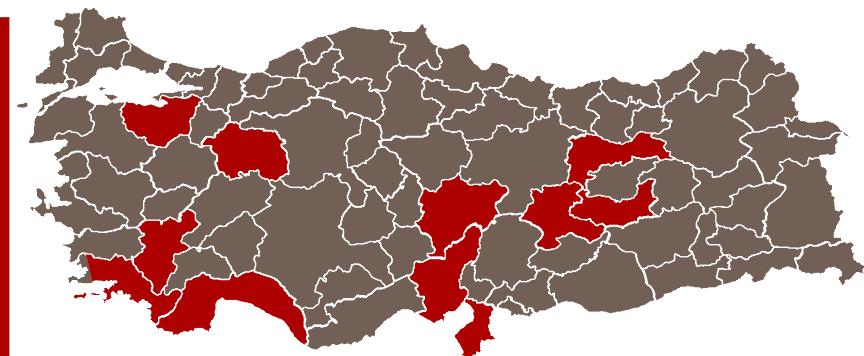
Table 8: Turkey's Chrome Exports

2012	Amount (million tonnes)	Value (USD million)	Total Export (%)
China	1.82	361.18	85.40%
Sweden	0.13	18.26	6.31%
Russia	0.08	14.53	3.85%
Other	0.09	24.78	4.44%

Source: Turkstat, MIGEM, IMMIB



Investment Support and  
Promotion Agency of Turkey



# Major Companies of the Chrome Sector(1)

Name	Logo	Web Page	What They Do
Türk Maadin Şirketi A.Ş.		<a href="http://www.turkmaadin.com">www.turkmaadin.com</a>	TMS was founded in 1918 in Istanbul as Ottoman-German Mining Co. The company is one of the leading chrome producers and exporters of Turkey. TMS has 3 chromite mines in Mihalıçık, Köyceğiz and Tavas. It has the capacity to manufacture more than 100,000 tonnes per year.
Çevikler		<a href="http://www.cevikgroups.com">www.cevikgroups.com</a>	Since 1990 Cevikler operates 10 chrome concentration facilities in Kayseri, 8 in Sivas and 25 Kütahya. With respective annual production capacities of 250,000, 200,000 and 350,000 tonnes.
Muratoğlu Krom		<a href="http://www.muratoglukrom.com">www.muratoglukrom.com</a>	Muratoglu Krom was founded in 1969. The company produces chrome ore and purchased new chrome ore areas to explore and conduct feasibility studies. Muratoglu owns two warehouses in Mersin and İskenderun.
Akmetal		<a href="http://www.akmetalmadencilik.com">www.akmetalmadencilik.com</a>	Akmetal is active since 1970. The company has 15 licenced mines in Adana and produces chrome ore. It has the processing capacity of a million tonnes per year.
ŞETAT Maden		<a href="http://www.setatmaden.com">www.setatmaden.com</a>	ŞETAT Maden was founded in 1996. It has 4 chrome processing factories in Bursa. Hüglatepe factory has the capacity to process 30 million tonnes of chrome per year.



# Major Companies of the Chrome Sector(2)

Name	Logo	Web Page	What They Do
<b>CVK Group</b>		<a href="http://www.cvkgroups.com">www.cvkgroups.com</a>	CVK meets half of Turkey's total chromium production and the company's chromium reserve is approximately 100 million tons. It has licences in Adana, Bursa, Sivas, Erzincan. CVK is managed by the Chinese ferrochromium establishment and steel manufacturer TISCO as an example of vertical integration.
<b>Eti Krom A.Ş</b>		<a href="http://tr.etikrom.com/">http://tr.etikrom.com/</a>	After its privatization and handover to Yıldırım Holding for USD 58 million, it continues to be the largest chrome ore and ferrochrome producer in Turkey. The chrome ore division has 79 mines spread across Turkey and has a total production capacity of 1 million metric tonnes per year. At the ferrochrome plant, 4 furnaces have a total production capacity of 150,000 metric tonnes. Eti Krom's main export markets are Europe, the Americas, China and other Asian markets.
<b>Dedeman Madencilik</b>		<a href="http://www.dedemanmadencilik.com/">http://www.dedemanmadencilik.com/</a>	Dedeman Madencilik operates chrome mines in the Kayseri region. The production capacity of the complex is 250,000 - 350,000 tonnes year. Dedeman Mining discovered USD 3 billion worth of chrome reserves in Aladağ, Adana in 2006. The reserves are estimated to hold 10 million tonnes of concentrated ore and the reserves in the region are estimated to be worth of USD 100 billion.



# Nickel: Turkey will compensate for its import dependency in nickel with new investments in the field

## Nickel Mining in Turkey

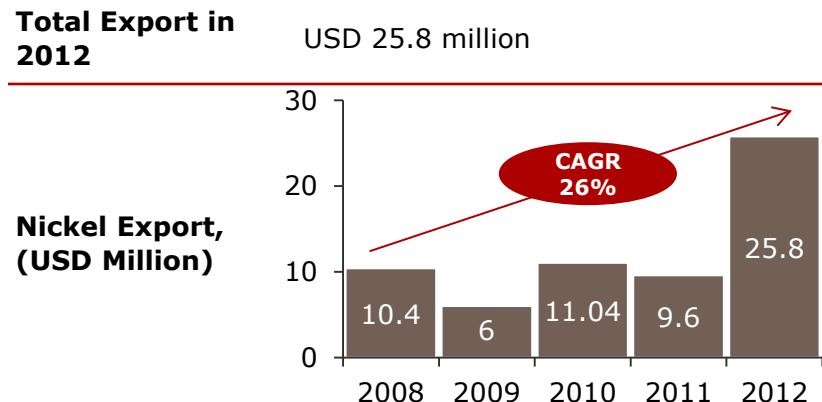
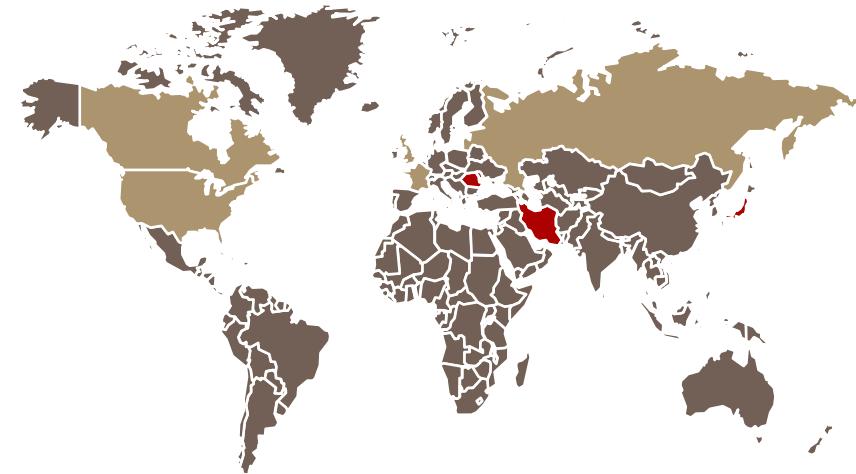
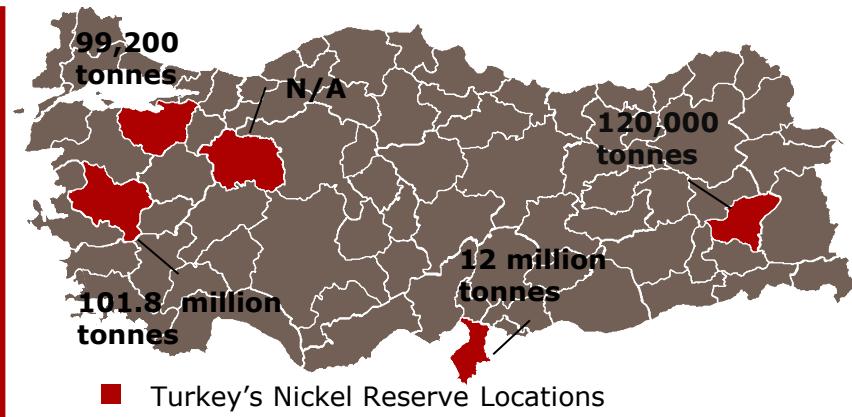


Table 9: Turkey's Nickel Imports/Exports

2012	Value (USD million)	Total Import (%)
USA	86.0	43.69%
Russia	23.0	11.69%
Canada	21.0	10.68%
England	15.3	7.77%
France	12.3	6.24%

2012	Value (USD million)	Total Export (%)
Philippines	13.9	54.01%
Iran	3.4	13.19%
Romania	1.5	5.62%
Japan	1.4	5.45%
USA	1.1	4.14%



# Nickel: Three Success Stories - Zorlu Holding, VTG and Fe-Ni Mining

## Zorlu Holding

- In 2007, Zorlu acquired Meta Nickel Cobalt, which operates nickel mines and established Turkey's first nickel refinery in Manisa.
- The aforementioned nickel reserve is estimated to be about 500,000 tonnes and has a projected value of USD 10 billion. The annual processing capacity of the nickel plant will be 10,000 tonnes and production is expected to start in October 2013. Moreover, total exports are expected to reach USD 600 million in three years.
- The cost of the plant is USD 300 million.
- The plant will be the first nickel producing plant in Turkey. The nickel products produced will be exported.



## VTG Holding

- VTG Holding will invest a total of USD 630 million in the Çaldağ Nickel Project.
- The project will produce 20,000 tonnes of nickel yearly.
- The project will help decrease import dependency for nickel in Turkey and support the automotive and construction industries that demand high quality nickel in their projects.



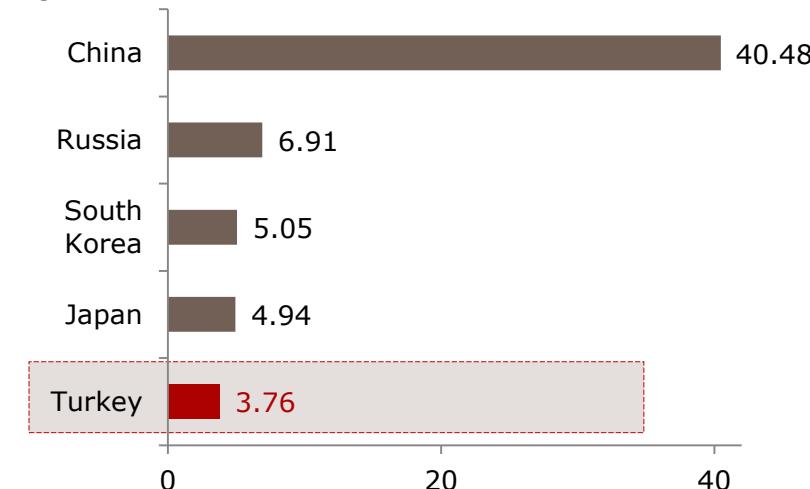
## Fe-Ni Mining

- Fe-Ni Mining Ltd. Co. was established in 2008. The Fe-Ni Mining Company has been providing nickel to foreign companies from its open pit mine in the Eskişehir-Mihalıççık-Yunus Emre district in Turkey.
- Fe-Ni Mining has facilities in Karaçam-Eskisehir.
- Exploration activities by the company show that the total estimated reserves are 6 million wet metric tonnes in the area.



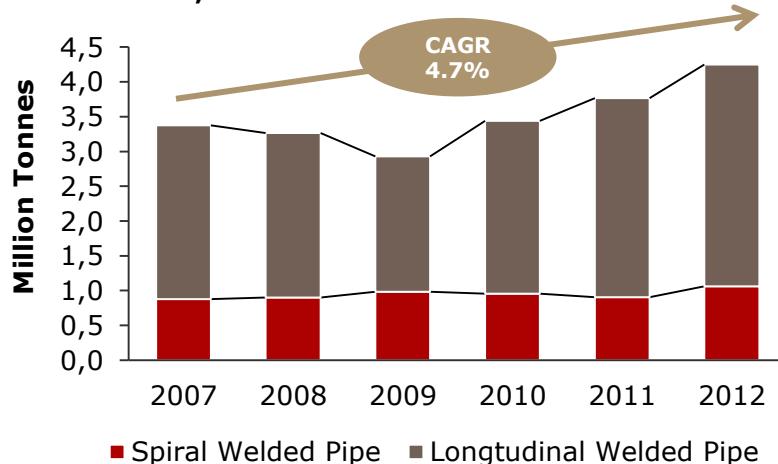
# **Welded Pipe: Turkey is a leading welded steel pipe producer in Europe and is ranked 5th in the world...**

**Figure 53: Worldwide Welded Steel Production, 2011**



Source: ÇEBİD

**Figure 54: Turkey's Welded Steel Pipe Production, 2007-2012**



Source: ÇEBİD

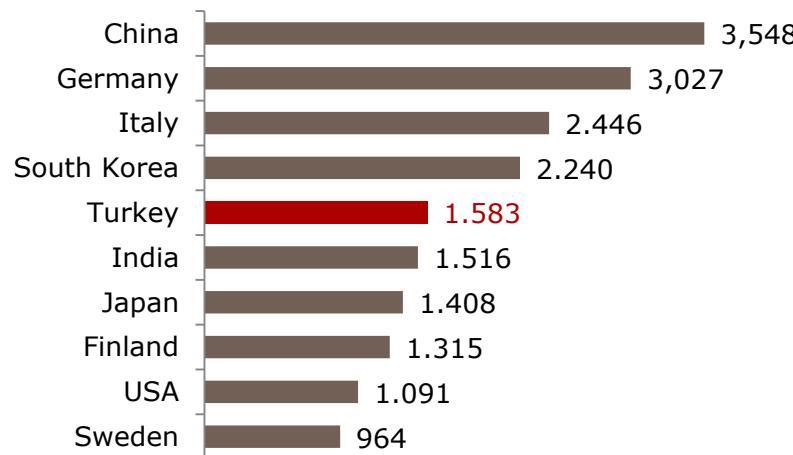
- Turkish welded pipe production technology is constantly developing and this development was reflected in production amounts. Turkish welded steel pipe production grew from 3.4 million tonnes in 2007 to more than 4 million tonnes in 2012. That is an increased **CAGR of 4.7%** during those periods.
- Turkey aims to become the 3<sup>rd</sup> largest welded steel producer in the world by 2023.



# ...and it is also the 5<sup>th</sup> largest steel pipes exporter

- The vast majority of production in Turkey is small and medium-sized pipes.
- Large diameter spiral welded pipes that are generally used in water, oil and natural gas transmission lines are about 25% of total production.

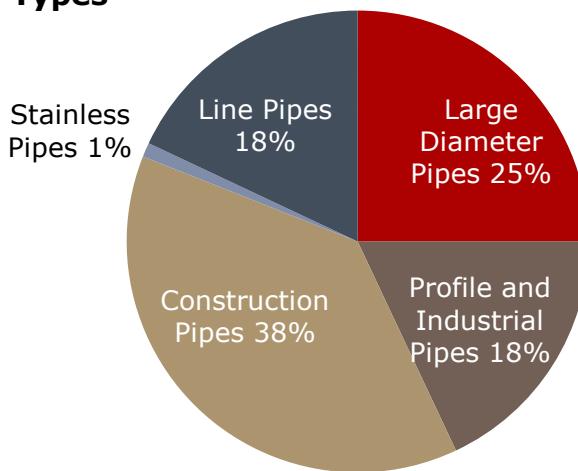
**Figure 55: Top 10 Steel Pipe Exporters in the World (thousand tonnes), 2011**



Source: ÇEBİD

- In 2011, welded steel pipe export in the world was USD 40 billion. Turkey's steel pipe export during the same period was 1.58 million tonnes corresponding to a value of USD 1.56 billion.

**Figure 56: Steel Pipe Production by Product Types**



Source: ÇEBİD

- In 2012, Turkey increased its steel pipe export to 1.83 million tonnes.
- The steel pipe sector of Turkey is very dynamic and competitive, exporting high quality products to more than 140 countries worldwide.



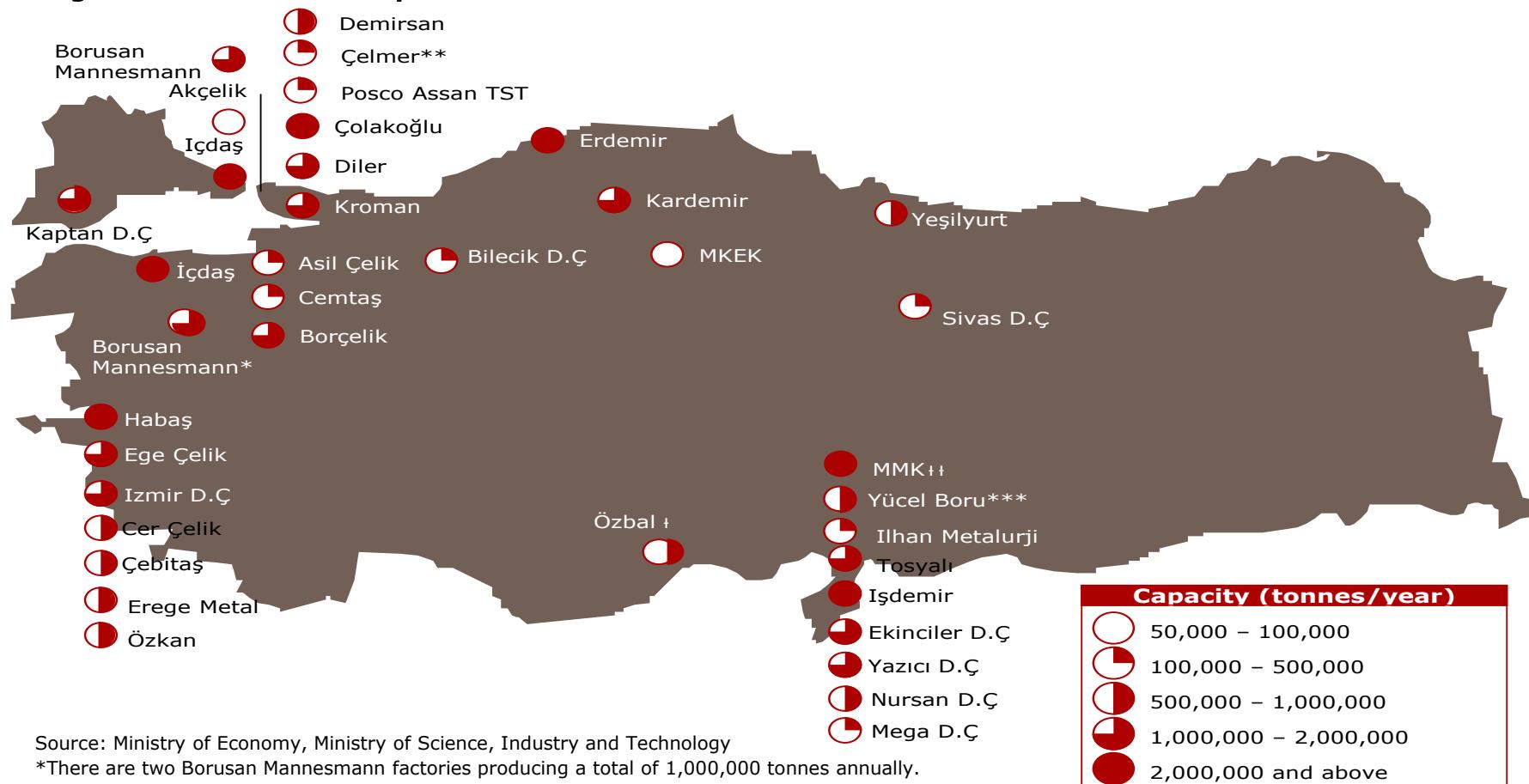
# B. Investments in the Iron and Steel Industry

- i. Case Studies and Success Stories in the Industry
- ii. Investments in the Industry
- iii. Major NGOs of the Iron and Steel Industry



# There are approximately 150 steel production plants in Turkey...

Figure 57: Steel Plant Capacities and Locations



Source: Ministry of Economy, Ministry of Science, Industry and Technology

\*There are two Borusan Mannesmann factories producing a total of 1,000,000 tonnes annually.

\*\*Çelmer factory has an average monthly production of 19,000 tonnes and 1,415 mm.

\*\*\*Yücel Boru has two factories in Gebze and Dörtyol, with a total production capacity of 900,000 tonnes per year.

† Özbal has 3 factories with a total production capacity of 150,000 tonnes per year.

†† MMK has two factories in Gebze and Dörtyol with a combined production of over 2,000,000 tonnes.



# Investments in the industry are continuously increasing

**Table 10: Selected Investments**

Company Name	Investment Type	Investment Cost (in USD million)	Capacity (in thousand tonnes)	Date
Tosyalı Holding	Long Product	500	1,000	2015
Habaş	Flat Product	N/A	4,500	2014
Izmir Demir Çelik A.Ş	Profile - Rebar	45	1,200	2013
Kibar Holding-Posco Assan	Stainless Steel	350	200	2013
ThyssenKrupp	Automotive Industry (chassis/frame)	30	50	2013
Tosyalı Holding	Pipe	500	1,250	2012
Yücel Boru - İskenderun	Pipe	70	200	2012
Özbal Çelik A.Ş	Pipe	20	75	2012
MMK-Atakaş	Flat Product	1,700	2,500	2011
Bilecik Demir Çelik Fabrikası	Stainless Steel	N/A	150	2011
Çolakoğlu	Flat Product	1,000	3,000	2010
Özkan Demir-Çelik A.Ş	Steel Mill	125	700	2010

- Investments have ramped up in the industry as Turkey's potential has become evident to investors. More than 14 million tonnes of capacity will be added to the industry. These investments will range from finished steel product investments to qualified steel investments such as stainless steel.

Source: 7th Turkish Steel Market Conference, SteelOrbis



# Major Players in Iron and Steel

## Erdemir

- Founded in 1967, Erdemir was the only flat steel producer in Turkey until 2009.
- The main plant is located in Zonguldak.
- In 2002, they acquired Isdemir and became the biggest iron producer in the country.
- Erdemir invested TL 3.6 billion to modernize its Isdemir plant after acquisition.
- In 2005, OYAK acquired 49% of Erdemir for USD 2.77 billion.
- Erdemir is able to import and export through a port in Zonguldak.



## Içdaş Çelik

- İstanbul Çelik Demir İzabe Sanayi was established in 1969.
- In 2012, Içdaş ranked 9<sup>th</sup> among the 500 Biggest Industrial Enterprises of Turkey issued by ISO.
- The company is active in the fields of steel production, energy, shipyard and logistics.
- Today, Içdaş employs approximately 10,000 people and has two facilities in Biga, Çanakkale and Güneşli, Istanbul.
- The company exports most of its production and had net sales production value of TL 4.9 billion in 2012.



## Çolakoğlu Metalurji

- Çolakoğlu was founded in 1945 as a steel trading firm.
- Çolakoğlu's product range includes a lot of iron and steel derivatives from sheet metal to rod.
- Çolakoğlu has the biggest and most productive electric arc furnace that produces steel from scrap metal.
- Their plant is located in Kocaeli, which is close to Istanbul and the firm is headquartered on Istanbul's Anatolian side.



Source: Emerging Markets Insight, Official Websites



# Other Major Players

## Iron and Steel Industry

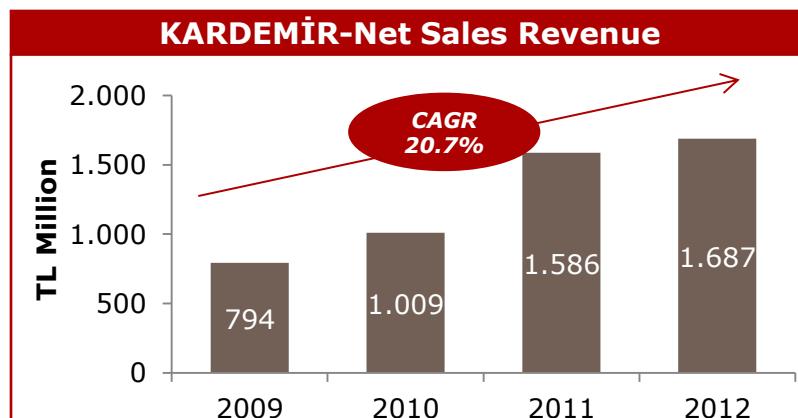


# Case Study: Kardemir-Karabük Iron and Steel Works



- Karabük Iron and Steel Works started production in 1937 and was a public company for 58 years.
- Kardemir is Turkey's first integrated iron and steel factory and is the only company producing long steel ore.
- As a training ground for experts in the field, Karabük Iron and Steel Works led to the establishment of the Turkish heavy metal industry having a hand in creating new companies that later would flourish such as Erdemir and İsdemir.
- The company was privatized in 1995 and named Kardemir-Karabük Iron and Steel Industry and Trade Co. Ltd.

- Recently, the company installed its 5<sup>th</sup> blast furnace. The blast furnace will start operating in February 2014 and will have a production capacity of 1.2 million metric tonnes per year. It will raise Kardemir's crude steel capacity from 1.8 million metric tonnes per year to 3 million metric tonnes per year.
- The company's other ongoing investments include a new coke plant, continuous casting plant and increasing converter capacities.
- Kardemir is set to begin production of high value-added products, including bearing, spring, tool steels, pre-stressed concrete strand and free cutting steels, which are used in many industries such as the automobile, machinery and construction.



Source: Emerging Markets Insights, [kardemir.com](http://kardemir.com)

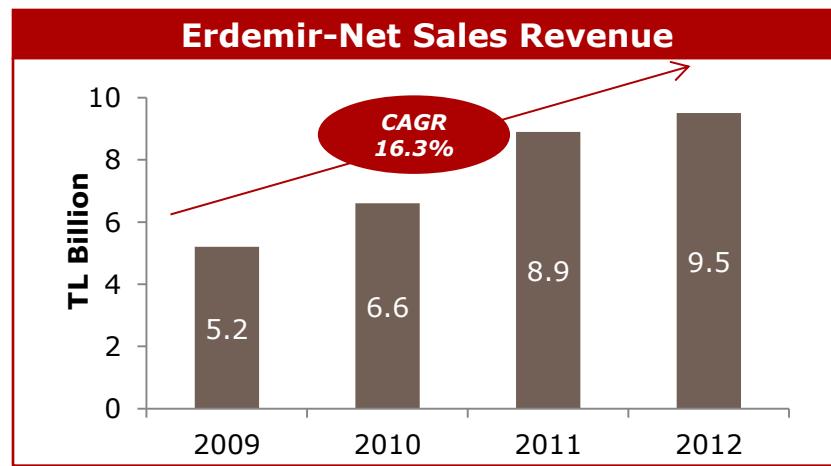


# Case Study: Erdemir



- Erdemir began producing steel in 1965. The Erdemir Group is the biggest company in Turkey in terms of total assets. It has nine subsidiaries including Iskenderun Demir ve Çelik A.Ş. (Isdemir)
- Isdemir is the biggest integrated iron and steel plant of Turkey in terms of long product production capacity. It is the only integrated facility in Turkey producing long and flat products with its 3.5 million tonnes per year hot rolling capacity.
- Isdemir started production in 1975 with a capacity of 1.1 million tonnes per year of crude steel. With a plant extension in 1985, it reached a yearly capacity of 2.2 million tonnes. There are three blast furnaces with a total annual capacity of 2.45 million tonnes of pig iron production.
- After it was privatized in 2002, all of the state owned shares in Isdemir were later purchased by Erdemir for a total amount of USD 50 million. Erdemir's share of 46,2% was later purchased by OYAK for USD 2.96 billion. Currently, 92.91% of Isdemir's shares are owned by Erdemir, and 7.09% is owned by Isdemir Employee Support Foundation.

- The company has planned to expand its liquid steel production capacity to 5.3 million tonnes per year with an investment of USD 2 billion.
- Isdemir produced 4.5 million tons of crude steel in 2012, placing it among the best in Turkey in terms of production rates. Isdemir's owner, Erdemir, was the 47<sup>th</sup> largest crude steel producer in the world in 2012 with 7.9 million tonnes.
- S&P increased Erdemir's credit rating to B+ due to its high profitability and high liquidity in 2012 despite the negative economic trend within the steel industry worldwide.



Source: Emerging Markets Insights

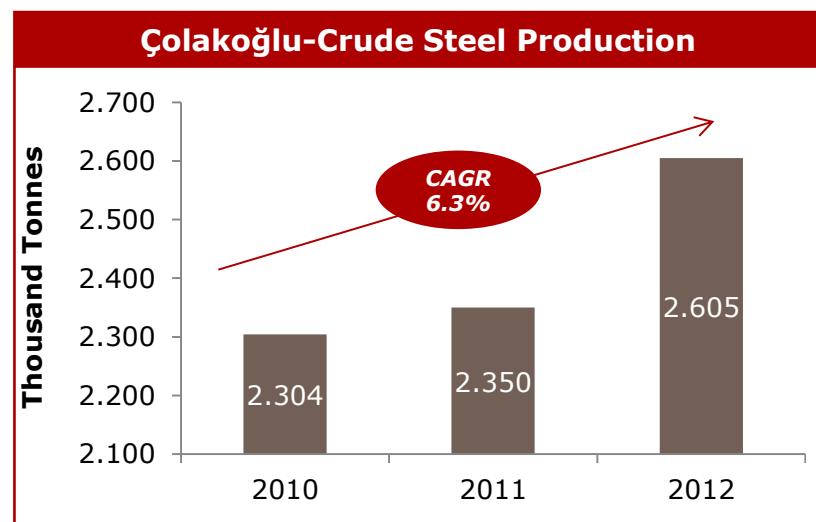


# Case Study: Çolakoğlu Metalurji A.Ş.



- Çolakoğlu Metalurji started its iron-steel business in 1945 in Istanbul. They built their first rolling mills in 1960 and in order to supply billet steel, they started production in 1969 at their plant in Dilovası.
- As a leader in the sector they produced wire rod for the private sector in 1985, in 1990 Çolakoğlu Metallurgy added ribbed rebar to its product range.
- Çolakoğlu had the biggest Electric Arc Furnace in the world in 2007. Today, their furnace is still the biggest Electric Arc Furnace in Europe.

- In 2012, Çolakoğlu Metalurji succeeded in increasing its crude steel production from 205,000 tonnes to 2.6 million tonnes and moved up 11 places in the world steel production standings to become 101<sup>st</sup> largest producer. Currently, their capacity is 3 million tonnes and keeps increasing with new investments.
- The company provided steel products for the Marmaray project in Istanbul.



Source: DÇÜD, Ministry of Science, Industry and Technology



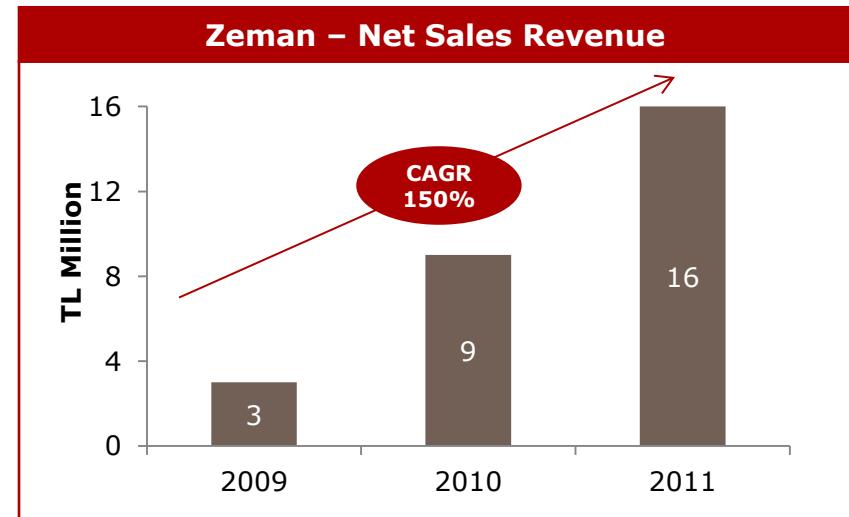
# A Success Story: Zeman & Alfa

"The real winner in this partnership will be Turkey, even though both companies will reap benefits by merging their strengths. The opportunities for Alfa Çelik to do business in other countries around the world will increase with this partnership."

*Rıdvan Murat, General Manager of Zeman Metalurji, November 2009*



- The Austria-based steel company Zeman acquired 80% of Turkish steel producer Alfa Steel as a way of investing in Turkey in 2009.
- The plant has a yearly capacity of 17,000 tonnes and is located in an area of 30,000 m<sup>2</sup> in Sakarya, a city neighboring Istanbul.



Source: Dünya Gazetesi, Emerging Markets Insight



# A Success Story: MMK Metalurji

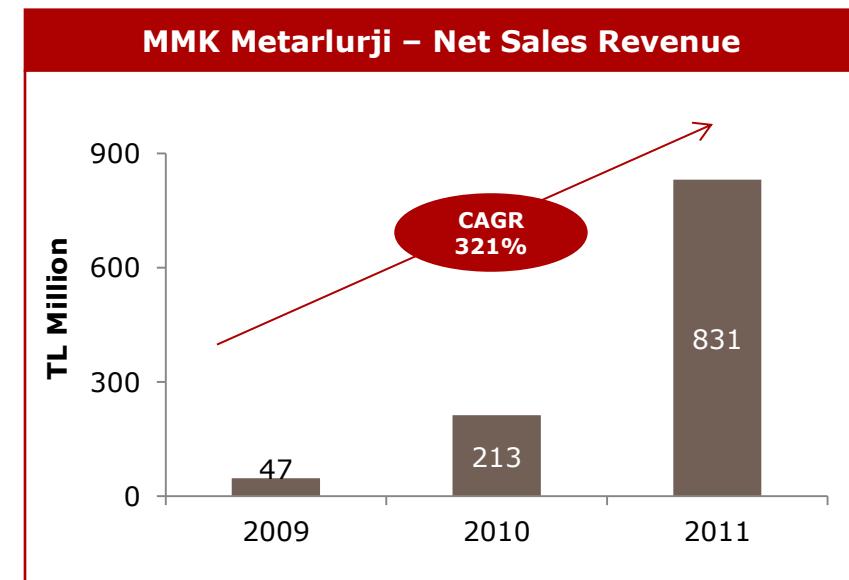
"In 2012, we plan to produce around 1 million tonnes of metal products and reach a designed capacity of about 2.3 million tonnes in 2013. The plant's production is mainly to supply the domestic market as well as North Africa and the Middle East."

Vitaly Galkin, CEO of MMK Metalurji, November 2012



- MMK Metarlurji, a subsidiary of The Russian Company Magnitogorsk Iron and Steel Works (MMK), operates in primary metal manufacturing.
- MMK Metalurji offers a variety of products and services and employs 2,067 people.

- The integrated plant is designed to produce 2.3 million tonnes of steel products annually, using advanced automation systems and globally acclaimed innovative technologies.
- The company reported 900,000 metric tonnes of steel output in 2012.



Source: Prime-Business News, Emerging Markets Insight, MMK Metalurji



# Major NGOs of the Iron and Steel Industry

Name	Logo	Web Page	What They Do
<b>Türkiye Çelik Üreticileri Derneği- Turkish Steel Producers Association</b>		<a href="http://www.dcud.org.tr">www.dcud.org.tr</a>	The association has 20 members and aims to improve the iron and steel industry in Turkey. One of the ways it does so is to collect statistical information in order to increase effectiveness. The association provides an environment to discuss the problems of the industry and examine the possible solutions.
<b>Demir Çelik Haddeciler Derneği- Roiling Mills Union of Turkey</b>		<a href="http://www.haddecilerdernegi.org">www.haddecilerdernegi.org</a>	The association consists of 53 members. Their main aim is to coordinate communication within the industry and to conduct technological research for the advancement of the iron and steel industry.
<b>Çelik Boru İmalatçıları Derneği- Turkish Steel Pipe Manufacturers Association</b>		<a href="http://www.cebid.org.tr">www.cebid.org.tr</a>	The association has 19 members and works to improve communication between the authorities and steel pipe firms. Its work aims at improving steel pipe exportations.
<b>Metal Isıl İşlem ve Sanayicileri Derneği- Heat Treatment and Manufacturers Association</b>		<a href="http://www.misad.org.tr">www.misad.org.tr</a>	The association consists of 32 members. MISAD's objectives are to deliver training to the sector's firms, support research and improve the quality of the sector.



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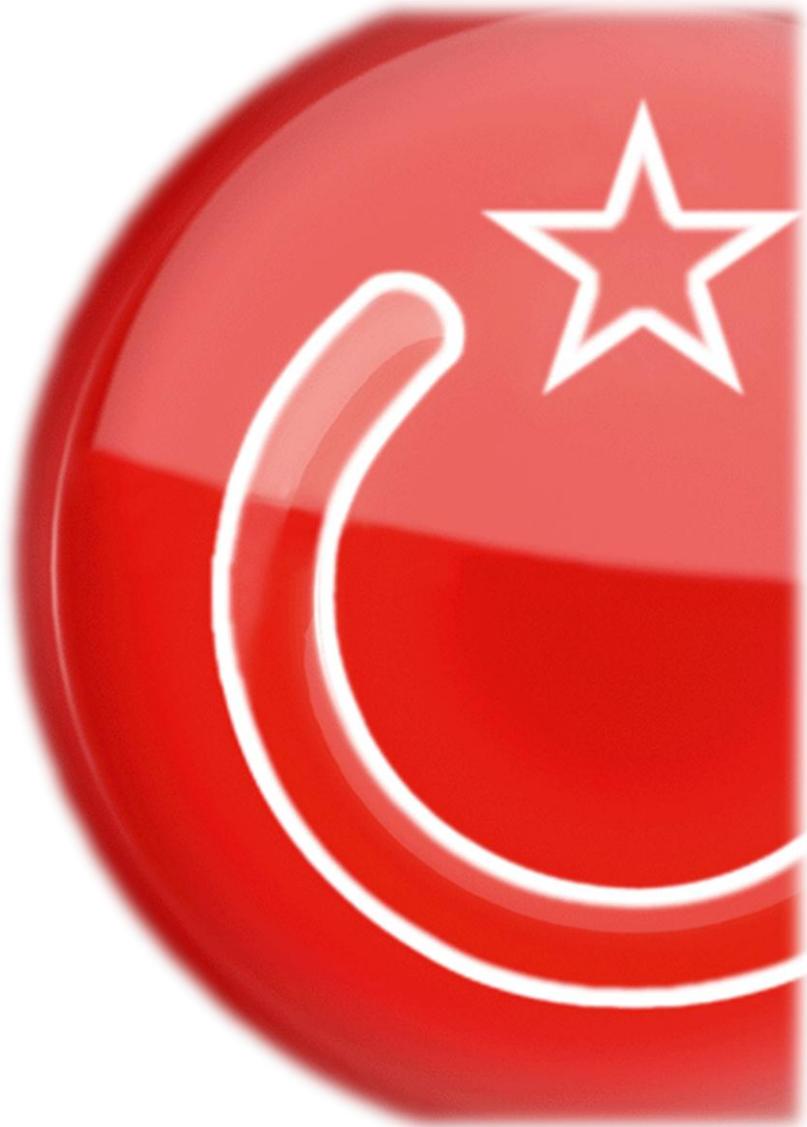
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