

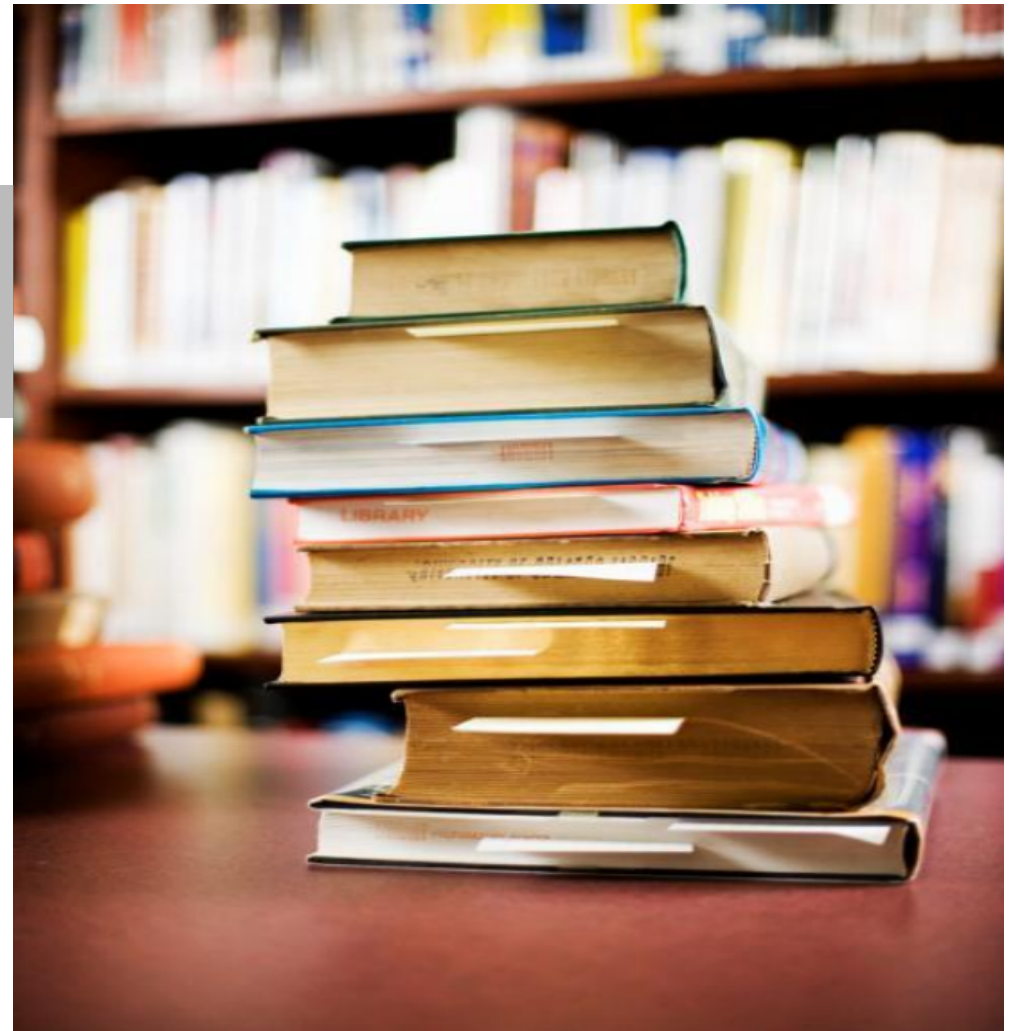
THE 5 KEY CHALLENGES FOR TURKISH COMPANIES WHEN GOING TO NUCLEAR BUSINESS

– Strategies on how to compete and use the foreign competition–



Research conducted by :

**DYNATOM INTERNATIONAL
GmbH**



Areas covered

- The nuclear power market provides important opportunities to Turkish companies but costs and risks are increasing rapidly
- The 5 Key Challenges that threaten your business
- 3 Steps to Stay out of Trouble
- Case Studies



The nuclear power market provides important opportunities for Turkish Companies



**... BUT Costs, Risks
and Competition are
Increasing**

It's getting harder to make money in nuclear, such as in China

- While revenue continues to grow, margins decrease

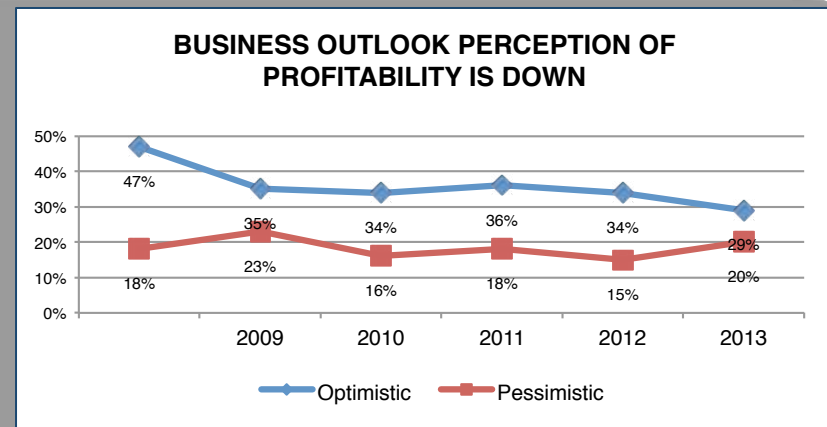
"The nuclear industry is struggling with Additional costs due to new regulatory requirements"

The Fukushima nuclear disaster and the impact on the global nuclear industry, Greenpeace, February 2013

- Business outlook perception of profitability is down in China

29% in 2013 from a high of 47% in 2008, pessimism is up, 20% in 2013 (up 5% from 2012).

Profitability is especially low in certain sectors, including Energy, Chemicals & Petroleum, IT & Communications, Transportation & Logistics and Machinery.



*2013 Business in China Survey,
A CEIBS, Swiss Center Shanghai, China Integrated Analysis*

"It is the lowest level of optimism for profitability in the history of this Business Confidence Survey."

European Business in China: Business Confidence Survey p. 10, European Chamber, 2013

The key reasons why business is getting tougher and companies are chasing in other markets such as Turkey

	<u>European Chamber Survey</u>	<u>CEIBS Survey</u>	<u>Swiss Survey</u>
Rising Labor Costs	✓ No. 1	✓ No. 3	✓ No. 1
Fierce Competition	✓ No. 6	✓ No. 2	✓ No. 2
Economic slowdown in China	✓ No. 3	✓ No. 1	✓ No. 3
Economic slowdown in home market	✓ No. 2	✗	
Slow recovery of global economy	✓ No. 5 (Lower international demand)	✓ No. 4	✓ No. 4
Government policies	✗	✓ No. 5	✓ No. 5
Legal environment	✓ No. 8 (Biased relations/regulatory enforcement) No. 9 (Burdensome regulatory environment)	✓ No. 6	✓ No. 6

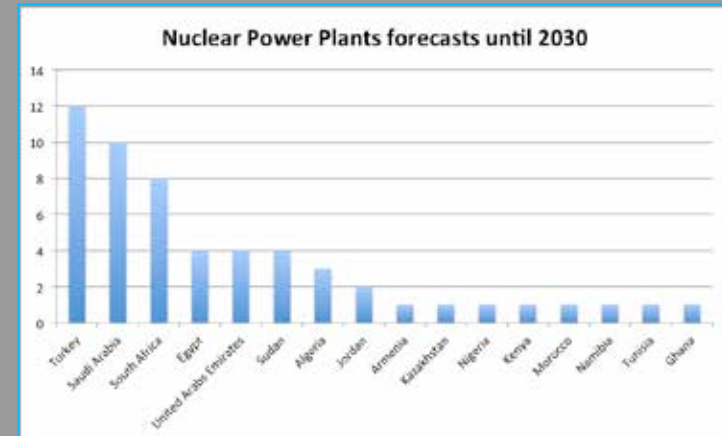
European Business in China: Business Confidence Survey European Chamber, 2013

*2013 Business in China Survey & 2013 Swiss Business in China Survey,,
A CEIBS, Swiss Center Shanghai, China Integrated Analysis*

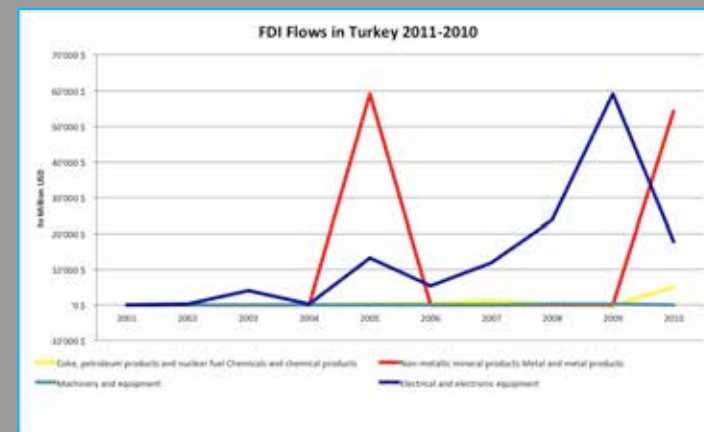
Nuclear is still a leading emerging market for investment such as MENA

Everybody Wants a Piece of the Golden Cake!

- 55 new reactors are forecasted in the Middle East and African Continent until 2030 and more until 2040
- FDI in the Turkish energy market is just burgeoning while the electricity market is one of the fastest growing in the world, with approx. 9% annual growth on average, in 2010 and 2011.



Sources: IAEA, World Nuclear, IEA, OCDE,



Source: UNCTAD, FDI/TNC database based on data from the Central Bank of Turkey

But a major challenge is the lack of a reliable supply chain

- **The lack of an established and experienced supply chain might lead to delays, as might a shortage of a skilled workforce**

The number of suppliers of critical components is limited, there is the risk that bottlenecks. In the case of the Areva EPR design, some very large forging for the reactor pressure vessel can only be made currently by Japan Steel Works.¹

*UK Energy and Climate Change Committee 2012–13
Building New Nuclear: the challenges ahead Sixth Report of Session*

- **“Our industry has a predominance of over 55 year olds, and we are expecting to see a great deal of workers enter retirement over the next 5 years”**

Michael Hockey, Managing Director of the ECIA, the UK Engineering Construction Industry



- **Releasing working capital down the supply chain is critically important if the manufacturing suppliers are to survive and grow**

*Department for Business and Skills
Strengthening UK supply Chain 2013*

More various, suppliers are also becoming global

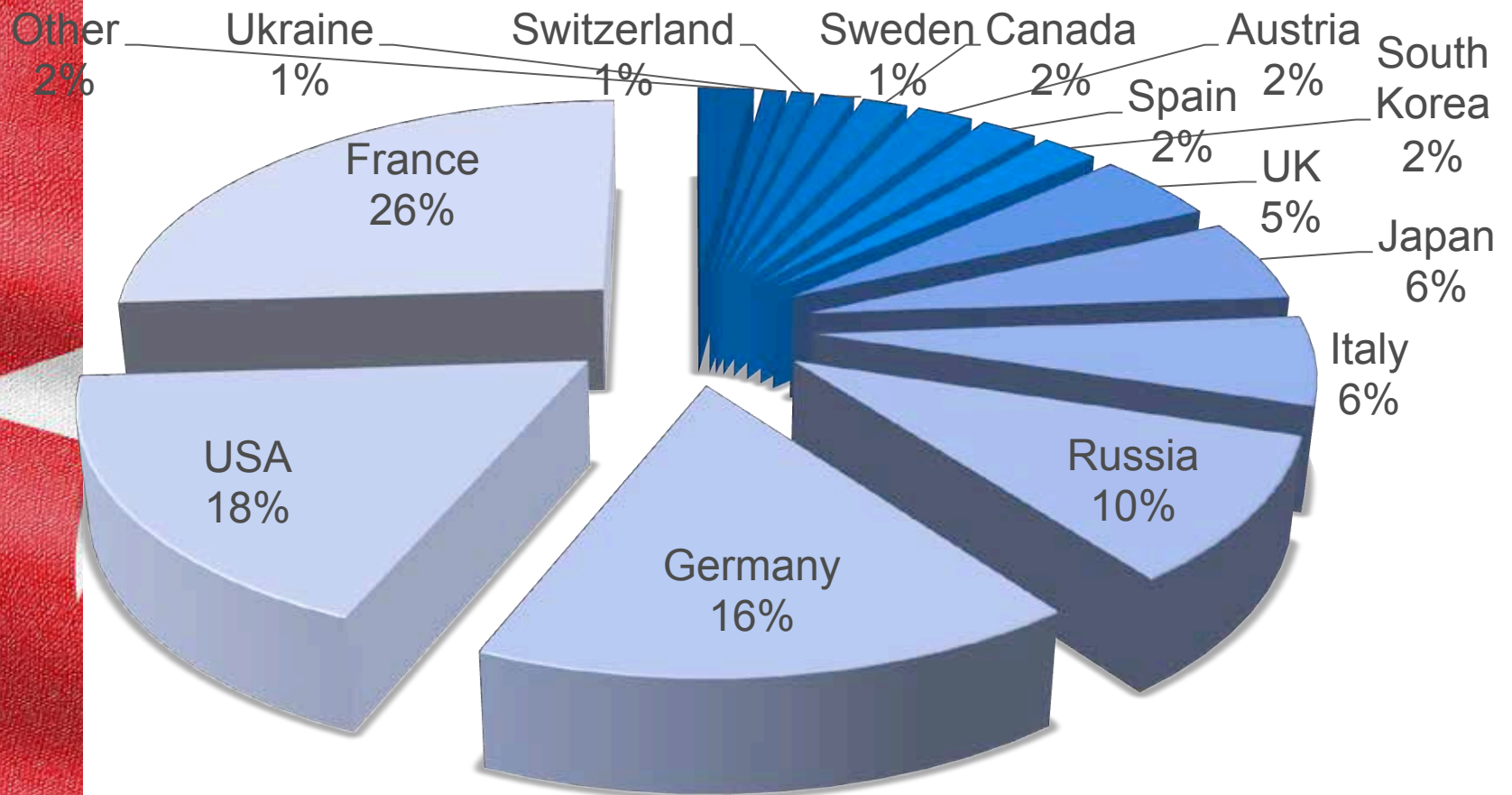
- **Emerging suppliers go global**

Already established or have agent in Turkey

1. Erzhang Group
2. Dongfang Electric
3. Haerbin Electric
4. Dongfang Boiler
5. Fangda Carbon New Material Technology
6. Wujian Dongwu Machinery



Example in China: A large international supply chain



- Since 2008, 231 Foreign companies from 19 countries received the HAF 604 certification for the sales of safety related equipment in China

Revenue from the nuclear market will become **CRUCIAL** for a a specific range of companies

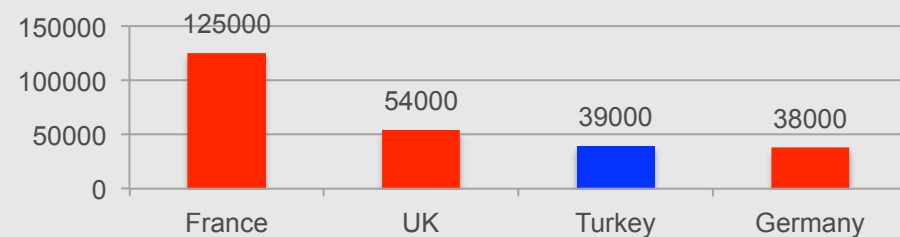
- From a large survey of the 1,000 top Turkish companies in the energy sector, 30 will gather into a nuclear cluster, others will get involved in construction and non safety equipment



Source: Istanbul Chamber of Commerce and Ankara Chamber of Commerce

- “One job created in the Nuclear industry will create ten other jobs in other segments “Viktor Karmatsky, June 8, 2012. Nuclear Intelligence Weekly

Jobs generated in the nuclear industry



Sources: EDF, NIAUK, State of the World 2013, Dynatom International

The 5 key challenges that threaten your business



1. **Rising Cost & Lack of Skills**
2. **Fierce Competition**
3. **Limited Nuclear Cluster**
4. **Lack of Support**
5. **Wrong Strategy**

1. Costs of setting up operations in Turkey alone may grow fast

- **Growth has lost momentum in 2014**

In the context of serious regional geopolitical tensions and the sluggish recovery in Europe, exports are projected to be subdued and GDP growth to be relatively weak by Turkish standards, at 3¼ per cent in 2015 and 4% in 2016

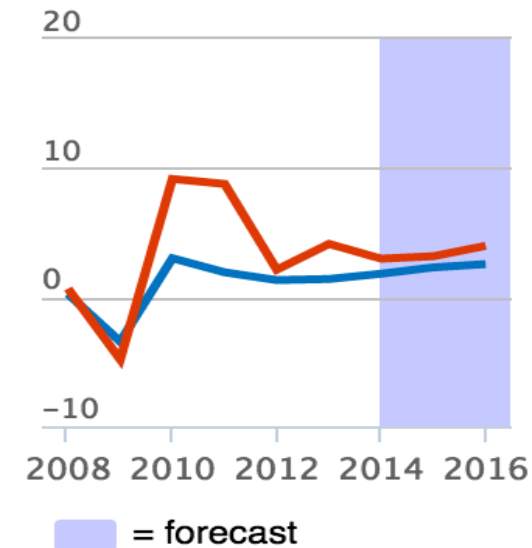
- **Inflation rate is decreasing but still high**

The Central Bank of Turkey cut its mid-point inflation forecast for the end of this year to 5.5 percent from a previous 6.1 percent, governor

Governor Erdem Başçı, Central Bank of Turkey

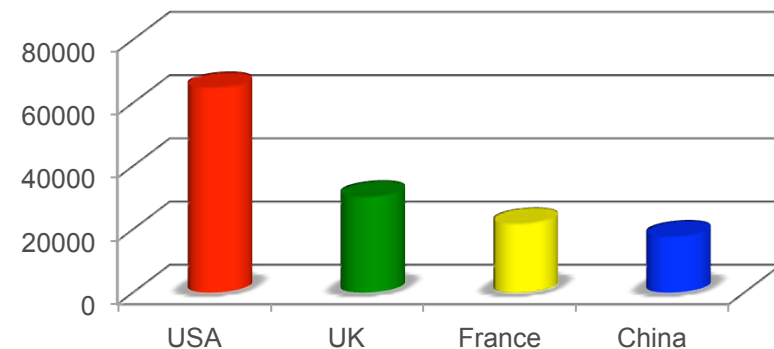
- **Lack of skilled labor will require Investment in human resource**

A conventional mechanical engineer in Turkey with 20 years of experience earns a salary of 30,000 Euros



OECD

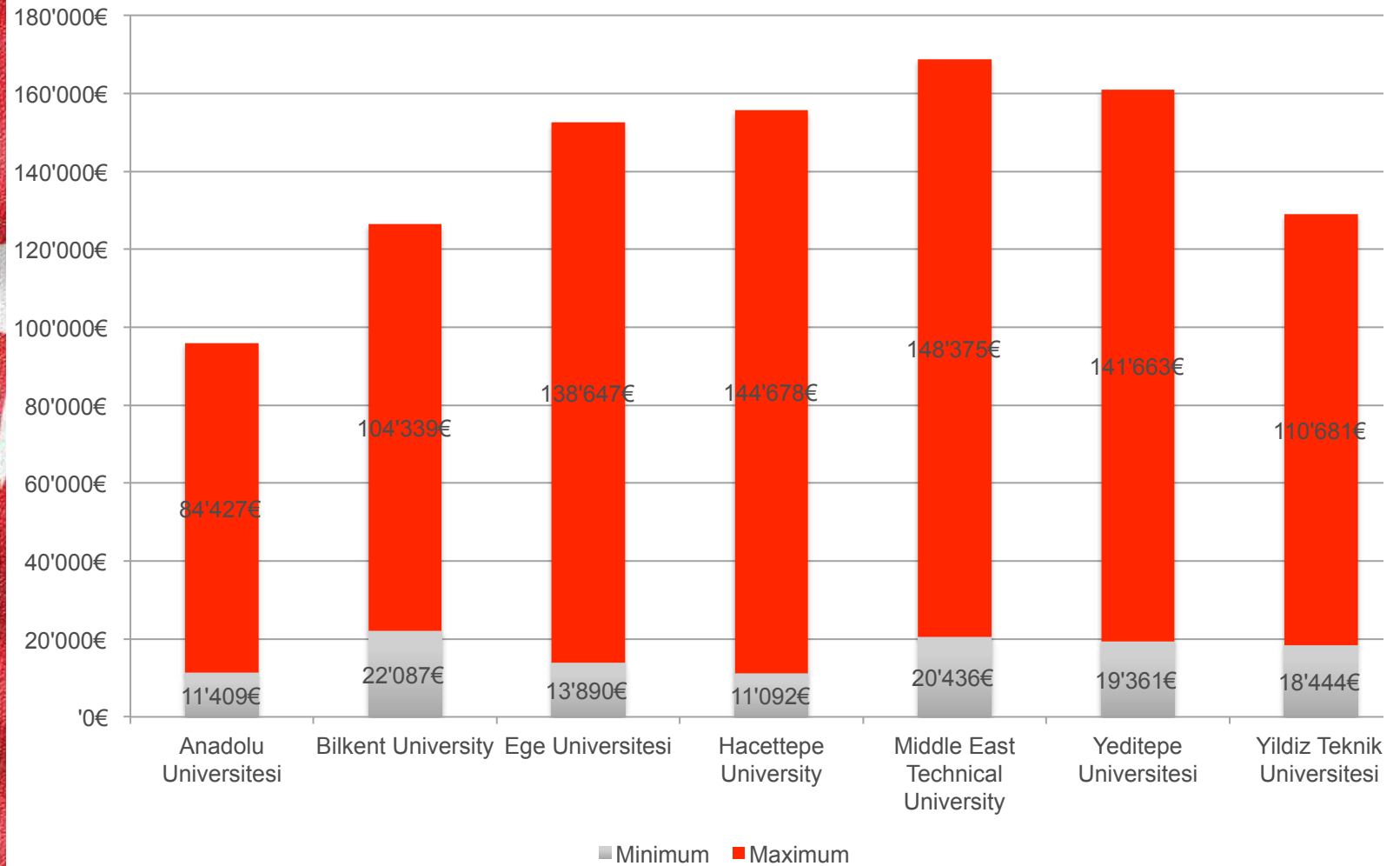
Average salary for graduated technician in nuclear industry (€)



Bureau of Labor statistics, National Careers Service, Onisep, CFHI

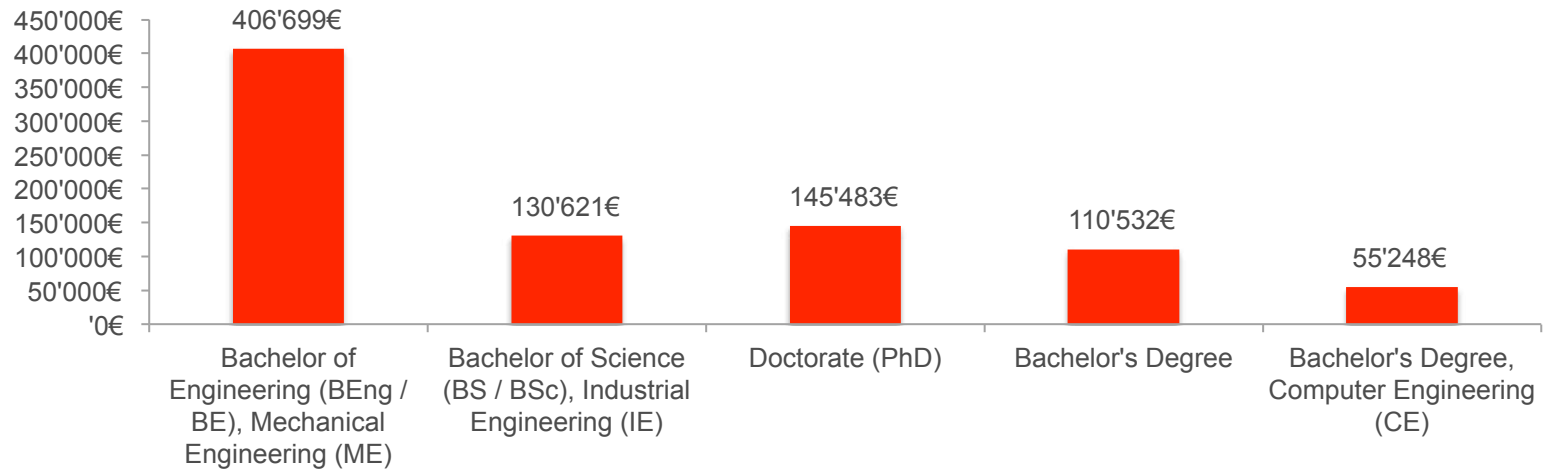
Cost of Human resource

Salary for Engineers from Major Schools

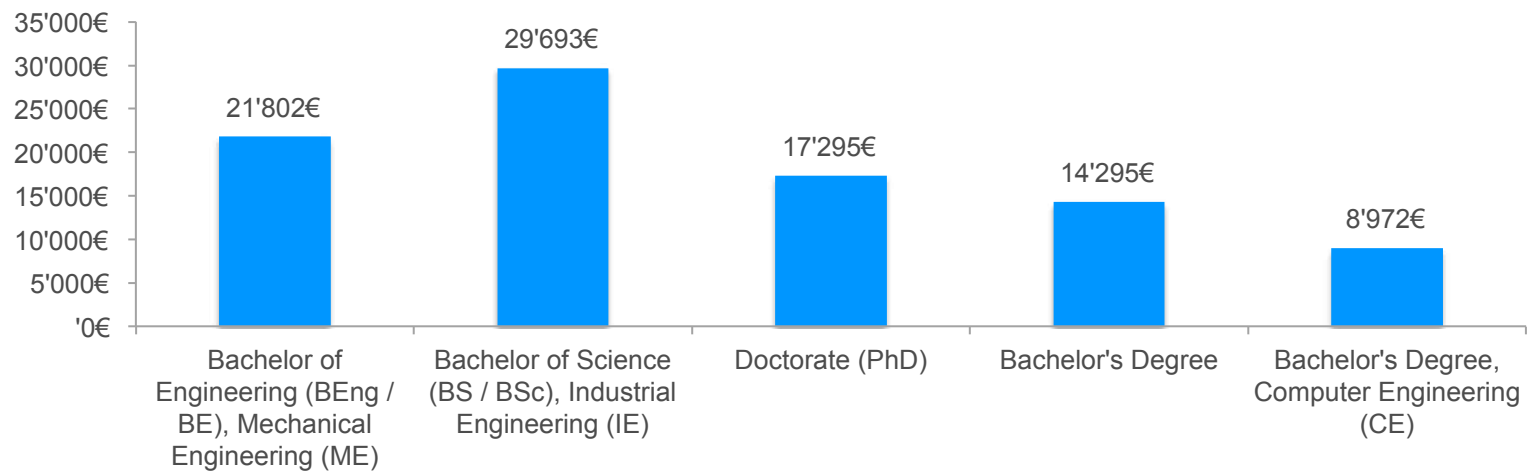


Cost of Human resource

Maximum salary range for popular degrees



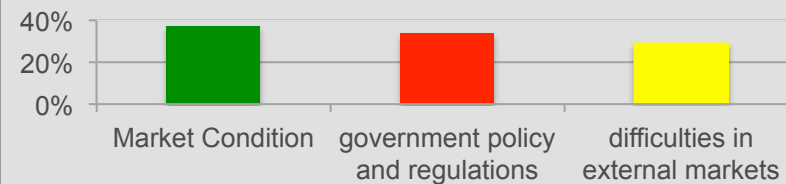
Minimum salary range for popular degrees



2. Expect fierce and experienced competition

- Turkish executives may not foresee foreign competition as a main issue in their market

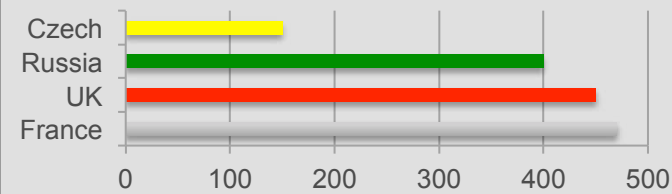
External issues for Turkish firms



PWC Family Business Survey 2012

- The foreign competition has an average of 25 years of experience
- China alone has a list of 3,000 local suppliers for its nuclear projects

Short list of Main nuclear suppliers



GIIN, Rosatom, NIAUK, Westinghouse, CNNC

- Turkish companies are involved in assembly work, as well as supplies of non-specialized equipment (level 4): which represent 40-43% of the capital expenditure

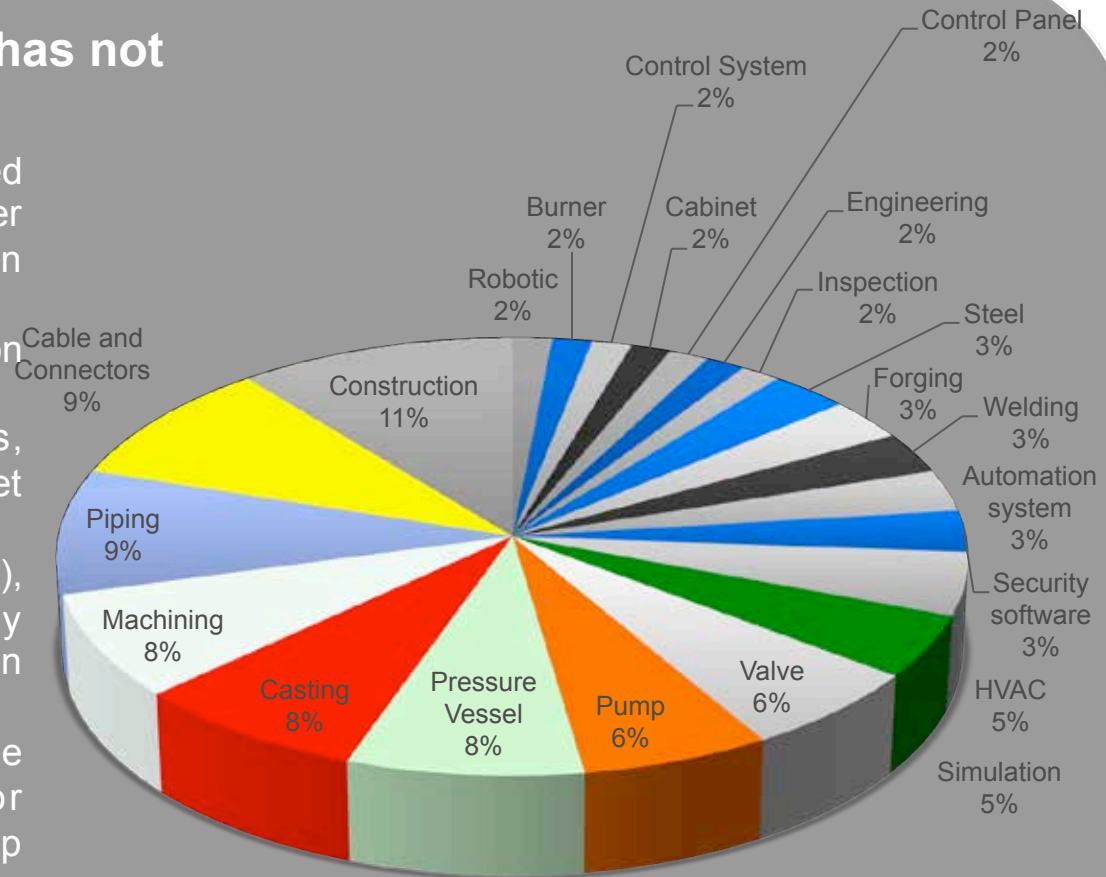


Rosatom: Akkuyu Nuclear Power Plant – Progress To-date and the Way Forward, February 2013
Akkuyu NPP PROGRESS & DEVELOPMENT 2014

3. The Turkish Nuclear Cluster is just being assessed

- **Domestic Competition has not started yet**

- 70 companies are assessed to form the nuclear cluster and to become the main Turkish exporters.
- The offer is limited to non safety equipment
- Instrumentation, sensors, motors are not produced yet domestically.
- France (GIIN), UK (NIAUK), Spain (SGNC) actively promote their industry in overseas markets.
- These countries cover the overall supply chain or created strategic partnership with engineering companies, for example Rolls-Royce Power Systems and Rosatom.



Dynatom International

4. Lack of support and protectionism

- **No interaction between the research, design and manufacturing**

18 Design Institutes in China, all state owned enterprises, participate at an early state to the transfer of technology and support of the local industry.

“Yantai Cable Factory and Shanghai Nuclear Engineering Research and Design Institute signed an agreement of cooperation in the research and design of class 1E cable for nuclear power plants. 1E Nuclear Cable is expected to be made in Yantai , Shandong province.”

Friday, 03 July 2009 Yantai Daily

- **No protection from the safety authority and bureaucracy**
- **Ex: The Chinese authority created vague and changing regulations such as the HAF 604 :**
 - To control the import of foreign equipment and material
 - To understand the quality management of foreign competitors
 - To review the amount of foreign equipment sold and create emerging domestic competition
 - To delay or stop foreign companies to participate to local tenders



5. Getting into the wrong strategy can mean having to shut down your business

- **The local industry has no clue of the real foreign capability**

- In 2009 China National Nuclear Corporation signed an agreement for 8 reactors with a US vendor of DCS. The company did not have the skills neither the experience to work on the design of such equipment. The projects were delayed (18 Months), resulting in the loss of tenth of millions of USD.
- Similar problem with the State Nuclear Power Technology Corporation and CW-EMD for the design and manufacturing of the Reactor Coolant Pump in the AP1000

World Nuclear News

- **Strategic gap between the objectives of the government, and the tactic from the manufacturer**

- Reaction after a visit of ZiO Podolsk, ZIOMAR, and GIDROPPRESS: "In some sense we got amazed by the scale. I hope that in the not so distant future we will watch similar industrial success already on the territory of the Republic of Turkey.

Qadir Oguzhan Alifendioglu, Head of Delegation, TAEK, December 2013

- **Illegal actions from your partner can lead to international sanctions**

- China Nuclear Industry Huaxing Construction Co., pled guilty to charges it conspired to violate the International Emergency Economic Powers Act (IEEPA) and the Export Administration Regulations (EAR). illegal exports of high-performance epoxy coatings from the United States to the Chashma II Nuclear Power Plant in Pakistan

Corporate Crime Reporter December 2012

3 Steps to enter the nuclear market in 2015



1. **Define a multinational strategy**
2. **Assess the domestic market and local skills**
3. **Partner with an experienced foreign company**

STEP 1



**Forget about the Turkish
nuclear power market, go
global**

Have a clear multinational strategy and actively manage risks

- **233 Chinese nuclear manufacturer have a presence either directly, or in a total of 55 countries.**
- **209 leading nuclear companies are in total doing business in 26 emerging nuclear markets.**

‘the recent dominant thinking has been to bring down barriers to world trade while giving some degree of protection to some countries and industries. Thus global strategy is an important aspect of such international negotiations’.

Professor Richard Lynch, Global Strategy

- **SNPTC-WEC Nuclear Power Technical Services (Beijing)**

SWSC levered Westinghouse’s desire to expand their global supply chain to attract suppliers interested in exporting

Join the supply chain. You never know when they’ll come and get your market

- **Assess the list of subsidiaries from the EPC**

Examples:

- Areva : Corys vs. L3 Mapps
- Rosatom: Arako vs. CCI
- WEC: NuCrane Manufacturing vs. Mammoet

Create and use leverage

- Expand regionally, in particular in countries where local culture is complex/ antagonist to European, North American and Asian
- Use the 22 treaties signed in nuclear cooperation as a starting point for cooperation and be sure the export license from your target or partner is easy to process

- Visa
- Time Difference
- Language barrier
- Alcohol restricted
- Food
- Working time (ex: KSA)

Treaties in civil nuclear



TAEK, CNIC (Citizen's Nuclear Information Center) ,Hurriyet
Daily New, 'ENS, WNA

STEP 2



**Action Without Planning is
the Cause of Every Failure**

Always know what is going on in your market segment

No News = Bad News

- **In China 82 companies provide safety related valves**
Screen on daily basis a maximum of information related to your competitors in your markets
- **Create a corporate website with reports available to the public:**
Make your company the expert in the industry: Market data crushes product data
- **Get first hand information**
Participate in workgroup with government agencies, such as ASO, ISO, KOSGEB, MUSIAD, TUBITAK...and create partnership with Engineering universities. Ex: PNB in France, CNEA in China

Find the right people to work with

Most skilled workers in Turkey tend to immigrate

- **Early cooperation with Technical schools and universities: benefit of the research in your company**
- **Ex: Gedik University**

CNNC and Harbin Engineering University signed strategic agreement and agreement on joint personnel training.

CNNC December 2010

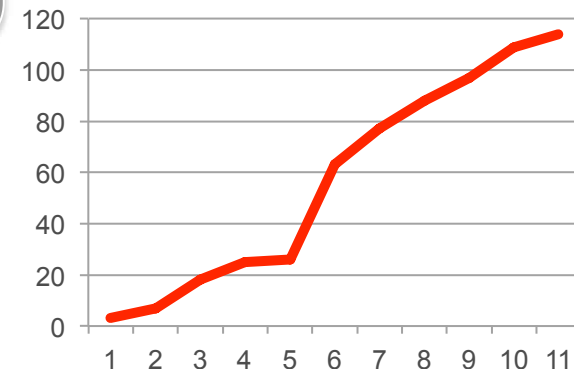
- **Finance Doctorates to retain knowhow and future managers**

- CEA and the industry Finances doctorates CTCI/CTCR

CEA-INSTN

- **Create a strong QM department, and design team.**
- **Use the licensing culture of US Companies**

Certification for Design awarded 2004-2014 (HAF 601)



STEP 3



**Alliances and partnerships
produce stability when they
reflect realities and interests.
Stephen Kinzer**

Make Communication your Priority No. 1 and Develop Cultural Intelligence

“To see me does not necessarily mean to see my face. To understand my thoughts is to have seen me.”

Mustafa Kemal Atatürk

Expectations
from your
company

Education to the staff

Transfer of technology, Russian
US and French codes and
standards

Using the foreign Brand

Continuous development of new
equipment

Expectations
from the
foreign partner

Experience in the nuclear market,
investment in training program

Protection of IP, reporting on local
regulations, relation with TAEK
and EPC

Expansion of the Brand, Control of
non proliferation to Iran, Syria,
Libya

Proactive business development
in regional programs (UAE, Egypt,
KSA, Jordan, Armenia...)

The search for the right partner: PREPARE

Assess the top 2 and 3 in the market

Except in a few cases, avoid the star, take the challenger

- The challengers are more open to discussion
- The companies that are not "state owned minded" react faster
- The large brand are often too bureaucratic and slow to decide

Prepare a list of technical needs and regional market opportunities

Foreign partner wants visibility

- You are expected to work as equal partner
 - Know your nuclear environment
 - Assess your technological gaps, and your competitor weakness
- Outline your multi national strategy MENA

The long term commitment, financial and master of the local regulations

Show your will to invest in development to match the partner standard

- Show your commitment to excellence, nuclear is long run:
 - Investment in Human Resource, Codes and standard, and a considerable QM program.
- Develop your network with TAEK, TUBITAK, AFAD, and the Ministry of Energy

Sign fast, prepare for a first consulting project

Foreigners are impatient due closure of major market such as China

- Visit fast your partner facilities
- Draft a first consulting / research project (your investment) to learn from the foreign company
- Prepare for a joint program within the next 3 months.

Which partner should you target?

Country	Advantage	Weakness	Expectation
Belgium	Reacts Fast, experienced, multicultural	High expectation, often suspicious	Region oriented
Canada	Easy going, trustful	CANDU oriented mostly, not aggressive	Moderated
China	Speed in execution	Slow in Decision, poor communication, state oriented	Fast Return on Investment
Czech	Russian standards	State Oriented	Expects orders from Rosatom
France	Experienced in overseas market	Suspicious in transfer of technology, non exclusive	Expects purchase orders from you
Germany	Market oriented, experienced, need to act fast	Made in Germany: small transfer of technology	Planning
Japan	Quality	Poor communication, lack of leadership, language barrier	To sell directly through their sogo sosha
Korea	Aggressive	Control freak	Fast Return on Investment
USA	Licensing	Process guru, license export, more maintenance oriented	Visibility

Once you get in the first contract: ASSESS & LEARN



- **Assess results and identify key points of failure or success in your partnership**
- **Learn lessons for the future, i.e. implement an SOP for the future or improve or change existing SOP.**

Case Studies



1. Mavinci

2. GEDIK

Mavinci: Nuclear Safety

- **Leader in CBRN development, but:**
 - No experience in nuclear power market
 - Lack of vision in the market
- **What was done ?**
 - Assessment of Mavinci capabilities
 - Proposal of several markets to get involved in
 - Suggestion of the partner and business model
 - Planning of the partnership, and market opportunities
 - Commitment to investment in the nuclear training center
- **Delivery**
 - Partnership with the leading Technical Safety Organization from Germany (GRS)
 - Creation of a consortium with Hacettepe University
 - Planning of specific research and nuclear safety projects for 2015



Gedik: Nuclear Casting

- **Leader in Welding and Valve, but:**
 - No experience in nuclear power market
 - Lack of understanding of standards and codes
- **What was done ?**
 - Assessment of Gedik capabilities
 - Suggestion of the partner and business model
 - Planning of the partnership, and market opportunities in the region
 - Commitment of investment from Gedik to complete Forgemasters offer
- **Delivery**
 - Partnership with Sheffield Forgemasters from United Kingdom
 - Creation of an education project between the UK and Gedik
 - Planning of specific consulting projects for 2015



YOUR NEXT STEP

Any industrialized country that uses nuclear power controls 90% of the supply chain.

China, India, the Middle East, Asia Minor, Africa and Latin America are no exceptions to this rule, it is just a question of timing.

Your role is to act in the global market and to anticipate new challenges rather than wait for orders and control the damage from your competitors.

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"Action without thinking is the cause of every failure" Peter Drucker.