ETİ MADEN
“World Leader in Boron Sector”

ETİ MADEN AND GLOBAL BORON MARKET

Orhan YILMAZ, PhD
Chairman and General Manager
ETİ MADEN

- **Date of Establishment:** 1935
  - 1935 -1998 ETİBANK
  - 1998 -2004 ETİ Holding A.Ş.
  - 2004 - Eti Mine Works General Management

- **Main Field of Activity:** The production and sales of boron products.

- **Legal Status:** State owned company

- **Management Systems:**
  - **Integrated Management Systems**
    - Environmental Management System TS-ISO-EN-14000
    - Occupational Health & Safety Management System TS-İSG-OHSAS 18001
    - General requirements for competence of test and calibration laboratories TS-EN ISO/IEC 17025
World Boron Mineral Reserves

- PERU: 2%
- ARGENTINA: 1%
- BOLIVIA: 2%
- CHILE: 3%
- AFGENTINA: 1%
- KAZAKHSTAN: 1%
- CHINA: 4%
- TURKEY: 72%
- RUSSIA: 8%
- USA: 7%
BORON IN USE

GLASS

CONCENTRATED BORON PRODUCTS
- Colemanite, tincal and ulexite etc. concentrated ores

BORON CHEMICALS
- Borax pentahydrate, borax decahydrate, anhydrous borax, boric acid, sodium perborate monohydrate, anhydrous boric acid and etc.

SPECIALTY BORON PRODUCTS
- Boron carbide, zinc borate, boron nitride, boron hydride, ferrobor & other boron compounds.

INDUSTRIES DEPENDING ON BORON
- Insulation and textile grade fiberglass, borosilicate glass, ceramic, detergent etc.
Boron Minerals Produced By Eti Maden; Colemananit, Tincal and Ulexite

Following four minerals comprise around 90% of commercially use.

- Colemanite \((\text{Ca}_2\text{B}_6\text{O}_{11}.5\text{H}_2\text{O})\)
- Tincal \((\text{Na}_2\text{B}_4\text{O}_7.10\text{H}_2\text{O})\)
- Ulexite \((\text{NaCaB}_5\text{O}_9.8\text{H}_2\text{O})\)
- Kernite \((\text{Na}_2\text{B}_4\text{O}_7.4\text{H}_2\text{O})\)

- Colemanite and tincal are the most widely-used boron minerals.

- Turkey is the world’s major source of colemanite.
World Boron Consumption by End-Use in 2011

- Fiberglass 46%
- Borosilicate glass 15%
- Ceramics 11%
- Agriculture 10%
- Detergents 6%
- Ferro-boron 2%
- Others 10%

- Consumption of borates in fiberglass is concentrated in China, the world’s largest producer of textile-grade material, and in the USA, the world’s largest producer of insulation-grade material.
Boron Products & Production Sites of Eti Maden

**BANDIRMA BORON WORKS**
- Borax Decahydrate
- Borax Pentahydrate
- Boric Acid
- Boron Oxide
- Etidot-67 (Agri Boron)
- Sodium Perborate

**EMET BORON WORKS**
- Boric Acid
- Concentrated Colemanite

**KIRKA BORON WORKS**
- Etibor-48 (Borax Pentahydrate)
- Etibor-68 (Anhydrous borax)
- Calcined Tincal (Compacted)

**BİGADİÇ BORON WORKS**
- Ground Colemanite / Ulexite
- Concentrated Colemanite / Ulexite
- Natural Zeolite
Eti Maden in Figures; Production & Capacity
Eti Maden in Figures: Sales

Million USA $


Domestic Sales
Export
Total Sales
Sales of Eti Maden Vs Main Competitor

Eti Maden
Main Competitor

Ton (Based on B2O3)

Eti Maden in Figures; Regional Boron Export (Far East, Europe, USA)
Consumption of Boron Products in the World (Million Tons)

<table>
<thead>
<tr>
<th>Year</th>
<th>Consumption</th>
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<tbody>
<tr>
<td>2000</td>
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<tr>
<td>2002</td>
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</tr>
<tr>
<td>2005</td>
<td>3.3</td>
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<tr>
<td>2010</td>
<td>4.0</td>
</tr>
<tr>
<td>2011</td>
<td>4.3</td>
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Global Suppliers & Market Shares

- **SUPPLIER**
  - **ETİ MADEN**
    - 2000: %31
    - 2002: %30
    - 2005: %36 World Leader
    - 2010: %42 World Leader
    - 2011: %47 World Leader
  - **USA**
    - Consumption: 33, 37, 35, 25, 24
  - **OTHERS**
    - Consumption: 36, 33, 29, 33, 29

- Russia
- China
- South America
Eti Maden in Turkish Economy

Eti Maden is stated as 1st in public rank and 16th in general rank in the list of “Top 1000 Exporters of Turkey”

*TEA (Turkish Exporters Assembly)
Eti Maden in Turkish Economy

- **Eti Maden** rose to 43rd in rank of general evaluation from the level of 56th in 2009 and placed in 6th as gross profit rank in the list of “500 Large Enterprises*” in 2010.

- **Sales Revenue**: $854 million
- **Export**: $829 million
- **Gross Profit**: $488 million
- **Dividend paid to treasury**: $300 million

*ISO (Istanbul Chamber of Industry)*
In the list of 2011 Corporate Income Tax Ranking Eti Maden is at 15th (in general), however at 4th among the producer corporates.

<table>
<thead>
<tr>
<th>No</th>
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<tr>
<td>1</td>
<td>MERKEZ BANKASI A.Ş.</td>
</tr>
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<td>2</td>
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<td>TURKCELL İLETİŞİM HİZMETLERİ ANONİM ŞİRKETİ</td>
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<tr>
<td>4</td>
<td>TÜRKİYE GARANTİ BANKASI A.Ş.</td>
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<td>YAPI VE KREDİ BANKASI A.Ş.</td>
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<td>6</td>
<td>TÜRKİYE HALK BANKASI A.Ş. .GENEL MÜDÜRLÜĞÜ</td>
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<tr>
<td>7</td>
<td>TÜRKİYE VAKİFLAR BANKASI TÜRK ANONİM ORTAKLIĞI</td>
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<td>KOZA ALTIN İŞLETMELERİ A.Ş.</td>
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<td>35</td>
<td>ÇAYELİ BAKIR İŞLETMELERİ A.Ş.</td>
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</table>
How succeeded

1. Focusing Strategy
   - Focused on core business
   - Outsourced some secondary activities

2. Cost Minimisation Strategy
   - Adapted new technologies in our chemical processes,
   - Automated some man-made activities and increased efficiency.

3. Research and Development Strategy
   - Developed new technology and new end-use market.
COMPLETED INVESTMENTS (2002-2007)

- **2002**
  - THIRD BORAX PENTAHYDRATE PLANT, KIRKA, ESKİŞEHİR (2002)

- **2003**
  - SULFURIC ACID PLANT, BANDIRMA, BALIKESİR

- **2004**
  - SECOND GRINDING PLANT, BİGADİÇ, BALIKESİR

- **2005**
  - BORIC ACID PLANT, EMET, KÜTAHYA

- **2007**
  - SODIUM PERBORATE PLANT (EXPANSION), BANDIRMA, BALIKESİR
  - CONCENTRATOR PLANT (EXPANSION), BİGADİÇ, BALIKESİR
  - BORON OXIDE PLANT (SECOND LINE), BANDIRMA, BALIKESİR
  - CALCINED TINCAL PLANT, KIRKA, ESKİŞEHİR

- III.BORAX PENTAHYDRATE PLANT, KIRKA, ESKİŞEHİR

Capacity 240,000 t/y
COMPLETED INVESTMENTS (2008-2011)

- **2008**
  - BORAX DECAHYDRATE PLANT (EXPANSION), BANDIRMA, BALIKESİR
  - ANHYDROUS BORAX PLANT, KIRKA, ESKİŞEHİR
- **2009**
  - BORAX DECAHYDRATE PLANT, KIRKA, ESKİŞEHİR
  - AGRI-BORON (ETİDOT-67), BANDIRMA, BALIKESİR
- **2010**
  - REHABILITATION OF STOCK AREAS, BİGADİÇ, BALIKESİR
  - CAMKOY WASTE RESERVOIR CAPACITY INCREASE, BİGADİÇ, BALIKESİR
  - NEW STEAM BOILER UNIT, BANDIRMA, BALIKESİR
  - SINGLE PHASE PENTA PRODUCTION PLAN, KIRKA, ESKİŞEHİR
  - AGİLDERE WASTE RESERVOIR ELEVATION, EMET, KÜTAHYA
- **2011**
  - FOURTH BORAX PENTAHYDRATE PLANT, KIRKA, ESKİŞEHİR
  - BORIC ACID PLANT (EXPANSION), EMET, KÜTAHYA
  - CONCENTRATOR & GRINDING PLANT, BİGADİÇ, BALIKESİR

II. BORIC ACID PLANT,
EMET, KÜTAHYA
Targets of Strategic Plan

- PRODUCTION CAPACITY OF BORON CHEMICALS
  2.1 MILLION TONS

Long Term Targets

- PRODUCTION CAPACITY OF BORON CHEMICALS
  5.5 MILLION TONS
Employment

Number of Employees

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<td>4,952</td>
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<td>4,743</td>
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<tr>
<td>2003</td>
<td>4,544</td>
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<tr>
<td>2004</td>
<td>4,361</td>
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<td>4,047</td>
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<td>2006</td>
<td>3,850</td>
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<td>2007</td>
<td>3,705</td>
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<tr>
<td>2008</td>
<td>3,414</td>
</tr>
<tr>
<td>2009</td>
<td>3,431</td>
</tr>
<tr>
<td>2010</td>
<td>3,730</td>
</tr>
<tr>
<td>2011</td>
<td>3,827</td>
</tr>
<tr>
<td>2012</td>
<td>3,815</td>
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</table>
NEW EMPLOYMENT
PAST TEN YEARS AND COMING TEN YEARS

INVESTMENT COST FOR THE NEW CAPACITIES IN 10 YEARS PERIOD
508,7 MILLION US$

NUMBER OF EMPLOYMENT FOR THE NEW INVESTMENTS
1.213 PERSON

TARGETED ADDITIONAL CAPACITY UP TO 2023
3,8 MILLION TON

ESTIMATED EMPLOYMENT FOR THE ADDITIONAL CAPACITY
2.500 PERSON
Eti Maden possesses the operating license of *rare earth elements and thorium reserve* located in *Eskişehir/Sivrihisar region*. The ore is complex in nature.

The ore contains *REE (Rare Earth Elements)* Cerium, Lantan, Neodium, barite and fluorite besides thorium.

Mineral contents of the *orebody*: 37,44% CaF$_2$, 31,04% BaSO$_4$ and 3,14% RRE. Calculated total reserve is about 30.358.268 ton.

Feasibility study has been carried out.

Accordingly, for operation of 10 year period; 10,000 t/y REE, 250 ton/y Thorium, 72,000 ton/y Barite and 70,000 ton/y Fluorite will be produced.

Estimated annual revenue of the project is about 1 billion US$.
R&D Works

**Aim:**
- Increase production efficiency
- Develop new usage areas
- Develop new products
- Contribute boron technology

**Strategy:** Rather than waiting the growth of boron market, leading to develop market by finding new boron products and new usages.
R & D Works

Completed projects

- Sodium Perborate
- Trimethyl Borate
- Agri-Bor & Zinc Borate
- Boron Oxide
- Calcined Tincal
- Anhydrous Borax

Ongoing projects

- Sodium Borohydride
- Calcined Colemanite
- Boron Soda
Possible Investment Opportunities in Turkey

- **Glass Industry**
  - Fiberglass (Reinforcement-Textile Fiberglass)
  - Glass Wool (Insulation Fiberglass)
  - Borosilicate Glass

- **Specialty Boron Products**
  - The primary specialty boron products are boron carbide, boron nitride etc.
Foreign Representatives & Sales Agents

- **Foreign Representatives**
  - Etimine SA, Luxembourg
  - Etimine GmbH, Germany
  - Etimine Srl, Italy
  - Etimine USA, USA
  - Etimine Asia, China
  - Mario Pilato Blat S.A., Spain

- **Sales Agencies**
  - AB Etiproducts O.Y., Finland
  - Etiproducts Russia
  - Borochemie
  - Afro-Global Group PTY LTD.
  - Asian Agro Chemicals Corporation

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**Exclusive**:
- Luxembourg, Belgium, UK, Germany, France, Ireland, Italy, Austria, Spain, Netherlands, Portugal, Switzerland, Czech Republic, Slovak Republic, Slovenia, Hungary, Croatia, USA, Canada, Liechtenstein, Monaco, Gibraltar, San Marino, Andorra, Isle of Man, Channel Islands

**Non-exclusive**: Romania, Bulgaria, Serbia, China

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**Countries**:
- Finland, Sweden, Norway, Denmark, Iceland, Estonia, Latvia, Lithuania, Russia, Poland, Belarus, Ukraine
- Singapore, United Arab Emirates (UAE), Oman, India, Sri Lanka, Thailand, Indonesia, Hong Kong, Bangladesh, Burma, Malaysia, South China (Guangdong EFA.), Taiwan
- South Africa, Ivory Coast, Ghana, Kenya, Zimbabwe, Nigeria, Benin, Uganda, Tanzania
- India, Indonesia, Bangladesh, Sri Lanka, Thailand, Malaysia, United Arab Emirates (UAE)
### ELECTRICITY PROFILE

**CONSUMPTION AND PRODUCTION (2011)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Generated Electricity</td>
<td>255,309,063 kWh</td>
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<tr>
<td>Consumed Electricity</td>
<td>278,387,448 kWh</td>
</tr>
<tr>
<td>Purchased Electricity from TEİAŞ</td>
<td>37,074,228 kWh</td>
</tr>
<tr>
<td>Sold Electricity to National Grid (TEİAŞ)</td>
<td>13,995,843 kWh</td>
</tr>
</tbody>
</table>

**The ratio of production and consumption: 91.7%**

**Installed Power:**
- TEİAŞ: Turkish Electricity Transmission Co.
- 51.36 MWh
INVESTMENT POLICY AND METHODOLOGY

PURCHASING POLICY

• to provide exchange savings by purchasing machinery and equipment from local manufacturers

OUR STRATEGY

• To enlarge scale of investments with new and modern technology for the opportunities of the market

INVESTMENT METHOD

• To implement as a turn key process covering know-how, engineering, construction and commissioning of the plant.
Mission & Vision

MISSION

• To utilize the national boron resources within the framework of sustainable development, and to serve these goods to all humanity by converting them into high quality value added boron products, thus to contribute to the nation’s prosperity.

VISION

• To become an establishment which continues steady growth in traditional boron products market and takes a pioneering role in developing new boron products that make difference, and creates maximum added value from boron resources by making the country information and technology base of the world boron industry.
<table>
<thead>
<tr>
<th>CONTACT</th>
<th>ADDRESS</th>
<th>TELEPHONE</th>
<th>E-MAIL</th>
<th>FAKS</th>
</tr>
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<tbody>
<tr>
<td>ETİ MADEN , TURKEY</td>
<td>Ayvalı Mah. Halil Sezai Erkut Cad. Afra Sok. No:1/A 06100 Keçiören/ANKARA</td>
<td>90 (312) 294 20 00 90 (312) 231 36 41</td>
<td><a href="mailto:webmaster@etimaden.gov.tr">webmaster@etimaden.gov.tr</a></td>
<td>90 (312) 230 71 84</td>
</tr>
<tr>
<td>ETIMINE SA, LUXEMBOURG</td>
<td>204, Zone Industrielle SCHELECK-II L-3225 Bettembourg LUXEMBOURG</td>
<td>+352 52 02 02</td>
<td><a href="mailto:BoronMail@etimine.com">BoronMail@etimine.com</a></td>
<td>+352-52 02 03</td>
</tr>
<tr>
<td>ETIMINE SRL, ITALY</td>
<td>Via Cassoli 4, 42100 Reggio Emilia, ITALY</td>
<td>+ 39 (522) 45 19 67</td>
<td><a href="mailto:etiminesrl@libero.it">etiminesrl@libero.it</a></td>
<td>+ 39 (522) 43 05 70</td>
</tr>
<tr>
<td>ETIMINE USA Inc, USA</td>
<td>Penn Center West Building 1 Suite 400 Pittsburgh, PA, 15276, USA</td>
<td>(1) 412-809 82 15</td>
<td><a href="mailto:etimineusa@etimine.usa.com">etimineusa@etimine.usa.com</a></td>
<td>(1) 412 809 82 17</td>
</tr>
<tr>
<td>ETIMINE ASIA, CHINA</td>
<td>325 Tianyaoqiao Rd. Gateway International Plaza, Room: 2510 P/C: 200030, Shanghai, CHINA</td>
<td>+86 21 336 324 13</td>
<td><a href="mailto:info@etimineasia.com">info@etimineasia.com</a></td>
<td>+86 21 336 325 12</td>
</tr>
<tr>
<td>AB ETI PRODUCTS O.Y. FINLAND</td>
<td>Piispanportti -9 02240 Espoo /FINLAND</td>
<td>+358-9-819 44 44 0</td>
<td><a href="mailto:sales@etiproducts.com">sales@etiproducts.com</a></td>
<td>+358-9-819 44 44 4</td>
</tr>
<tr>
<td>BOROCHEMIE INTERNATIONAL PTE. LTD.</td>
<td>77 High Street, #09-09 High Street Plaza, 179433, SINGAPORE</td>
<td>+65 6334 7500</td>
<td><a href="mailto:borochemie@singnet.co.sg">borochemie@singnet.co.sg</a></td>
<td>+65 6334 0735</td>
</tr>
<tr>
<td>AFRO-GLOBAL GROUP PTY. LTD.</td>
<td>79 Oxford Road, Saxonwold 2196, Johannesburg, P.O.BOX 2381, Saxonwold 2132, SOUTH AFRICA</td>
<td>+26-11-486-1477</td>
<td><a href="mailto:Felicia@AfroGlobal.co.za">Felicia@AfroGlobal.co.za</a></td>
<td>+26-11-486-3699</td>
</tr>
<tr>
<td>MARIO PILATO BLAT S.A., SPAIN</td>
<td>Paseo de Alameda 17, 46010 Valencia, SPAIN</td>
<td>+34-96 339 32 70</td>
<td><a href="mailto:mpb@mariopilato.com">mpb@mariopilato.com</a></td>
<td>+34-96 369 08 50</td>
</tr>
<tr>
<td>ASIAN AGRO CHEMICALS CORPORATION</td>
<td>11F-09 Amenity Centre Tower-2, Al-Jazeera Al Hamra, Ras Al Khaimah, U. A. E.</td>
<td>+971-7-2434822</td>
<td><a href="mailto:marketing@asiangro.ae">marketing@asiangro.ae</a></td>
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