The global energy landscape and its impact on Turkey

Dr. Boris Gehring
Business Unit Manager, Power & Systems
TÜV SÜD
Global energy outlook

49.5% growth in consumption in 20 years

43.3% growth in consumption projected by 2040

Demand fuelled by coal, oil, gas, and nuclear renewables

Source: International Energy Outlook, 2013
Energy efficiency – the fifth fuel

The potential of energy efficiency

Coal-fired power plants in Turkey
- Average efficiency: 35.1%
- 8 – 10% more power can be generated through better processes and technologies

Gas-fired power plants in Turkey
- Average efficiency: 50.0%
- 1% improvement in country-level average gas generation efficiency can translate into USD 66 million in fuel cost savings over 15 years
Energy landscape in Turkey

- **4.6% CAGR increase** in electricity demand until 2030
- **Ranked 11th worldwide** for total net energy imports
- **79.8% of electricity generation** from conventional thermal
- Increased focus on coal, gas and nuclear plants

**Electricity generation by source**

- Conventional Thermal: **79.8%**
- Hydro: **16%**
- Wind: **3.3%**
- Others: **0.9%**

Source: Eurostat, 2014
Risks of aging infrastructure

Power plant damage in Germany

- Built in 1965
- Boiler circulating pump in coal block failed, extensive damages to boiler room
- TÜV SÜD Group conducted damage analysis, construction monitoring during repairs and inspection before the plant commissioning.
Risks of aging infrastructure

Shell of the boiler circulation pump, boiler house 6.4m
Risks of aging infrastructure

Shell of the boiler circulation pump, boiler house 6.4m

Outer diameter = 1150mm
Inner diameter = 680mm

Residual fracture caused by force

Fatigue fracture
Risks of aging infrastructure

Extent of damages
Risks of aging infrastructure

Extent of damages
Global energy outlook

Extent of damages
**Challenges**

- Balancing operational efficiency, availability and compliance to environmental standards
- **Efficiency**: Minimising energy loss in power generation and maximising output
  - 7 - 15% of the power generated in fossil-fuel plants is consumed by the plant’s auxiliary systems.
- **Availability**: Minimising downtime due to unforeseen repairs or maintenance needed due to breakdowns
- **Compliance to standards**: Minimising emissions and ensuring safety to meet national and international standards

**Solutions**

- Integrated solutions that focus on operation and implementation synergies
- **Renovation & Modernisation**
  - Include NDT, performance tests, energy audits
  - Increase lifetime of plants by 15 to 20 years
  - Increase rated capacity by 4 – 8%
  - Increase efficiency by 8 – 10%
- **Asset Integrity Management, Operation & Maintenance**
  - Include in-service inspections, preventive & predictive maintenance
  - Maximise productivity, avoid unnecessary shutdown
- **Independent inspection and assessment**
  - Ensure adherence to environmental and safety standards
Customised end-to-end solutions

From feasibility and planning through to procurement, construction, commissioning, operation, maintenance, and decommissioning, TÜV SÜD ensures improved **operational safety, reliability** and **overall performance** of power plants for investors, engineering, procurement and construction contractors, and operators.
Supply chain solutions for new build plants

- Pre-shipment inspection
- Loading/unloading supervision
- QA inspection (IQC)
- Vendor Qualification & Supplier Valuation
- Market surveillance management
- Tender & contract management
- Supply chain audits
- Site assessment
- Stage inspection
- Verification of Conformity & Procurement certification
- Final inspection
- Post-shipment inspection

Procurement Assurance
Economic success, environmental targets and social accountability are challenges that every company must face. Access to first-class know-how is the first step towards meeting these challenges, followed by the efficient implementation of targets.
Conventional power plant asset life cycle

INVESTMENT
- Feasibility & planning
- Procurement
- Construction
- Commission
- In-service
- Refurbishment & decommission

Owner's engineer
- Technical due diligence
- Supply chain assurance
- Construction quality assurance (QA/QC)
- Plant status assessment
- Rehabilitation/modernisation management

Technical advisory
- Licensing & consenting
- Pre-qualification
- Compliance certification
- Plant optimisation
- Failure analysis (RCFA)

Technical due diligence/consultancy
- Tender & contract management
- Pre-qualification
- Compliance certification
- In-service inspection
- Efficiency consultancy

Site assessment
- Design review
- Design approval
- Claim management
- Performance tests
- Noise / vibration / emissions testing
- Due diligence (TDD - technical, EDD - environmental)

Staff training / qualification
Your business benefits

**Increase availability, optimize performance**
TÜV SÜD’s experts help you obtain professional advice in performance optimization to reduce outage time and increase your return on investment.

**Promote efficiency, reduce emissions**
Our experts’ impartial perspective fosters cost efficiency in your organisation, while their comprehensive knowledge contributes to your emissions goals.

**Minimise risk, improve reliability**
We help you to reduce the risk of conventional power plant incidents, enhance safety for people and the environment, increase process transparency and eliminate interface problems.

**Strengthen your competitive edge**
Leverage on our expertise in safety and statutory compliance for legal certainty. Third-party certification by TÜV SÜD demonstrates your commitment to quality.
Thank you for your attention.

tuv-sud.com/conventionalpower
conventionalpower@tuv-sud.com