

Planning the volume of cross-border flows of electricity and development of appropriate infrastructure

TEİAŞ

Load Dispatch Department

European Transmission Coordination Division

Mehmet KARA

Basic Principles for the cross-border trade

- ▶ Allocation of the cross-border flows
- ▶ Should be non-discriminatory
- ▶ Market based
- ▶ Giving economic efficient signals
- ▶ Securing the network, maximizing the social welfare

Energy in Turkey

- ▶ Turkey has around 8% load growth average in the last 20+ years
- ▶ Huge potential for investors
- ▶ Access to European electricity market
- ▶ Access to ENTSO-E
- ▶ Turkey aims to be an energy hub in the region
- ▶ The opportunities for long term plans for TR-GE interconnections should be taken into account

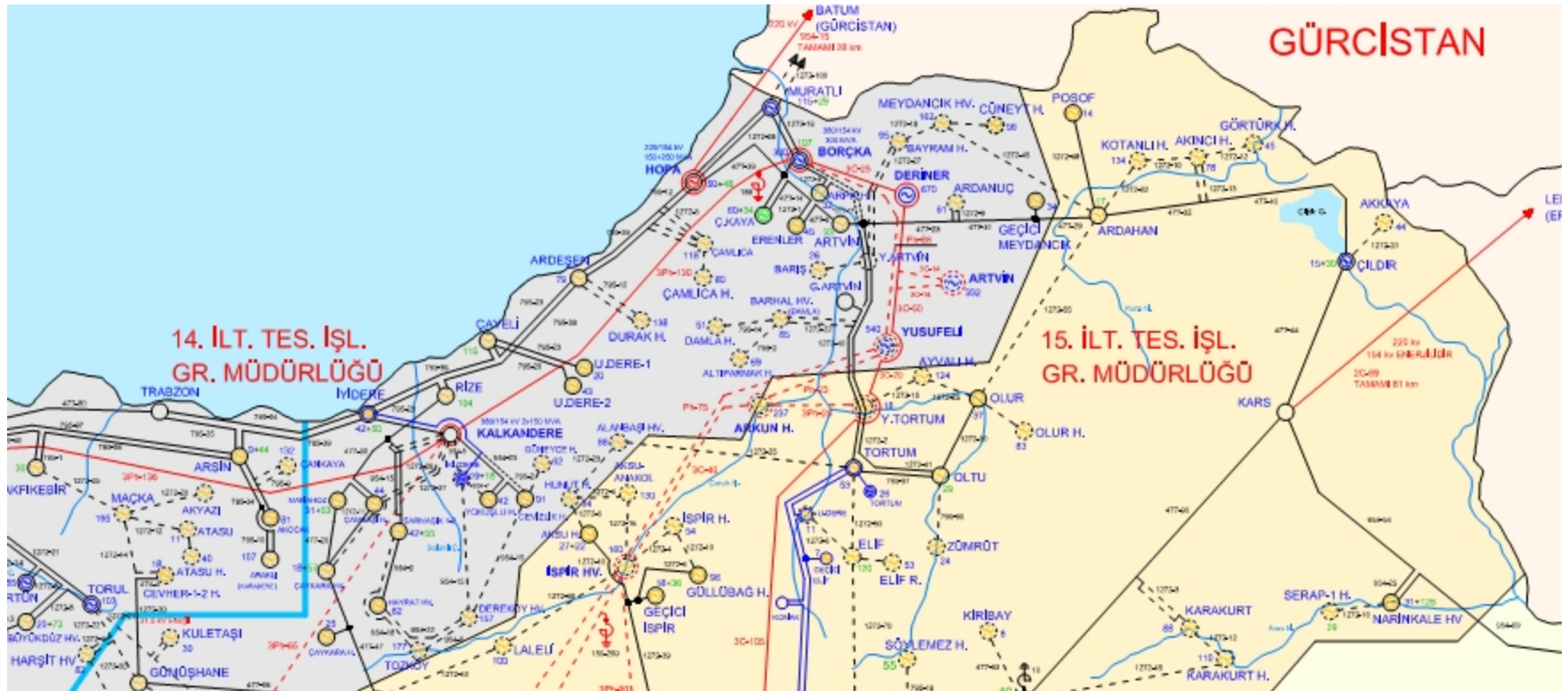
Basic Principles

- ▶ According to Electricity Law 6446 TEİAŞ is responsible for monitoring the electricity grid in real time, ensuring grid security
- ▶ Grid Security is always #1 priority in TSOs world
- ▶ Cross-border flows should never endanger the grid security
- ▶ TEİAŞ responsible not only for its customers, also to ENTSO-E
- ▶ No Grid, no trade

The volume of cross-border trade

- ▶ Planning the volume of cross-border trade between Georgia and Turkey, should always be based on grid simulations
 - Realistic
 - Taken into account regions specifics
 - Security limits should be respected

Map of the North-East Turkey



Regions Specifics

- ▶ A lot of existing HPPs
- ▶ New HPPs to come
- ▶ Only two 400 kV connection to the rest of the system
- ▶ When one line trips, all the production + Import from Georgia is connected to the system with one line only
- ▶ Not only over-flow problem, angular stability problem
- ▶ It is “felt” even in mid-Europe

Development of the infrastructure

- ▶ New 400 kV transmission lines are necessary
- ▶ To limit the consequence of such trips, TEİAŞ installs SPS on the North–East of Turkey
- ▶ Effect to ENTSO–E to be minimized
- ▶ In such trip, automatic tripping of HPPs or NGCCPPs
 - Problem with Power Plant owners
 - Who will pay for their loss?

Development of the infrastructure

- ▶ Such a trip may always trigger an inter-area oscillation within ENTSO-E
- ▶ Currently around 0.15 Hz
- ▶ SPS is just a temporary solution
- ▶ Real solution is to have additional 400 kV lines
- ▶ Building new lines always take time
- ▶ Not only a financial problem, but also enviromental problem

New Transmission Line Investments

Keban-Bağıştaş 400 kV OHL

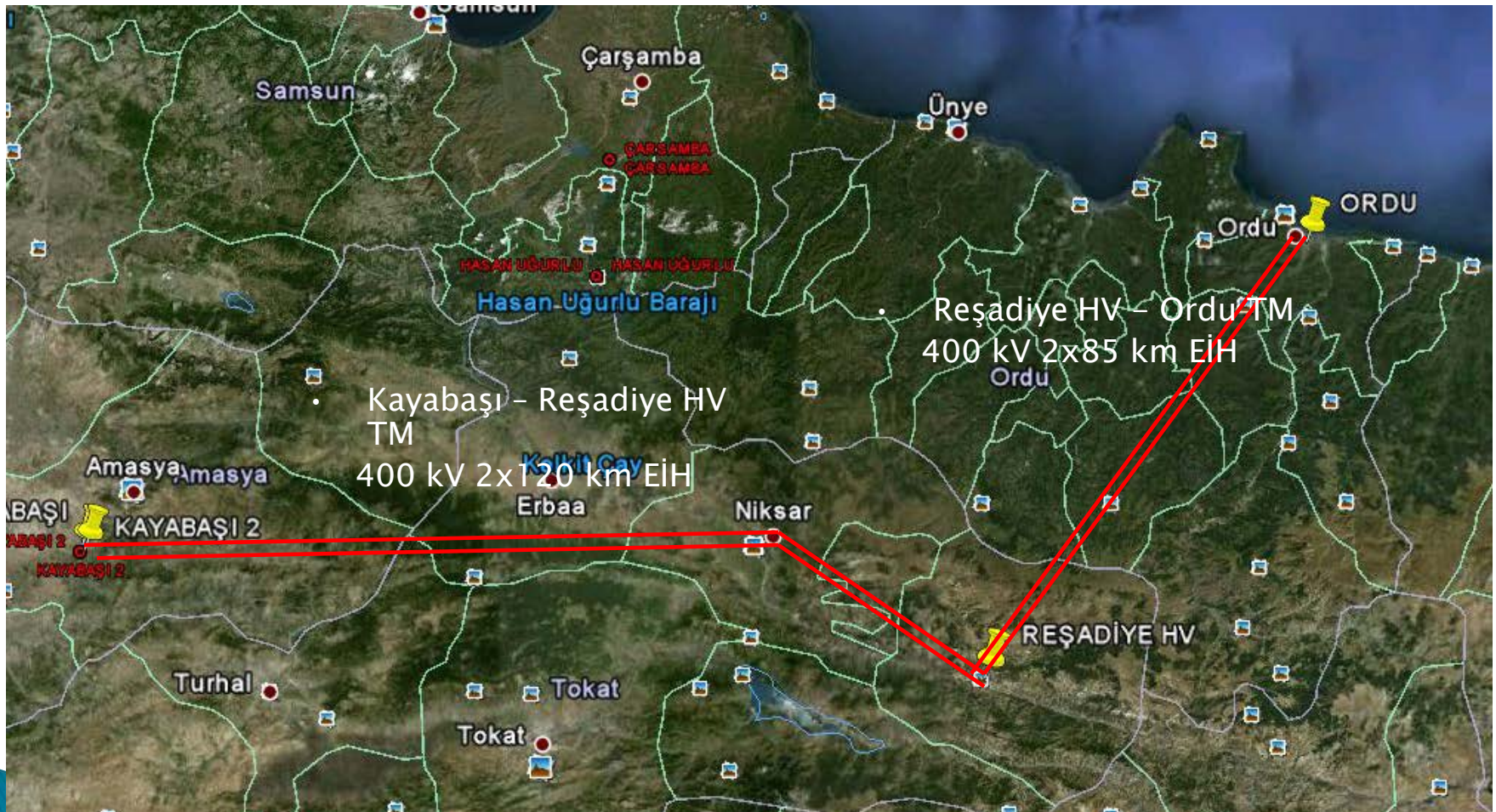


New Transmission Line Investments



New Transmission Line Investments

Kayabaşı – Reşadiye Havza – Ordu 400 kV OHL



Legal Perspective

- ▶ TEİAŞ has to follow ENTSO–E Operational Handbook for the grid operation
 - TR–GE interconnection too
- ▶ Additional Network Codes are to be published in EU
- ▶ Eash TSO has to follow
- ▶ Some rules or procedures may change in near future
- ▶ Regulators participation is necessary for those changes

Suggestions

- ▶ Co-operation with regulators and TSOs are necessary
 - Establishing a Working Group?
- ▶ Planning the volume of the flow should be in parallel with the grid infrastructure
- ▶ Security of grid should be ensured
- ▶ Similar market rules and methodologies make it easier for market-coupling

Suggestions

- ▶ Legal side of the problems should not be under estimated
- ▶ Force Majeures should be defined good
- ▶ Legislation for the cross-border trade should be updated according to the developments and experiences
- ▶ Close co-operation is essential!

Thank You
hmet.hmet.kara@teias.gov.tr