



Improving Energy Security & Enabling Private Investment

## Energy Technology & Governance Program

United States Agency for International Development  
and  
United States Energy Association

NARUC International Relations Committee  
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United States Energy Association



## Overview

- Nonprofit voluntary membership association
- 150 members cover the breadth of the U.S. energy industry
  - Utilities, regulatory agencies, oil & gas, nuclear finance, research universities, consultancies
- U.S. member committee of the World Energy Council
- Educational dissemination mission
  - Annual State of the Energy Industry; Energy Efficiency Forum, Energy Supply Forum; weekly briefings
- 25 years of cooperation with USAID



# Delivery Mechanisms Support ETAG Objectives



Black Sea Regional  
Transmission  
Planning Project  
(BSTP)



Southeast Europe  
Cooperation Initiative  
Transmission Planning  
Project (SECI)



Eastern Europe  
Natural Gas  
Partnership (NGP)



Southeast Europe  
DSO Security of  
Supply Working  
Group (SEEDSO)



Electricity Market  
Initiative (EMI)



Utility Cyber  
Security Initiative  
(UCSI)



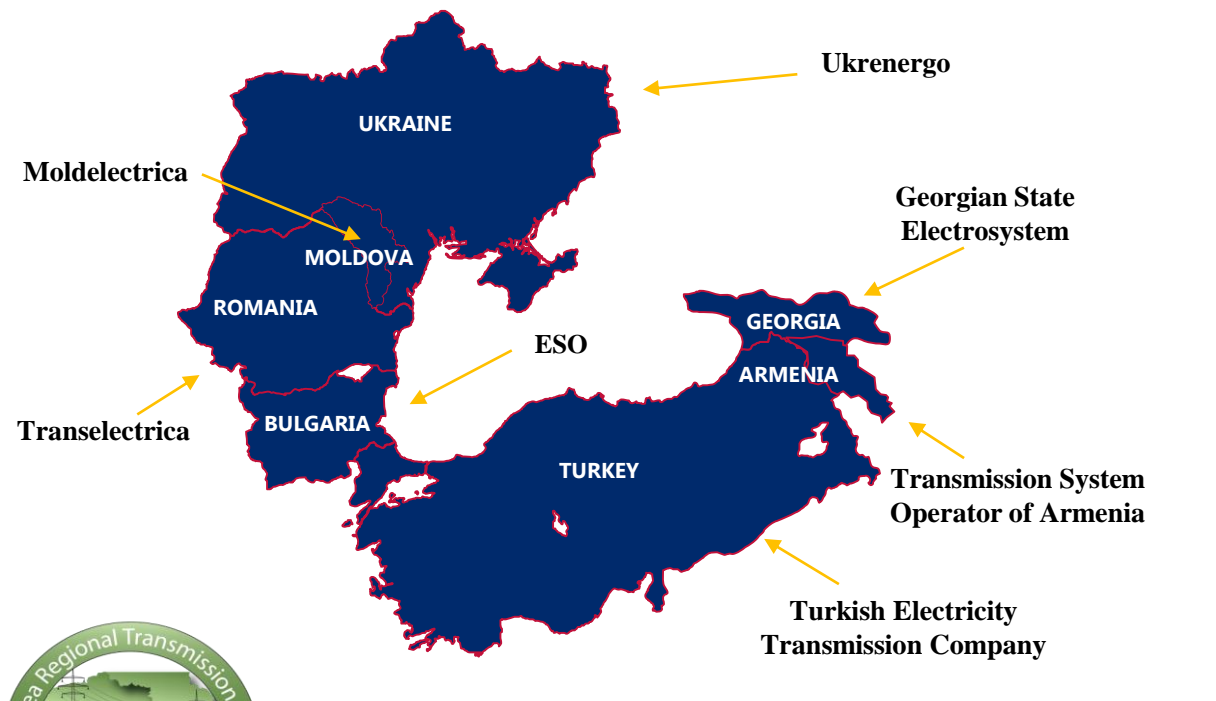
Plan for robust, reliable cross-border transmission interconnections as the backbone infrastructure for cross border trade and exchange of electricity generated by clean & innovative energy technologies.

Develop Technical rules, guidelines and network infrastructure assessments to accelerate integration of clean and innovative energy technologies.

Improve security of supply in distribution systems by supporting: optimization planning; line loss education; asset management programs; smart grid technology; and region wide disaster preparedness and emergency response programs.

Fortify the capability of electric power and natural gas utilities to defend against cyber-attacks and improve their capacity to restore service in a timely and effective manner





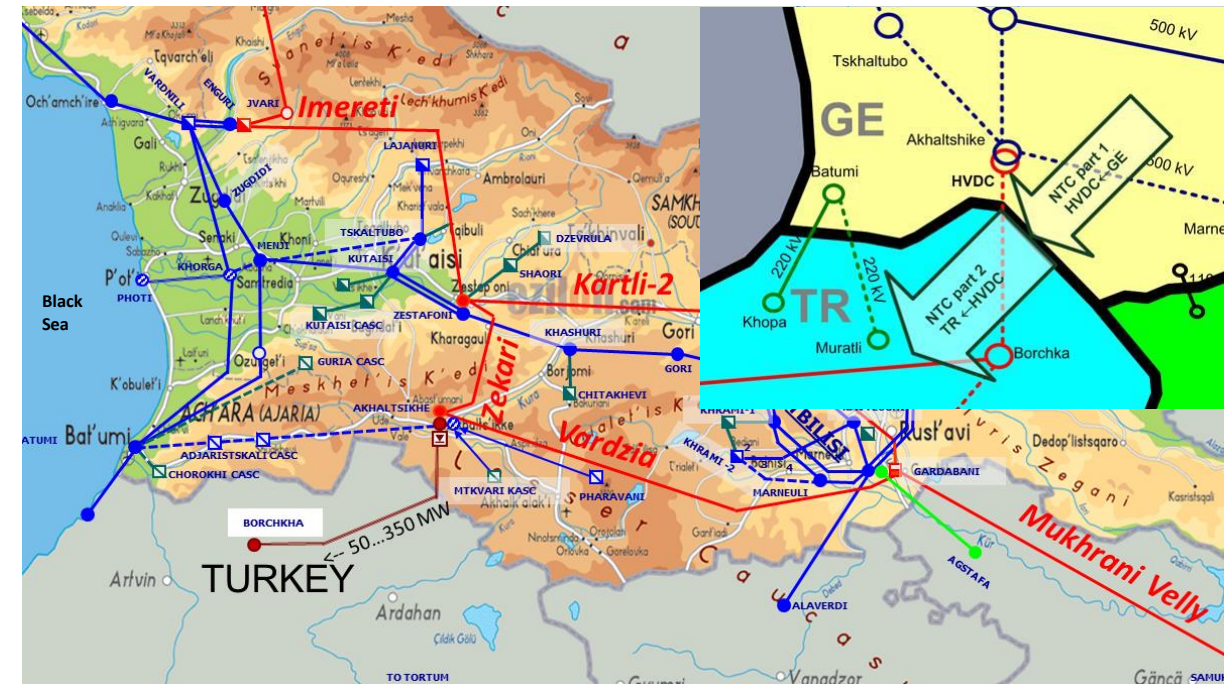
## Black Sea Transmission Planning Project (BSTP)

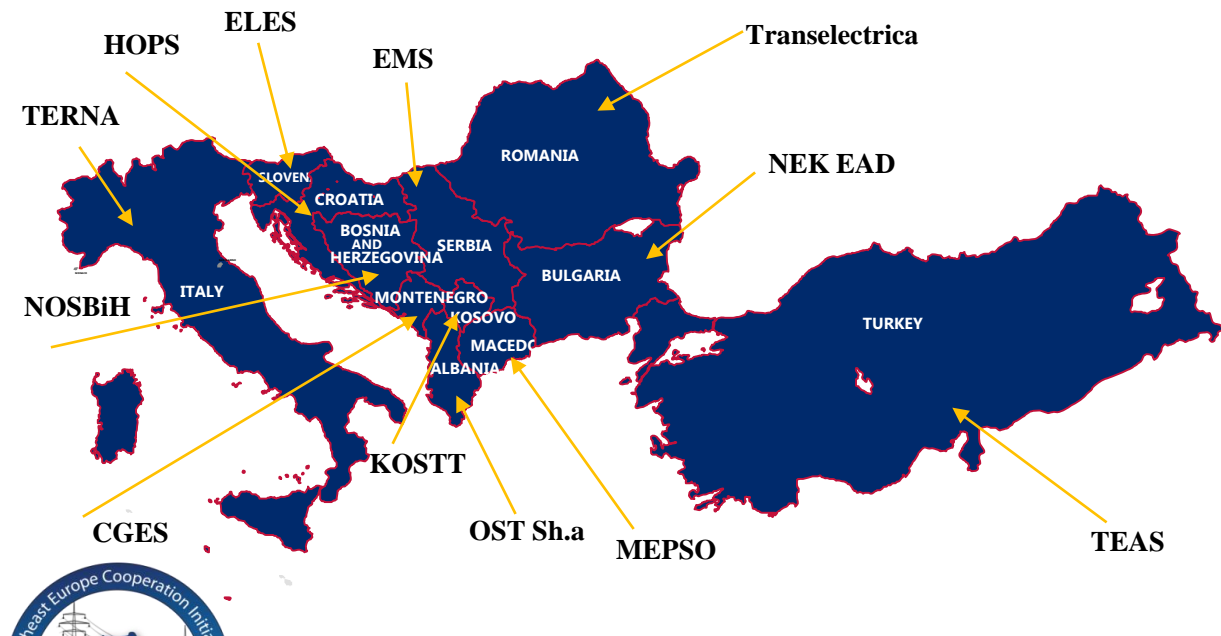
### Objectives:

Develops and maintains regional electricity network planning models to support development of Black Sea infrastructure, regional electricity trade and electricity trade between the Black Sea region and Europe. Supports transfer and adoption of European network planning and operational practices to accelerate integration with ENTSO-E.

## Progress

- Conceptualized the \$300 million High Voltage Direct Current Back to Back (HVDC B2B) station connecting GE to Borcka TR, enabling export of Georgian hydropower to Turkey
- Currently improving BSTP members' capacity to conduct System Adequacy Assessments of their electricity grid, using ENTSO-E methodology





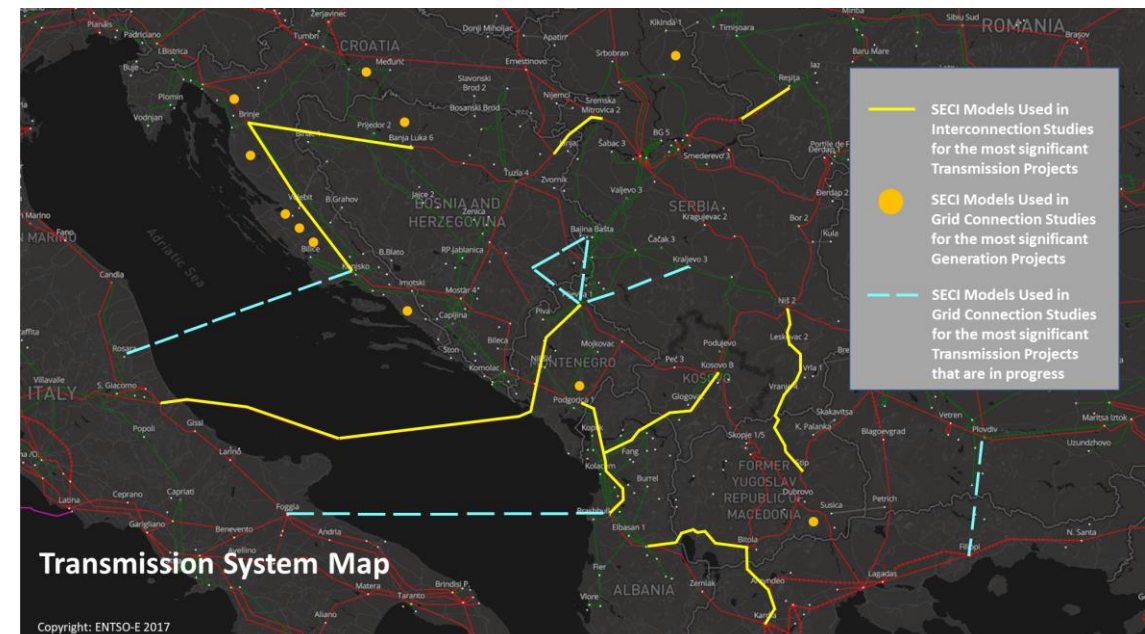
## Southeast Europe Cooperation Initiative Transmission System Planning Project (SECI) (2001 – 2017)

### Objectives:

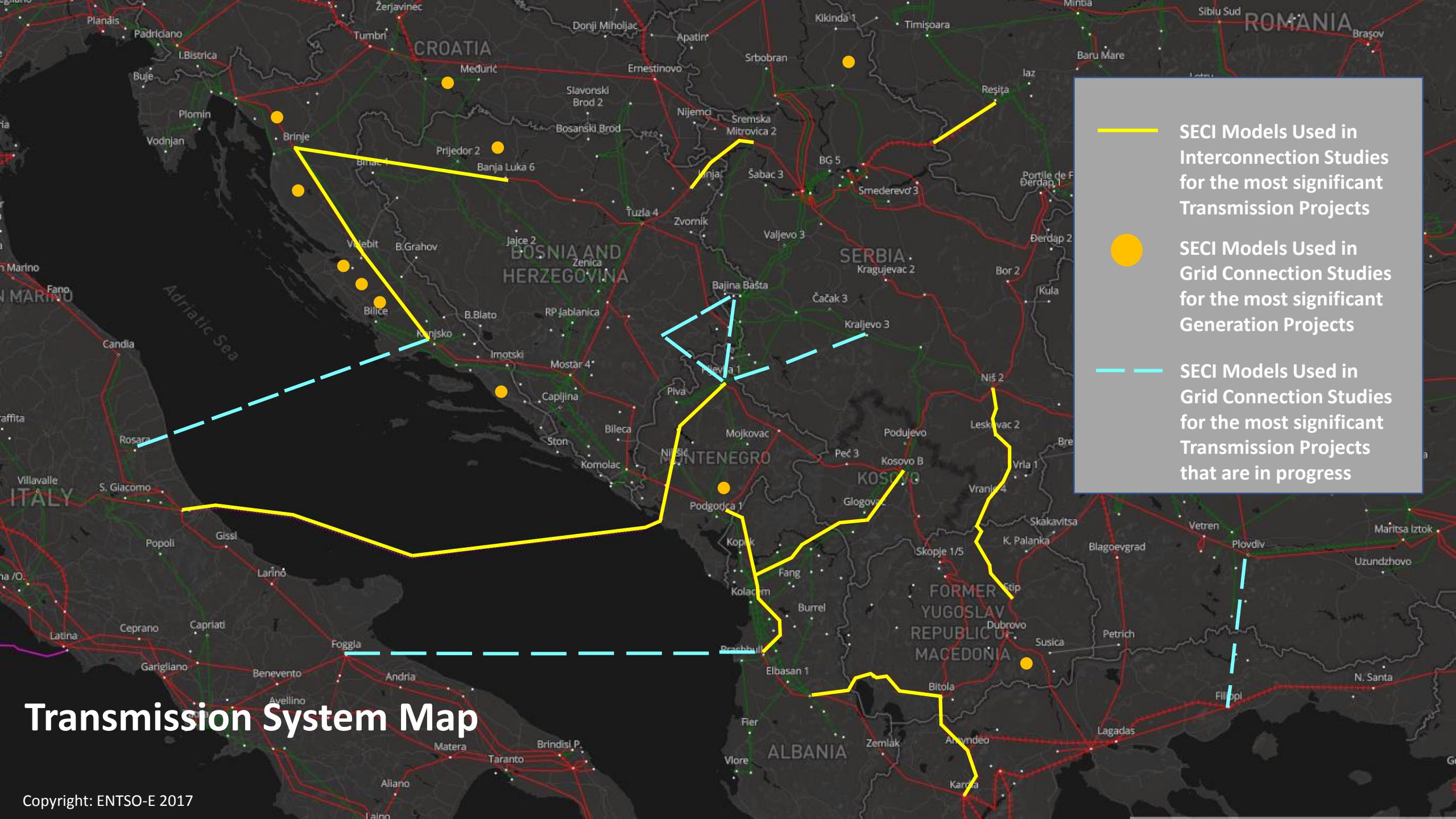
- Developed and maintained regional electricity network planning models to support development of Black Sea infrastructure, regional electricity trade and electricity trade between the Black Sea region and Europe.
- Supported transfer and adoption of European network planning and operational practices to accelerate integration with ENTSO-E.

## Progress

- Models & forecasts are most detailed available in Europe
- \$10 billion worth of transmission investments leveraged through the use of SECI & BSTP models for new internal & interconnection lines
- Sustainable program - graduated USAID assistance and adopted by ENTSO-E in 2017







SECI Models Used in Interconnection Studies for the most significant Transmission Projects

SECI Models Used in Grid Connection Studies for the most significant Generation Projects

SECI Models Used in Grid Connection Studies for the most significant Transmission Projects that are in progress

# Transmission System Map



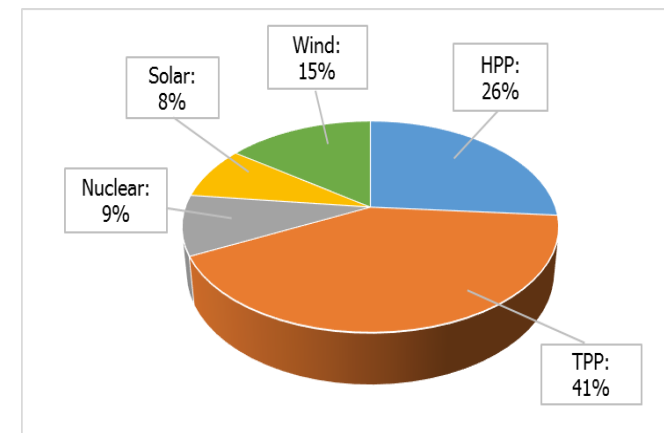
## Electricity Market Initiative (EMI)

**Objectives:** Established in June to 2018 to reduce “seams” between domestic electricity markets in Southeast Europe, encourage deeper and more liquid wholesale electricity trade and accelerate development of clean and efficient generation.

## Progress

- Developing 2025 day ahead electricity market planning model to calculate wholesale costs of electricity, ensure network stability, and harmonize calculations of cross-border transmission capacity

## EXPECTED SOUTHEAST EUROPE GENERATION CAPACITIES IN 2030



Installed capacity (GW)	Albania	Bosnia and Herz-egovina	Bulgaria	Greece	Croatia	Hungary	Kosovo	Monte-negro	Macedonia	Romania	Serbia	Slovenia	TOTAL
HPP	3.15	2.27	2.61	4.53	3.19	0.00	0.04	1.11	1.26	6.13	3.30	1.04	28.62
TPP	0.50	2.47	5.26	10.11	2.74	5.12	1.66	0.20	1.51	9.88	4.45	1.32	45.21
Nuclear	0.00	0.00	2.08	0.00	0.00	4.40	0.00	0.00	0.00	2.86	0.00	0.70	10.03
Solar	0.10	0.10	1.80	4.00	0.20	0.08	0.03	0.02	0.04	2.20	0.02	0.28	8.86
Wind	0.20	0.64	1.60	6.20	1.30	0.80	0.13	0.19	0.15	4.20	0.83	0.11	16.35
TOTAL	3.95	5.48	13.35	24.84	7.43	10.39	1.85	1.52	2.95	25.26	8.60	3.44	109.07



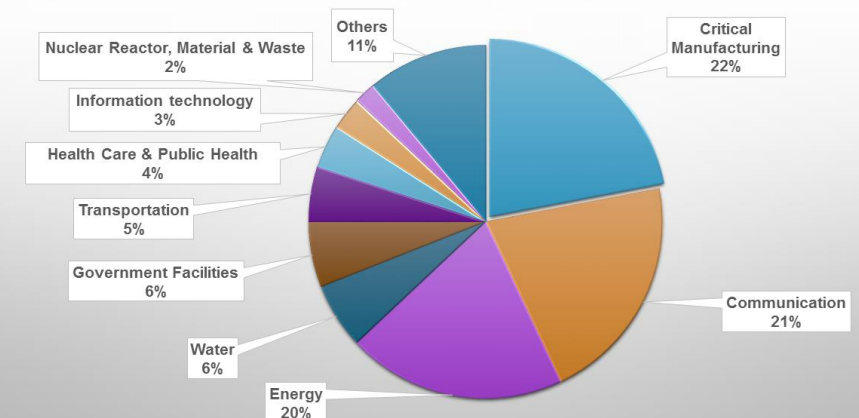
## Utility Cyber Security Initiative (UCSI)

**Objectives:** improves cyber threat detection and management; strengthens defense against attack; and enhances network resiliency.

## Progress

- Developing a cyber risk assessment methodology to identify the top threats to each member
- Developing cyber strategies for UCSI members to prioritize initial cyber security network investments
- Conducted a cyber security management audit of the Georgian State Electro System identifying management and cultural change priorities
- Supporting development of a virtual cyber Information Sharing and Analysis Center (ISAC)

### Cyber Security Incidents by Sector, 2016



Source: ICS- CERT



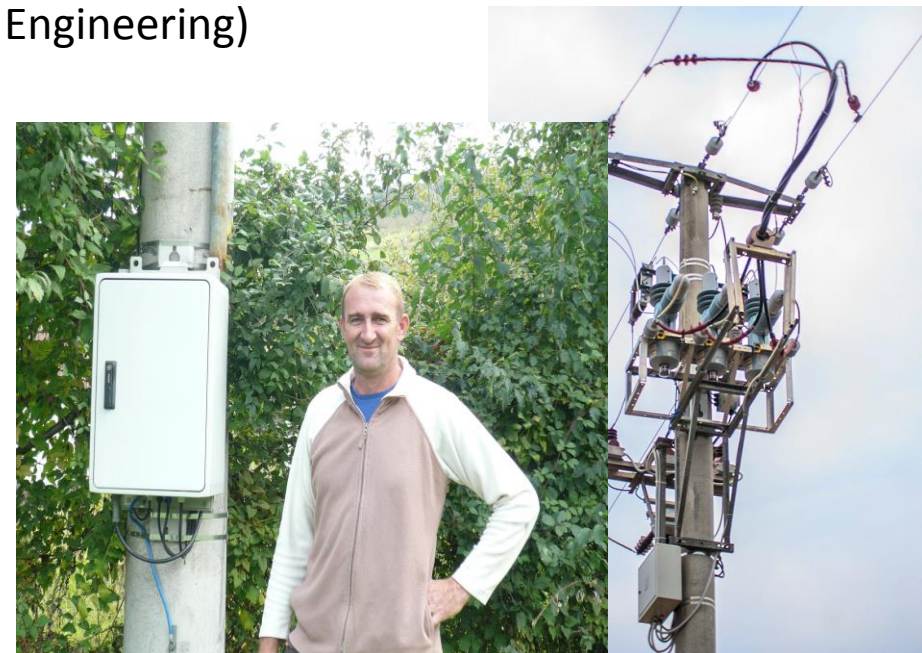


## Southeast Europe Distribution System Operator Security of Supply Working Group

**Objective:** To assist the electric distribution companies in Southeast Europe to improve the security of supply on the “last mile of service.”

## Progress

- Benchmarking of 108 key operational and economic performance metrics in a continuous improvement process
- EVN Macedonia established emergency response program incorporating U.S. best practices from CenterPoint Energy and American Electric Power (AEP)
- Small demonstration project in district of Brcko, BiH demonstrating U.S. smart grid technology (Schweitzer Engineering)





## Eastern Europe Natural Gas Partnership (EE-NGP)

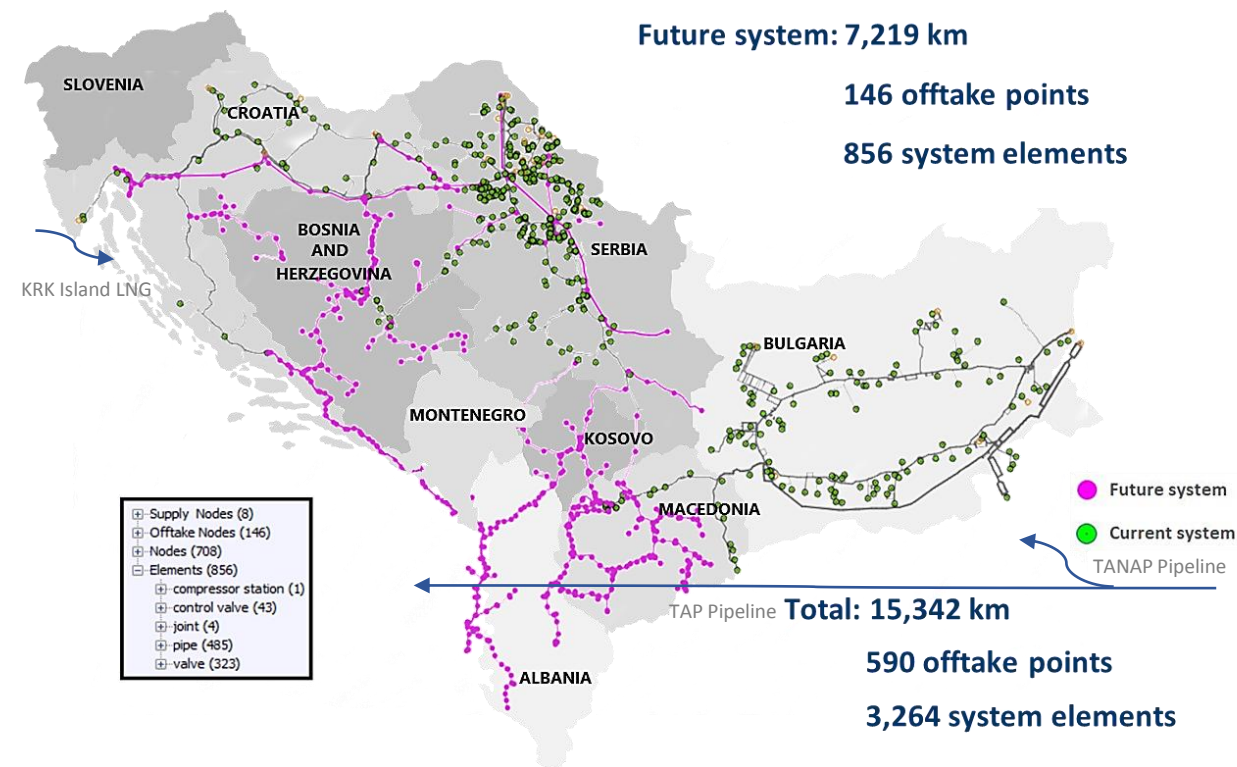
### Objectives:

- Promotes regional cooperation in natural gas transmission network planning and supports regional harmonization of methodologies and operational principles.
- Identifies potential natural gas transmission network investments to expand natural gas markets and diversify supply.
- Enables the creation of a regional gas market with the potential for US gas supplies.



## Progress

### EE-NGP Max 2040 Model





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## WIDE EMI COVERAGE IN SOUTHEAST EUROPE



### Objectives:

Reduce seams between domestic markets

Encourage deeper, more liquid wholesale trade

Accelerate clean, efficient generation

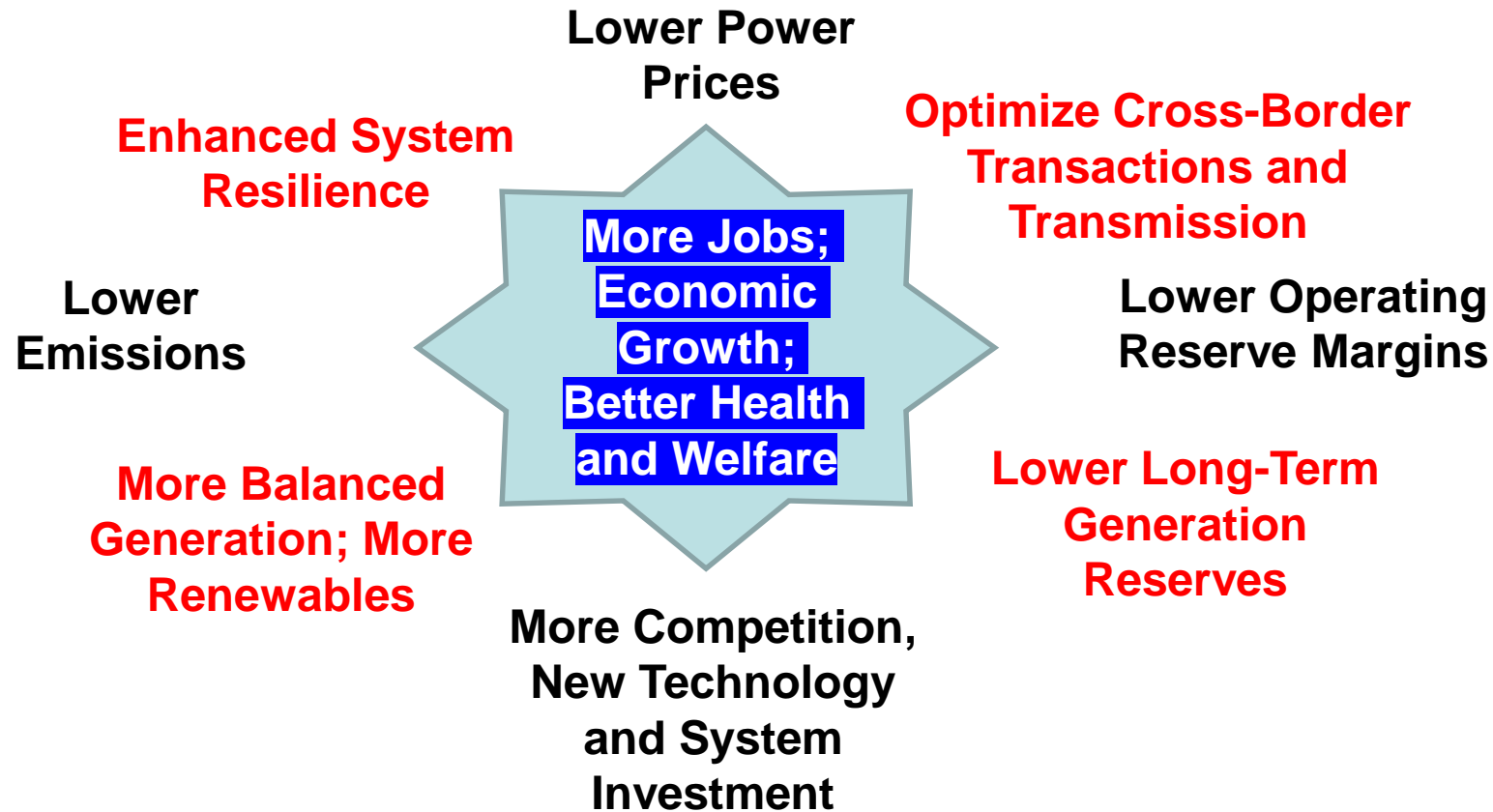




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## Potential Benefits from Greater SEE Market Integration, With Support from the EMI





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## Key EMI Accomplishments to Date

**TSOs and MOs in Ten Countries Have Joined the EMI**

**Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Kosovo,  
Macedonia, Montenegro, Romania, Serbia, Slovenia**

**MOU SIGNED JULY 2018; REGULATORS ARE OBSERVERS**

**Identified Priorities and Begun Work**

**Market consolidation; RES integration; System operations**

**STARTED MODELING THE BENEFITS OF INTEGRATION**

**Developed Draft Work Plan; Selected First Tasks**

**Near-term and longer-term work – THREE KEY AREAS**

**Conducted Two Successful WG Meetings –  
50-60 People - Next One Later this Month**

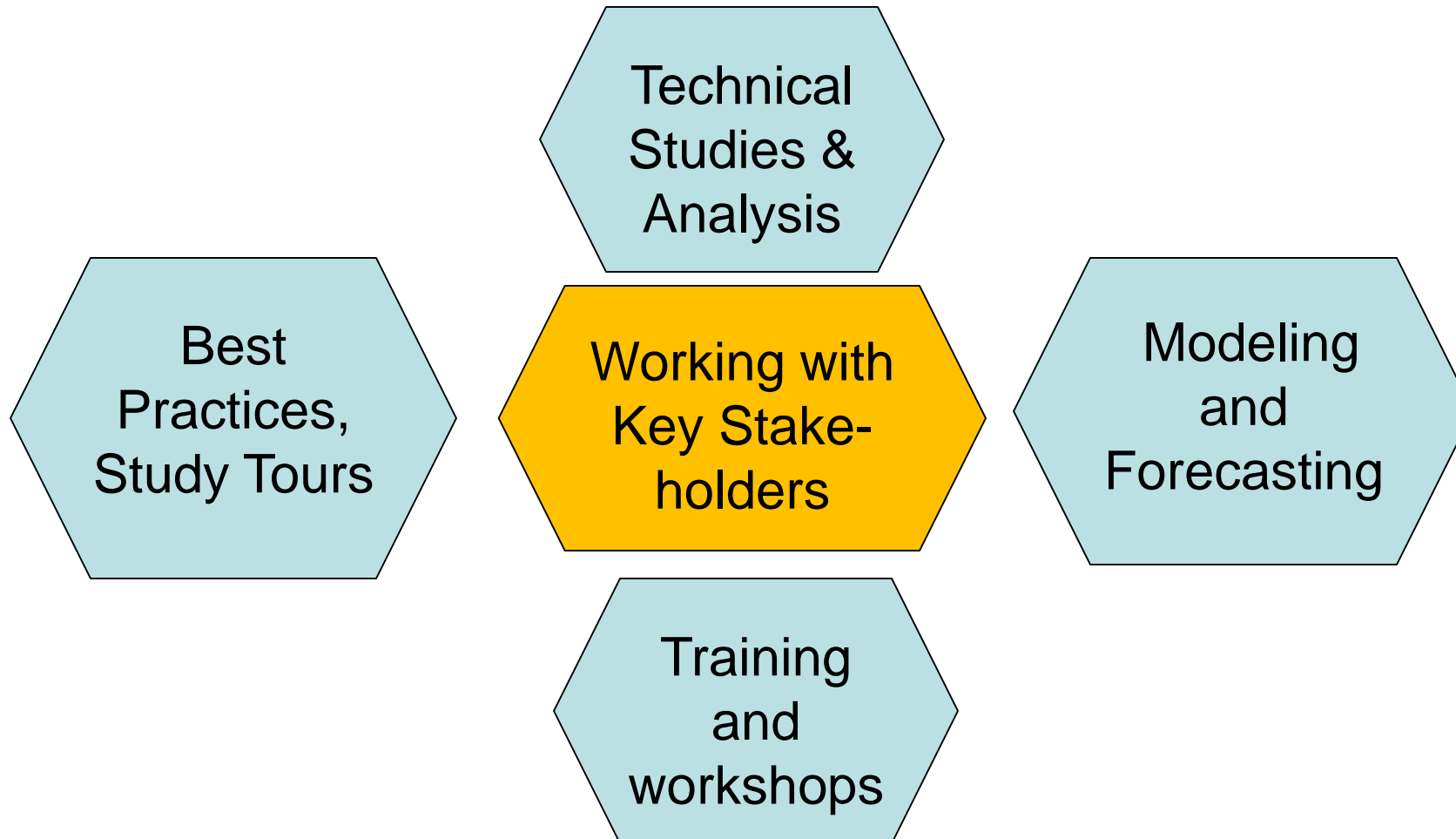
**Country overviews; technical discussions; expert best  
practices; regulatory inputs; next steps on EMI Work Plan**



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## How is the EMI Working Group Delivering Results?







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## **Area of Opportunity #1: Capture the Benefits of Greater Regional Market Integration**

### **Overall Objectives**

- Stimulate and capture the benefits realizable through the robust power markets in Southeast Europe
- **Demonstrate those benefits to regional stakeholders.**
- Foster regional markets that can trade competitive products, and that optimize the capacity and daily grid utilization. Begin with day-ahead markets.
- **Support TSOs and MOs with regulatory consideration of such consolidation.**



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## **Area of Opportunity #2: Best Practices for the Integration and Procurement of Alternative Generation/Renewable Energy Sources (RES)**

### **Overall Objectives:**

- **Enhance the ability of EMI countries to:**
  - Optimize future development;
  - Minimize system impacts; and
  - Absorb growing amounts of alternative generation (especially intermittent sources and renewables/RES) onto the grid.
- **Carry out this technical work in anticipation of procurement organized through regulatory channels.**



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## **Area of Opportunity #3: Support to Foster Efficient Regional Day-Ahead Market and Operations, e.g., Common Cross-Border Capacity Calculations and Allocation Processes**

### **Overall Objectives:**

- **Improve TSO/MO institutional capacity to model and analyze network behavior in more competitive, day-ahead wholesale energy and balancing markets.**
- **Foster the development of a common regional approach to cross-border capacity calculations and the allocation of such capacity.**
- **Regulatory implications through changes in TYNDPs and generation mix.**





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## WHY DOES ALL THIS MATTER TO REGULATORS?

- The findings of USEA's EMI work may well come before regulators in the next few years
  - Reviewing the benefits of coupling with other countries
  - Assessing the need for new transmission
  - Considering possible wholesale and retail rate changes
  - Enabling TSOs to conduct special analyses in the TYNDPs
  - Fostering the introduction of more competitive generation
  - Making the transition from FITs to low-priced renewables
  - Achieving enhanced resilience
- Meet EU emissions standards; Support EU accession
- Enhance economic growth