

Maps – Israel panel





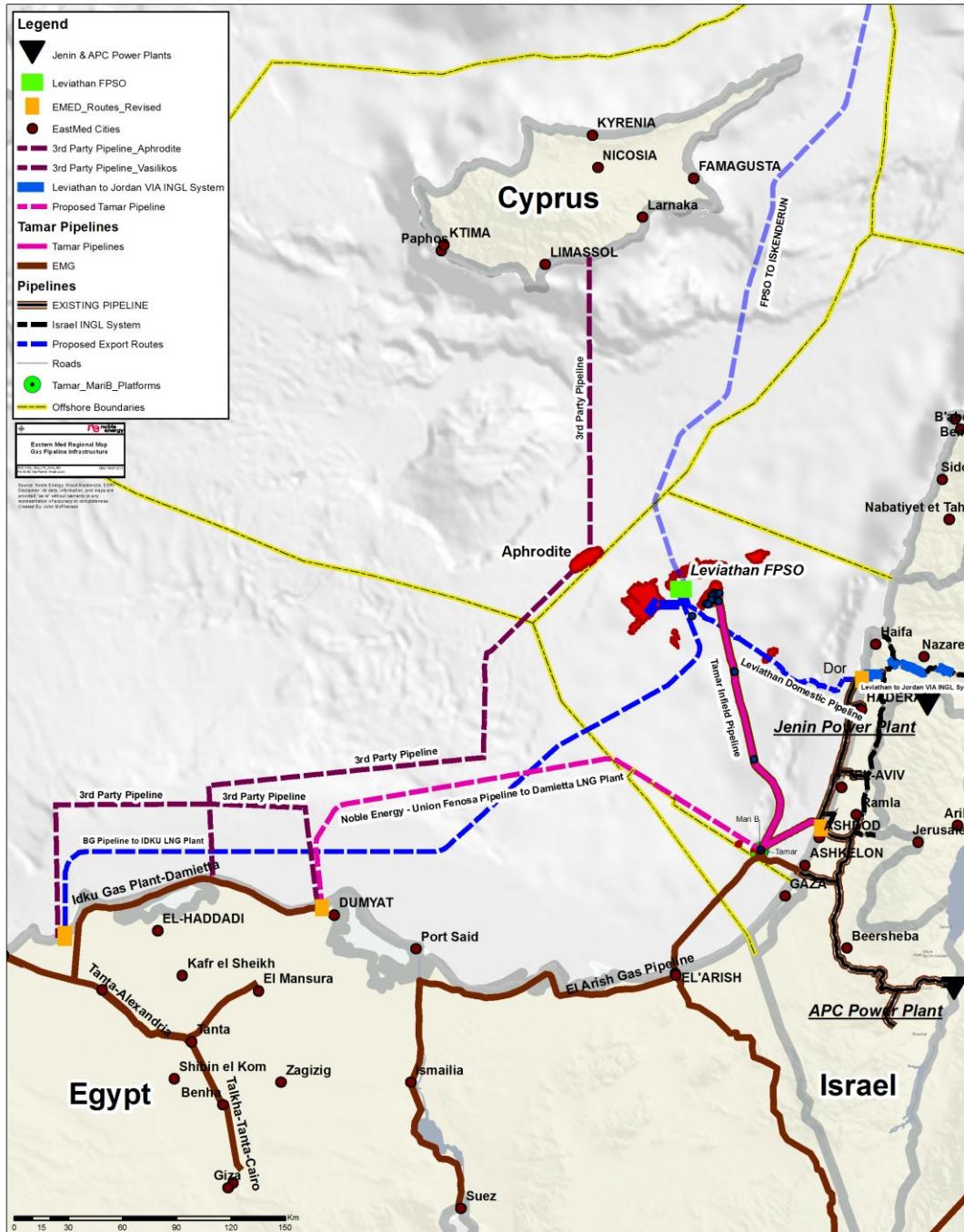


Figure 1: Israel's natural gas fields



Gas in the eastern Mediterranean





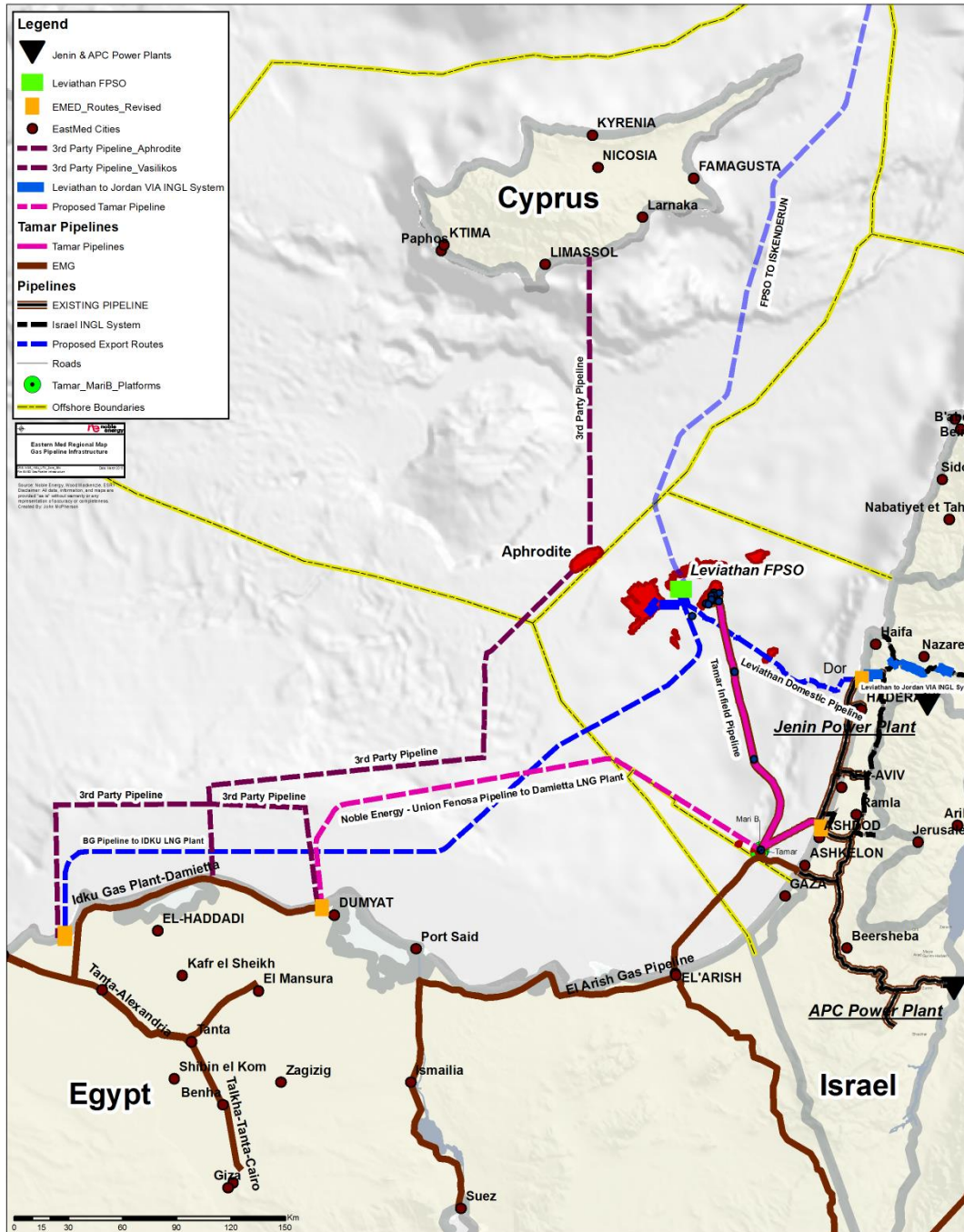


Figure 1: Israel's natural gas fields



Gas in the eastern Mediterranean







NARUC Annual Meeting

International Priorities and Engagement Opportunities on Clean Coal and Carbon Management

Stephanie Duran, Director

Division of International and External
Partnerships

Office of Clean Coal and Carbon Management

February 2016

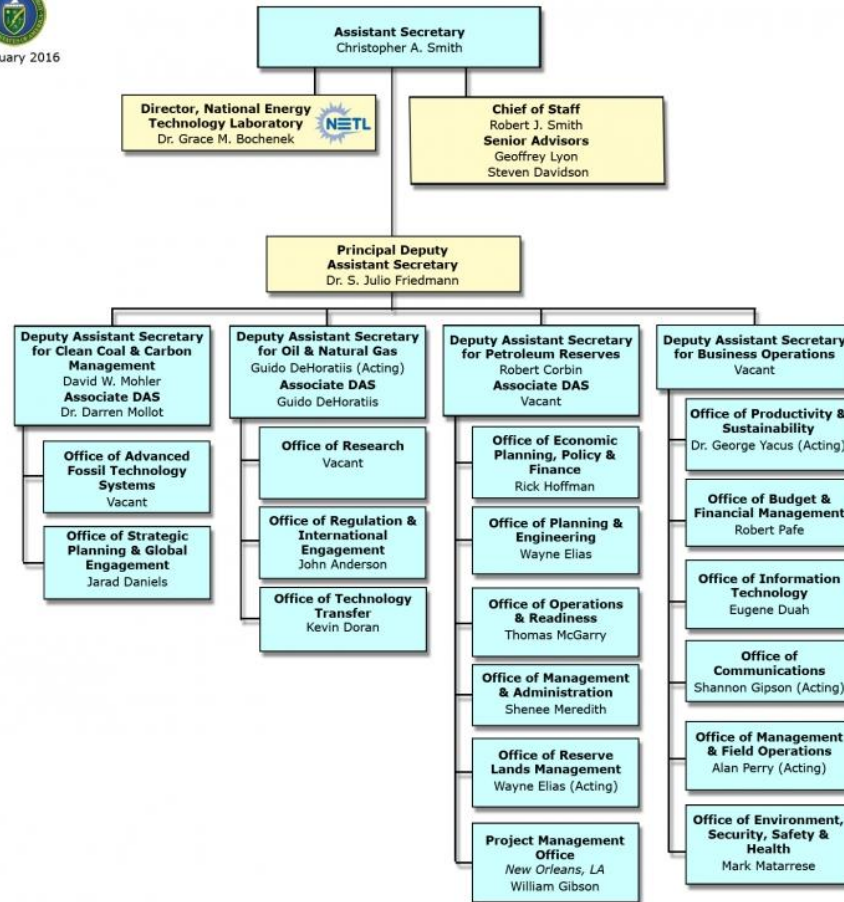
Outline

- Mission, Goals, and Key Activities
- FY 2016 International Priorities
- International Collaboration Footprint
 - Where we are and where we are going
- Subnational Collaboration

Office of Fossil Energy



February 2016



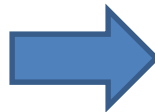
U.S. DEPARTMENT OF
ENERGY

Fossil
Energy



International and External Partnerships

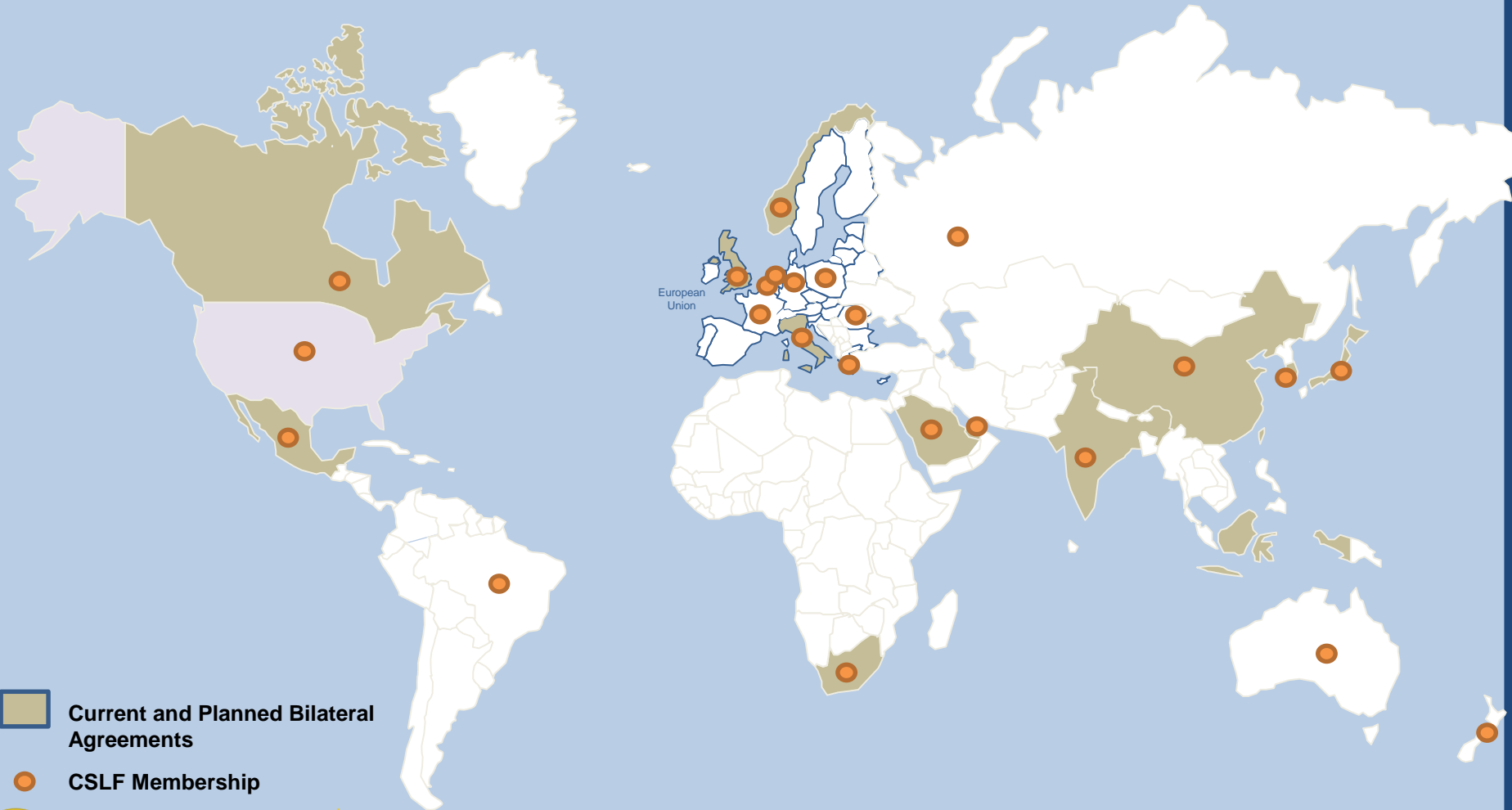
- **Mission:** Collaborate with international partners to **leverage cost, risk, and information sharing** through global research and development (R&D) activities and joint carbon capture, and storage (CCS) demonstration projects at scale
- **Goals:** Engage U.S. and foreign governments, industry, and academia bilaterally and multilaterally to:
 - **Reduce global greenhouse gas emissions** through CCS deployment around the world
 - **Lower CCS technology costs** through R&D and technology demonstration
 - **Create a value for CO₂** that results in co-benefits for CCS
 - **Increase knowledge, understanding and expertise** globally on CCS policy and technical issues
 - **Advance U.S. technology** application in international energy markets that benefits the U.S. economy and creates U.S. jobs
 - **Increase foreign direct investment** in domestic CCS demonstrations



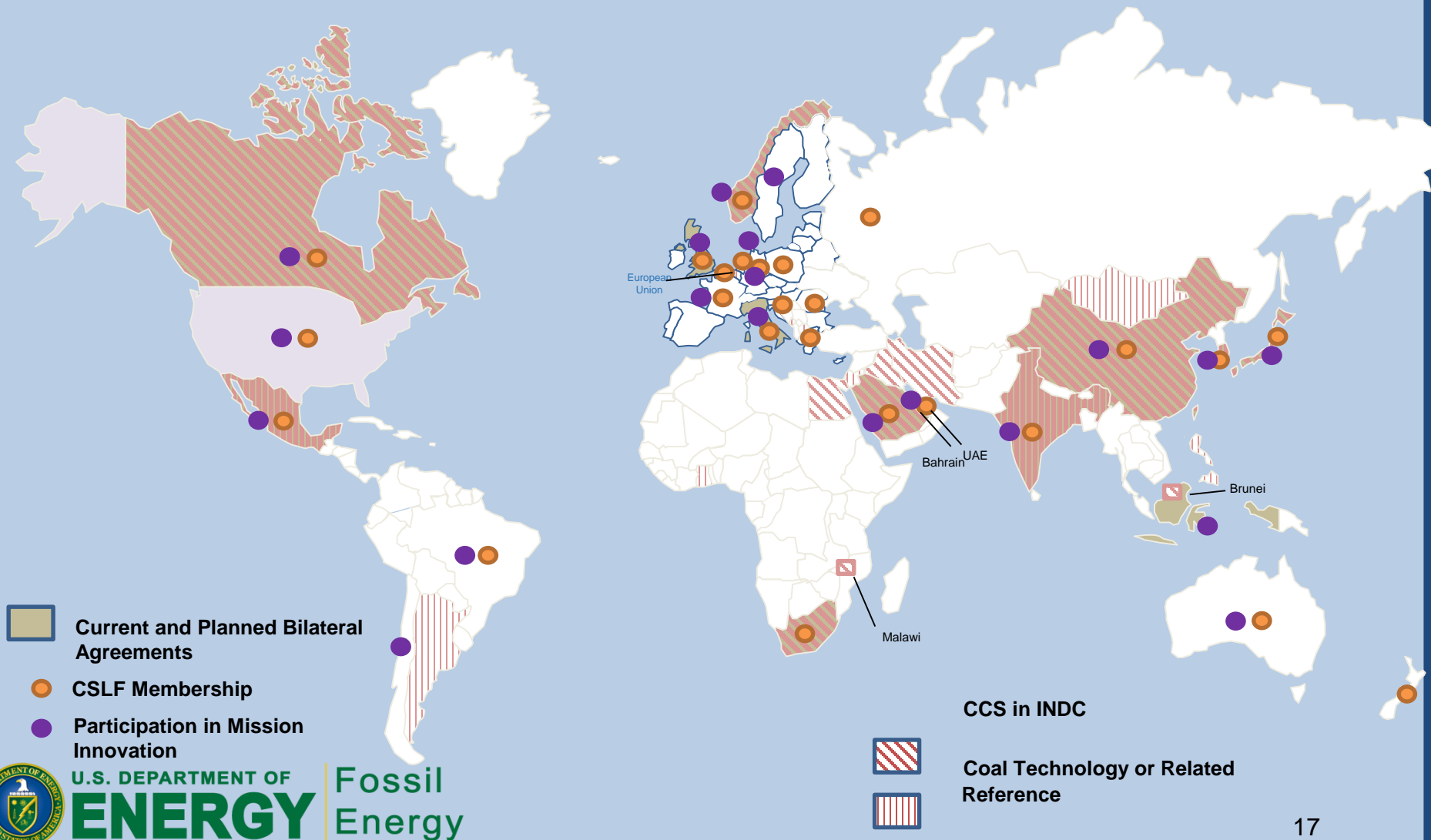
- **Key Activities:**
 - Implement **joint R&D** initiatives that address our overarching goals
 - Pursue **international large-scale demonstrations** and science collaborations
 - Create opportunities for **knowledge sharing and best practices exchanges** on CCS policy, financing, and regulatory measures
 - Advocate for **policy parity for CCS**
 - Conduct **capacity building** activities
 - Promote **trade and investment**
 - Foster **closer subnational linkages** between U.S. states and international partners to support policy goals and spur commercial opportunities



Where we are today



Where do we go from here?



Carbon Sequestration Leadership Forum (CSLFF)



Mission Innovation

Country	CSLF Member	CCS in INDCs	Large Scale CCS Projects (Source: Global CCS Institute)
Australia	✓		3 Large Scale Projects
Brazil	✓		1 Large Scale Project
Canada	✓	✓	6 Large Scale Projects
Chile			
China	✓	✓	9 Large Scale Projects
Denmark	Former Member		
France	✓		Pilot Scale Projects
Germany	✓		
India	✓		
Indonesia	Potential Member		Planned Pilot Scale Project
Italy	✓		Pilot Scale Projects
Japan	✓		Pilot Scale Projects
Mexico	✓		
Norway	✓	✓	2 Large Scale Projects
Republic of Korea	✓		2 Large Scale Projects
Saudi Arabia	✓	✓	1 Large Scale Project
Sweden			
United Arab Emirates	✓	✓	1 Large Scale Project
United Kingdom	✓		4 Large Scale Projects



International Collaboration with the States

- **Collaboration opportunities center around...**
 - *Research*
 - *Technology*
 - *Potential trade and investment*
 - *Regulatory standards and best practices*
- **Key countries**
 - *China*
 - *Colombia*
 - *India*
 - *Iraq*
 - *Japan*
 - *Korea*
 - *Canada*
 - *Mexico*
 - *United Kingdom*

Recent & Upcoming Opportunities for Subnational Engagement

- ***U.S.-China Clean Coal Industry Forum: August 2015***
 - Hosted by Governor Bullock
 - Opportunity to highlight Montana's work on clean coal and CCS
 - Stronger ties between Montana and Chinese provinces
- ***Iraqi delegation visit to North Dakota: October 2015***
 - Delegation from Iraqi Ministry of Oil (including Deputy Minister for Gas)
 - Focus on natural gas capture and utilization technologies (i.e., aeroderivatives) and integrating power generation into the regional grid
 - Meetings in State capital and field visits and with EPRI and industry
- ***Low Carbon Forum: September 2016***
 - Hosted by Governor Li Xiaopeng in Shanxi Province
 - Many State governors and U.S. universities have been invited to attend



State PUC Visit to China



- Annual trip to China for State PUCs to continue building a strong relationship between China and the United States
- August 2015: Lisa Polak Edgar (FL), Travis Kavulla (MT), Brian Kalk (ND), Brooks McCabe (WV), Kara Brighton (WY)
- Opportunity to share approach to greenhouse gas regulations and the future of the electricity generation
 - Ranging from technologies like large fossil and nuclear-fueled generation plants to the incorporation of small localized distributed sources of energy
 - Focus on China's national carbon trading plans and CCS in China
- **Planning under way NOW for 2016**



Office of Clean Coal and Carbon Management State Outreach

- Wyoming COAL-oquium (December 2015)
 - Wyoming Business Alliance Event
 - Hosted by Colorado Business Roundtable and the Wyoming Mining Association
 - Participation by
 - Key industry and State officials
 - State senators and representatives
 - Colorado and Texas
 - University of Wyoming School of Energy Resources
- Continued engagement of U.S. States on domestic issues related to clean coal and CCS
 - David Mohler
 - Joe Giove
 - Tamara Zelikova
 - John Panek

How can we be a resource to YOU?

- Visit U.S. states when foreign official delegations come to Washington
- Seek venues and co-hosts for annual events OUTSIDE of Washington
 - U.S.-China Clean Coal Industry Forum
 - Technical Workshops (i.e., CBM)
- Help connect U.S. states to foreign contacts
 - Seek events in foreign countries where State representation might make sense
- Support for planning for major trade missions to China and other countries
 - Advocacy for U.S. companies and technologies
- Leverage existing sister-state relationships to support program priorities
 - Wyoming-Shanxi
 - North Dakota-Shandong
- Others??

Contact Us

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International Programs Update

United States Agency for International Development
United States Department of Energy
United States Energy Association

William L. Polen
Senior Director
United States Energy Association

February 14, 2016



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ETAG Objectives

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 & innovative energy technologies

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

Support utility commercialization, privatization and market transformation to improve overall network efficiency and support clean energy market development



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Project Goals: SECI & BSTP



Promote National & Regional Transmission Planning
Among TSOs

Harmonize Transmission Planning Principles, Methods
and Methodologies



Identify Priority Investments in Transmission Systems &
Interconnections



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BSTP Project Participants



- Armenia – Scientific Energy Research Institute
- Armenia – Electric Power System Operator
- Bulgaria – NEK EAD, National Electricity Company
- Georgia – Georgian State Electrosystem (GSE)
- Moldova – Moldelectrica
- Romania – Transelectrica
- Turkey – Turkish Electricity Transmission Company
- Ukraine – Ukrenergo



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SECI Project Participants



- Albania – Transmission System and Market Operator **(OST)**
- Bosnia and Herzegovina – Independent System Operator in BiH **(NOS BiH)**
- Bosnia and Herzegovina – Electricity Transmission Company of BiH
- Bulgaria – NEK EAD, National Electricity Company
- Croatia – **Croatian** Transmission System Operator LLC **(HOPS)**
- Kosovo – Transmission System and Market Operator (KOSTT)
- Macedonia – Macedonia Transmission System Operator **(MEPSO)**
- Montenegro – **Montenegrin Transmission System Operator (CGES)**
- Romania – Transelectrica
- Serbia – JP Elektromreza Srbije (EMS)
- Turkey – Turkish Electricity Transmission Company **(TEIAS)**
- Italy – Terna (**observer**)
- Slovenia – Elektro Slovenia **(ELES)** (**observer**)



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SECI & BSTP Accomplishments



> 200 Participants Trained in the application of PSS/E, financial analysis, electricity market operations
Sustainable Expert Working Groups & Centers of Excellence

> \$1 billion worth of transmission investments leveraged through the use of SECI & BSTP models for new internal & interconnection lines

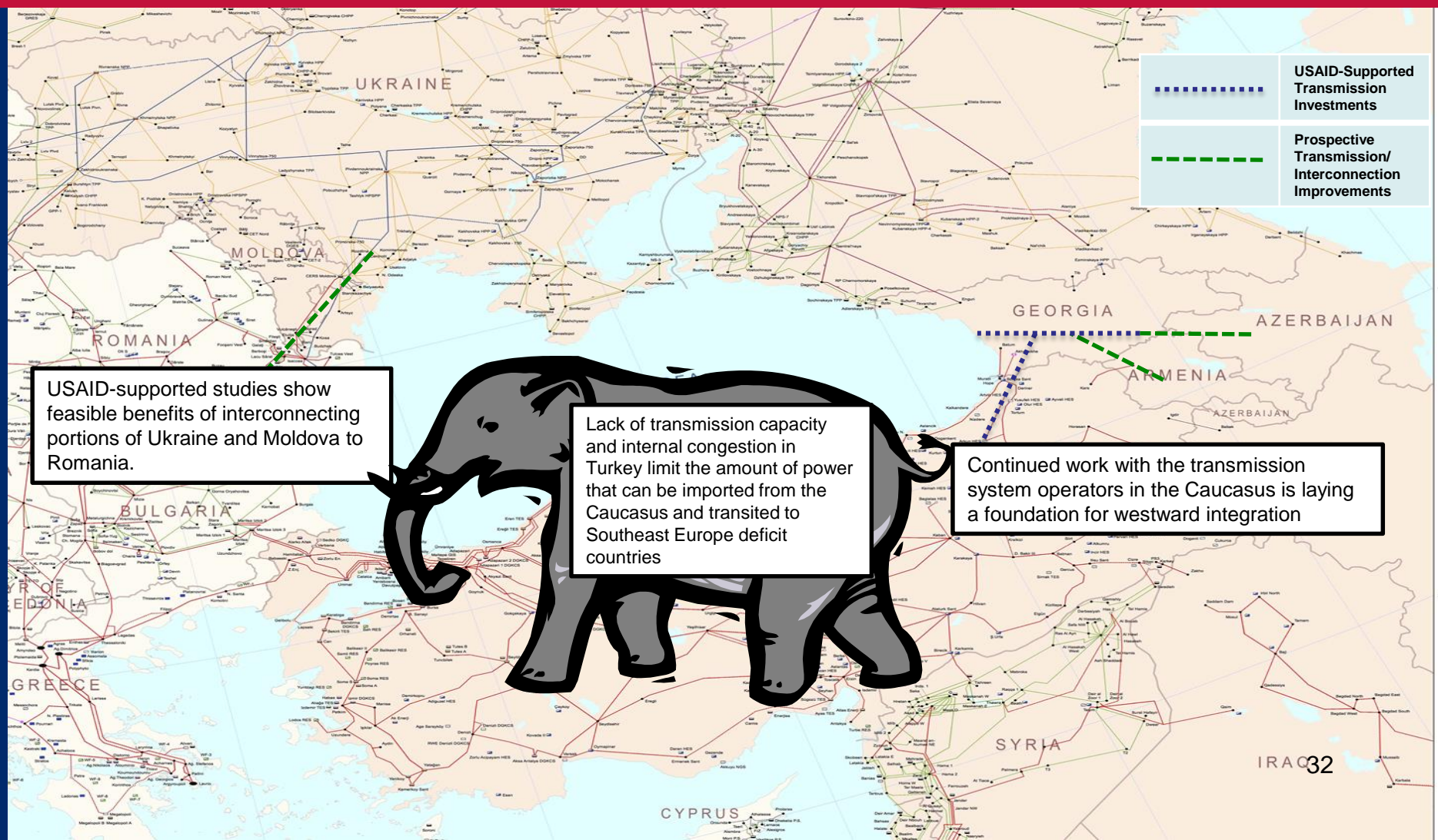
AGT Power Bridge & Montenegro – Italy Interconnection



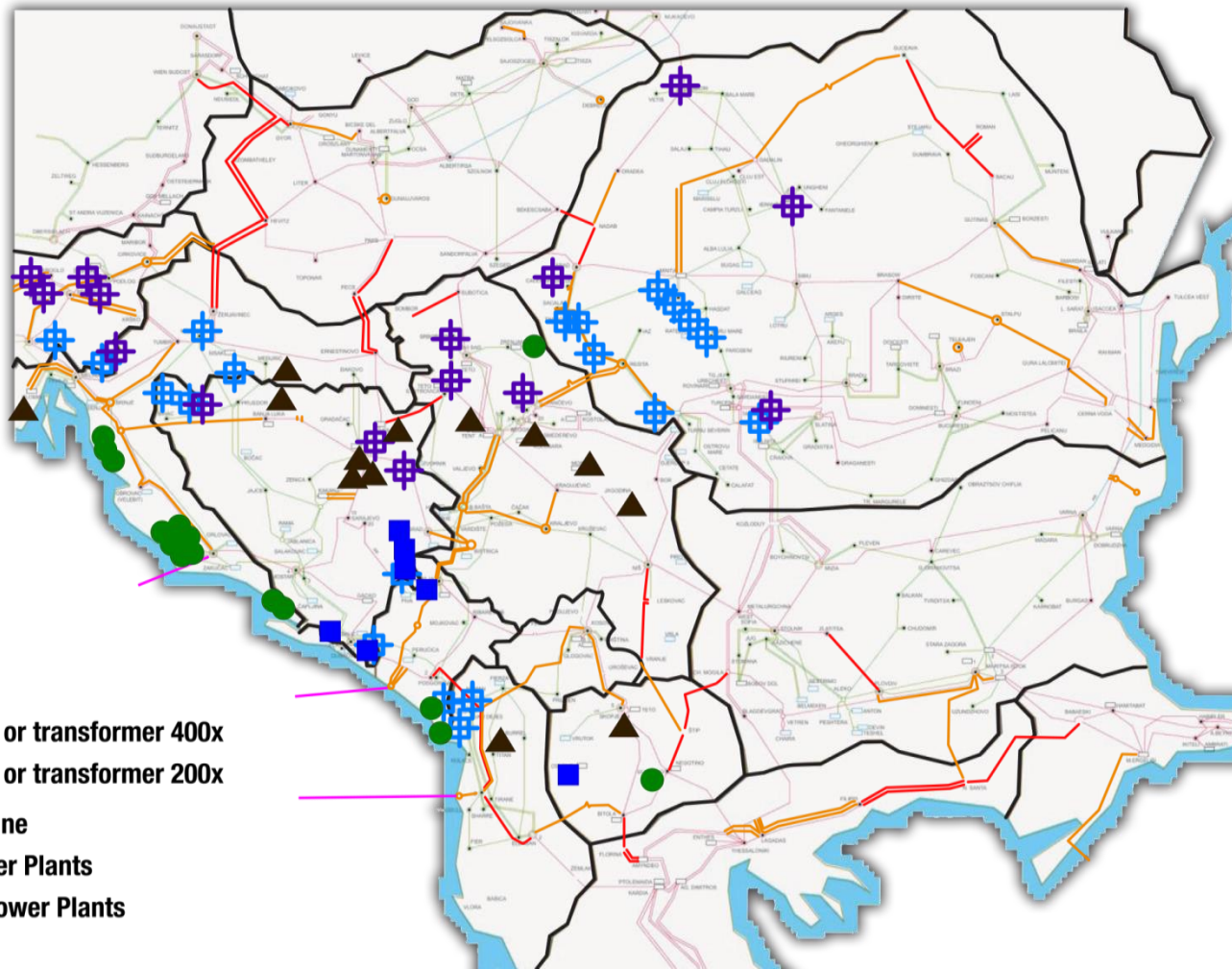
Models & forecasts have proven accuracy & are most detailed available in the E&E



Internal Congestion & Reliability Issues Limit Integration of Clean Energy



Almost All Regional System Operators & Developers Use SECI Models for Project Development



**Transmission
Reinforcements**

**Queued
Reinforcements**

**Congestion
Limitations**

**Clean Energy
Generation**

- ✚ Line 400kV or transformer 400x
- ✚ Line 200kV or transformer 200x
- Wind Turbine
- Hydropower Plants
- ▲ Thermal Power Plants



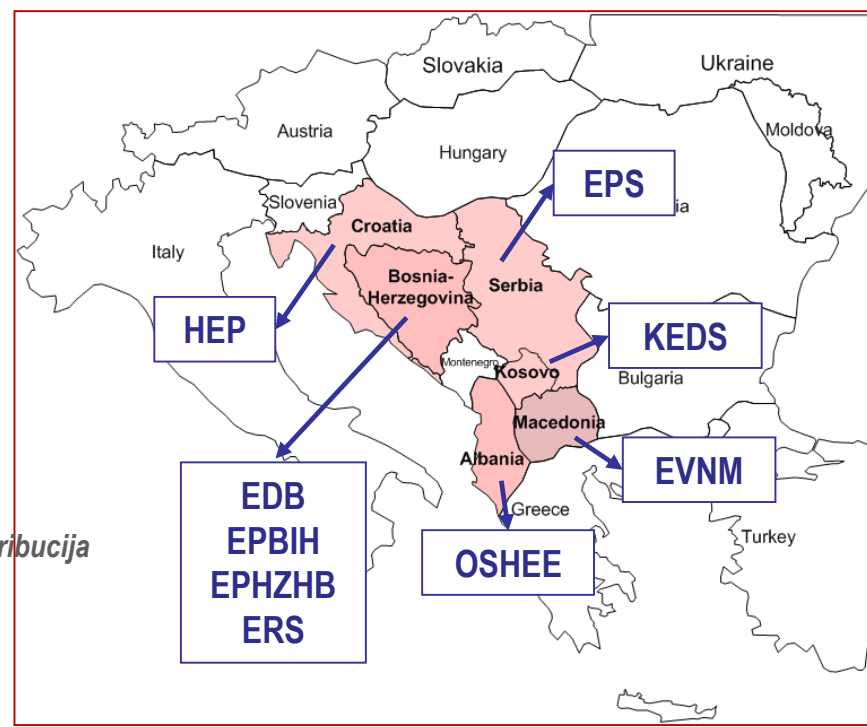
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USEA
United States Energy Association

CURRENT MEMBERS of WG – 9 DSO (6 countries)

- **Albania – OSHEE** (*OSHEE Operatori i Shpërndarjes së Energjisë Elektrike sh.a.*)
- **Bosnia and Herzegovina**
 - **EDB**
(*JP Komunalno Brcko*)
 - **EPBIH**
(*JP Elektroprivreda BiH*)
 - **EPHZHB**
(*JP Elektroprivreda Hrvatske Zajednice Herceg-Bosne*)
 - **ERS**
(*JP Elektroprivreda Republike Srpske*)
- **Croatia – HEP**
(*HEP – Operator distribucijskog sustava d.o.o.*)
- **Macedonia – EVNM**
(*EVN Macedonia*)
- **Serbia – EPS** *up until July 2015 5 DSOs; now 1 DSO EPS Distribucija*
(*Elektroprivreda Srbije*)
- **Kosovo – KEDS**
(*Kosovo Electricity Distribution and Supply*)






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SEE DSO WG 2013 - 2015 Deliverables

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EATP Objectives

Institutional Development | **Capacity Building** | **Investment** | **Analysis**

Support a permanent, sustainable regional Working Group of transmission planning excellence to strengthen a core EAPP function

Improve capacity of EAPP utilities to plan for and conduct network and economic analyses of investment projects of regional significance

Prioritize transmission and interconnection investment to enhance regional electricity trade and network reliability

Promote the results and findings of the EATP analyses to policy makers, regulators, regional organizations, development partners, IFIs



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EATP Participants

Eastern Africa Power Pool (EAPP)

Burundi: Régie de Production et Distribution d'Eau et d'Electricité (REGIDESO)

Ethiopia: Ethiopian Electric Power (EEP)

Kenya: Kenya Power & Light (KPLC); KETRACO

Rwanda: Rwanda Energy Group (EUCL, REG Ltd.)

Tanzania: Tanesco

Uganda: Uganda Electricity Transmission Company, LTD (UECTL)



CONSENSUS TASKS

1. CCS & CES Consultation, Analysis & Cooperation
2. CCS & CES Outreach
3. CCS & CES Conference & Workshop Support



Program Highlights

- Developed UN ECE Recommendations on CCS in a Post-Kyoto Treaty World
- Supported Two CCS Analytical Studies: 1) Advancing Next Generation Coal Conversion Technologies; 2) CCS Oklahoma Showcase Project
- Supported CSLF Ministerial, Technical and Policy Meetings
- Organized Workshops at Abu Dhabi Sustainability Week
- Supported UAE Delegation Visit to Permian Basin
- Uploading IEA Clean Coal Center Produced CCS Reports to USEA Website
- Conducted 21 Industry CCS Briefings
- Provided 6 CCS Presentations at Major Industry Conferences
- Supported RECS CCS Training Program for Young Professionals
- Conducting Analysis of Options for Financing CCS Demo Projects
- Conducted Workshop on CCUS for Residual Oil Zones
- Conducting Workshop on CCUS Modular Technologies