



# IEA Technology Collaboration Program on **High-Temperature Superconductivity** (IEA HTS TCP)

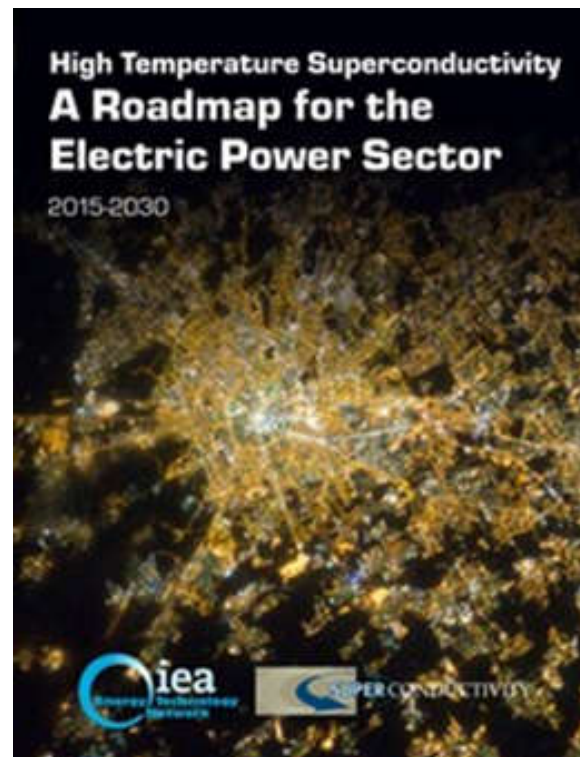
## ASC Special Session

5 September 2016

Denver, Colorado  
USA



**– ASC Special Session –**  
**What will Drive Market Maturity  
for HTS Applications in the  
Electric Power Sector?**



**IEA HTS Technology Collaboration Program**  
5 September, ASC 2016, Denver, CO

# – ASC Special Session –

## AGENDA

14:30 - 14:35	Welcome and Introduction to the session	<b>Chris Rey</b>
14:35 - 14:40	The IEA-HTS TCP	Luciano Martini
14:40 - 14:50	HTS: A Roadmap for the Electric Power Sector	Brian Marchionini
➤ <b><u>Applications Panel</u></b>		
14:50 - 15:20	Contributions from EU, Japan, Korea and US	
15:20 - 15:45	Roundtable Discussion with all participants	
➤ <b><u>Wires Panel</u></b>		
15:45 - 16:10	Contributions from US, EU, and Japan	
16:10 - 16:30	Roundtable Discussion with all participants	
➤ <b>Session Summary and Key Messages</b>		



**IEA HTS Technology Collaboration Program**  
5 September, ASC 2016, Denver, CO





# IEA Technology Collaboration Program on **High-Temperature Superconductivity** (IEA HTS TCP)

Luciano Martini  
Chairman

## ASC Special Session

5 September 2016  
Denver, Colorado



[www.ieahts.org](http://www.ieahts.org)

# International Energy Agency Mission

The IEA is an autonomous organization which works to ensure reliable, affordable and clean energy for its 29 member countries and beyond. The IEA has four main areas of focus: energy security, economic development, environmental awareness and engagement worldwide.

The IEA examines the full spectrum of energy issues and advocates policies that will enhance the reliability, affordability and sustainability of energy in its 29 members countries and beyond.

The IEA provides authoritative statistics and analysis ...

<https://www.iea.org>

Energy Technology  
Perspectives 2016

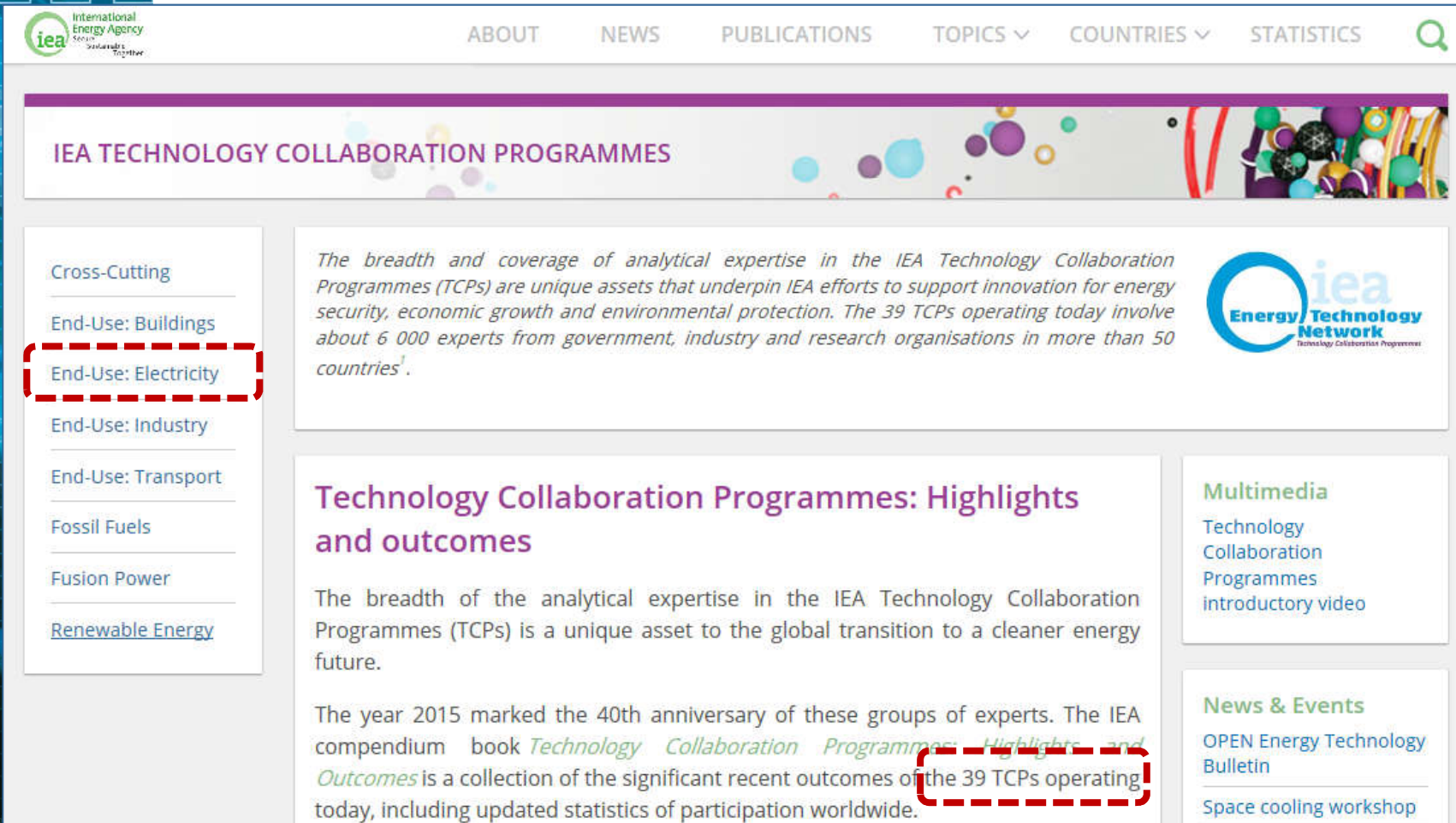
World Energy  
Outlook 2016





# About the IEA and its Technology Collaboration Programmes

Technology  
Collaboration  
Programmes



The screenshot shows the IEA Technology Collaboration Programmes website. The top navigation bar includes links for ABOUT, NEWS, PUBLICATIONS, TOPICS, COUNTRIES, and STATISTICS. The main header features the IEA logo and the title 'IEA TECHNOLOGY COLLABORATION PROGRAMMES'. A sidebar on the left lists various categories, with 'End-Use: Electricity' highlighted by a red dashed box. The main content area contains a paragraph about the breadth and coverage of analytical expertise in the IEA Technology Collaboration Programmes (TCPs), followed by a section titled 'Technology Collaboration Programmes: Highlights and outcomes'. This section includes a paragraph about the 40th anniversary of these groups of experts and mentions a compendium book titled 'Technology Collaboration Programmes: Highlights and Outcomes', with the phrase 'the 39 TCPs operating today' highlighted by a red dashed box. On the right side, there are two boxes: 'Multimedia' with a link to 'Technology Collaboration Programmes introductory video' and 'News & Events' with links to 'OPEN Energy Technology Bulletin' and 'Space cooling workshop'.

International Energy Agency  
Secure. Sustainable. Together.

ABOUT NEWS PUBLICATIONS TOPICS COUNTRIES STATISTICS

## IEA TECHNOLOGY COLLABORATION PROGRAMMES

Cross-Cutting

End-Use: Buildings

**End-Use: Electricity**

End-Use: Industry


End-Use: Transport

Fossil Fuels

Fusion Power

[Renewable Energy](#)

*The breadth and coverage of analytical expertise in the IEA Technology Collaboration Programmes (TCPs) are unique assets that underpin IEA efforts to support innovation for energy security, economic growth and environmental protection. The 39 TCPs operating today involve about 6 000 experts from government, industry and research organisations in more than 50 countries<sup>1</sup>.*



### Technology Collaboration Programmes: Highlights and outcomes

The breadth of the analytical expertise in the IEA Technology Collaboration Programmes (TCPs) is a unique asset to the global transition to a cleaner energy future.

The year 2015 marked the 40th anniversary of these groups of experts. The IEA compendium book *Technology Collaboration Programmes: Highlights and Outcomes* is a collection of the significant recent outcomes of the 39 TCPs operating today, including updated statistics of participation worldwide.

#### Multimedia

Technology Collaboration Programmes introductory video

#### News & Events

OPEN Energy Technology Bulletin

Space cooling workshop





# About the IEA HTS Technology Collaboration Program

- Brings together government and funding Agencies representatives, researchers, equipment manufacturers and utility end-users to address common interests.
- Participants sponsor studies, workshops, exchange information, introduce their research facilities to other participants and guide the assessments.
- Participants also ask experts from their countries to provide input and to peer-review draft reports.
- Strategic documents, minutes of meetings, and workshop presentations are published on the website.

# Contracting Party Information

## Canada

**Julian Cave Ph.D**  
Hydro Quebec, Institut de recherche



## Finland

**Prof. Risto Mikkonen**  
Tampere University of Technology  
**Dr. Antti Stenvall**  
Tampere University of Technology



## Germany

**Tabea Arndt, Ph.D**  
Siemens AG  
**Prof. Dr. Mathias Noe**  
ITP Karlsruhe Institute of Technology



## Israel

**Prof. Guy Deutscher**  
Tel Aviv University  
**Dr. Yoel Cohen**  
Ministry of National Infrastructures



## Sponsor Contact Information

**Dr. Klaus Schlenga**  
Bruker HTS GmbH  
**Dr. Giovanni Grasso**  
Columbus Superconductor

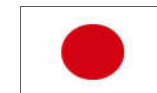
## Italy

**Dr. Luciano Martini - Chairman**  
Executive Committee  
RSE S.p.A  
**Dr. Michele de Nigris**  
RSE S.p.A



## Japan

**Mr. Susumu Kinoshita**  
NEDO  
**Prof. Hiroyuki Ohsaki - Vice-Chairman**  
University of Tokyo



## Korea

**Mr. Si-Dol Hwang**  
Korea Electric Power Research Institute  
**Prof. Gye-Won Hong**  
Korea Polytechnic University



## Switzerland

**Dr. Bertrand Dutoit**  
Ecole Polytechnique Fédérale de Lausanne  
**Mr. Roland Brüniger**  
Swiss Federal Office of Energy



## United States

**Ms. Debbie Haught**  
U.S. Department of Energy  
**Dr. Dominic Lee**  
Oak Ridge National Lab



## Operating Agent Information

**Brian Marchionini**  
Energetics Incorporated (USA)

**Yutaka Yamada**  
Neo Japanese Green Energy Laboratory (Japan)

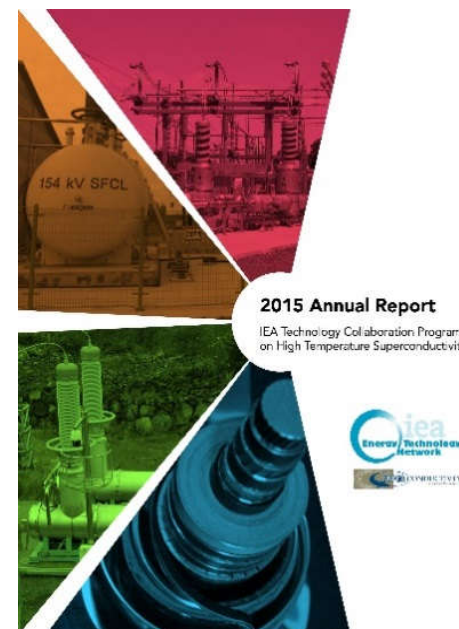




# IEA Technology Collaboration Program on HTS: Main Activities



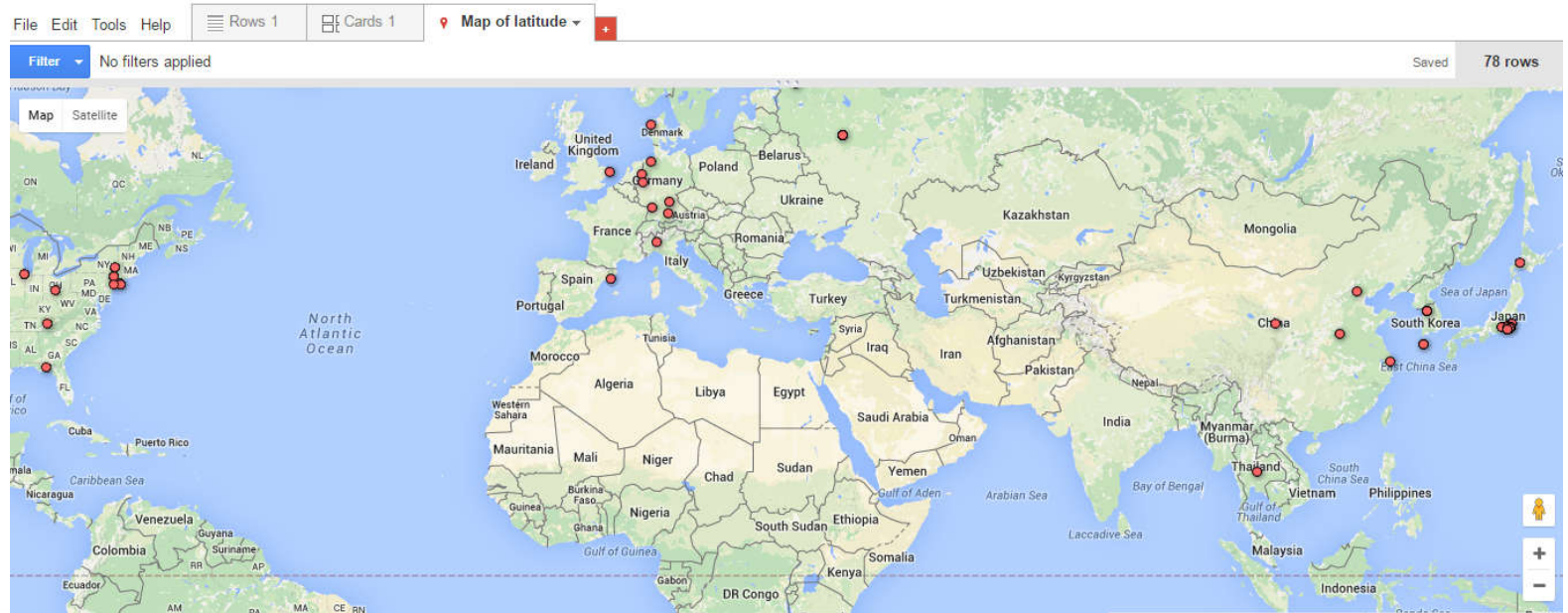
- Technical communications and outreach (e.g. Annual Report and HTS Applications Roadmap)
- Share policy and technical information among TCP participants
- Develop website content with technical and policy information
- Stay current with HTS interest groups and IEA activities
- Organize technical Workshops
- Support in promoting TCP visibility
- Coordination with other IEA groups such as ISGAN



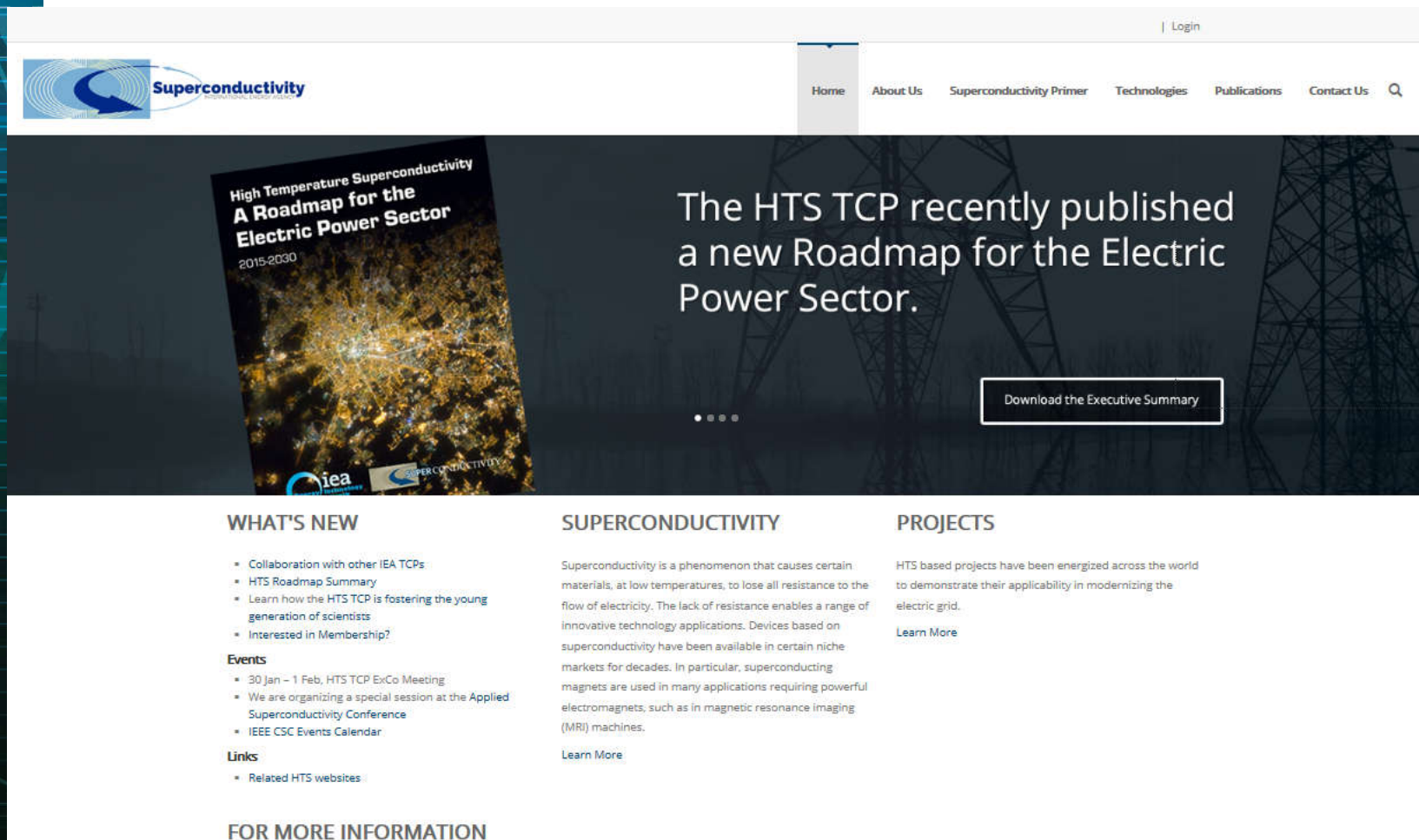
# World Projects at a Glance

## Technical monitoring of HTS projects:

- Covers EU, US, Korea, Japan, China, Russia
- Focus is on electric power projects
- Updated periodically



For more information please  
visit: [www.ieahts.org](http://www.ieahts.org)



The screenshot shows the homepage of the IEA HTS website. At the top, there is a navigation bar with a 'Login' link. Below this is a main banner featuring a large image of a power transmission tower. On the left side of the banner is a book cover titled 'High Temperature Superconductivity A Roadmap for the Electric Power Sector 2015-2030'. To the right of the book cover, the text reads 'The HTS TCP recently published a new Roadmap for the Electric Power Sector.' Below this text is a button that says 'Download the Executive Summary'. Under the banner, there are three columns of content: 'WHAT'S NEW' with a list of updates, 'SUPERCONDUCTIVITY' with a paragraph about the phenomenon and a 'Learn More' link, and 'PROJECTS' with a paragraph about HTS projects and a 'Learn More' link. At the bottom, there is a section titled 'FOR MORE INFORMATION'.

Superconductivity

Home About Us Superconductivity Primer Technologies Publications Contact Us

High Temperature Superconductivity  
A Roadmap for the  
Electric Power Sector  
2015-2030

The HTS TCP recently published  
a new Roadmap for the Electric  
Power Sector.

Download the Executive Summary

**WHAT'S NEW**

- Collaboration with other IEA TCPs
- HTS Roadmap Summary
- Learn how the HTS TCP is fostering the young generation of scientists
- Interested in Membership?

**Events**

- 30 Jan – 1 Feb, HTS TCP ExCo Meeting
- We are organizing a special session at the Applied Superconductivity Conference
- IEEE CSC Events Calendar

**Links**

- Related HTS websites

**SUPERCONDUCTIVITY**

Superconductivity is a phenomenon that causes certain materials, at low temperatures, to lose all resistance to the flow of electricity. The lack of resistance enables a range of innovative technology applications. Devices based on superconductivity have been available in certain niche markets for decades. In particular, superconducting magnets are used in many applications requiring powerful electromagnets, such as in magnetic resonance imaging (MRI) machines.

[Learn More](#)

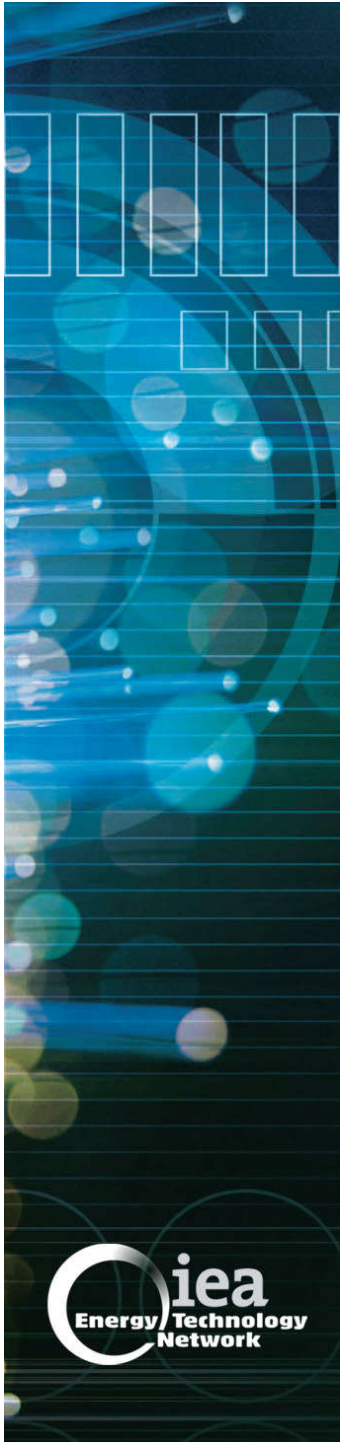
**PROJECTS**

HTS based projects have been energized across the world to demonstrate their applicability in modernizing the electric grid.

[Learn More](#)

**FOR MORE INFORMATION**





# – ASC Special Session –

## AGENDA

### Applications Panel: **Worldwide Progress in Electric Grid Modernization using HTS Based Devices**

14:50 - 15:20	<b>Essen Cable/Augsburg FCL/others</b> Mathias Noe - KIT	Germany
	<b>TEPCO Cable</b> Hiroyuki Ohsaki – University of Tokyo	Japan
	<b>Cable/FCL</b> Hyerim Kim - KEPRI	Korea
	<b>Resilient Electric Grid</b> Mike Ross - AMSC	US
15:20 - 15:45	Roundtable Discussion with all participants	



**IEA HTS Technology Collaboration Program**  
5 September, ASC 2016, Denver, CO

# – ASC Special Session –

## AGENDA

### ➤ Wires Panel: **Worldwide Progress in Superconducting Wire**

15:45	<b>Advanced Superconductor Manufacturing Institute</b> Venkat Selvamanickam - University of Houston	US
-	<b>Updates from EU-Eurotapes</b> Klaus Schlenga - Bruker	Germany
16:10	<b>Updates from Japan</b> Yutaka Yamada - Shibaura Institute of Technology	Japan
16:10 - 16:30	Roundtable Discussion with all participants	





# Questions for the Special Session Panel (Applications)

- What is the most significant challenge to integrating HTS based devices into the electric grid? What are the steps that can be taken to overcome this?
- What regulations or standards in your region would be helpful for HTS devices to reach market maturity?
- **Is cheaper and higher performance wire the key solution for energizing more HTS based electric power devices in the grid?**
- Are HTS grid projects feasible in the next 5 years without government subsidies?
- What collective efforts can the HTS industry collaborate on to help overcome the challenges?

# Questions for the Special Session Panel (Wire)

- **Is cheaper and higher performance wire the key solution for energizing more HTS based electric power devices in the grid? Or is today's wire price and performance sufficient?**
- **Is government sponsored R&D still needed to help drive down the cost of HTS wire and improve performance?**
- **What type of government sponsored R&D would be needed to help wire development—think broadly as to what would help the broader industry and not one process/company? Or should this R&D be conducted by the wire developers?**

# For Discussion

- **Are cryogenic equipment reliability major concerns for utilities/end users?**
- **What are examples of how the industry can galvanize efforts to help energize HTS grid projects?**
- **To date, most HTS grid projects have been heavily subsidized by government agencies. When will non government subsidized projects be energized? When will market “pull” occur, instead of technology “push”?**



# Session Summary and Key Messages

**The possible way forward and next steps:**

**Closer interaction and industry leadership**

**Targeted effort to duly inform utilities about:**

- **HTS technology and benefits**
- **refrigeration systems**

**Reliability and safety of the HTS devices to be fully proven to utilities by live-grid installations**

...

**The HTS Roadmap update in 1 year time please leave your contact information in order to be involved in the survey**