ELECTRIC TRANSMISSION 301: New Business Models

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What’s Driving Transmission Investment?

- Aging Infrastructure
- Growing Demand for Renewable Energy
- New FERC Policies
- Other Regulatory Drivers

U.S. transmission investments by FERC-jurisdictional providers increased from $2 billion/year in the 1990’s to $10-13 billion/year in the last several years*

Projected $120-160 billion of investments over the next decade (for reliability, integration of new resources, upgrading/replacement of facilities built in 1950-70's)*
New Business Models

- Transmission Subsidiaries (Transcos)
- Joint Ventures
- Public-Private Partnerships
- Independent Transmission Companies
- Merchant Transmission
- Passive/Financial Investment
Clean Line’s projects connect the best wind resources to load centers
HVDC in China

- Irkutsk (Russia) - Beijing
  800kV, 6400 MW, 2015

- Hami – C. China
  800kV, 6400 MW, 2018

- Xianjiaba – Shanghai
  800kV, 6400 MW, 2011

- Xiluodu - Hanzhou
  800kV, 6400 MW, 2015

- Xiluodu - Hunan
  800kV, 6400 MW, 2014

- Jinsha River II – East China
  800kV, 6400 MW, 2016

- Jingping – East China
  800kV, 6400 MW, 2012

- Jinsha River II – East China
  800kV, 6400 MW, 2019

- Jinsha River II - Fujian
  800kV, 6400 MW, 2018

- Nuozhadu-Guangdong
  800kV, 5000-6000 MW, 2015

- Ningxia - Tianjing
  800kV, 6400 MW, 2010

- NW-Sichuan (Baoji – Deyang)
  3000 MW, 2011

- Humeng – Shandong
  800kV, 6400 MW, 2015

- Humeng - Tianjing
  800kV, 6400 MW, 2016

- BtB China-Russia (HeiHe)
  750 MW, 2008

- FarEast (Russia) – NE China
  3000 MW, 2010

- Humeng - Liaoning
  800kV, 6400 MW, 2018

- Hulunbeir (Inner Mongolia) - Shenyang
  3000 MW, 2010

- BtB Northeast-North (Gaoling)
  1500 MW, 2008

- North Shaanxi-Shandong
  3000 MW, 2011

- BtB Shandong - East
  1200 MW, 2011

- BtB North - Central
  1000 MW, 2012

- Gezhouba-Shanghai Expansion
  3000 MW, 2011

- Lingbao BtB Expansion
  750 MW, 2009

- Goupitan - Guangdong
  3000 MW, 2016

- Yunnan - Guangdong
  800kV, 5000 MW, 2009

- Jinhong-Thailand
  3000 MW, 2013
**HVDC transmission lines bring economic, environmental and electric reliability benefits**

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<tr>
<th>Benefit</th>
<th>Description</th>
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<tr>
<td>Greater Efficiency</td>
<td>Lower line losses</td>
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<tr>
<td>Reduced Cost</td>
<td>Requires less infrastructure, results in lower costs and lower prices for delivered renewable energy</td>
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<td>Improved reliability</td>
<td>Control of power flow enhances system stability and lowers cost of integrating wind</td>
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<td>Smaller footprint</td>
<td>Use narrower right-of-way than equivalent alternating current (AC)</td>
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**AC**  
Three 500 kV lines

**3000-4000 MW Capacity**

**DC**  
One ± 500kV bipole

**3000-4000 MW Capacity**
Key Issues in effectively siting multi-state transmission lines

- Varying Legal Requirements by State
- Environmental Permitting
- Federal, State, & Tribal Land Issues
- Coordinating Interconnection, Regulatory, & Financial Timelines