



Recent Developments in US-Mexico Electricity Trade: A Tale of Two Borders

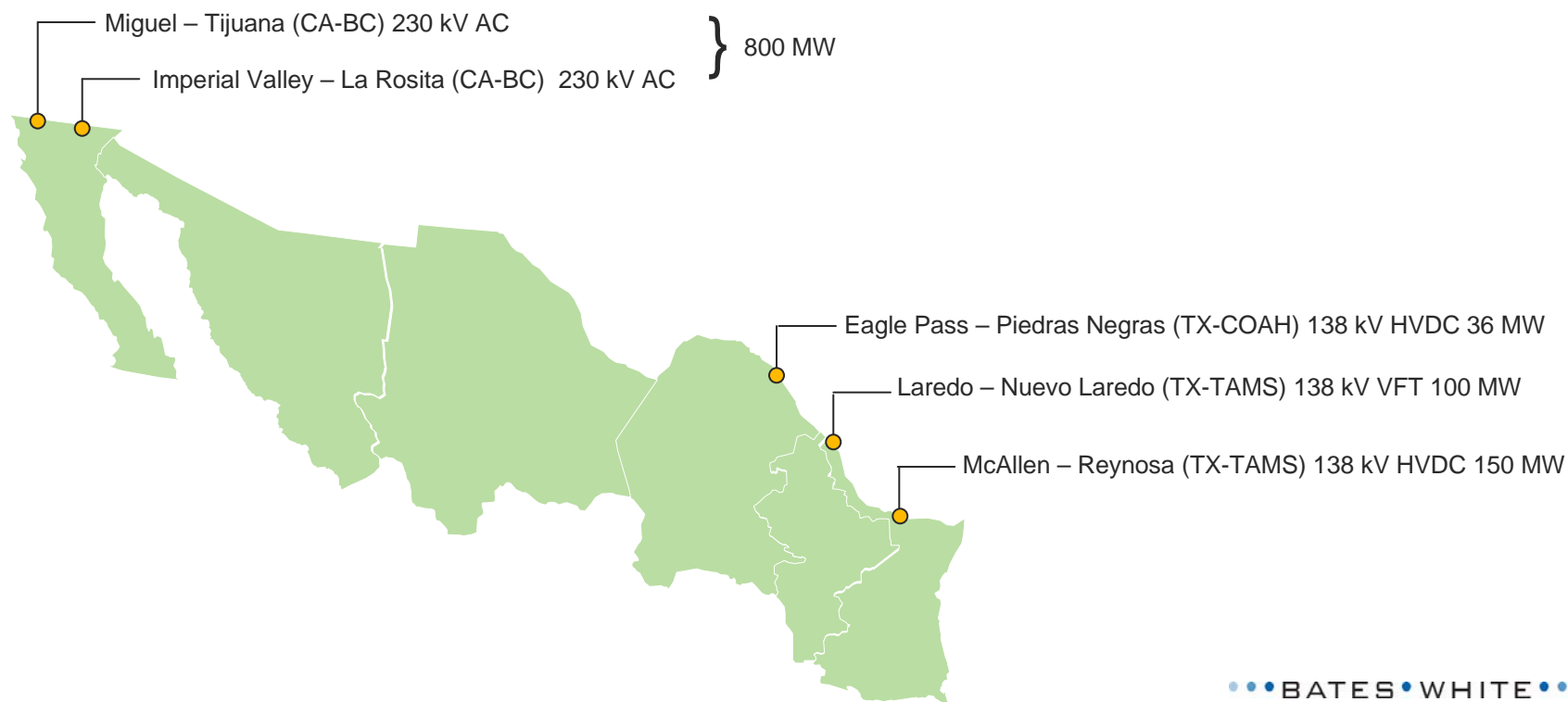
Nicolas Puga, Principal

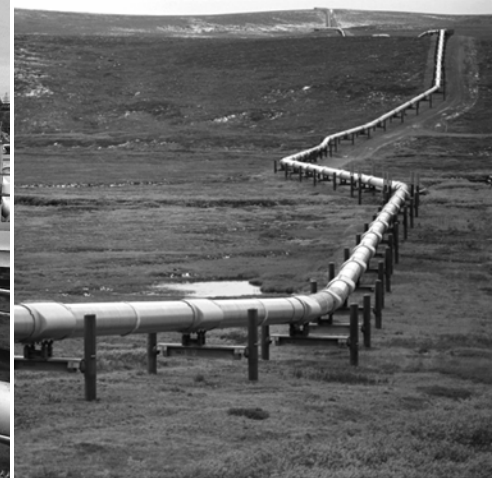
BORDER ENERGY FORUM XIV
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Historical trends of US-Mexico electricity trade may soon change

- ERCOT-NE Mexico Trade: *Finally Ready for Take-Off*
- California – Baja California Renewable Energy Trade: *A Mixed Tale*

Bi-Directional Commercial Transaction-Capable US-Mexico interconnections





ERCOT – North East Mexico Border

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ERCOT – NE Mexico: readiness for bi-directional electricity trade

• Infrastructure

- Eagle-Pass 36 MW HVDC Tie – Began operations in August 1999
- Laredo-Nuevo Laredo 100 MW VFT Tie – Began operations in May 2007
- **Sharyland McAllen-Reynosa 150 MW DC Tie – Began operations in Oct 2007**

• Regulatory

- DOE has issued Export Authorizations to 5 power marketers – 200 others could apply to include McAllen-Reynosa tie or DOE could change interconnection rules
- FERC has disclaimed jurisdiction in relation to trade over Sharyland DC tie
- CRE has finalized the interconnection contract for imports from ERCOT
- CFE has completed, but has yet to publish, the revised conditions for the Convenios Especiales Sect. 8.1: Contracted Demand Option for Hourly Tariffs
 - Whereby charges for supply interruptions will now be equivalent to those in backup tariffs

• Operational

- Revised Protocols recently adopted by ERCOT
- Changes to Operating Guide re: DC ties complete – soon to be adopted

• Market

- Large spreads between ERCOT wholesale prices and CFE's industrial on-peak prices likely to entice Mexican industry to import
- South ERCOT is capacity short while CFE has capacity overhang



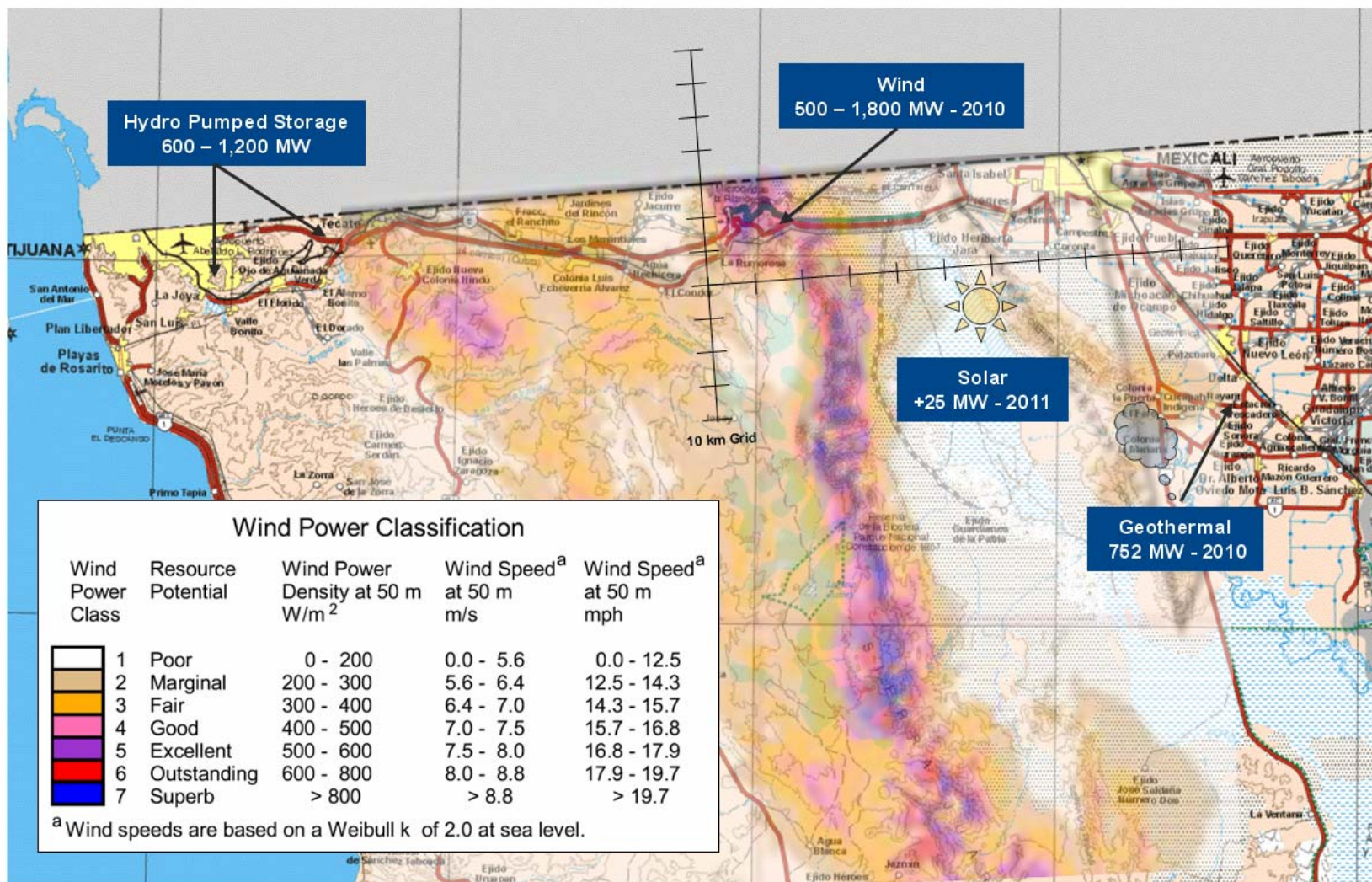
California – Baja California Border

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Three strong drivers for increased bi-directional trade ... tempered by risk

1. IPP and CFE exports to US marketers and utilities
 - CFE's 2006 net energy exports increased 76% from 2004 levels
 - Without new IPP plants in BC private exports grew by 57% from 2004 (2006)
2. Wholesale imports by BC Industries
 - Driven by differences between CA wholesale prices and CFE's On-Peak Industrial Tariff prices
 - Limited to CFE on-peak periods but up by 51% from prior year (2006)
3. Potential renewable energy exports to satisfy CA IOUs, ESPs and CCAs RPS goals:
 - 20% of total resources by 2010 and 33% by 2020
 - Wind potential estimates range from ~ 2,000 MW in area "close" to border to 10,000 MW throughout the Juarez Mountains
 - 1,200 MW of pumped storage hydro capacity studied by CFE
 - Limited additional geothermal potential

Northern Baja California Renewable Energy Resources



Feasibility of BC renewable exports to California

A recent CEC study of the key determinants of the feasibility of importing BC renewable energy found:

1. RPS Eligibility as out-of-country renewable resources – Exposure to regulatory risk*
2. Compliance with the legal and regulatory frameworks (Mexico and NAFTA) – No problems identified**
3. Compliance with the U.S. legal and regulatory frameworks (DOE y FERC) - No problems identified
4. Availability of transmission capacity– Highly constrained***
5. In operation before end of 2010 – Difficult but not impossible.
6. Competitive price – Potentially problematic without subsidies.

* See subsequent discussion on RPS requirement for environmental compliance.

** *CFE can oppose the issuance of an export permit by the CRE, if the resulting power flows negatively impact the operation of CFE's power system. Since CFE's Baja California grid is part of WECC, such an impact may arise even if the renewable resource is not interconnected through CFE's transmission infrastructure.*

*** *A significant level of renewable exports will require the development of new transmission infrastructure.*

California RPS requirements for out-of-country renewable generation

- An applicant for a facility located outside of the United States must provide the following:
 1. A comprehensive list and description of all California environmental quality LORS¹ that would apply to the facility if the facility were located within California at a site designated by the applicant.
 2. An assessment as to whether the facility's development or operation will cause or contribute to a violation of any of these LORS.
 3. An explanation as to how the facility's developer and/or operator will meet these LORS in developing or operating the facility, including whether the developer and/or operator will secure and put in place mitigation measures to ensure that these LORS are complied with.

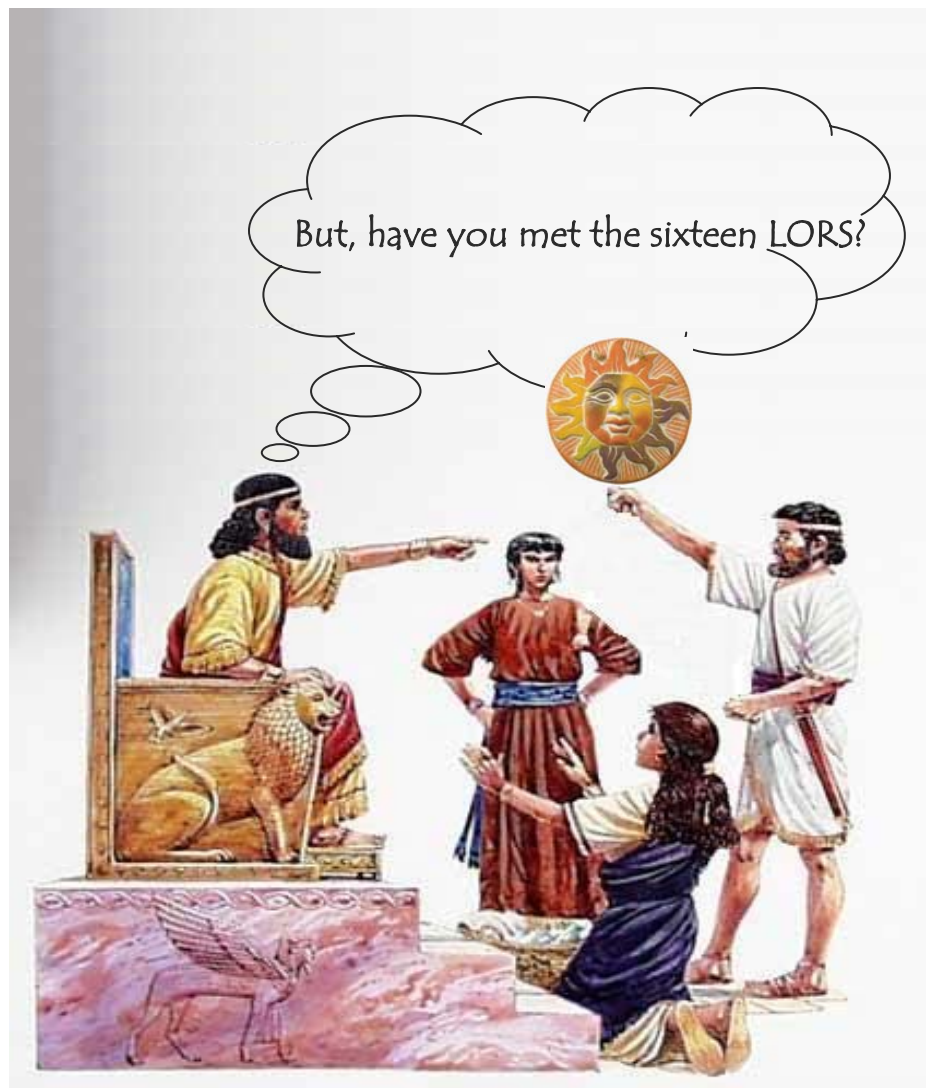
(1) LORS: California Environmental Quality Laws, Ordinances, Regulations and Standards

California Environmental Quality Laws, Ordinances, Regulations and Standards (LORS)

- According to the RPS Eligibility Guidelines, at a minimum, the LORS in the application for RPS Certification shall address the following environmental areas:
 1. Cultural Resources
 2. Land Use
 3. Traffic and Transportation
 4. Visual Resources
 5. Socioeconomics
 6. Air Quality
 7. Public Health
 8. Hazardous Materials Handling
 9. Workers' Safety
 10. Waste Management
 11. Biological Resources
 12. Water Resources
 13. Agriculture and Soil
 14. Paleontologic Resources
 15. Geological Hazards and Resources
 16. Transmission System Safety and Nuisance

Source: CEC Renewables Portfolio Eligibility – Staff Draft Guidebook – Third Edition

Regulatory Risk in RPS Eligibility: The Quest for the Sixteen LORS



Regulatory risk in the RPS Eligibility Guidelines:

- Biennial Re-certification
- Subject to changes in law
- Developer/utility must present case for “equivalent compliance”
 - Selecting a (any) county which LORS the project would comply with.
 - Problem is, LORS vary widely from one county to another
 - CEC Staff determines compliance on case-by-case basis
 - Change proposed during recent proposed guidelines workshop¹: “*physical impact within -- on the California environment.*”

(1) Committee Workshop Before the California Energy Resources Conservation and Development Commission, Implementation of Renewables Investment Plan Legislation and Implementation of Renewables Portfolio Standard Legislation, Sacramento, California, September 27, 2007.

Jurisdictional Issues in Current and Proposed Eligibility guidelines

- California environmental laws applied outside the state (and country)
- Possible clarifying language following first out-of-country requirement – could be patterned after Pacificorp proposal¹ – (in *italics*):
 - A comprehensive list and description of all California environmental quality LORS *...that are actually applicable to the physical environmental impacts in California of the facilities development or operation, if any, but excluding those LORS that do not apply under the laws of the jurisdiction in which the facility is located, developed or operated.*
- If adopted, the resulting path to compliance would involve:
 - Assessment of the impact that facilities located in Mexico near US-Mexico border would have on California territory as defined by the LORS.
 - Plan to comply with LORS and mitigation measures to lessen impact of development and operation of facility.

(1): Comments on RPS Guidebooks submitted to CEC by PacifiCorp, September 28, 2007

Development of Transmission to Connect Remote Renewables

Significant progress has been made:

1. CAISO asked FERC for a Declaratory Order to build transmission infrastructure for renewable resources
2. FERC issued Declaratory Order granting CAISO authority to finance transmission infrastructure
3. California State government established a process to identify competitive renewable zones (RETI)
 - The Renewable Energy Transmission Initiative (RETI) is a statewide collaborative process to help identify the transmission projects needed to accommodate RPS renewable energy goals, support future energy policy, and to facilitate transmission corridor designation and transmission and generation siting and permitting.
 - RETI will assess all competitive renewable energy zones in California and possibly also in neighboring states that can provide significant electricity to California consumers by the year 2020. RETI also will identify those zones that can be developed in the most cost effective and environmentally benign manner and will prepare detailed transmission plans for those zones identified for development.
 - The RETI effort will be supervised by a coordinating committee comprised of California entities responsible for ensuring the implementation of the state's renewable energy policies and development of electric infrastructure, namely:
 - California Public Utilities Commission (CPUC)
 - California Energy Commission (Energy Commission)
 - California Independent System Operator (California ISO)
 - Publicly-Owned Utilities (SCPPA, SMUD, and NCPA)

Source: California Energy Commission

CAISO's Location Constrained Resource Interconnection (LCRI) process

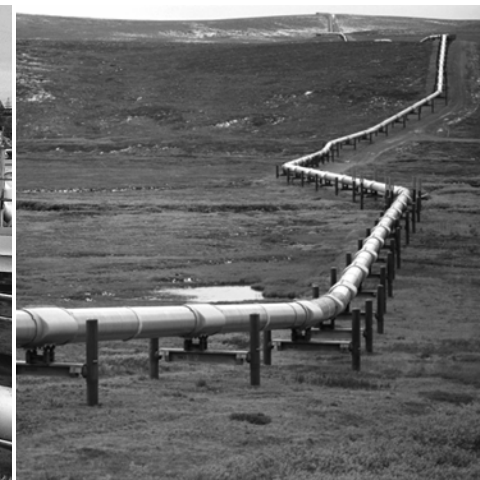
- Used to identify transmission facilities needed to connect isolated renewable resource areas that are deserving of financing and partial payment through the Transmission Access Charge (TAC).
- As generating facilities interconnect to the transmission facilities, the cost recovery for the facility would be proportionally shifted from the TAC to the generation project sponsors.
- The California Public Utilities Commission (CPUC) and California Energy Commission (CEC) will provide joint certification of the Energy Resource Areas (ERA) that will be connected using the LCRI financing mechanism
 - A project must not be eligible for rate treatment under the TAC as a network transmission facility.
 - A project must permit access to an area that is not readily accessible, but where there are significant non-transportable energy resources
 - LCRI transmission projects must be turned over to CAISO operational control.
 - LCRI transmission projects must be designed to serve multiple generating facilities.
- CAISO will present the LCRI proposal to the BOG at the October 17th and 18th BOG meeting, and will file the proposal at the Federal Energy Regulatory Commission (FERC) on October 31st
- Ratepayers' total TAC exposure to the LCRI will be capped at 15% of the total of net high voltage transmission plant investment of all Participating Transmission Owners (PTO) recovered under the TAC.
- Until this process is fully developed, CAISO will use an interim process for evaluating whether transmission projects are eligible for LCRI financing.
- CAISO has determined that the risk associated with the "pre-designation" of LCRI facilities outweighs the benefits, and will require all LCRI projects to fully demonstrate commercial interest, per the rules outlined in the proposal, prior to their approval.

Source: BP

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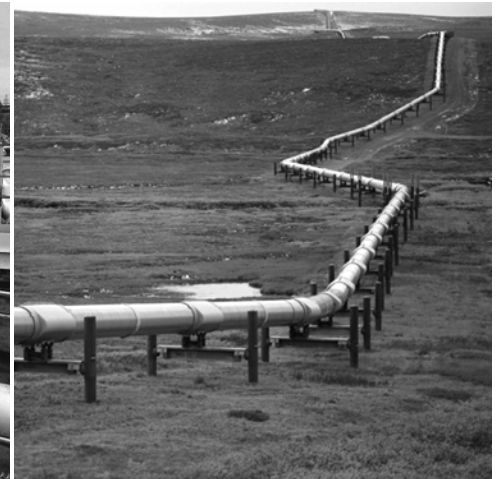
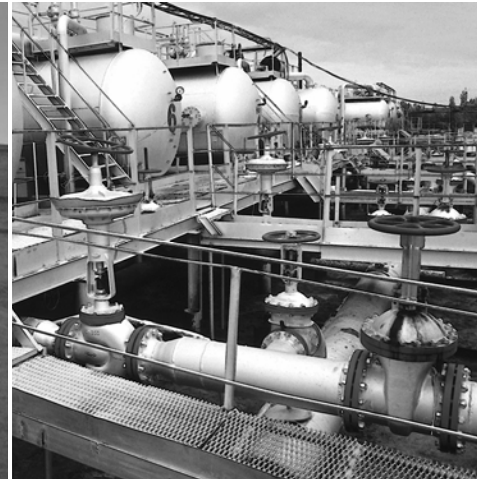
Conclusions - Looking Ahead

- ERCOT-Mexico bi-directional electricity trade is poised for short-term take-off
- For increased trade across CA-BC border to occur, the following changes have to take place:
 1. Recognition of Baja California border area as an Energy Resource Area by the RETI process.
 2. More clearly defined LORS compliance requirements
 3. Reduced regulatory uncertainty for RPS certified facilities
 - Establishment of safe harbor from changes in law for operating facilities
 - Elimination of biennial re-certification requirement



About the Author

Nicolas Puga is a Principal in the Energy Practice of Bates White, LLC, an economics consulting firm based in Washington, DC and San Diego, CA. Mr. Puga is an advisor to independent power producers, generation and transmission project developers, project lenders and government agencies in the regulatory, technical and market feasibility of energy resource development. For a number of years, he has advised government and private sector clients in the regulatory and market aspects of energy infrastructure to connect the U.S. and Mexican energy markets, and currently advises the California Energy Commission in cross-border energy resource development. Before moving to the U.S., Mr. Puga worked for the Comisión Federal de Electricidad and the Instituto de Investigaciones Eléctricas. Mr. Puga has a B.Sc. in Electrical Engineering and a M.Sc. in Energy Engineering from the University of Arizona.



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