



Wind energy resource development along the Baja California-U.S. Border: progress and potential hurdles

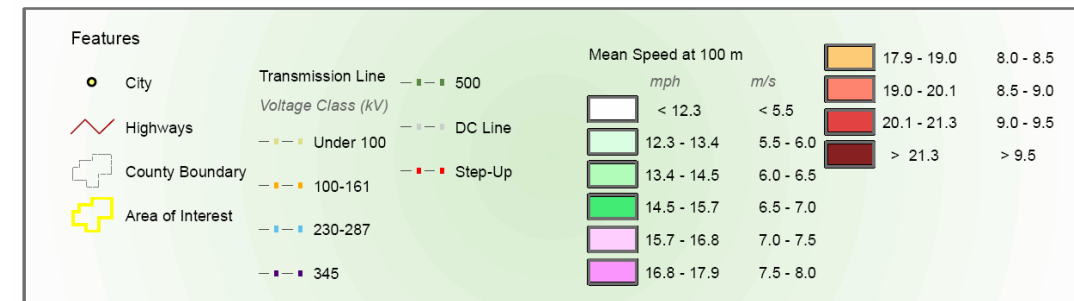
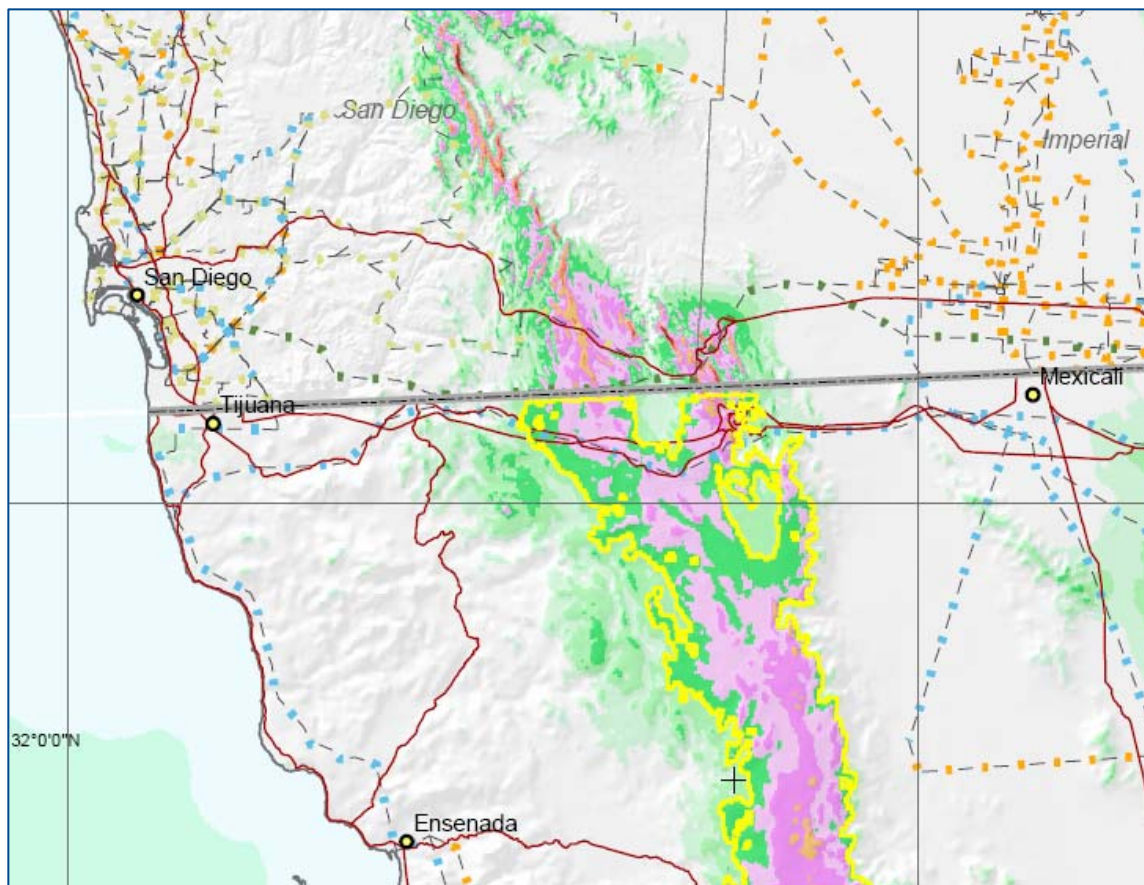
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Agenda

- Wind energy potential in northern Baja California
- Baja California is considered a Renewable Energy Zone by RETI
- Transmission constraints and proposed remedies
- Assessment and remediation of system Impacts
- Potential environmental Issues
- Considerations moving forward

Wind energy potential in northern Baja California



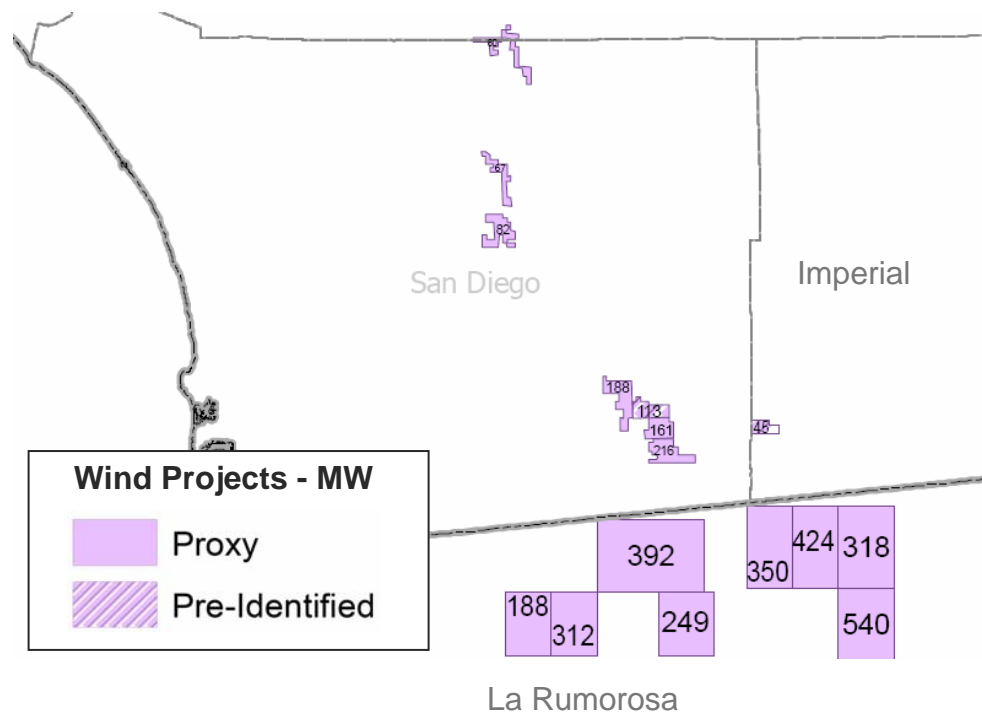
- La Rumorosa region has the second highest wind energy potential in Mexico
- Estimates of the developable potential of the area are still tentative. Multiple site-specific anemometric studies have been completed and/or are still under way
- Using NREL AWS True Wind 50 m windspeed estimates and GIS data, the Renewable Energy Transmission Initiative (RETI) Phase 1B study estimated 2,700 MW of developable wind potential
- CAISO Interconnection applications up to May 2008 total over 5,000 MW
- Resource is too large for local consumption

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Source: Asociados Panamericanos, reproduced by permission.

Baja California is considered a Renewable Energy Zone by RETI

- California's Renewable Energy Transmission Initiative (RETI) will help identify the transmission projects needed to accommodate RPS renewable energy development goals, support future energy policy, and facilitate transmission corridor designation and transmission and generation siting and permitting.
- RETI has identified competitive renewable energy zones in California and in neighboring states that can provide significant renewable electricity to California consumers by the year 2020 in a cost effective and environmentally benign manner. RETI will prepare detailed transmission plans for those zones identified for development.
- RETI has characterized wind resource areas in California, southern Nevada, Oregon, Washington, British Columbia, and the northern portion of Baja California.
- Northern Baja: Using wind power GIS data from NREL, a technical potential of over 9,000 MW was identified in the border region. Capacity (MW) and annual generation (GWh) were estimated for potential projects in the region. Slope data were used to estimate capital costs. The same 70% ratio of developable to technical potential found in California was used to account for environmental, military, constructability, slope, airport, etc.



Source: Renewable Energy Transmission Initiative RETI Phase 1B – Resource Report, DRAFT RESOURCE REPORTB&V Project Number 149148.0020

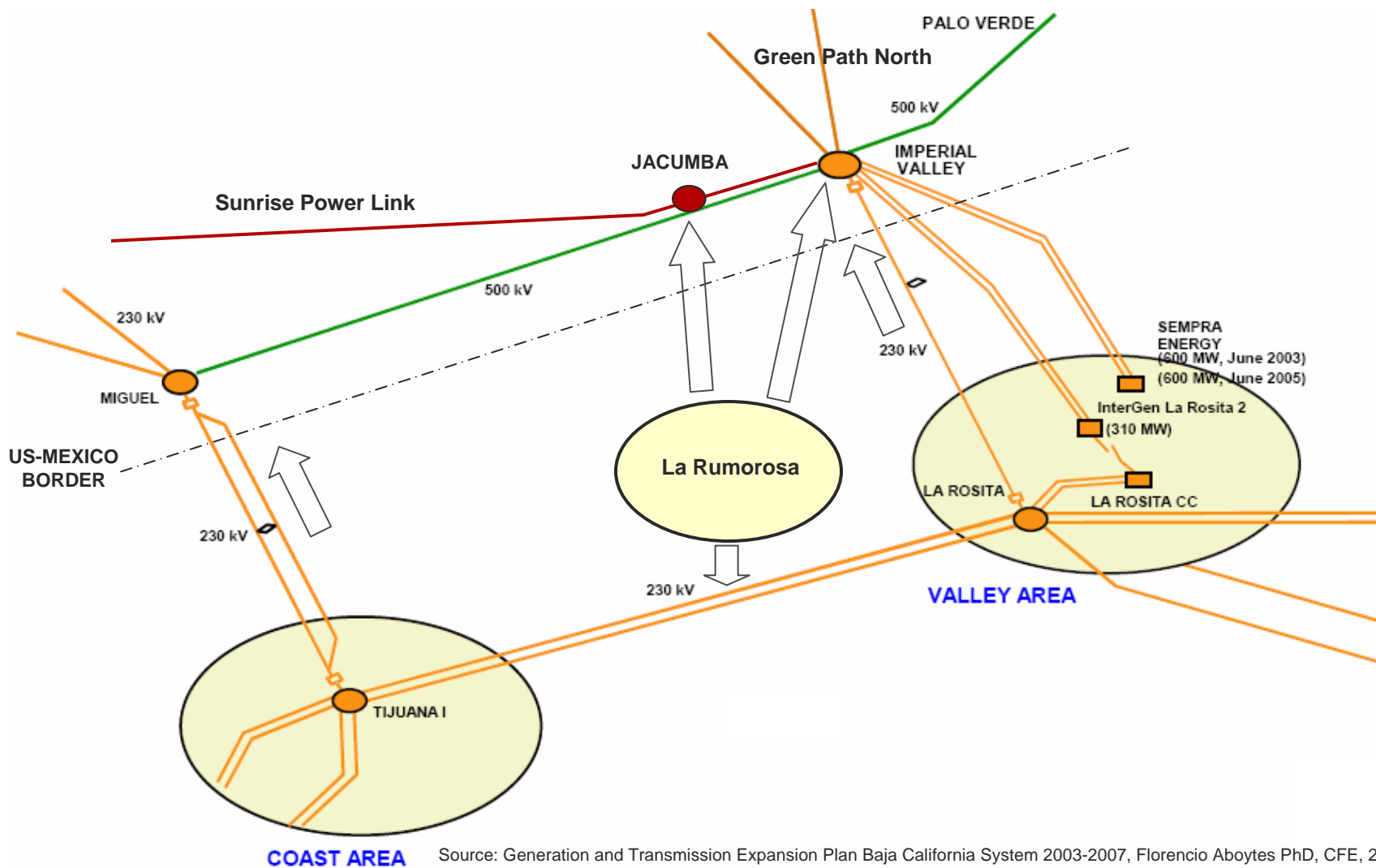
Baja California wind power projects in California ISO Controlled Grid Generation Queue

Sources

- Location, capacity and point of interconnection: California ISO Controlled Grid Generation Queue as of May 18, 2007
- Attribution of generation capacity to each developer is based on publicly available information, including press releases and company presentations. Bates White cannot vouch for the accuracy and/or completeness of this information.

Developer	Total MW	Generation Location	GIPR Study Group
Sempra	1,400	La Rumorosa	Serial Cluster Transition Cluster
Union Fenosa	1,000	La Rumorosa	Transition Cluster
Asociados Panamericanos	1,000	La Rumorosa	Transition Cluster
Fuerza Eolica/Clipper	300	La Rumorosa	Transition Cluster
Others	400 420 500	La Rumorosa La Rumorosa Unknown	Transition Cluster
Total	5,020		

Possible cross-border export paths for Baja California wind power

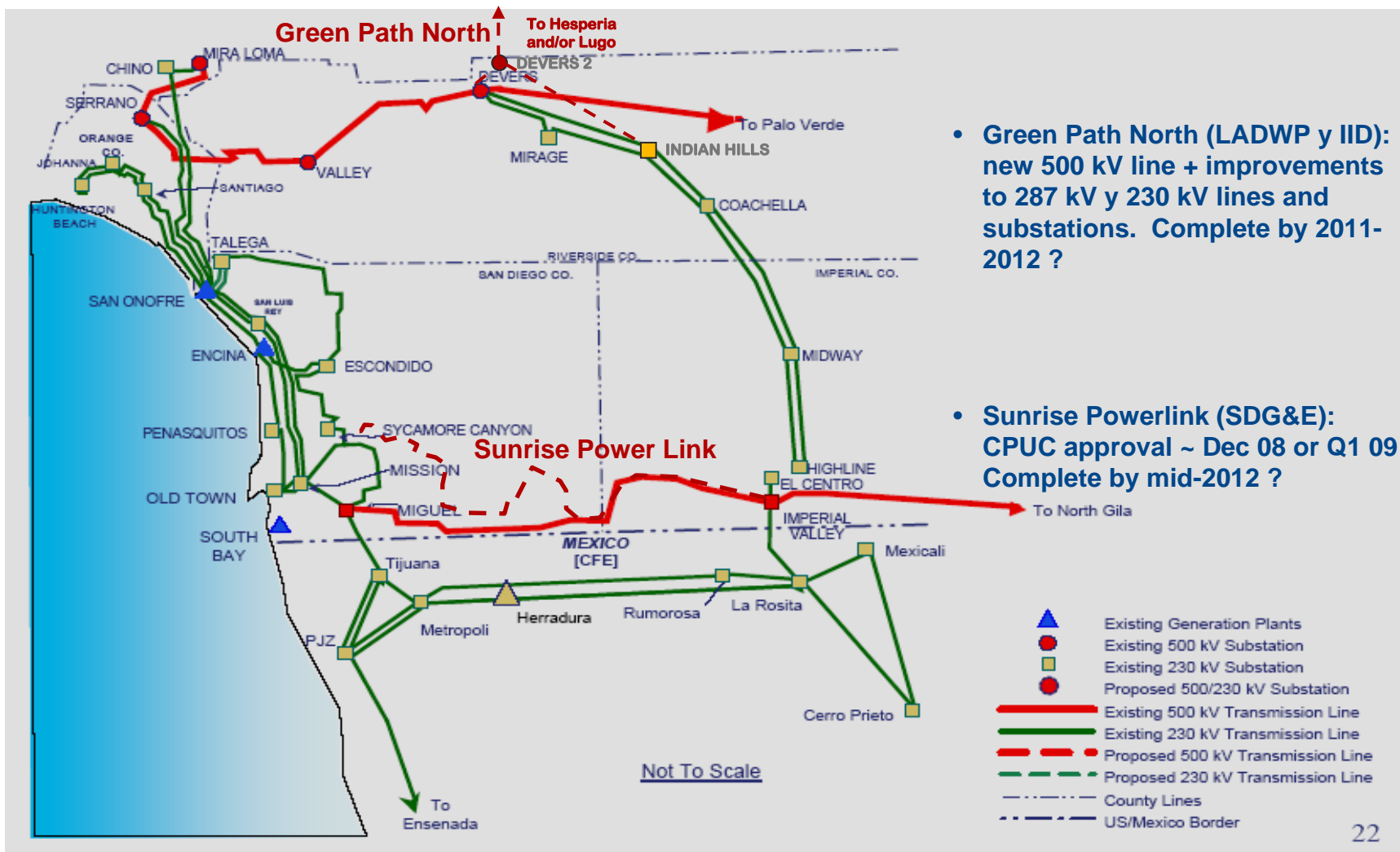


COAST AREA

Source: Generation and Transmission Expansion Plan Baja California System 2003-2007, Florencio Aboytes PhD, CFE, 2003

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Ability to reach California's power markets is limited by existing transmission



- **Green Path North (LADWP y IID):** new 500 kV line + improvements to 287 kV y 230 kV lines and substations. Complete by 2011-2012 ?
- **Sunrise Powerlink (SDG&E):** CPUC approval ~ Dec 08 or Q1 09 Complete by mid-2012 ?

Assessment and remediation of system impacts

- Interconnecting over 5,000 MW of La Rumorosa wind generation could have significant impacts on the region's power systems
 - Comisión Federal de Electricidad (CFE) and Imperial Irrigation District (IID), the balancing areas adjoining CAISO, will be affected by the interconnection of this new resource, even if they are not directly connected to it
 - Impacts must be identified and addressed to CFE's satisfaction prior to its concurrence with the issuance of regulatory export permits by the Comisión Reguladora de Energía
- The old LGIP serial study of new project interconnections and the uncertainty of completion of proposed projects, made it hard to assess the extent of the aggregate impact
 - The new GIPR cluster process, with significant earnest deposits of up to \$500k, will reduce that uncertainty
 - Organizational "silos" at CAISO and CFE delayed the awareness of the magnitude of the impact of proposed new capacity, but CAISO has now engaged CFE and IID to study the impact that the region's cluster will have on their systems
- Remaining hurdle
 - CFE system impact remediation will remain a bilateral process between CFE and each wind developer in the cluster
 - This may lead to delays in the issuance of export permits if negotiations with one or more developers fail

Potential environmental issues

Background

- In early 2008, two environmental groups protested the CPUC's approval of SCE's 250MW RPS contract with Baja Wind, LLC, Sempra's project in La Rumorosa,¹ listing 18 unaddressed environmental impacts and linking the approval of the project to that of the Sunrise Transmission Project (STP)
 - The impacts range from potential bat and avian collisions to impacts on endangered and threatened species habitat, as well as soil and water impacts
 - The protest links the wind project to the CEQA/NEPA EIR/EIS process of the cross-border line to interconnect to the STP
 - It called for the remediation of the impacts prior to approval of the project
 - It called for the wind project permitting process to satisfy the same environmental requirements as a similar project in California
- Depending on its first point of interconnection to the WECC, the CEC can require that a Baja California wind project meet California environmental quality laws, ordinances, regulations and standards (LORS) for the California county most likely affected by the project
- The licensing of the Intergen and Sempra Baja generation facilities established a precedent of extraordinary environmental scrutiny due to their location in Baja and power sales to California markets

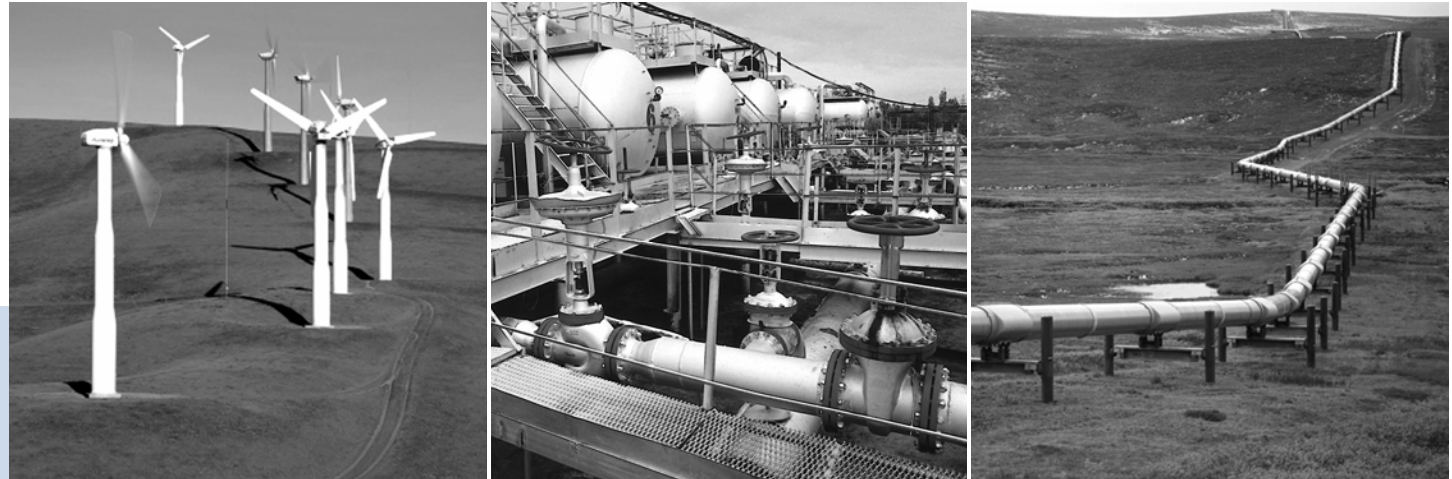
Potential environmental issues (continued)

Considerations for California Regulators

- Wind projects located in Baja California must meet Mexican municipal, state and federal laws, ordinances, regulations and standards; these are, in part, modeled after international best practices
- Requiring compliance with California LORS duplicates much of the effort and cost of compliance, while not necessarily reducing environmental impacts beyond complying with Mexican LORS
- “Compliance” with CA LORS is not verified by the appropriate county and state agencies but by CEC staff
- The requirements of an Environmental Impact Report (EIR) under CEQA and the requirements of a Manifestación de Impacto Ambiental under SEMARNAT are very similar
- An item-by-item review of the requirements in an EIR under CEQA reveals that homologous requirements exist under various Mexican federal laws and implementing regulations, including: la Ley General del Equilibrio Ecológico y la Protección al Ambiente (LGEEPA); Ley Federal Sobre Monumentos y Zonas Arqueológicas, Artísticas e Históricas; la Ley General de Vida Silvestre; and, the applicable Normas Ecológicas Oficiales Mexicanas
- A new and very strict environmental standard has been proposed to address the impacts of building and operating wind farms (Norma Oficial Mexicana PROY-NOM-151-SEMARNAT-2006)

Considerations moving forward

- The combined additional transmission capacity of the Sunrise Transmission Project and the Green Path North (1,200 MW each) may not be enough for the wind capacity under development
- Further, under certain LNG price and availability scenarios, several thousand MW of conventional gas-fired generation could be developed in the region—requiring additional transmission
- Stalled negotiations with one developer may jeopardize CFE's agreement with export permits issuance—suggesting the need for collaboration among developers
- Significant reinforcement of CFE's 230-kV East-West corridor may be necessary to accept all 5,000 MW plus of Baja wind—how much will developers be asked to shoulder?
- Integrating 5,000 MW plus of wind may require regulation resources not readily available in southern California and Baja California



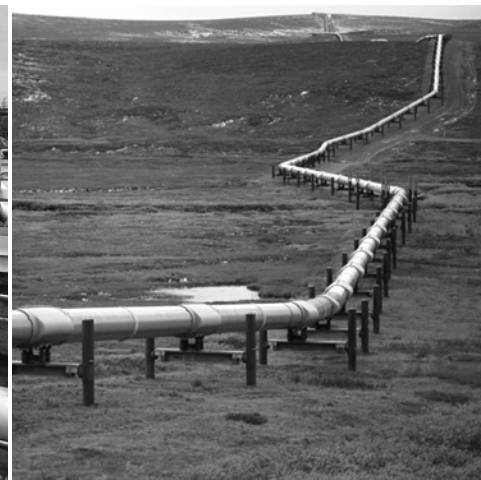
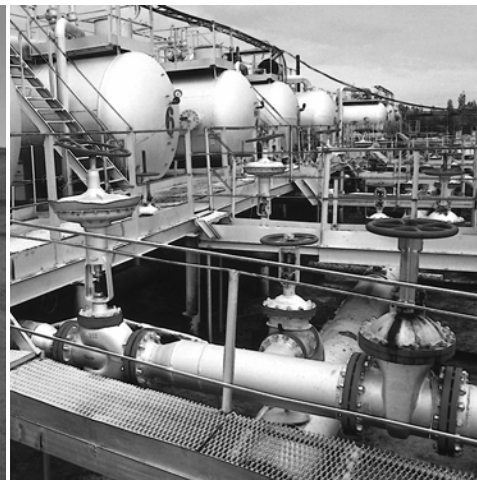
References

More information about the energy resources and infrastructure of the Baja California-California border region can be found in the following California Energy Commission reports coauthored by Bates White:

Challenges and Opportunities to Deliver Renewable Energy from Baja California Norte to California, June 2008, CEC-600-2008-004

Current Status, Plans, and Constraints Related to Expansion of Natural Gas-Fired Power Plants, Pipelines and Bulk Electric Transmission in the California/Mexico Border Region, August 2008, CEC-600-2008-008

Comparative Analysis of Future Gas and Electric Infrastructure Options in the California/Mexico Border Region, October 2008, CEC-600-2008-011



About the author

Nicolas Puga is a Partner 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 United States, 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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