Transmission Projects: Lessons Learned and Implications for New Undersea Cable Transmission Projects

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Hawai‘i Infrastructure Partners

- Principals
  - Hugh Baker, formerly CEO of Hunt Power, an HVDC project developer; full-time resident of Hawai‘i
  - Ed Krapels, CEO of Anbaric, developer of HVDC and microgrid projects
  - Ed Stern, CEO of PowerBridge, developer and operator of HVDC systems
- Investors in HIP
  - Energy Investors Funds
  - Starwood Capital

Relevant Experience: Neptune and Hudson

Completed on schedule and on budget in 2008. In operation, meeting +/- 20% of the power requirements of Long Island

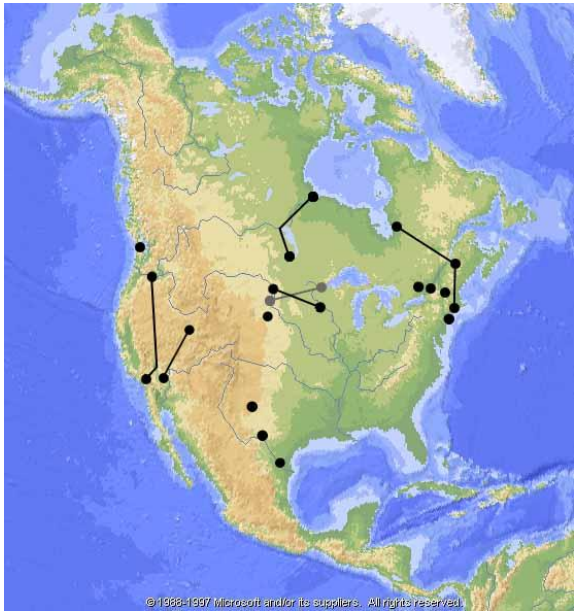
Connection point: W 49th St in Manhattan. Construction began May 2011; COD in 2013.

Additional Projects Under Development by HIP Principals

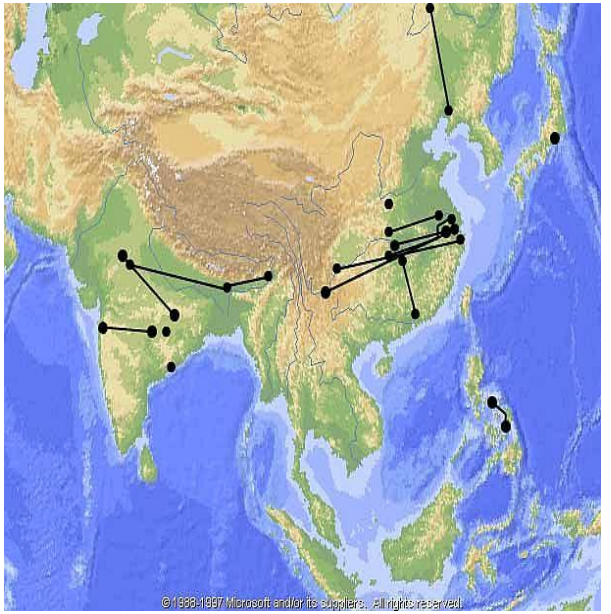
- **Green Line Project** (New England), designed to connect wind in northern Maine with the load centers of southern new England. Cable to be installed in the Atlantic Ocean off the coast of Maine, NH, and MA.
- **West Point Project** (New York), designed to provide replacement power should the Indian Point nuclear plant be closed; cable to be installed in the Hudson River.

There are scores of subsea cable projects in the world

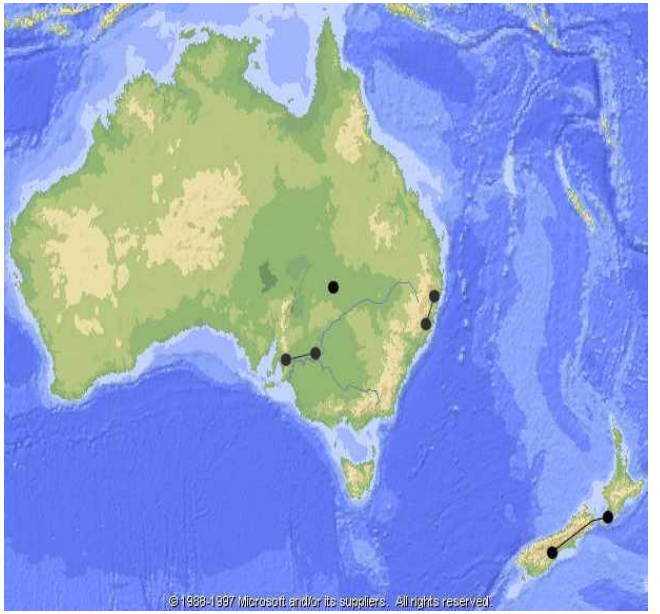
ABB Subsea and HVDC Transmission Development



North America



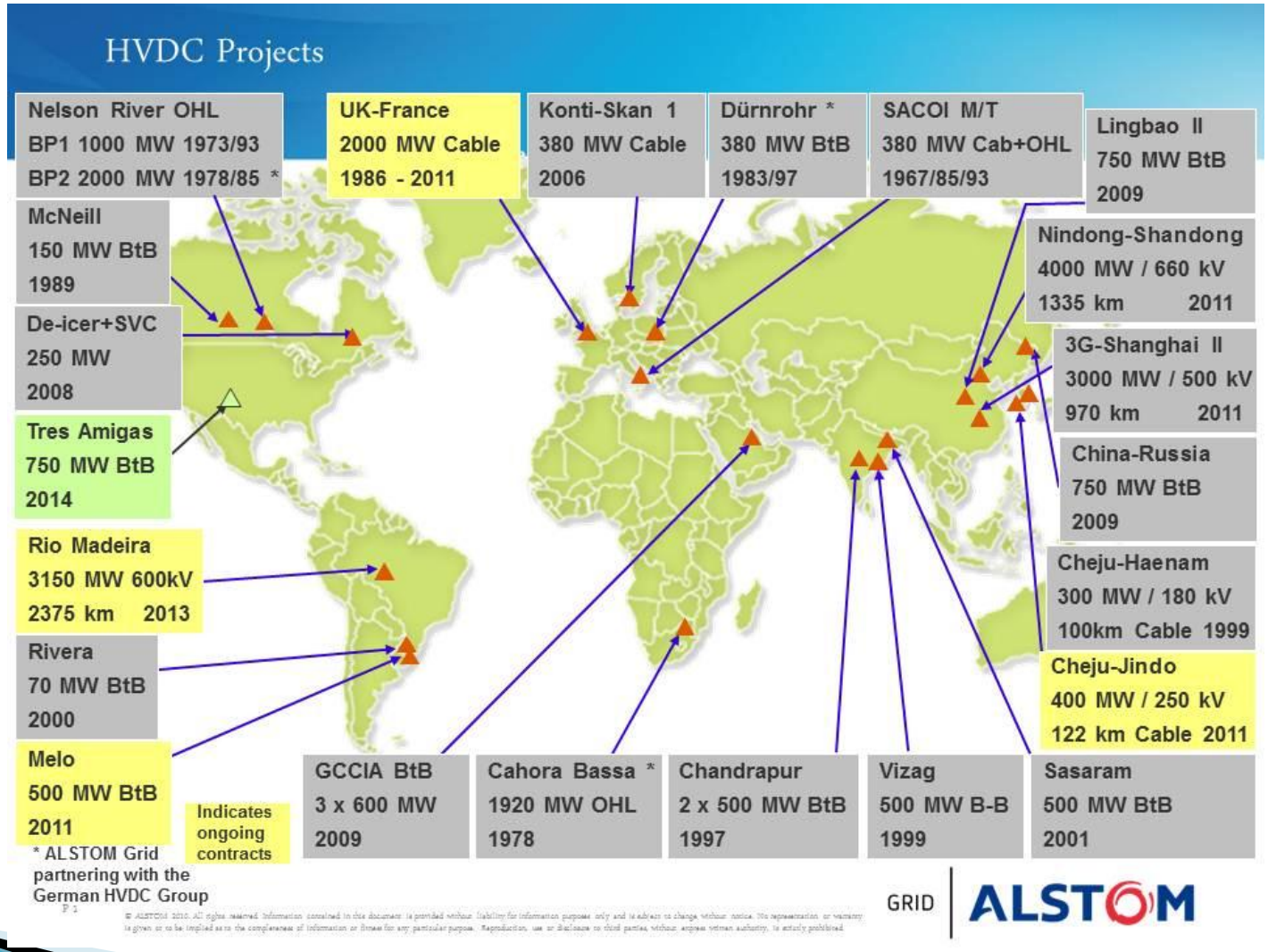
Asia



Oceania

Siemens Subsea and HVDC Projects

Alstom's Subsea and HVDC Projects



And, Assorted Cable Suppliers

- Prysmian – provided cable for Neptune, Hudson, TransBay and many other European and Asian subsea projects
- Nexans – provided cable for Malta to Sicily, Oslofjord II, Dubai, Lincs and a number of other European and Asian subsea projects
- There are also Japanese, Korean, and Chinese cable manufacturers

Why Are These Project Built?

- Typical reasons
  - Connect remote areas with high electric rates to lower cost markets (e.g. Neptune, Hudson)
  - Manage interconnection of asychronos electric grids (e.g. ERCOT DC ties, Tres Amigos)
  - Efficiently move remote renewable generation to load centers (i.e. Hawai‘i’s situation)
- In just about every situation, the goal of these projects is to reduce costs and improve reliability of service for ratepayers
  - In Hawai‘i, this a matter for the State, the PUC and HECO to determine.
  - If the project is economically feasible and the policies are set, the Hawai‘i interisland cable <u>can</u> be financed, constructed and operated.

Implications for New Undersea Cable Transmission Projects

Context and Suggestions for Undersea Cable Transmission Projects

- Other undersea cables have been longer, larger, deeper, and more complex than projects such as the cable discussed between the islands of Maui County and Oahu.
- Projects can be built under several different regulatory and financing regimes… which of those is used is up to local regulators and lawmakers.
- Here are four suggestions that will minimize development risk and maximize public and ratepayer benefits.

1. Separate transmission from generation

- For a multi-island, multi-generational infrastructure **SYSTEM:**
  - Because the transmission project will last *far longer* than the generation to which it is initially tied, it is in the long-term best of interest of the citizens of the location to keep the transmission ownership separate;
  - Such separation of ownership is generally seen as desirable public and regulatory policy in other jurisdictions in the US and around the world.

2. Use an RFP process to obtain binding and competitive bids

- The RFP for the transmission project should require a fixed price bid, shielding ratepayers from cost overruns;
- The RFP should have a small (e.g. less than 3 month) response window (otherwise it will not be taken seriously by bidders and prices offered will be notional);
- The RFP should be structured to obtain binding bids from development teams (developers plus vendors).

3. The RFP should ask respondents how they plan to manage project-on-project risk

- It is neither necessary nor desirable to assume that joint "consortium" ownership of the generation and transmission is a preferred response to the RFP;
- Transmission is likely to take longer than generation to build, so the developers of energy supply projects need to be prepared to tailor their schedules to that of the transmission project.

4. Current conditions are good for new projects to begin

- Interest payments are a huge part of infrastructure cost… delay runs the risk that interest rates will be much higher than they are today.
  - A 1% rise in interest rates will cost ratepayers about $15 million in additional project cost during construction and about $5 million per year during the financing term

Conclusions

- Undersea cable systems are reliably and cost-effectively delivering clean electricity in many locations around the world
  - Several locations are significantly reducing the use of fossil fuels
  - When structured correctly, provide future generations access to additional sustainable generation.
- Undersea cable systems are permittable, buildable, and serve as the backbone of sustainable energy systems
- Thank you for the opportunity to be with you today.