CRUISE SHIP
SHORE POWER PROSPECTS

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Shore Power Description

• Power is transmitted from an on-shore transformer to the ship through flexible electrical cables. The cables connect to the ship's electrical system through traditional male/female plugs & sockets and enable the ship to operate or “hotel” on shore supplied power versus onboard generators.

• Power is transferred and synchronized to the ship under a closed transition process monitored and controlled by the ship’s automation system.

• Internal shore side monitoring and protection is achieved with protection relays, which insure safety and protection for both the ship and shore electrical systems.
Excavation & Conduit Installation
Cable & Equipment
Main Metering Equipment, Transformer & Secondary Equipment
Ground Switch

Cable Positioning Device
Ship Side Equipment-Hardware

- Shorepower switchboard is installed, typically only on one side. This is connected into the ship’s main power architecture.

- Onboard automation must also be modified to allow the synchronization with the shore power.

- Ship’s engineers must then be qualified.
Ship Side Equipment-Procedures

• Winch lowers cables into hull & cables are connected to the ships infrastructure.

• Onboard power loads are carefully shifted and synchronized with the shore power.

• Onboard engine(s) can then be deloaded and shut down.
Criteria for a Successful Shore Power Project

• **Source of shore side electrical power**
  – Availability of an adequate supply of electricity at a reasonable cost
    • Not causing disruptions to local populace
    • Interruptable rates
    • Many calls are off peak on Saturdays and Sundays
    • Ships produce electricity for approximately $0.07 - .20/kWhr
    • Must be moored at a dock
  – Cleaner source than possible onboard
    • Renewables – vs- Coal or other fossil fuels
    • Onboard abatement options
    • Proximity to the port is important due to line loss

• Frequency of calls by cruise vessels equipped to connect to Shore Power.
Criteria for a Successful Shore Power Project.

- Availability of the same dock and pier facility for these vessels for every call
- Adequate dock and uplands space for equipment
- Willing partners including – utility, port and government agencies
San Francisco Shore Power
Juneau, AK 2001 – Shore Power
First High Voltage Shore Power Connection for Cruise Ships
Existing Shore Power Projects

- Juneau, AK - 1 installation, completed 2001
- Seattle, WA - 2 installations (each dual voltage), completed 2005 & 2006
- Vancouver, BC - 2 installations (each dual voltage) completed 2009
- San Francisco, CA - 1 installation (dual voltage), completed 2010
- Los Angeles, CA - 2 installations, (single voltage), completion 2011
- San Diego, CA - 1 installation (dual voltage), completed 2010
- Long Beach, CA - 1 installation (dual voltage), est. completion 2011
- Brooklyn Red Hook, NY - 1 installation (dual voltage) est. completion 2012
Conclusion on Shore Power

• Chicken or the Egg Phenomenon when it comes to further deployment of this technology

• In some instances Shore Power is a good emissions reduction strategy
  – It can deliver benefits in high population density areas, but not always
  – If renewable/nuclear it delivers globally

• Recent European Union commissioned study found that for certain ports and for certain ships it is worth pursuing, but:
  – They found that only 1-3% of a ship’s total emissions are reduced for each day plugged in
  – This does not include a correction for ships that are/may have onboard abatement systems onboard or revisions to emissions regulations
    • The ECAs will already dramatically reduce emissions, thus cutting into claims of shore power benefits
  – We need to remember that we must find solutions for the other 97 – 99% of the emissions when the ship is underway, wherever that is