



*Proposal for
the Future Development of
the Electricity Infrastructure in Macao*

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Switching on the future for you and Macao

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1 Executive Summary

Over the years, the stable regulatory framework crafted by the Macao Government has been instrumental in ensuring that the Macao community enjoys world-class electricity service. Specifically, this framework has encouraged the right level of investment, facilitated the importation of electricity and natural gas from the Mainland, supported efforts to keep tariffs affordable and helped maintain a stable and productive workforce for the electricity industry.

The framework has supported a vertically integrated industry structure that has been well suited to Macao, a market characterized by its small size. With one player operating the whole value chain from generation / importation to retail, the economy of scale is at its maximum. The operation of the industry involves no transaction costs between multiple parties, which in a market with the size of Macao are likely to far outweigh any benefits the multi-operator model may bring.

The integrated industry structure has also allowed the infrastructure development to be managed by a private sector company with world leading expertise. As a result, Macao has enjoyed consistently high supply reliability and security through periods of high growth. Past experience tells us that such good result was not achieved at times when infrastructure investment decisions were made by the Government. Equally unlikely was such excellent result been achievable if the complex efforts of building the right infrastructure at the right time to cope with Macao's evolving demand had been left to a group of uncoordinated players each reacting to market forces on their own benefits.

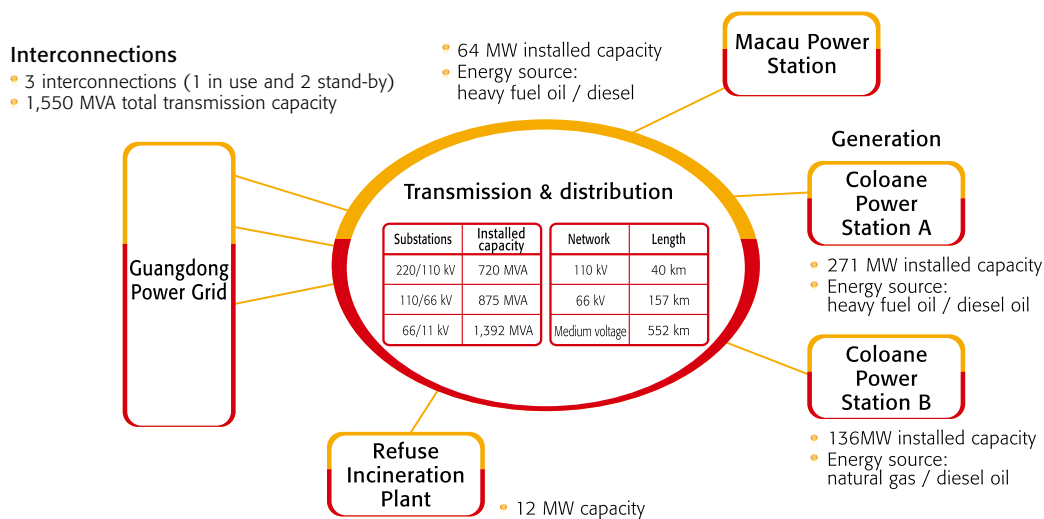
In our forecast period, Macao's electricity demand will continue to grow. Our estimate is that the demand will more than triple between years 2007 and 2025. Sustainable development of the electricity industry can only be achieved through the joint efforts of CEM, the Government and the customers, by always keeping the right balance between social responsibility, the economy and the environment within the framework of a transparent process.

The governing objectives of the electricity industry in Macao should be:

- reliable and secure supply;
- stable tariffs;
- environmental sustainability;
- contribution to local economy;
- good employment opportunities for Macao citizens.

One important pillar in the vision to achieve these objectives is to attain the balance between different energy sources. Our proposed source mix will include importation, local generation using natural gas and renewable sources, plus the suitable back-up sources in place.

Electricity supply infrastructure in Macau 2008



Electricity supply infrastructure in Macau 2025

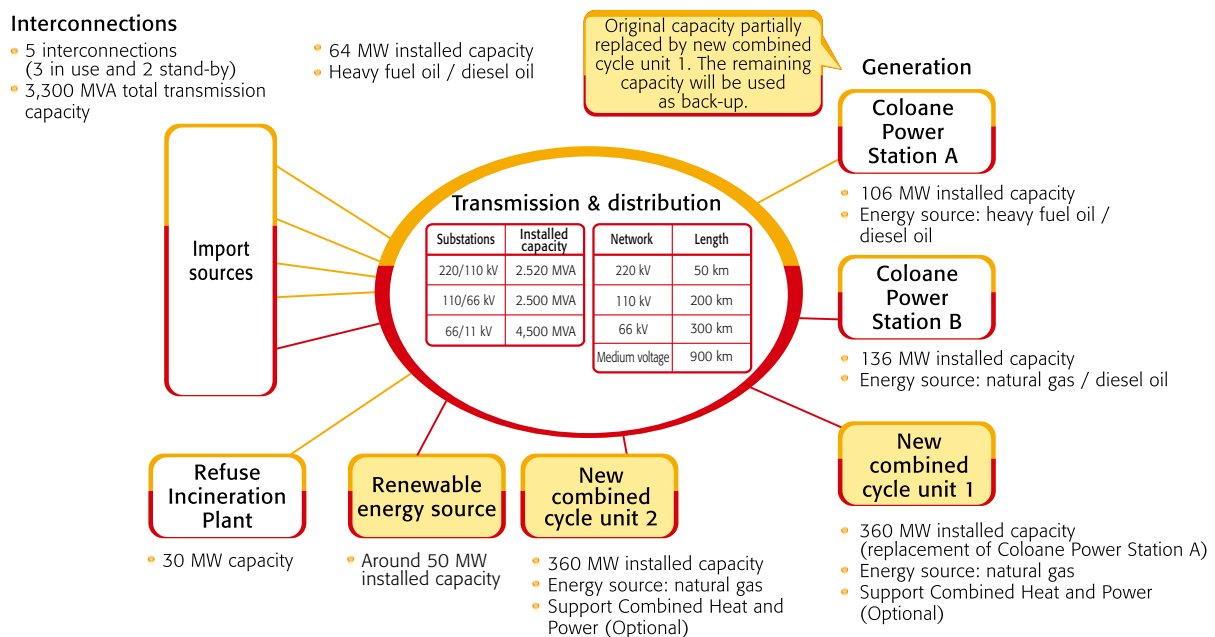


Figure 1-1 Current and future electricity supply infrastructure in Macao.

3_4.1 **Strengthen the infrastructure for interconnection with Guangdong Power Grid**

Importation from the Mainland has been and will continue to be an important energy source for Macao. The growing electricity demand of Macao requires robust interconnection infrastructure.

In June 2008, the 220 kV Canal dos Patos Substation was established, providing an additional 720MVA of transforming capacity and two 110kV interconnections as back-up. Also in our plan is the Lotus 220kV Substation, which will provide additional interconnection with the Guangdong Power Grid to support Macao's demand through 2010. The Lotus Substation can be expanded further for higher capacity.

Interconnection	In service since	Transmission capacity
Macao Norte – Zhuhai	June 1984	250MVA
Nova Taipa – Nanping	May 2006	250MVA
Canal dos Patos – Zhuhai / Gongbei	June 2008	1,050MVA
Lotus – Hengqin	Planned 2010	700MVA (1,050 MVA after expansion)

3_4.2 **Move towards clean energy by replacing existing heavy fuel generation facilities with cleaner models**

A number of the existing generation units use diesel / fuel oil. In alignment with the strategy of migrating towards cleaner fuel, Macao will benefit from gradually replacing the existing heavy fuel generation facilities with a gas-fired combined cycle unit. At the same time, the heavy fuel units should be kept as back-up in order to provide redundancy in case of emergency.

An illustrative configuration of the replacement combined cycle unit can be:

- 2 Gas turbines + 2 Boilers + 1 Steam turbine;
- Gross efficiency 52%;
- Electrical Capacity 360 MW (site conditions);
- Boiler designed to provide additional steam for end-user demand.

We plan to close Macao Power Station and hand the concession land back to the government.