興達

HSINTA
ECOLOGICAL
POWER PLANT
CONSTRUCTION
PROJECT
CONCEPTUAL DESIGN
INTERNATIONAL
COMPETITION

興達電廠生態建設計畫概念設計國際競圖

競圖須知 Design Brief

空間需求與設計準則
Space Requirements and Design Guidelines

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興達 HSINTA ECOLOGICAL POWER PLANT CONSTRUCTION PROJECT CONCEPTUAL DESIGN INTERNATIONAL COMPETITION

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I. 空間需求與設計準則
I. Space Requirements and Design Guidelines

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Note: The English translation is intended for reference only. If any discrepancy exists between the Chinese and English versions, the Chinese version shall govern unless the Competition Documents specify otherwise.

第壹章 Chapter 1

計畫概要 Introduction to the Project

1.1 緣起 Origin

台灣自民國70年代以來由於經濟發展迅速，電力需求逐年成長，穩定的電力供給乃成為經濟發展最基本也最重要的一環。台灣電力公司(以下簡稱：台電公司)肩負著提供台灣地區充裕電力及配合國家長期發展之重任，多年以來始終不斷致力於電源之規劃與開發之工作。

Since the 1980s, Taiwan has seen its electricity demand increase yearly together with rapid economic growth. A stable supply of electricity has therefore become the most fundamental and important component of national economic growth. Taiwan Power Company (hereinafter as "TPC"), mandated with the responsibility to ensure sufficient power supply and enable long-term development of the country, has over the years dedicated itself to the continuous development and planning of electricity generation.

政府於民國100年11月3日宣布新電力政策，核三廠機組於民國113~114年屆齡後將不再延役，因應台灣南部地區用電成長需求，未來興達電廠供電角色將更為重要。

On November 3, 2011, the government announced a new policy in electricity generation: the reactors at Nuclear Power Plant No. 3 will no longer be used after their expected lifecycle end in 2024~2025. In anticipation of rising power demand in southern Taiwan, Hsinta Power Plant is bound to take on a more significant role in future power supply.

「2025非核家園」是政府行政團隊未來政策走向，為實現2025年「非核家園」，現有的發電配比必須要有一些改變，包括提高綠能與燃氣複循環發電比重，同時，對於能源開發、供電穩定也需提出相關配套，盡力達成目標。綠能、天然氣、非核家園是一脈相關。除了發展綠能，更新發電機組也是增加供電的方式之一，政府將加速第三天然氣接收站，擴大天然氣發電，不只能緩和空污，也為了將來導入綠能發電爭取時間，並且是「穩健減核、逐步非核」的重要配套措施之一。政府的目標將建立低碳永續、高質穩定、效率經濟的能源體系，2025年除完成非核家園外，也將達成再生能源發電量占總發電量比例達20%。再生能源電源持續不斷地加入電網已呈不可擋的趨勢。因此，為因應未來台灣電力系統整體需求及二氧化碳減量等環保議題，未來天然氣發電在供電上將更形重要。

To realize the Administration's "2025 Nuclear-Free Home" policy, changes must be made to current distribution of electricity generation, including boosting the percentage of green energy and gas combined cycle generation. Meanwhile, supplementary measures for energy-related R&D and stable power source must also be proposed to meet this goal. To this end, green energy, natural gas and nuclear-free home must be tackled in a holistic way. In addition to developing green energy, another way to boost power supply is to update existing electricity generation units. The government will accelerate the completion of Natural Gas Terminal No. 3 and increase the ratio of natural gas in fuel mix. This move, as a critical supplementary measure of "Stable nuclear energy reduction en route to nuclear-free home", will not only mitigate air pollution but also buy time to develop green electricity generation options. The government's goal is to establish an energy supply system that is low-emission, sustainable, high quality, stable, efficient and cost-effective. Aside from achieving nuclear-free home in 2025, the ratio of renewable energy in the power supply equation must also reach 20%. The continuous addition of power from renewable energy feeding into the grid is an unstoppable trend. To address the overall need of Taiwan's electricity supply system and environmental issues such as CO2 reduction, natural gas will only increase in importance in the energy mix.

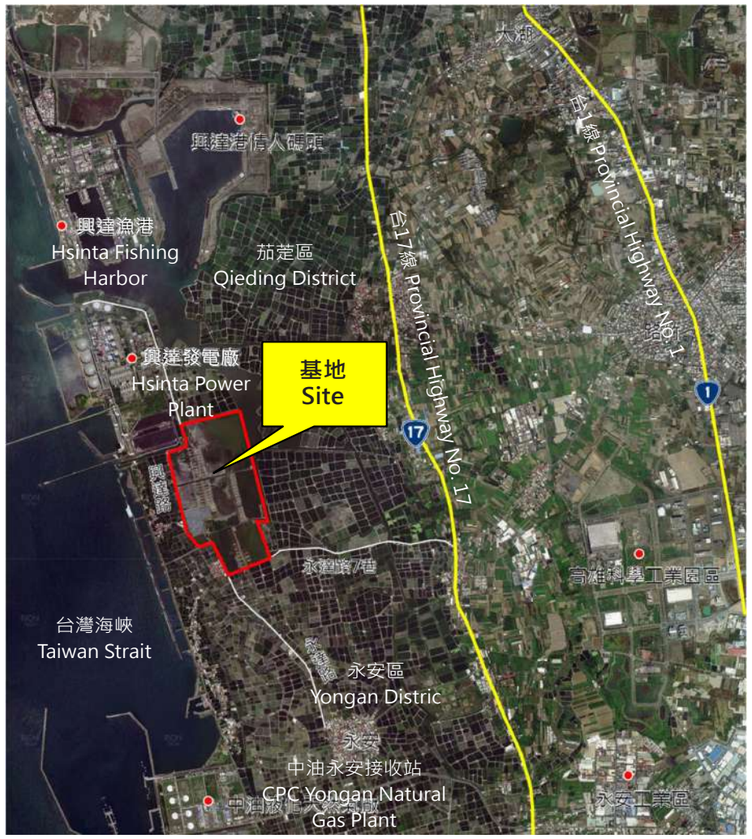
台電公司為因應既有機組除役及長期電力負載成長需求，並提升電廠整體營運績效及競爭力，降低二氧化碳與空污排放，爰規劃推動「興達電廠燃氣機組更新改建計畫」(以下簡稱本計畫)。本計畫是以興達電廠既有燃氣機組將於112~114年除役退休，規劃更新設置總裝置容量約390萬瓩之燃氣複循環機組，作為替代既有燃氣一至五號機組的目標，第一部更新改建機組商轉目標訂於112年7月，預計於民國115年1月全部機組取得電業執照及商轉。

The "Hsinta Power Plant Natural Gas Units Replacement Plan" (hereinafter as the "Hsinta Plan") has been developed with multiple objectives in mind. It aims to address imminent decommissioning of existing power generation facilities and growing demand in long-term electricity capacity, enhance the overall performance and competitiveness of the supply system and reduce CO2 emission and pollution. According to the plan, existing natural gas units No. 1 through to No. 5 at Hsinta Power Plant, which are expected to be decommissioned around 2023~2025, are to be replaced with gas combined-cycle units with a total installed capacity of 3.9GW. The goal is to start commercial operation of the first replaced unit in July 2023 and to obtain utility license and start commercial operation of all units by January 2026.

1.2 計畫內容概要 Brief of Project Content

興達電廠廠址位於高雄市永安區興達路6 號，目前共分為二個廠區，第一廠區設置主要發電設備機具，第二廠區則為台電公司於民國75 年向台鹽公司收購之鹽灘地。第一廠區佔地面積約為147.8 公頃，位於高雄市永安區與茄萣區交界，廠區土地位於高雄市永安區鹽田里，北鄰興達漁港、西鄰台灣海峽，電廠周圍由台灣海峽、漁塭、漁港區所圍繞，對外交通無論北上或南下皆須經由廠區東側之台17 線。第二廠區(為本次競圖基地，以下簡稱：本基地)緊鄰第一廠區東南側，佔地面積約130 公頃，南至鹽保路(永達路7巷)，西以興達路為界，東至連通潟湖的竹仔港溝(公溝)，其中南側為永安鹽田濕地，依據106年度「內政部重要濕地審議小組」第4次會議(民國106年7月21日)結論，已將永安鹽田南側約41.25公頃範圍，經再評定後劃為地方級永安鹽田重要濕地，深具生態特色及富有環境教育之潛力。另外濕地範圍內另有佔地約1.3公頃之「原烏樹林製鹽株式會社辦公室」，已於97年5月21日經高雄市政府指定為市定(直轄市定)古蹟，深具歷史及保存之意義。

Hsinta Power Plant is located at No. 6, Hsinta Rd., Yongan District, Kaohsiung City. The Plant is currently divided into two sites. The primary electricity generation equipment is located at Plant Area No. 1, while Plant Area No. 2 encompasses salt fields TPC purchased from TAIYEN in 1986. Plant No. 1 occupies an area of 147.8 hectares at the intersection of Yongan and Qieding districts in Kaohsiung City. Located in Yantian Borough, Yongan District, it is flanked by Hsinta Fishing Harbor to the north and Taiwan Strait to the west. The site is surrounded by Taiwan Strait, fish farms and fishing harbor and both its northbound and southbound accesses depend solely on Provincial Highway No. 17 to the east. Plant No. 2 (the competition site, hereinafter as the "Project Site" is to the southeast of Plant No. 1. At 130 hectares, it is bound by Yanbao Rd. (Lane 7, Yongda Rd.) to the south, Hsinta Rd. to the west and, to the east, Zhuzaigang Channel (a public watercourse) linking to a lagoon. The south side of the site encompasses Yongan Salt Field Wetland. A 41.25-hectare area in the southern end of Yongan Salt Field was designated as a locally important wetland in a reassessment conducted during the fourth session (July 21, 2017) of 2017 meetings by the "Ministry of the Interior Important Wetland Review Committee". The Committee concluded that the area boasts rich ecological features and strong potential in environmental education. There is also a 1.3-hectare office building for the former Wushulin Salt Manufacturing Company within the extent of the wetland. Rich in historical significance and worthy of conservation, it was designated by Kaohsiung City Government as a municipal historical architecture on May 21, 2008.



基地地理位置示意圖 Site Map

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鹽田濕地 Salt Field Wetland

原烏樹林製鹽株式會社辦公室
Office building for the Former Wushulin Salt Manufacturing Company

興達電廠既有機組興建於民國60 年代，裝設有4 部燃煤機組、5 部天然氣複循環機組，裝置容量合計約432.6 萬瓩。燃煤機組分別於1982 年~1986 年陸續商轉，迄今機齡已逾30 年，燃氣機組乃於1999~2000 年間裝置，為提高發電效率抑低溫室氣體排放，及因應國內用電量擴增需求，而有更新的必要。台電公司初步規劃於興達電力設施預定地(第二廠區-本次競圖基地)推動「興達電廠燃氣更新改建計畫」，設置3 部燃氣機組，目標裝置容量約390 萬瓩；另於興達電既有廠區(第一廠區)部分，規劃未來將更新為新的超超臨界（USC Ultra Supercritical)燃煤機組。

The existing electricity generation units at Hsinta Power Plant were built in the 1970s and include 4 coal-fired units and 5 natural gas combined-cycle (CCGT) units totaling 4.326GW in installed capacity. Operation of the coal-fired units began one by one between 1982 and 1986, and they have since been running for over 30 years. The natural gas units, installed between 1999 and 2000, need to be replaced in order to increase efficiency, reduce green house gas emission and address rising power demand. According to TPC's initial planning, 3 natural gas units totaling 3.9GW are to be installed within the reserved site for Hsinta electricity generation facility (Plant No. 2, i.e. the competition site) as per the Hsinta Plan. Another plan is being developed for Plant No. 1 toward a final goal of USC Ultra Supercritical coal-fired units.

然依據以往電廠規劃經驗，由於電廠基地面積有限，新興電廠可行性研究對於廠區配置與量體少有變動彈性，造成電廠整體意象發展受限，難以擺脫外界對電廠之既有印象。為配合前述發電計畫規劃需要，本公司擬委外辦理電廠造型及景觀規劃工作，希望未來電廠造型及景觀能有別以往電廠給民眾之印象，期能結合當地環境，將濕地、古蹟及地方特色融入電廠造型及景觀規劃中，因此初步命名為「興達生態電廠」，使電廠既可符合發電功能，亦能滿足民眾視覺品質之要求，且展現新世代電廠造型及景觀意象，讓「興達生態電廠」成為當地之亮點，並做為本計畫推動時向民眾溝通說明或陳報政府機關審查時之輔助說明資料，使本計畫順利推動。

Nevertheless, past planning experience has shown that the feasibility study of a new power plant offers little flexibility with regards to site planning and massing due to limited site area. As a result, there is often little room for creativity in developing an overall image that breaks free from the power plant stereotype. In conjunction with the aforementioned plant development, TPC plans to contract out the building form and landscape design of the plant with the intent to shape a refreshing impression of a next-generation power plant. With a view to incorporate the wetland, historical and vernacular features of the local environment in its building form and landscape design, the facility has

been given the preliminary name of Hsinta Ecological Power Plant. The goal is to fulfill the function of power generation while achieving high aesthetic quality and exemplifying the form and landscape design of a next-generation power plant, turning Hsinta Ecological Power Plant into a local highlight. Furthermore, the results will also serve as supplementary information when communicating the Hsinta Plan with the public or submitting to the government for approval in order to facilitate its implementation.

由於電廠需考量發電功能，造型及景觀上亦必須兼顧設備空間機能需求，造型及景觀規劃限制條件較多，使得創新不易，「興達生態電廠」為全新電廠，為能引進創新設計與想法並吸引國際知名設計團隊參與，以利本公司綠色企業形象之形塑，其造型及景觀規劃擬採國際競圖方式辦理，冀能藉由此次整廠概念設計競圖，取得電廠未來規劃願景及意象，後續得以順利推展具有突破性的新電廠概念並與國際接軌，塑造成為當地地標，並藉由電廠意象宣導企業理念，提升國人對電力設施的認同，並藉由宣傳活動提升企業形象。本計畫國際競圖之成果將做為後續設計及施工之參考，使得最後完工之電廠能成為讓當地民眾引以為傲之電力設施。

The building form and landscape design of a power plant must also take into consideration the spatial and functional needs of a power generating facility, which tend to hinder innovation. In the planning of Hsinta Ecological Power Plant as a brand-new facility, TPC hopes to introduce innovative design and ideas and attract reputable design teams around the world while establishing a green corporate image. By undertaking its building form and landscape planning through an international conceptual design competition, thus shaping the vision and image for the future plant, TPC hopes to realize breakthrough concepts for the next-generation power plant--one that aligns itself with leading global standards to become a local landmark. The image embodied by the new plant will also serve to promote TPC's corporate philosophy, help the public better identify with power plants in the country and enhance the corporate image through promotional activities. The result of the competition will serve to inform the plant's future design and construction, toward making the final product the pride of all local residents.

第貳章 Chapter 2

經費及期程 Budget And Schedule

2.1 經費 Budget

本計畫預算費用估計為新台幣1,168.7億元，其中主發電設備統包費用約844.4億元，非主設備統包費用（含開關場、附屬設備、輸電線路及其他工程）約324.3億元。

The estimated budget of the Hsinta Plan is estimated at 116.87 billion dollars NTD, with general contract for the primary electricity generation equipment accounting for 84.44 billion dollars and general contract for the ancillary systems (including switchyard, ancillary equipment, transmission lines and others) accounting for 32.43 billion dollars.

2.2 預定時程 Scheduled Time

本計畫預計於民國115年1月全部機組取得電業執照及商轉，主要里程碑及進度如下表：

Obtaining of utility license for all units in the Hsinta Plan and start of their commercial operation are scheduled for January 2026, with key milestones and progress outlined as follows:

編號 No.	主要里程碑 Key Milestones	預定日期 Scheduled Date
1	計畫奉核及准予先行辦理補辦預算 Approval of Hsinta Plan for advanced plan execution, with budget to be approved late	107 年 2 月（行政院） February 2018 (Executive Yuan)
2	環境影響評估核准 Approval of environmental impact assessment	107 年 12 月（環保署） December 2018 (Environmental Protection Administration)
3	海岸管理法 / 濕地 [保育] 法申請許可 Permit application per Coastal Zone Management Act and Wetland Conservation Act	108年3月(內政部營建署) March 2019 (MOI Construction and Planning Agency)
4	核發土地開發許可 Issuance of land development permit	108年5月(內政部營建署) May 2019 (MOI Construction and Planning Agency)
5	使用分區及使用地變更異動登記 Registration of zoning and land use modification	108 年 7 月（高雄市政府） July 2019 (Kaohsiung City Government)
6	施工許可 Construction permit	108年10月(經濟部能源局) October 2019 (MOEA Bureau of Energy)
7	主要設備決標 Contract award of primary equipment	109 年 7 月 July 2020
8	第一部機取得電業執照及商轉 Issuance of utility license and commercial operation of Unit No. 1	112 年 7 月 July 2023
9	第二部機取得電業執照及商轉 Issuance of utility license and commercial operation of Unit No. 2	113 年 7 月 July 2024
10	第三部機取得電業執照及商轉 Issuance of utility license and commercial operation of Unit No. 3	115 年 1 月 January 2026

第參章 Chapter 3

基地與周邊環境概述
Introduction to the Project Site and Surroundings

3.1 基地現況 Project Site

興達發電廠位於高雄市永安區與茄萣區交界處，廠區面積135公頃，北臨興達漁港，東側則以濱海公路台17號為界。興達電廠設置有4部燃煤火力機組及5部複循環機組，總裝置容量為432.595萬瓩。

The existing 135-hectare Hsinta Power Plant sits between two districts of Kaohsiung City: Yongan and Qieding. The site borders with Hsinta Fishing Harbor to the north, and with Provincial Highway No. 17 (also known as the coastal highway) to the east. It has four coal-fired units and five CCGTs with a total installed capacity of 4325.95 kilowatts.

本基地位於興達電廠東南側，屬高雄市永安區，面積約130公頃。本基地南側約41.25公頃範圍，經再評定後劃為地方級永安鹽田重要濕地，濕地之西北角為既有之太陽光電系統面積9.45公頃，另外於濕地近中央位置另有佔地約1.3公頃之「原烏樹林製鹽株式會社辦公室」，已經指定為市定(直轄市定)古蹟，剩餘面積約78公頃則作為電力設施用地。

The 130-hectare project site is located in the Yongan district to the southeast of Hsinta Power Plant. A portion of 41.25 hectares in the south is a municipal wetland, formerly the site of saltpan field. To its northwest sits a photovoltaic system spanning 9.45 hectares. In the middle of the wetland, the city has carved out a 1.3-hectare heritage site to preserve the office of former Wushulin Salt Manufacturing Co. The remaining 78 hectares are to be used for power utility.

基地範圍示意圖
Extent of Project Site

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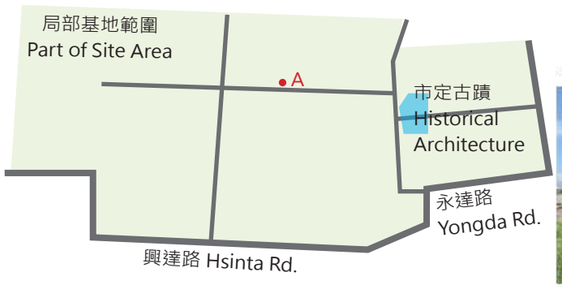
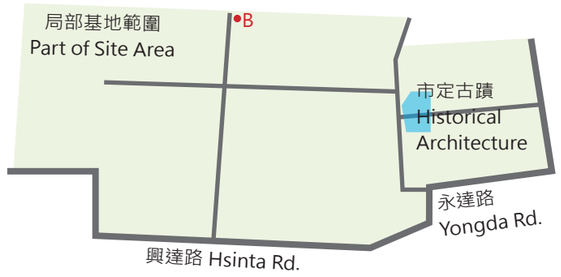
生態電廠興建計畫概念設計國際競圖

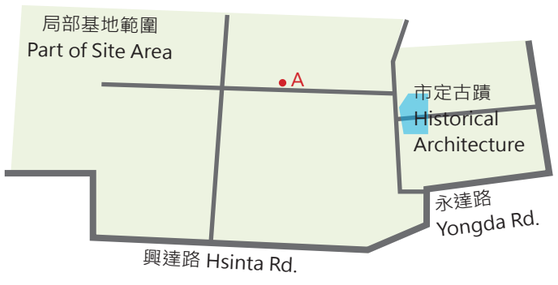
基地及周邊環境影像
Photos for the Site and Surrounding Area

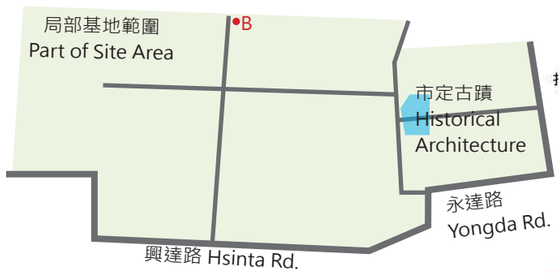
A.濕地照片 Photos of wetland

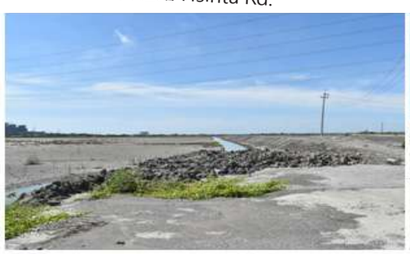
(觀賞更多照片/影片，請至本競圖網站www.EcoPP.com.tw)
(For more Photos/Videos, please visit competition website at www.EcoPP.com.tw)





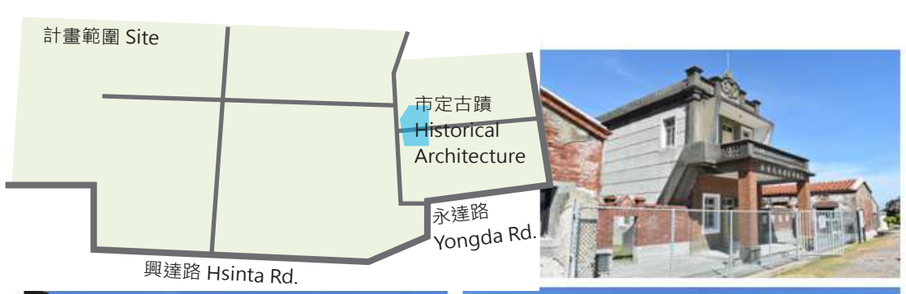






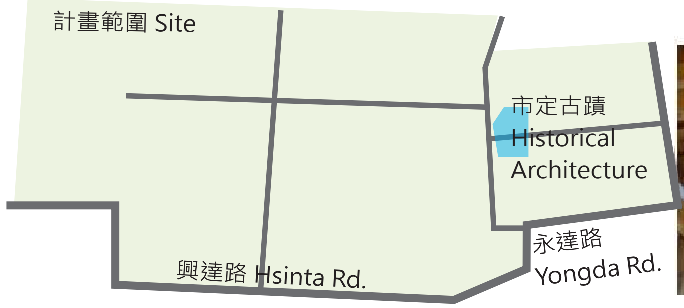
基地及周邊環境影像
Photos for the Site and Surrounding Area

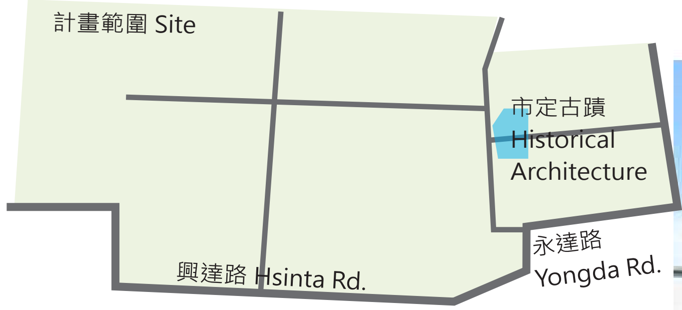
B.市定古蹟照片 Photos of Historical Architecture

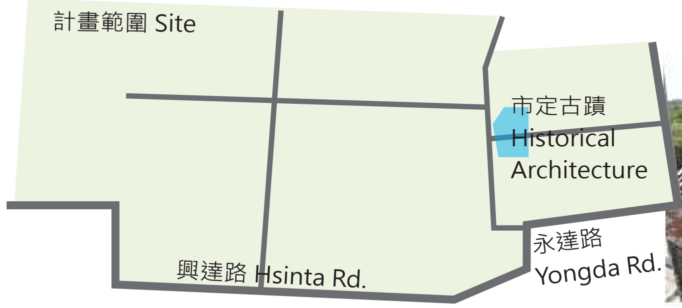


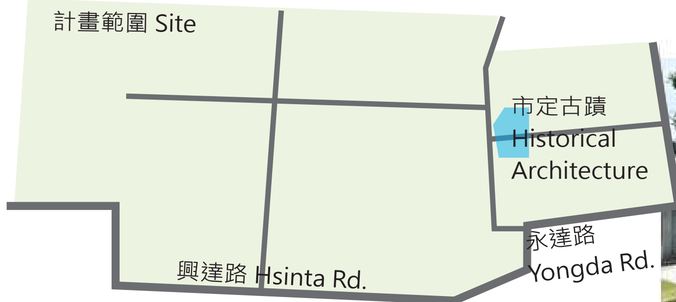
基地及周邊環境影像
Photos for the Site and Surrounding Area

B.市定古蹟照片 Photos of Historical Architecture









基地及周邊環境影像
Photos for the Site and Surrounding Area

C.既有興達電廠照片(第一廠區) Photos of Existing Hsinta Power Plant (Plant Area No. 1)

既有興達電廠廠區照片-1
Photos of Existing Hsinta Power Plant-1

既有興達電廠廠區照片-3
Photos of Existing Hsinta Power Plant-3

既有興達電廠廠區照片-2
Photos of Existing Hsinta Power Plant-2

既有興達電廠廠區照片-4
Photos of Existing Hsinta Power Plant-4

3.2 基地特性 Site Context

3.2.1 地理位置及現況 Location and Current Conditions

本基地位於既有興達電廠(第一廠區)之東南側，面積約130公頃，廠址附近地勢平坦，無山脈丘陵阻隔，地面高程皆在5m以下，陸域地形變化極小；海岸地區受到當地氣、海象因素長期作用，形成沙洲及潟湖分佈之地形，海岸地形平緩。

The project site sits in the southeast side of the exiting Hsinta Power Plant (Plant Area No. 1), covers 130 hectares. The topography here is very homogeneous and flat at 5-meter elevation or lower without any hill. The coastal region has extensive sandbars and lagoons formed by land and marine forces.

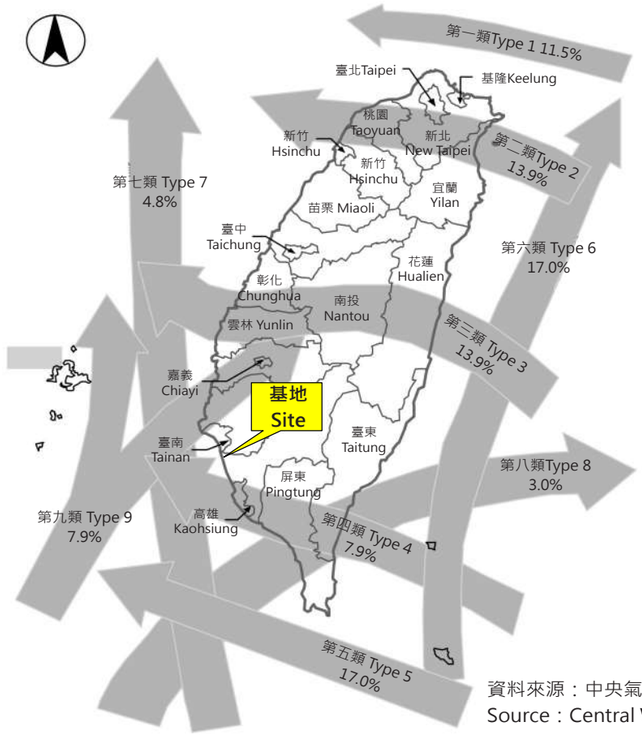
基地範圍示意圖
Extent of Project Site

3.2.2 氣候與氣象 Climate and Weather

3.2.2.1 颱風 Typhoon

中央氣象局將侵台之颱風路徑分成九種類型，其中對本區影響較大者為第二、第三、第七、及第九路徑。依據歷年(1911~2015)之颱風資料統計，侵台颱風總計405次，其中第二路徑佔13.9%，第三路徑佔13.9%，第七路徑佔4.8%，第九路徑，佔7.9%，這三種颱風路徑佔侵台颱風總次數之40.5%。

The Central Weather Bureau (CWB), Taiwan’ s top authority on meteorology, has identified nine track types for historical typhoons (totally 405 from 1911 to 2015) that hit Taiwan. Track types II (13.9%), III (13.9%), VII (4.8%) and IX (7.9%) are more relevant to this project site. Together they account for 40.5% strike probability.



資料來源：中央氣象局
Source：Central Weather Bureau

侵台颱風路徑分類統計圖(1911~2015年)
Types of Typhoon Tracks from Historical Data (1911~2015)

基地位於臺灣西海岸南段，高雄市永安區與茄萣區之交界處，在歷年來侵台颱風之9類路徑中，除第4類與第7類路徑之颱風將直接侵襲本區外，第5、8、9類路徑之颱風亦有影響。根據統計結果，約有39%之侵台颱風將直接影響本區海域，亦即平均每年約有1.34個颱風將影響高雄港附近之海域。

The project site is located on the southern portion of Taiwan’ s west coast between Yongan and Qieding districts of Kaohsiung. Among the nine typhoon-track types that ever hit Taiwan, Type IV and Type VII affect this area directly, while Types V, VIII and IX have indirect impact. Historic data show 39% (or 1.34 per year) of typhoons passing through Taiwan will jolt the waters near Kaohsiung.

3.2.2.2 降雨 Precipitation

a.降雨量Precipitation

依據中央氣象局統計高雄地區歷年各月平均降水量如下表所示。由表知高雄地區全年平均降雨量約1,906.06mm，其中約87.65%集中於5月至9月，因此可推估興達電廠其年平均降雨量約在1,906.06mm之間，雨量亦集中於5月至9月間。

The table below shows CWB-compiled Kaohsiung area rainfall data, with an average of 1906.06 mm per year, out of which 87.65% are concentrated in the summer from May to September. We can surmise the rainfall for the Hsinta Power Plant is about the same.

月份 Month	高雄地區 Kaohsiung Area	
	降雨量 Precipitation (㎜)	百分比 Percentage (%)
1	18.7	0.98%
2	20.2	1.06%
3	37.5	1.97%
4	70.8	3.71%
5	201.6	10.58%
6	400.0	20.98%
7	370.3	19.43%
8	451.9	23.71%
9	246.9	12.95%
10	45.7	2.40%
11	24.9	1.31%
12	17.6	0.93%
合計 Total	1906.1	100.0%

高雄地區月平均降雨量統計表
Average Monthly Precipitation in Kaohsiung Area

b.降雨日數Number of Rain Days

中央氣象局統計歷年高雄地區全年每月降雨日數如下表所示，可知興達地區一年中以6~8月下雨機會最高。

The table below shows the average number of rainy days each month for Kaohsiung area. One can conclude that it rains most often in the months of June, July and August at the Hsinta project site.

高雄地區各月平均降雨日數統計表 單位:日(Unit: Day)
The Number of Rainy Days Each Month for Kaohisung Area

月份 Month	1	2	3	4	5	6	7	8	9	10	11	12	合計 Total
高雄地區 Kaohsiung Area	3.2	3.7	4.0	5.9	9.6	13.5	12.8	16.4	10.7	3.7	2.8	2.8	88.8

3.2.2.3 霧日 Number of Foggy Days

中央氣象局台南及高雄測候站自歷年各月份霧日數統計如下表所示。台南、高雄地區夏季(5~9月)幾乎無霧，其餘各月霧日數亦不多(每月少於3日)，年平均約12~14日。

The table below shows the average number of foggy days each month from historical data at Tainan and Kaohsiung weather stations. There is almost no fog in the summer (May to September) in Tainan and Kaohsiung, very few foggy days in other months (less than three days per month), and the annual average is about 12~14 days.

台南、高雄地區各月平均霧日數統計表 單位:日(Unit: Day)
Average Number of Foggy Days Each Month in Tainan and Kaohsiung

月份 Month	1	2	3	4	5	6	7	8	9	10	11	12	合計 Total
台南地區 Tainan Area	2.9	2.4	1.7	0.9	0.4	0.1	0.0	0.1	0.3	1.2	1.9	2.6	14.4
高雄地區 Kaohsiung Area	1.7	1.6	1.6	1.2	0.4	0.3	0.4	0.3	0.5	0.8	1.3	1.7	11.9

3.2.2.4 氣溫 Temperature

統計中央氣象局高雄測候站及台南測候站歷年各月份之氣溫資料，高雄地區之年平均氣溫約為24.6℃，高溫皆發生於每年5~9月間，而低溫則發生於12月至翌年3月間，而台南地區之年平均氣溫約為23.7℃，高溫亦發生於每年5~9月間，而低溫則發生於12月至翌年2月間。

The table below shows the monthly average temperature from historical data at Tainan and Kaohsiung weather stations. Kaohsiung area has an annual average temperature of 24.6 ℃, with high points in the summer (May to September), and low points from December to March. Tainan area has an annual average temperature of 23.7 ℃, also with high points in the months from May to September and low points from December to February.

台南、高雄地區各月氣溫變化表 單位：℃
Average Temperature Each Month at Tainan and Kaohsiung (Unit: ℃)

月份 Month	1	2	3	4	5	6	7	8	9	10	11	12	平均 Average
台南地區 Tainan Area	17.2	17.8	20.6	24.0	26.9	27.9	28.4	28.1	27.6	25.4	22.2	18.7	23.7
高雄地區 Kaohsiung Area	18.8	19.6	22.1	24.9	27.3	28.2	28.6	28.2	27.8	26.1	23.5	20.3	24.6

3.2.2.5 濕度 Humidity

統計中央氣象局高雄測候站及台南測候站歷年各月份相對濕度資料如下表所示。高雄地區年平均相對濕度為78.6%，每月之平均相對濕度介於74.6%~83.4%之間；台南地區年平均相對濕度為79.7%，每月之平均相對濕度介於78.1%~83.0%之間，相較兩地區資料，差異性並不大，興達電廠之平均相對濕度應介於其間。

The table below shows the monthly average relative humidity from data at Tainan and Kaohsiung weather stations. Kaohsiung area has an annual average relative humidity of 78.6% and its monthly humidity hovers between 74.6%~83.4%. Tainan area has an annual average humidity of 79.7% and its monthly humidity hovers between 78.1%~83.0%. There is little difference between the two areas. The average relative humidity at the Hsinta project site is likely be somewhere between the two.

台南、高雄地區各月平均相對濕度表 單位：%
Average Monthly Relative Humidity at Tainan and Kaohsiung (Unit: %)

月份 Month	1	2	3	4	5	6	7	8	9	10	11	12	平均 Average
台南地區 Tainan Area	78.4	78.7	78.0	78.2	79.2	82.3	81.3	82.9	80.7	78.0	78.0	78.4	79.5
高雄地區 Kaohsiung Area	74.5	75.5	75.5	77.4	79.1	82.6	82.0	83.3	81.5	78.2	76.4	75.1	78.4

3.2.2.6 氣壓 Atmospheric Pressure

綜整中央氣象局高雄及台南測候站歷年氣壓資料，如下表所示。

The table below shows the atmospheric pressure from historical data at Tainan and Kaohsiung weather stations.

台南、高雄地區各月氣壓變化表 單位：hpa
Monthly Atmospheric Pressure Data at Tainan and Kaohsiung (Unit: hpa)

月份 Month	1	2	3	4	5	6	7	8	9	10	11	12	平均 Average
台南地區 Tainan Area	1,016.8	1,015.8	1,014.0	1,011.2	1,007.9	1,006.0	1,004.5	1,004.2	1,006.8	1,010.3	1,013.5	1,016.0	1,010.6
高雄地區 Kaohsiung Area	1,016.1	1,015.0	1,013.2	1,010.8	1,006.7	1,005.4	1,004.6	1,003.5	1,006.3	1,010.5	1,013.4	1,015.7	1,010.1

3.2.3 潮位 Tides

興達地區屬於一日二回潮，每日各發生二次高、低潮。過去電廠卸煤系統改善計畫執行期間，台電公司委託中山大學於駁船卸煤碼頭下方設置波潮流測站，觀測期間自民國93年9月～97年12月，每5分鐘記錄一筆潮汐水溫資料，觀測潮位結果統計如下表。

Hsinta area experiences semi-diurnal tides—the tide cycles through a high and low twice each day. TPC Company commissioned Sun Yat-sen University to conduct tidal observation below the coal import terminal at 5-minute intervals from September 2004 to December 2008 when the coal unloading system was being overhauled. The tidal data are shown below.

興達卸煤碼頭下方波潮流測站93年9月~97年12月觀測數據
Tidal Observation Below the Coal Import Terminal from September 2004 to Decemebr 2008

項目 Measurement		興達電廠高程系統 Hsinta Power Plant Elevatio
•H.H.W.L	最高高潮位 Highest high water level	+1.38m
•H.W.L	朔望平均高潮位 Average high water level on the first and fifteenth day/night of a lunar month	+0.92m
•M.H.W.L	平均高潮位 Mean higher water level	+0.8m
•M.W.L	平均潮位 Mean water level	+0.36m
•M.L.W.L	平均低潮位 Mean lower water level	-0.08m
•L.W.L.	朔望平均低潮位 Average low water level on the first and fifteenth day/night of a lunar month	-0.19m
•C.D.L.	基準水平面 Chart datum level	-0.33m
•M.W.L	最低低潮位 Lowest low water level	-0.62m

註：興達電廠高程系統=內政部一等水準高程+0.253m
Elevation of Hsinta Power Plant = official first-order benchmark level +0.253m

3.2.4 水文 Hydrology

基地附近範圍內之主要河川有二：一為位於興達電廠北側約8公里之二仁溪，一為位於興達電廠南端約6公里的阿公店溪，位置參閱下圖所示：

There are two major rivers in the vicinity of the project site: Er-ren River, about 8 km to the north, and Agongdian River, about 6 km to the south. See the map below.

計畫區附近主要河川示意圖
Major Rivers Near the Project Site

3.2.5 地形 Topography

基地之地形低窪，且十分平緩，除既有自然排水路及東側防潮堤外，無太多高低起伏。預定地實測地形參見下圖。

The terrain at the project site is very flat: little undulation other than existing natural water ways and the dyke on the east boundary. The topography of the project site is attached here.

基地實測地形圖
Topology Survey Map of The Site
(請至本競圖網站www.EcoPP.com.tw下載CAD圖)
(Please visit competition website at www.EcoPP.com.tw to download CAD file)

3.2.6 地質 Geology

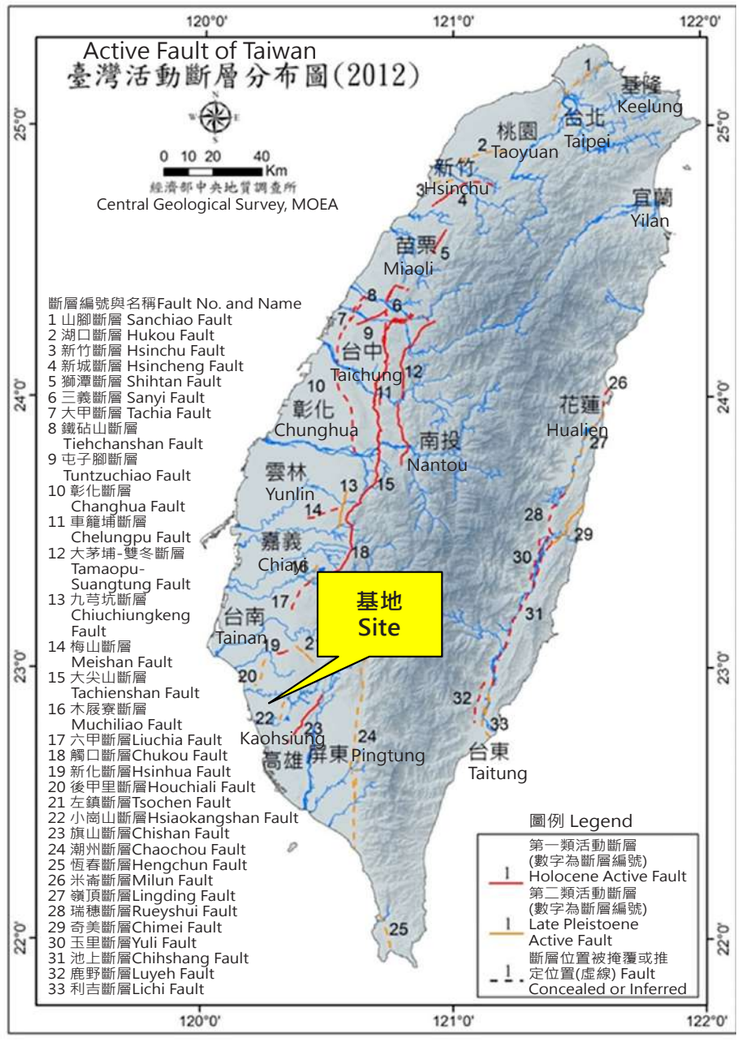
興達電廠位處於二仁溪至阿公店溪河口之間，區域地體構造上屬於西部平原區，地層主要為第四紀的現代沖積層，厚度約達200m。根據台電公司於該處環境影響評估之地質調查結果，本區地表主要以沉泥質砂、沉泥質黏土以及沉泥相互交疊淤積。由於其組成主要為各類細粒物質，地下水蘊蓄有限，並因長時間海進、海退輪迴致始其沉積物性質多變，沉泥及沉泥質砂之鬆緊程度由極鬆到極緊密均有，沉泥質黏土則自極軟至極硬均有。由於黏土承載力不佳，其受壓結果導致興達電廠多有沉陷產生，惟其多屬均勻沉陷。下圖為該區域地質圖。廠址附近之活動斷層整理如下表，距廠址均達10km以上，對本基地廠址應無直接影響，台灣活動斷層分布圖見下圖。

Hsinta Power Plant is located between the mouths of Er-ren River and Agondian River in a 200-meter-thick modern alluvium deposit belonging to Taiwan’s western plain land mass. According to geological survey, a part of TPC’s environmental impact assessment, this area is covered with cross-bedded silty sand, silty clay and silt sediment. Such fine-grained composition retains very little ground water. The ocean ebb and flow keep the sediment from stabilizing; the degree of compactness of silt and silty sand varies widely: from very loose to very dense, and consistency of silty clay ranges from very soft to very hard. As clay has a poor bearing capacity, Hsinta Power Plant has seen widespread subsidence, though very mild and even. Regional geology map is shown here. Active faults in the area are listed in the following table. All of them are at least 10 km from the site, therefore no direct impact. A map of active faults in Taiwan is also shown.

斷層名稱 Name of Fault	類型 Type	距廠址距離 Distance from Site
後甲里斷層 Houchiali	第二類 II	約 10.8km About 10.8km
小崗山斷層 Hsiaokangshan	第二類 II	約 12.5km About 12.5km
旗山斷層 Chishan	第一類 I	約 20.5km About 20.5km
新化斷層 Hsinhua	第一類 I	約 26.3km About 26.3km

廠址附近活動斷層表
Active Faults Near the Project Site

區域地質圖 Regional Geology



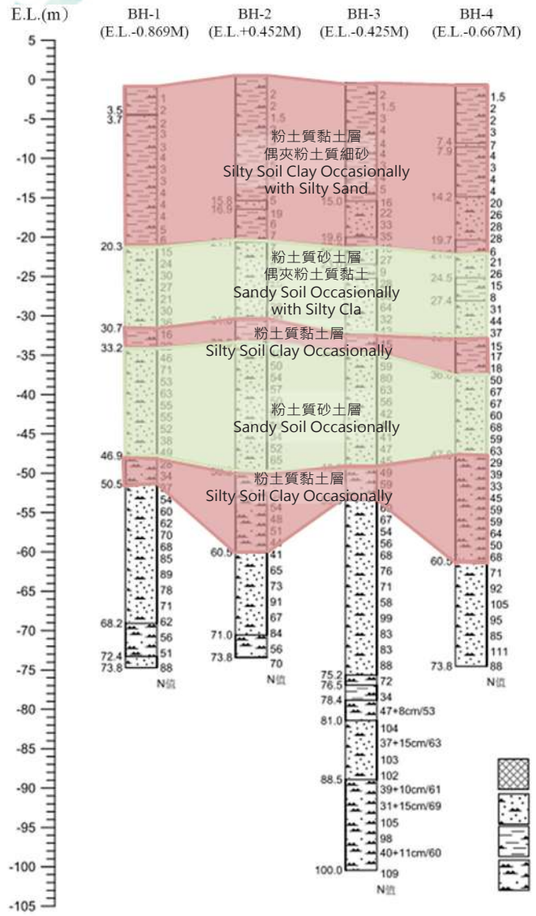
台灣活動斷層分布圖 Active Faults in Taiwan

3.2.7 基地(鹽灘地)區域地質 Geology of the Project Site (Salt Beach)

依據基地開發範圍之鑽孔BH-1~BH-4位置圖如下及鑽孔BH-1~BH-4地質資料圖，初步研判本基地之地層屬現代沖積層由砂、粉砂及黏土等組成。

A quick study of the location and borehole sample analysis of BH-1~BH-4 shows the geology under the project site consists of modern alluvium deposits of sand silty sand and clay.

鑽孔BH-1~BH-4位置圖
Locations of Boreholes BH-1 ~ BH-4



鑽孔BH-1~BH-4位置圖
Locations of Boreholes BH-1 ~ BH-4

3.3 土地使用計畫初步規劃 Preliminary Land Use Plan

本基地現況屬於高雄市之非都市土地，總面積約130公頃，屬一般農業區特定目的事業用地與特定專用區特定目的事業用地。

This 130-hectare site is currently classified as "non-urban land" and zoned as "specific enterprise use in general agriculture" and "specific and dedicated zone for specific enterprise use".

本基地為申請開發為特定目的事業使用，應辦理土地使用分區變更為特定專用區。即本基地現有特定專用區、一般農業區之使用分區，將全數變更為特定專用區；後續案件依規定將保育區分割編定為國土保安用地、滯洪池分割編定為水利用地，其餘區內土地視實際使用性質編定為特定目的事業用地，俾利取得開發許可

It is necessary to apply for rezoning to change from "specific enterprise use" to "specific dedicated use". In other words, land currently zoned as "specific dedicated use" and "general agriculture" should all be rezoned to "specific dedicated use". Subsequently, the site will be further divided up into three types of zoning for the purpose of obtaining the development permit: Protection and security use for the conservation area; hydrological use for the flood retention basin; and specific enterprise use for the rest.

初步規劃變更後之土地使用分區及面積如下表：

Preliminary plan of Zoning and Area Table after rezoning:

使用編定 Zoning	土地使用項目 Land Use	規範規定 Regulation Compliance	面積（公頃） Area (hectare)		備註 Note
國土保安用地 Protection and Security	保育區（含濕地緩衝區至少15公頃） Conservation (include at least 15 hectares wetland buffer)	保育區面積之百分七十以上應維持原始之地形地貌，不得開發。 Topography of 70% of conservation area must remain intact.	維持原始地形 Topography intact	21.18	—
			得變更地形 Topography changed	2.46	—
			小計 Subtotal	23.64	至少 30% At least 30%
特定目的事業用地 Special Enterprise Use	發電設備區（含減碳用地14公頃） Power Generation (include the 14 hectares for carbon reduction)	—	48.13		±15%
	鐵塔 Transmission towers	—	0.73		依設計須要 In accordance with design requirements
水利用地 Water Works	滯洪池 Flood Retention Basin	—	5.50		±15%
總計 Total	—	—	78.00		100.00

規劃原則Planning Guidelines：

1.本基地無坡度在百分之四十以上之區域，所以無需劃設不可開發區。

1. The project site does not have any portion that is over 40% grade (slope); therefore, there is no need to reserve undeveloped area.

2.全區坡度皆為一級坡及以下區域，遂劃設保育區面積不得小於扣除不可開發區面積後之剩餘基地面積之30%。

2. The entire site is of class I grade (slope <5%); therefor conservation area no less than 30% of the area of developable land must be reserved.

3.於約78公頃申辦範圍內，本燃氣機組設備規劃面積約48.13公頃並編定為特定目的事業用地，建蔽率百分之六十。容積率百分之一百八十。相關土地利用編定規劃如下圖所示(僅供參考)。不包括台電土地範圍內太陽能光電板、市定古蹟及保育利用計畫範圍。

3. Of the 78-hectare land for power plant construction, 48.13 hectares are to be rezoned for special purpose projects to house CCGT equipment with a building coverage ratio (BCR) of 60% and floor area ratio (FAR) of 180%. See the figure below (for reference only). This land reserved for CCGT does not include the area for TPC’ s photovoltaic system, municipal heritage site or eco-preservation land.

4.保育區面積不得小於基地面積扣除不可開發區後剩下之30%。本基地無不可開發區、保育區面積23.64公頃，佔23.64/(78.00-0) = 30.31% > 30%，符合法令規定。

4. The law requires at least 30% of the developable land (the site excluding non-development area) to be set aside for conservation purposes. This project site is totally developable. The size of conservation area is 23.64 hectares, accounting for 23.64/(78.00-0) = 30.31% which is larger than 30%; it is therefore compliant with the law.

5.保育區70%以上須維持原地形地貌，保育區維持原始地形地貌之面積約為21.18公頃，21.18/23.64 = 89.59% >法規70%，符合法令規定。

5. The law requires that topography remains intact in over 70% of conservation area. This project will keep 21.18 hectares untouched, accounting for 21.18/23.64 = 89.59% which is larger than the 70% required.

以上各類土地使用項目之規劃面積係為現階段規劃參考，仍須以未來提送內政部營建署經區域計畫委員會審議通過核備之面積，做為未來實際執行之依據。

The above are preliminary plans for land use envisaged at current stage. The actual sizes used shall be in compliance with the numbers approved by the Construction and Planning Administration (CPA of the Ministry of Interior) upon reviews by the Regional Planning Commission.

土地使用計畫初步規劃圖(僅供參考)
Preliminary Land Use Plan (for reference only)

本土地使用計畫初步規劃圖僅供參考，參賽者須參考土地使用分區及面積表之內容，依據設計須要，提出具創意及前瞻之分區規劃。

This preliminary land use plan is for reference only. The participant must propose creative and forward-looking zoning plan in according with design requirement based on the Zoning and Area Table.

3.4 建蔽率及容積率
Building Coverage Ratio (BCR) and Floor Area Ratio (FAR)

依據預估變更為特定目的事業用地後之規定，本燃氣機組設備規劃面積約48.13公頃之建蔽率百分之六十。容積率百分之一百八十。

The 48.13-hectare land for the CCGT facility will have a 60% BCR and 180% FAR in accordance with regulations after the land is rezoned as "specific enterprise use".

濕地內之鳥類 Birds in Wetland

3.5 永安鹽田濕地 Yongan Salt Field Wetland

過去的永安濕地，原名為烏樹林鹽場，百年前人們長期以曬鹽及賣鹽為生，為南台灣重要的曬鹽場。始自日據之初，為求增加鹽產量，鼓勵民間投資開設鹽場。1908年張作舟等人申請許可在此開闢鹽田百甲，利用新打港(今興達港)內海海水晒鹽，後由陳中和接掌，組織烏樹林製鹽公司。濕地內所遺留的「烏樹林製鹽株式會社辦公室」為仿巴洛克式風格，正立面山牆中有渦捲紋及草葉紋組成的徽章飾，即為陳中和所興建。

Yongan Wetland used to be the site of Wushulin (Black Forest) Salt Field, a major salt production site in Southern Taiwan one century ago. In early 20th century, Japanese colonial government encouraged private investment to boost production. In 1908 a business group led by Chang Zouzhou obtained permit for one kilometer square at Hsinta inner sea. Subsequently a tycoon Chen Zhonghe took over and set up Wushulin Salt Manufacturing Company with a two-story office prominently standing on the flat field. This Baroque-style building has a pediment with elaborated coils and leaves patterns in sculptured relief – the crest of the Chen. Family.

永安鹽田自從1985年停曬並移轉產權至台電公司後，原計畫闢建灰塘以貯存興達發電廠的飛灰，但因鹽民補償問題未決遲遲無法使用，同時煤灰可回收做其他利用，台電公司並未將飛灰填至本區塊土地內，從而使這一原屬低窪感潮帶之荒廢鹽田孕育了豐富的紅樹林與水鳥生態，逐漸成為候鳥棲地。

Yongan Salt Field Company ceased production in 1985 and transferred the property rights to TPC that originally intended to dump fly ash on it, a waste generated by the adjacent coal-fired plant. However, the land was never used as an ash pond because compensation negotiation with relocated-residents stalled, and TPC found other uses for the ash. Meanwhile mangroves began to spread and reclaim this expanse of low-lying tidal flat and become a migratory stopover for birds.

本基地包括41.25公頃之永安濕地，依據濕地保育法第27條規定，開發或利用行為應以優先迴避重要濕地為主，本競圖之設計不得對永安濕地作任何之變動，但應納入整體景觀及造型設計之重要考量。且應兼顧生態教育及觀光遊憩功能，使該濕地不僅得以保存，更兼具教育意涵，讓市民能夠親自體驗濕地自然環境之美，達到遊憩觀光發展與珍惜資源、環境保護互利互存之需求。

The project site includes the 41.25-hectare Yongan Wetland. Article 27 of Taiwan’s Wetland Conservation Act stipulates that “development and utilization should……as a priority, avoid Wetland of Importance”. The participant shall incorporate the wetland in overall landscape and visual design considerations but without any modification. Moreover, for education and tourism purposes, the participant’s proposal shall prominently feature the wetland to help the public appreciate its natural beauty and ecological value in the biosphere.

如何將生態保育及景觀諧調納入整體設計為本競圖之重要課題，尤其要兼顧電廠開發之須要，如何降低開發所帶來之環境影響將是本競圖極重大的挑戰。

The participant has a crucial task to incorporate ecological conservation and visual harmony into the overall design. In particular, it is a daunting challenge to meet the requirements of a power plant while minimizing impact on the environment.

3.6 濕地緩衝區 Wetland Buffer Zone

電廠之開發將對於永安濕地有所衝擊及影響，為降低開發對濕地之影響，電廠之開發應與濕地保持一定之距離，以確保濕地環境之永續。

The development of Power Plane will affect the ecosystem of Yongan wetland. To minimize the effect, a finite distance from the boundary of the power plant development shall be maintained to keep the ecosystem vibrant.

建築物與濕地保持至少100m之距離，總面積至少15公頃之完整區塊為原則作為濕地緩衝區，以儘量降低對濕地之影響，濕地緩衝區之整體景觀應納入設計之重要考量。

In order to reduce the effect of wetland, in principle, the structures of Power Plant shall keep a min. distance of 100m to wetland and with total area of at least 15ha. to become a Wetland Buffer Zone. The landscape of Wetland Buffer Zone shall be taken into design considerations.

3.7 市定古蹟 Municipal Historical Architecture

位於永安濕地範圍約中間位置有一佔地約1.3公頃之市定古蹟，為「原烏樹林製鹽株式會社辦公室」。

Kaohsiung city has designated a 1.3-hectare heritage site with a historical structure in the middle of Yongan Wetland. The two-story Baroque building was the office of the former Wushulin Salt Manufacturing Co..

烏樹林鹽田之開闢始於明治41年(1908)間，是由竹仔港庄張作舟邀集庄民約30餘人，圍築新打港海灘而為鹽田，初期開闢鹽田約112甲，後來約29甲轉售高雄首富陳中和。往後兩年期間，鹽田數度遭受颱風侵襲，毀損嚴重，修復曠日廢時，財力也難以支應。明治43年(1910)，庄民不勝負擔，6月間邀請陳中和入股改組為烏樹林製鹽公司。大正8年(1919)，陳中和將烏樹林製鹽公司完全併購，12月間，製鹽設備重修完成，共計鹽灘面積約137甲。大正12年(1923)8月，公司重組為烏樹林製鹽株式會社，製鹽之外，兼營養魚和輕便鐵路。昭和16年(1941)，臺灣總督府實施鹽業統制以因應戰時工業用鹽之調度，烏樹林製鹽株式會社從而被收購整併為南日本製鹽株式會社。

The salt field was developed by a group of over 30 villagers led by Chang Zuozhou from the nearby Bamboo Harbor. They built structures to fence off over 100 hectares of beach for saltpan, and sold a quarter of which to Kaohsiung tycoon Chen Zhonghe. During the first two years multiple typhoons devastated the field to a point of beyond salvage by available resources. In 1910 the founding group invited Chen to inject capital. After a few incarnations and size expansion, the company diversified into aquaculture and light rail in 1923 until it was acquired for war efforts by Japanese colonial government in 1941.

二戰後初期，臺灣日產事業雖由臺灣省接收委員會統一辦理，然時值過渡時期，烏樹林製鹽株式會社名稱與歸屬數度變動。民國42年(1953)7月成為財政部鹽務總局臺灣製鹽廠烏樹林鹽廠，民國60年(1971)1月更名為財政部臺灣製鹽總廠高雄鹽廠，民國70年(1981)奉令改隸經濟部。在此前後，烏樹林製鹽廠因技術變革與產業變遷等因素而沒落，復因民國70年(1981)間，興達火力發電廠開始建廠，空間與環境更衝擊鹽場的發展。民國73年(1984)台電公司以二億餘元購得烏樹林鹽廠鹽灘土地及地上物，至此鹽場的機能完全停滯。民國97年(2008)原烏樹林製鹽株式會社辦公室被指定為市定古蹟。

After the WWII, the Republic of China began to rule Taiwan and took over this state-run enterprise among others. The government agency supervising salt field operation changed with time. Gradually, its business dwindled because the salt industry economy had changed. With the construction of the nearby Hsinta coal-fired power plant in 1981, saltpan business was no longer viable due to space reduction and air pollution. In 1984, salt production came to an end when TPC paid over 200 million Taiwan dollars to acquire the entire land parcel plus all aboveground buildings and objects. The two-story office structure was later designated as a municipal-level heritage building in 2008.

原烏樹林製鹽株式會社辦公室外觀-1
The Office of the Former Wushulin Salt Manufacturing Co.-1

原烏樹林製鹽株式會社辦公室外觀-2
The Office of the Former Wushulin Salt Manufacturing Co.-2

本市定古蹟為本基地內之相當重要特色之一，依文資法之規定，須加以完整保存，本競圖之設計不得作任何之變動，但應納入整體景觀及造型設計之重要考量。

This Municipal Historical Architecture is one unique and important feature of the project site. It must be completely preserved in compliance with the Cultural Heritage Preservation Act. The participant' s design shall incorporate the heritage into overall landscape design for visual harmony without any modification.

3.8 太陽光電系統 Photovoltaic System

基地之南側為既設之太陽光電系統，民國100年台電公司設置完成，佔地9.45公頃。本競圖之設計不得作任何之變動，但應納入整體景觀及造型設計之重要考量。

The existing photovoltaic system was installed in 2011, occupying 9.45 hectares in the south portion of the project site. The participant must incorporate this feature into the overall landscape design for visual harmony without any modification to the system.

太陽光電系統位置示意圖
Location of the Photovoltaic System

3.9 輸電鐵塔 Transmission Towers

本基地內既存之輸電線路(由基地東北側橫跨至西南側)包括345kV興達-龍崎一路、興達-龍崎三路、興達-路北紅線、興達-路北白線計4回線及69kV興達-路北、興達-嘉定計2回線之既設輸電鐵塔及線路都必須先行改道遷移，以提供本基地新機組興建用地。既設之五座345kV輸電鐵塔必須改道遷移，初步規劃遷移後之路徑圖(僅供參考)，詳下圖。

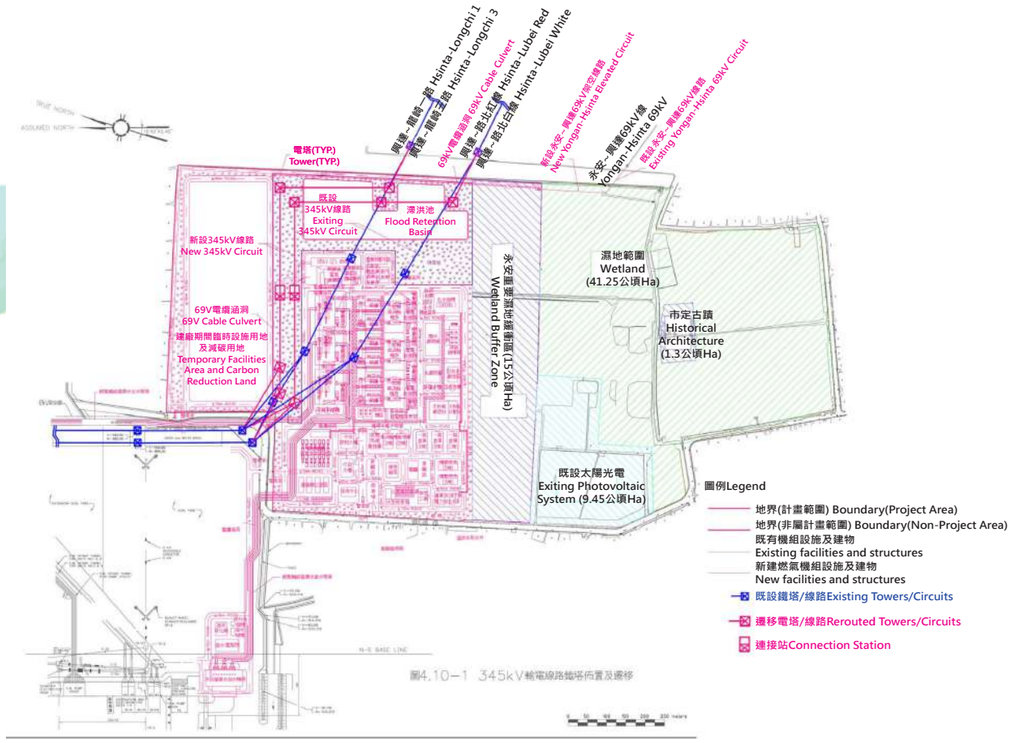
A number of transmission circuits go through this project site. Four 345kV loops: Hsinta-Longchi 1, Hsinta-Longchi 3, Hsinta-Lubei Red, Hsinta-Lubei White, and two 69kV loops: Hsinta-Lubei and Hsinta-Jiading. These existing circuits and five towers have to be rerouted for the construction of new units in this project. See below for a layout option after rerouting (for reference only).

既設之六座69kV輸電鐵塔也必須改道遷移，初步規劃為沿著濕地、保育用地區外圍及新建345kV鐵塔路徑，為符合國土保安用地規定，電塔與纜線需設置於緩衝綠帶外，濕地內則採架空方式；而在與345kV輸電鐵塔交錯處，為防345kV及69kV線路互相影響，需採地下電纜方式銜接，初步規劃路徑圖，詳下圖。

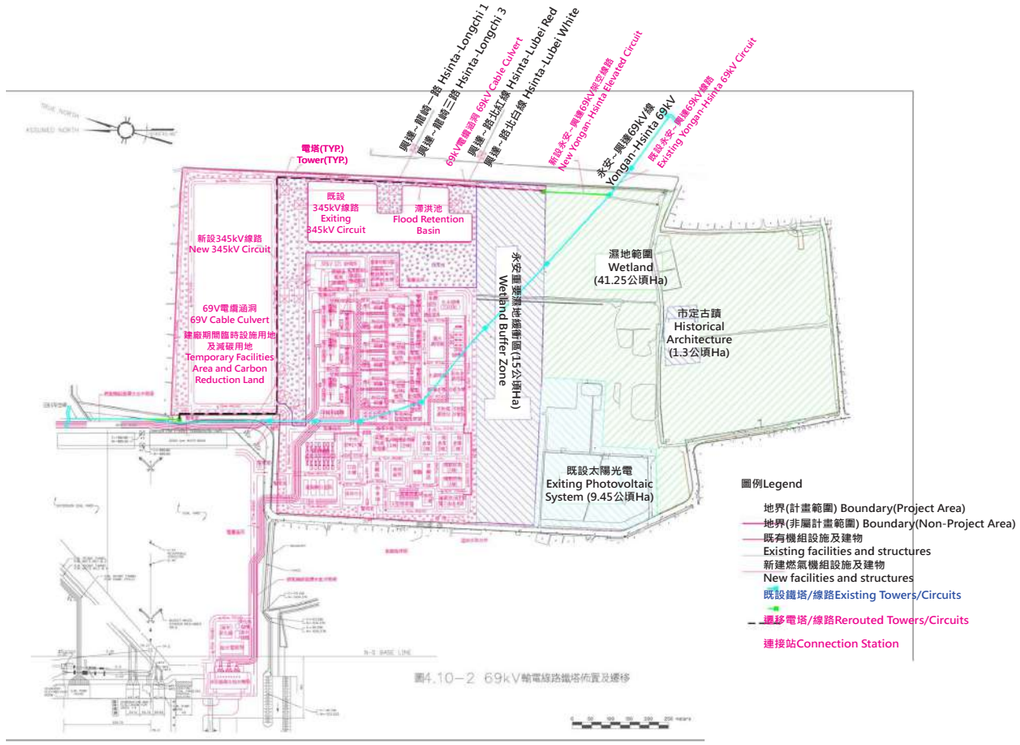
The six existing 69kV towers need to be relocated as well. A tentative idea is to have them erected along the perimeter of the wetland, the conservation area and the newly built 345kV tower path. To comply with regulations on homeland protection and security, transmission towers and cables must be placed outside green buffer zones, and deployed over wetland. At the place where the wire crosses the 345kV tower, it has to be deployed underground to avoid interference between the 345kV and 69kV circuitry. A tentative layout is shown below.

上列之遷移規劃圖為初步規劃僅供參考，參賽者得依設計需要，提出輸電線路鐵塔遷移路徑規劃(輸電線路以不穿越電廠建築物上方為原則)，並應將輸電鐵塔納入整體景觀及造型設計之重要考量。

The above re-routing layout is only tentative and for reference only. The participant shall propose a re-routing plan (In principle, the circuit shall not crossover the above of power plant structure.), while incorporating the towers in overall landscape design for visual harmony.



既有之345kV輸電線路鐵塔佈置及遷移圖(僅供參考)
Rerouting Option for the Existing 345kV Transmission Towers and Circuitry.
(for reference only)



69kV輸電線路鐵塔佈置及遷移圖(僅供參考)
Rerouting Option for the Existing 69kV Transmission Towers and Circuitry.
(for reference only)

3.10 減碳用地 Carbon Reduction Land

本基地需保留至少14公頃，作為減碳用地使用，未來將設置碳收集及儲存（Carbon capture and storage，簡稱CCS）設備，以收集既設之興達電廠及新建之興達生態電廠所產生之二氧化碳，目前尚未確定採用何種技術及設備，本競圖之參賽者須規劃約14公頃之面積作為減碳用地(並納入景觀設計)，原則上以接近第一廠區及第二廠區之位置為佳。

This project needs to set aside 14 hectares of land for future carbon reduction scheme with carbon capture and storage (CCS) equipment to capture CO2 generated by the existing Hsinta plant and the new Hsinta Eco plant. The CCS technology and equipment has not been chosen. The participant is to set aside 14 hectares for carbon reduction purposes(Please include landscape design), preferably near both plants.

3.11 滯洪池 Flood Retention Basin

為符合辦理土地使用分區變更之規定，本基地需保留5.5公頃(±15%)作為滯洪池用地使用，以調節洪峰、遲滯逕流，祈以降低電廠開發行為所增加之降雨洪峰流量，減緩對下游水路之影響。本基地東側接興達港內海及竹仔港溝(公溝)，基地之排水系統將依區排現況規劃，往東排入興達港之內海。因此考量配合整體之基地排水系統規劃，滯洪池以配置於基地東側為佳，將新設生態電廠之排水收納進滯洪池後再行排入公溝。

To meet the requirement for rezoning, the project site has to set aside 5.5 hectares for water retention: to catch flash flood and manage storm water runoff, to offset the extra rainwater runoff due to this development project, and mitigate downstream erosion. The project site connects with Hsinta inner sea and Zhuzaigang Channel (a pubic watercourse) on the east side. Considering the existing waterway system, it is desirable to place the retention basin on the east portion of the project site to collect the new plant’ s liquid effluent before discharging into the public waterway.

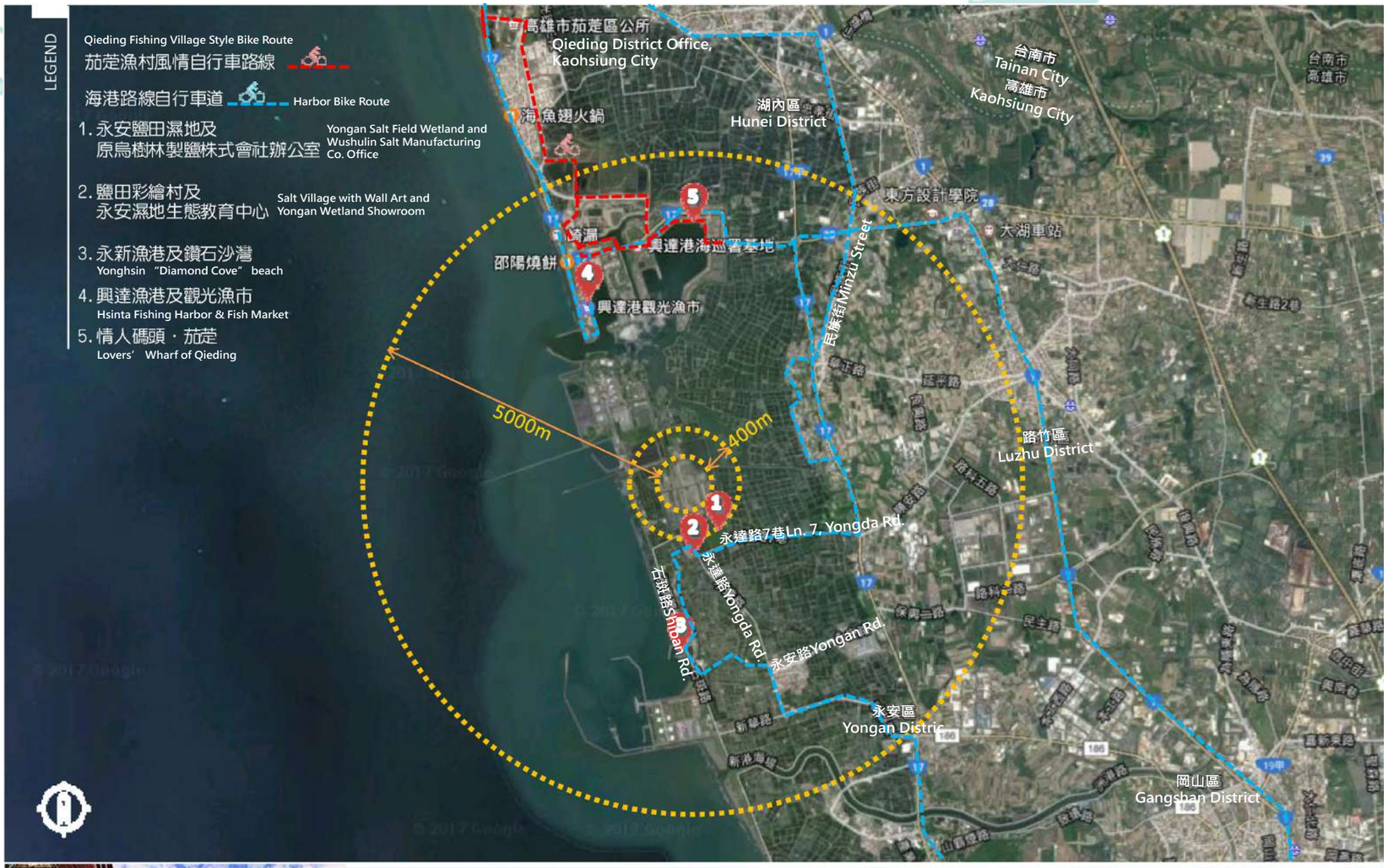
滯洪池之設計應考量生態、景觀、防洪之需要，納入整體景觀設計之重要考量。

Design of the retention basin shall incorporate its multiple functions–ecology, scenery and flood control – into the overall landscape for visual harmony.

3.12基地周邊環境簡介 Attractions in Surrounding Areas

基地周邊環境包括：鹽田彩繪村、永安濕地生態教育中心(原鹽田村新港國小鹽田分校)、永新漁港鑽石沙灣、興達漁港、情人碼頭．茄萣等，多數景點分布於中景(400-5000m)區，如鹽田彩繪村、永安濕地生態教育中心、永新漁港及鑽石沙灣、興達漁港與情人碼頭．茄萣，近景(0-400m)範圍則有永安鹽田濕地及原烏樹林製鹽株式會社辦公室。

There are a number of tourist attractions near the project site: Salt Village with wall art, Yongan Wetland Showroom (formerly a mini primary school), Yonghsin “Diamond Cove” beach, Hsinta Fishing Harbor, Lovers’ Wharf in Qieding. These scenic spots are of convenient distance (400~5000 m) from the project site. One attraction is right there (0~400 m away): the former Wushulin Salt Company office.



基地周邊自然人文環境示意圖
Rich Natural and Cultural Resources Near the Project Site

3.12.1鹽田彩繪村 Salt Village with Wall Art

鹽田社區位於基地西南角，原為烏樹林鹽田鹽工宿舍，隨鹽工移入、定居而形成聚落。格局為坐東朝西棋盤式街道規劃，清一色傳統閩南磚造建築。永安區鹽田社區發展協會為加深各地對鹽田社區居民傳統曬鹽、相關鹽業文化歷史以及濕地生態的瞭解，又能達到美化社區的目的，由高雄市永安區公所、台電公司興達電廠、台灣中油公司永安液化天然氣廠共同贊助，特別邀請東方設計學院一同以彩繪藝術改造古厝，於2015年9月13日在濕地生態教育中心舉辦「繽紛永安 彩繪鹽村」活動，讓鹽田社區蛻變成大人小孩都愛親近的鹽田彩繪村。

Salt Village, at the southwest corner of project site, was a cluster of low-story buildings, mostly are traditional gabled brick dwellings formed along a checkerboard street system when early salt workers came to settle with their families. Sponsored by the local authority and relevant utility companies, a grass-root group invited students at Tungfang Design Institute in next town to make wall art on brick fences facing the street. The colorful streetscape was officially launched on September 13, 2015 along with an eco-education showroom.

3.12.2 永安濕地生態教育中心(原鹽田村新港國小鹽田分校)
Eco-education Showroom (formerly a primary school)

新港國小鹽田分校閒置校舍由高雄市政府工務局改建，不定期辦理生態特展及在地鹽田文化活動，如設置曬鹽體驗區等，結合附近的賞鳥亭、觀景平台、生態藝術走廊等，呈現高雄市推動生態保育並使濕地成為兼顧生態教育及觀光遊憩功能的生態旅遊景點。

The city has revitalized this defunct primary school to host ecology exhibitions or relevant cultural events, such as hands-on salt extraction experience. With bird-watching huts, viewing platforms, and eco-art arcades, such programs inspire visitors to appreciate nature and reflect upon human impact on ecology, more than just a pleasant outing destination.

3.12.3 永新漁港鑽石沙灣 Yonghsin “Diamond Cove” Beach

永新漁港旁本來是一個堆滿廢棄漁船、舢筏和垃圾的一處小海灣，經過社區民眾的清理、環境美學的老師加入創意攜手改造下，將廢棄漁船粉刷拼貼上馬賽克、海邊常見的消波塊肉粽角加上三角錐變成海灣的守護鳥，沙地上種上耐旱植物成為海灣花園。小小巧思加上眾人的力量，大大改變了原來海灣的樣貌並賦予了它新的名稱—鑽石沙灣。

The cove beach near Yonghsin Fishing Harbor used to be strewn with disused fishing boats, rafts and garbage. With a touch of creativity, the community spruced up the boats with colorful paint and ceramic tiles, decorated concrete wave blocks into "birds" guarding the coast, livened up the sandy beach with drought-enduring plants. Residents' ingenuity has turned the deserted seaside field into the Diamond Cove Beach.

3.12.4 興達漁港 Hsinta Fishing Harbor

高雄市茄萣區興達港是台灣烏魚重地，每年冬至前後準時報到，為漁民帶來財富，別名「烏金」。漁民在村內曝曬烏魚子的景象壯觀。且其發達的近海漁撈及沿海養殖漁業，讓此地成為有名的新鮮魚貨集散地。「興達觀光魚市」內每個攤位擺滿新鮮活跳的魚蝦蟹和各種魚類加工品，種類繁多，同時聚集不少美味小吃攤，提供遊客最鮮美的海鮮菜色。

Hsinta Fishing Harbor is a hub of Taiwan's mullet fish roe, prized as a delicacy comparable to caviar. The mullet season starts toward the end of December when schools of mullet swim by this shore. The annual "black gold rush" is an important local ritual. Shortly after, racks of fish roes drying in the sun will sprout up everywhere in the village, a phenomenal sight for visitors. Bounty from near-sea fishing and aquaculture also makes the Hsinta Tourist Fish Market – with fresh catch and cook-to-order chefs – a hot destination for gourmet travellers.

3.12.5 情人碼頭．茄萣 Lovers' Wharf of Qieding

情人碼頭有的是美麗黃昏落日，傍晚點點風帆，未來還計畫設置遊艇專區，朝國際性觀光休閒港區邁進。

Lovers' Wharf of Qieding offers spectacular sunset against a vast blue ocean dotted with small sails. There is a future plan to develop this place into a yacht harbor for international leisure boats.

周邊尚有兩條自行車道路線，「茄萣漁村風情自行車路線」與「海港路線自行車道」，興達港情人碼頭是茄萣漁村風情自行車道的起迄點，海風、陽光、椰林、木棧板及風帆造型的海上劇場勾勒出熱帶海洋風情，沿著自行車道可以經過臺灣南端最大的候鳥渡冬環境地—茄萣濕地公園，觀察候鳥生態及珍貴的紅樹林，再馳騁於占地五公頃，海岸線長九百公尺海岸公園旁欣賞一望無際的風景，一路可到達二仁溪出海口及白砂崙濕地。無論是清晨騎著單車迎著海風，或在金黃夕照中欣賞漁光點點及情人碼頭的燈光絢爛七彩，都是浪漫寫意的輕旅行 。

Two bike trails – Fishing Village Route and the Harbor Route – provide alternative ways to savor the landscape at a leisure pace. Lovers' Wharf is the ideal point to start and end the 24-kilometer Fishing Village Route. Sea breeze, sunshine, palm trees, boardwalks, and an arena canopy shaped like a two-masted sailboat together project a tropical seaside ambience. Further on is the Qieding Wetland Park, the largest winter migratory stopover in southern Taiwan, where nature's rhythms play out with birds and mangroves at the center stage. The vast seashore park spans 900 meters of coastline and five hectares of beach for bikers to take in the view stretching all the way to the horizon. The journey leads to the Baishaluen Wetland where Er-ren River meets the ocean. Biking is always pleasant here: either an early morning ride to revel in the breeze or a late afternoon journey to relish the golden sunset with fishing boats dotting the ocean and the wharf's lighting – with every color of the rainbow – reflecting in the foreground.

第肆章 Chapter 4

廠區配置 Layout of the site

4.1 發電機組型式及容量 Generator Models and Capacity

本計畫預計設置2配1多軸式燃氣複循環機組，設置總裝置容量約300-390萬瓩之燃氣複循環機組為目標。

This project aims to set up 2-on-1 multi-shaft combined cycle gas turbines (CCGT) generator units with a total installed capacity of 300-390 megawatts.

4.2 廠區佈置(僅供參考) Plant Layout (for reference only)

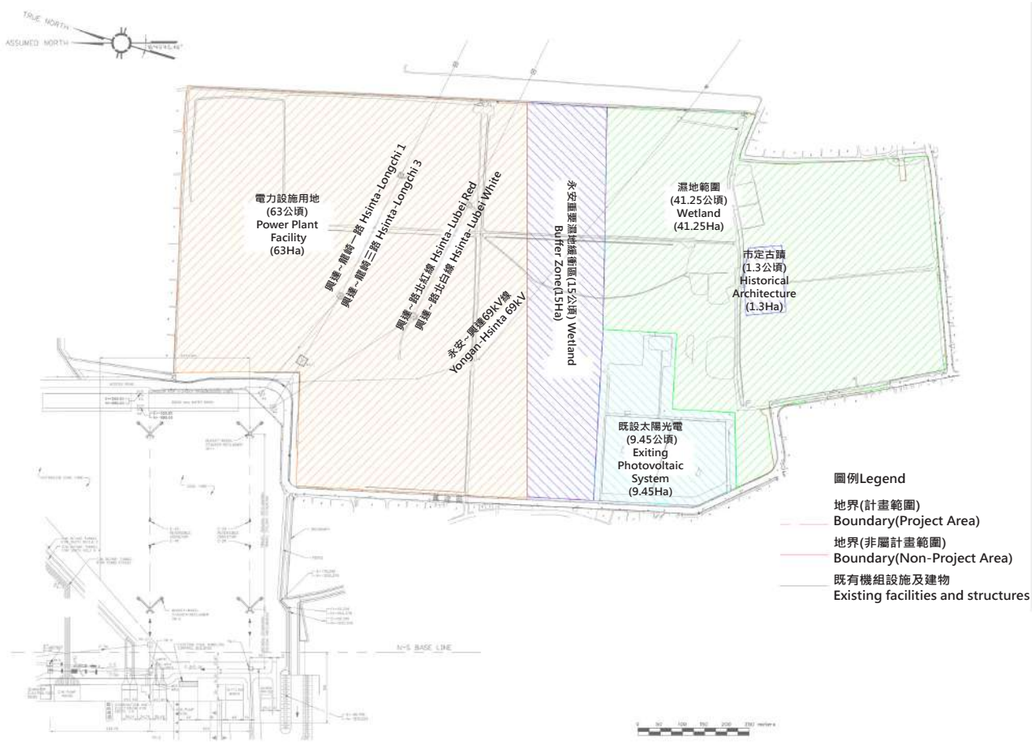
4.2.1 廠區整體配置 Master Plan

初步規劃將相關電力設施集中規劃於基地之北側，而將保育區位於南側之原則，將此預定地分五大區，由北到南分別為：(1)電力設施用地、(2)濕地緩衝區、(3)既設太陽光電系統、(4)永安濕地、(5)市定古蹟。

The preliminary plan will put the power facility in the north part of the site, leaving the south portion for conservation purposes. The five zones from north to south are for (1) power plant facility, (2) wetland buffer, (3) existing photovoltaic system, (4) Yongan Wetland, and (5) the municipal historical architecture, respectively.

興達生態電廠廠區初步規劃如下圖(僅供參考)，參賽者須依據設計須要，提出具創意及前瞻之規劃。

Shown below is the preliminary plan of the Hsinta Ecology Power Plant (for reference only). The participant must propose creative and forward-looking planning in accordance with design requirements.



興達生態電廠廠區初步規劃圖(僅供參考)
Preliminary Plan of the Hsinta Ecology Power Plant (for reference only)

4.2.2 廠區佈置規劃內容 Plan of the Power Generation Facility

本計畫機組佈置主要包括以下設施：

This project contains following equipment and facility:

a. 三部總裝置容量約390萬瓩之2配1燃氣複循環機組。

a. Three units of 2-on-1 CCGTs with a total installed capacity of about 390 megawatts.

b. 燃氣複循環機組之主發電設備包括氣渦輪機房、熱回收鍋爐、煙囪、汽輪機房及冷卻循環水系統(含海水電解房)。

b. Primary facility for CCGT power generation: gas turbine room, heat recovery boilers, chimneys, steam turbine room, and circulating cooling water system (including seawater electrolysis room).

c. 輸配電力之主要設施及設備，包括345kV開關場、緊急柴油發電機房及主/輔變壓器(氣渦輪機與汽輪機)等。

c. Main facility and equipment for power transmission/distribution: 345kV switchyard, emergency diesel generators, and main/auxiliary transformers (gas turbines and steam turbines).

d. 環保設施，包括廢水處理廠、回收水處理區/回收水槽、液氨儲槽區及廢棄物暫存區。

d. Waste treatment facility: waste water treatment plant, recovered water treatment area/water recovery tanks, liquid ammonia storage tanks, and temporary waste storage.

e. 公用設施，包括天然氣計量站/天然氣處理站、水處理廠/除礦水槽、生水儲槽、飲用水槽、消防/生水傳送泵防、氣渦輪機冷卻系統區及海水淡化廠(含海水/淡化水儲槽)。

e. Public utility: natural gas metering/handling stations, water handling plant/demineralized water tanks, raw water tanks, potable water tanks, firefighting/raw water pump room, gas turbine cooling system room, and seawater desalination plant (with tanks for seawater/desalinated water).

f. 行政/營運/生活設施，包括行政大樓、中央控制大樓、接待中心、維修廠房、修理工場、氣渦輪機維修廠、大型停車場、事業用電力站、地下生水池、各式倉庫(含重件倉庫、一般倉庫、潤滑油品倉庫及危險氣體倉庫)、餐廳及備勤宿舍。

f. Administrative/MRO/amenity hub: including administrative building, central control building, reception center; MRO (maintenance repair and operation) workshops for general purposes and gas turbines; large parking lot, power substation for site operation, underground raw water pool, storage spaces (for heavy objects, general items, lubricant/grease, and hazardous gases).

4.2.3 廠區佈置規劃之考量 Planning Considerations

本計畫擬在上述之電力設施用地上興建總容量約390萬瓩之三部2配1多軸式燃氣複循環機組及其相關附屬設施。廠區佈置規劃之考量因素如下：

This proposal envisages three sets of 2-on-1 multi-shaft CCGTs with a total installed capacity of 390 megawatts in the primary power generation area described above. The followings are planning considerations.

a.本基地內既有之69kV及345kV輸電線路及鐵塔須遷移改道至基地側面，並將69kV輸電線路改採地下化，除可方便線路銜接外，亦可使本計畫機組用地有完整性，以期能更加完善利用土地。

a. Existing 69kV and 345kV transmission lines and towers need to be re-routed to the edge of the site; the 69kV lines will go underground to optimize land use to simplify power line connection and to maintain the integrity of the land parcel for turbines.

b.將發電機組相關設施儘量與南側之濕地範圍保持較長距離，以利本計劃達成生態電廠之規劃目標。

b. It is desirable to maximize the distance between generator facilities and the wetland in the south to achieve the objective of this ecology power plant.

c.廠區大門應考量對外之方便動線，並減輕發電機組設施對周遭公共道路使用人之視覺衝擊，電廠周界應保有至少10公尺之隔離綠帶規劃。

c. Design of the entrance should optimize entry/exit traffic flow, and minimize the facility’ s visual impact to the view from the surrounding public roads -- there should be a green belt of at least 10 meters wide around the perimeter.

4.2.4 廠區各分區佈置考量因素 Considerations for Each Area

a. 行政區 Administrative Area

考量進出動線之方便性，廠區大門設置應考量接近對外主要道路，並與道路之間保留10米寬度以上之緩衝綠帶，以降低對外界景觀之衝擊。接待中心、行政大樓及中央控制大樓，停車場亦應與廠區出入口接近以利管理。

For easy entry/exit traffic, the entrance should be located near the main access road by an over-10-meter green belt buffer with the public road to minimize visual impact. Reception center, administration building, the central control building, and the parking lot should be near the main entrance for convenient management.

中央控制大樓應連接行政大樓及機組之汽輪機房，方便全廠運轉之掌控並提高連繫效率。

The central control building should be connected to the administration building and the steam turbine room to optimize overall operational control and efficient communication of the entire facility.

b. 營運區 Maintenance, Repair and Operation (MRO) Area

營運區主要供電廠爾後維運使用，設置有高壓馬達維修廠、氣渦輪機維修廠、維修廠房、修理工場、大型停車場及一般倉庫，危險氣體倉庫、潤滑油品倉庫、重件倉庫及廢棄物暫存區。

This area aims to ensure smooth MRO (maintenance, repair and operation) of the power plant. It contains high-pressure motor maintenance shop, gas turbine maintenance shop, general workshop, repair yard, large parking lots, and warehouses (for general purpose, hazardous gases, lubricant/grease, and heavy items) as well as temporary storage for wastes.

c. 生活區 Staff Amenity

主要供廠區員工生活所須空間，設置備勤宿舍及餐廳，供爾後電廠營運人員使用。

This is the living quarters with suites and canteen for off-duty staff to relax in, once the power plant begins commercial operation.

d. 主發電及公用設施區 Main Generators and Utility Area

以三部2配1多軸式燃氣複循環機組配置規劃，每部2配1燃氣複循環機組之主發電設備依序為氣渦輪機房、熱回收鍋爐及汽輪機房等主發電設備，每部機組之熱回收鍋爐煙囪採集合方式以減少煙囪數量，降低對景觀衝擊。

Three sets of 2-on-1 multi-shaft combined cycle gas turbines (CCGTs) are envisaged. Each set of generator (2-on-1 CCGT) has three sections: starting at the gas turbine generator room, through heat recovery boiler then the steam turbine generator room. Chimneys are consolidated for each set of generator to minimize visual impact to the landscape.

所需之公用設施包括天然氣計量站/處理站、液氨儲槽區、廢水處理廠、水處理廠/除礦水槽、回收水處理區/回收水槽、生水儲槽/飲用水槽及消防/生水傳送泵房，並以管架與主發電設備連接。

Public utilities required include natural gas metering/ handling stations, liquid ammonia storage tank area, waste water handling plant/demineralized water tank, recovered water treatment area/recovered water tank, raw water tank, potable water tank, firefighting/raw water pump room. They are to be pipe-connected to the main generator equipment.

氣渦輪機進氣冷卻系統區須臨近循環水進水暗渠，以利取用海水作為冷卻媒介，並以管架與主發電設備連接。

Gas turbine inlet-air cooling system area needs to be near the covered conduit of circulating water inlet to use seawater as cooling medium. It is to be pipe-connected with the main generator equipment.

e. 開關場區 Switchyard

本計畫之開關場區設置有345kV GIS設備房、開關場電氣設備房及相關附屬設施。

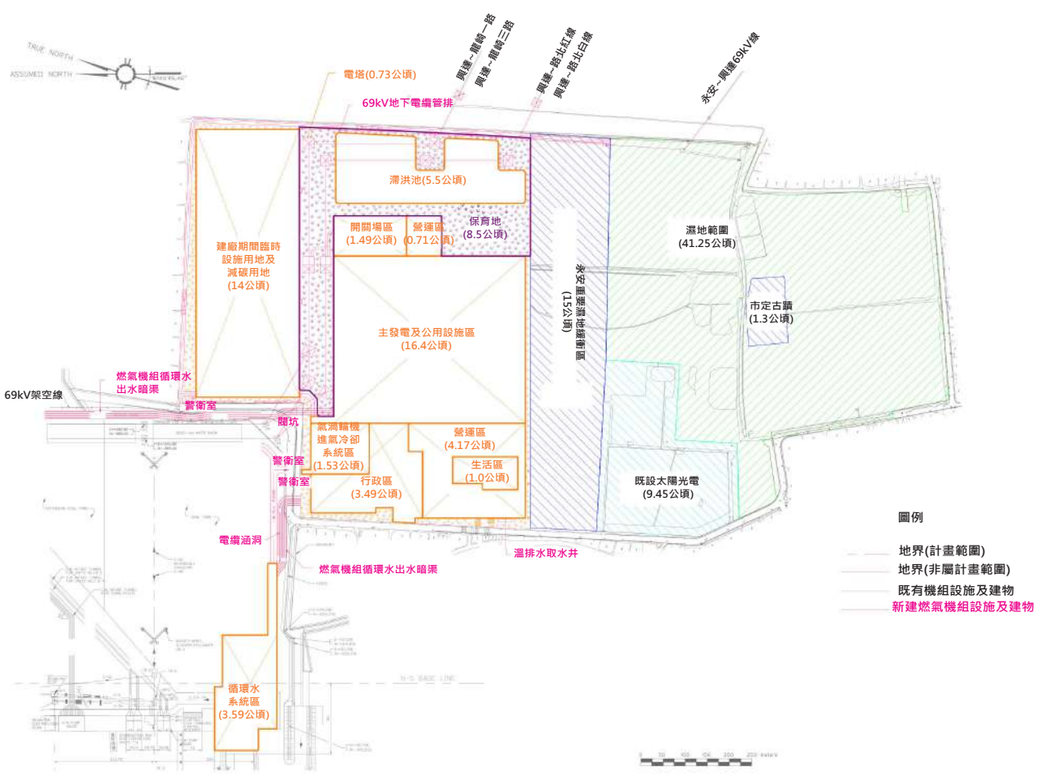
This project’ s switchyard has a 345kV GIS equipment room, switchyard electrical room and ancillary facilities.

f. 循環水系統區 Circulating Water System Area

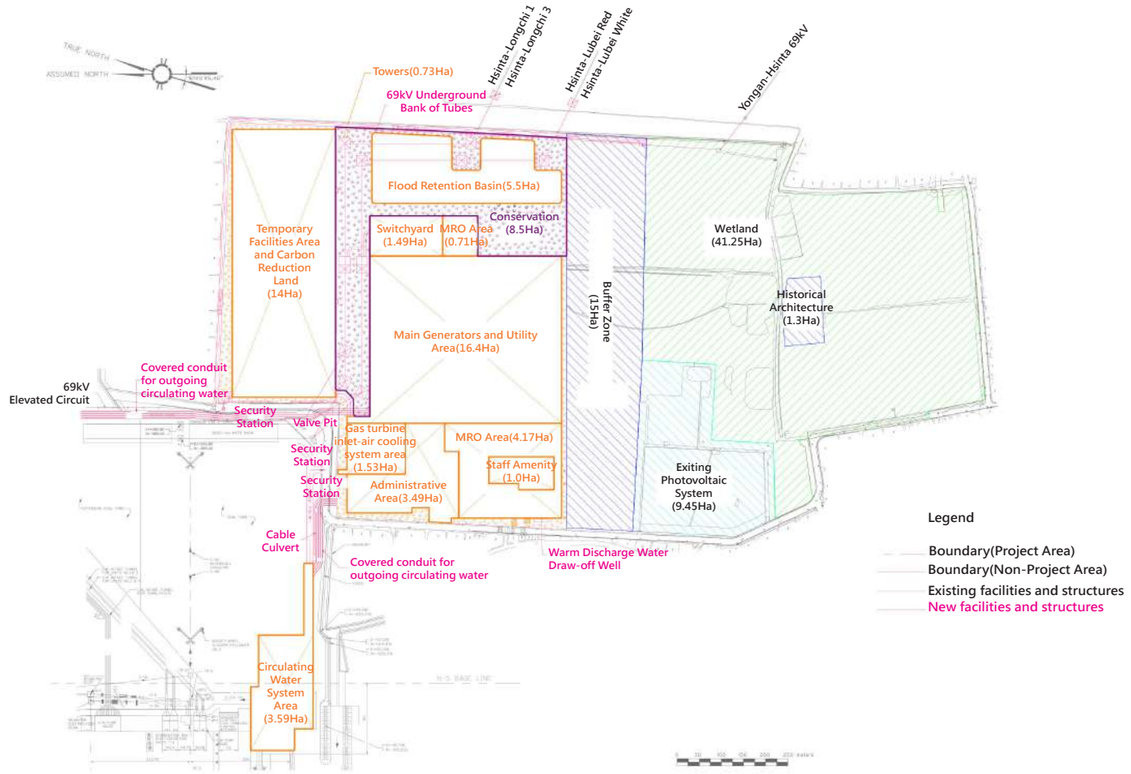
包括循環水抽水機房及海水電解室，循環水由興達電廠既有進水堤岸內取水，導入本計畫之循環水抽水機房，而後以抽水機將循環水以暗渠方式沿興達電廠南側圍牆進入本計畫用地，供應機組冷卻使用；循環水出水暗渠則為出主發電區後沿興達電廠東側圍牆外之興達路向北轉西，併入興達發廠既有出水導堤內排水。

This area includes rooms for circulating water pumps and seawater electrolysis. Incoming circulating water enters along the existing intake dyke, up the circulating water pump room of this project, and then goes into a covered conduit along the southern edge of the existing Hsinta Power Plant into

this project site to cool the generator units. Covered conduit for outgoing circulating water starts at the Main Generator Area then runs northbound along the Hsinta Road on the east perimeter of the Hsinta Power Plant before turning west to converge with existing channel along the outlet dyke.



廠區各分區佈置圖(僅供參考)



Plan of Various Areas in the Project Site (for reference only)

4.3 機械設備簡介 Machinery and Equipment

4.3.1 概述 Overview

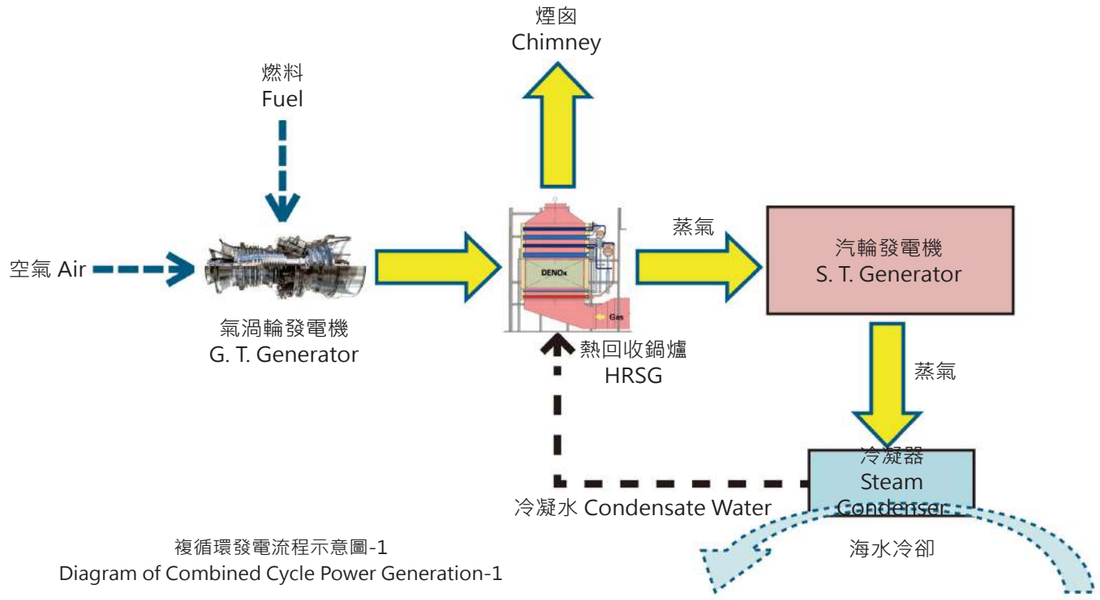
每部複循環機組係以二部氣渦輪發電機搭配同樣數量之熱回收鍋爐及一部汽輪發電機(即每部機組包括：二部氣渦輪發電機、二部熱回收鍋爐、一部汽輪發電機)。主要機械設備有氣渦輪發電機、熱回收鍋爐、汽輪發電機、冷凝器、主蒸汽及輔助蒸汽系統、冷凝水、鍋爐飼水系統及燃料系統等。

Each CCGT set consists of two gas turbine generators and two heat recovery boilers (steam generators) and one steam turbine generator. (i.e.: Each CCGT consists of 2 gas turbine generators, 2 heat recovery boilers, and 1 steam turbine generator) Core machineries include gas turbine generator, heat recovery boiler, steam turbine generator, steam condenser, primary and auxiliary steam system, condensate water, boiler water feed system and fuel system.

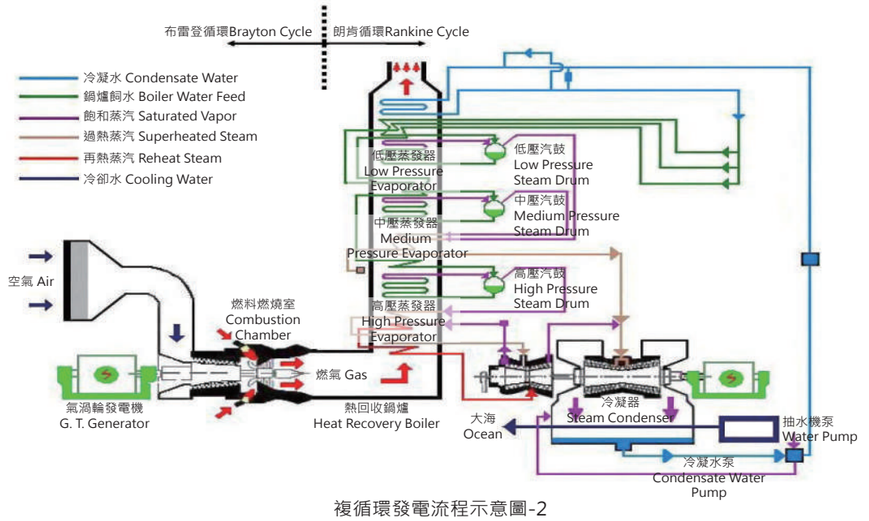
4.3.2 熱平衡系統 Thermal Balance System

複循環機組係布雷登循環(Brayton Cycle)與朗肯循環(Rankine Cycle)二種循環之組合。氣渦輪機為布雷登循環，空氣由濾清消音器吸入，經壓縮，伴以燃料燃燒後推動渦輪機發電，氣渦輪機排放之煙氣，經排氣煙道導入熱回收鍋爐，經由煙囪排入大氣，至此完成布雷登循環之運作。汽輪機為朗肯循環，利用氣渦輪機之煙氣導入熱回收鍋爐加熱飼水產生蒸汽，再藉由主蒸汽管依其壓力等級，引入各級汽輪機作功並驅動發電機發電，汽輪機排出之蒸汽進入連接之冷凝器，藉由海水之冷卻移除蒸汽潛熱，使其回復冷凝水狀態，再由泵送飼水回熱回收鍋爐，以進行下個發電循環，此為朗肯循環之運作。複循環發電流程示意圖如下：

"Combined cycle" refer to the combination of Brayton Cycle and Rankine Cycle. Natural gas turbine generators perform the Brayton cycle: Inlet air enters the gas turbine through a filter, a silencer, and a compressor, mixed with fuel to burn and drive the turbine to generate electricity. Exhaust air from the turbine is collected via ductwork into the heat recovery boiler and then discharged to the atmosphere through the chimney. This completes the Brayton Cycle. Steam turbine generators perform the Rankine Cycle. Exhaust air from the gas turbine is routed to the heat recovery boiler to boil water and generate steam which, depending on its pressure class, is guided into various parts of the steam turbine to generate power. Exhaust steam from the steam turbine generator is cooled off in a condenser to have the latent heat removed with seawater. The condensed water is pumped back to the heat recovery boiler for the next cycle. This completes the Rankin cycle. Diagram of combined cycle power generation below:



複循環發電流程示意圖-1
Diagram of Combined Cycle Power Generation-1

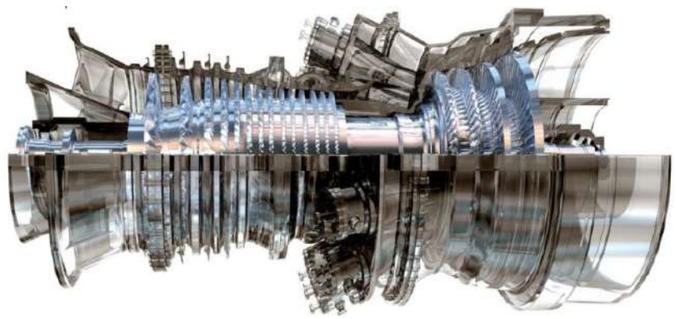


複循環發電流程示意圖-2
Diagram of Combined Cycle Power Generation-2

4.3.3 氣渦輪發電機 Gas Turbine Generator

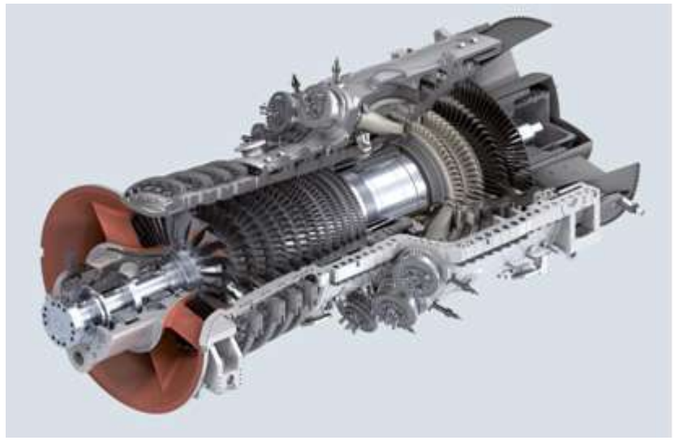
氣渦輪發電機為發電用重責(Heavy Duty)型，以天然氣為燃料，其構造可分為進氣室、壓縮室、燃燒室、渦輪機、發電機、儀控設備、輔助設備及排氣裝置等。一般而言，氣渦輪發電機組係由製造廠家整體供應，並包括燃料系統、冷卻系統、啟動系統、空氣濾清器、潤滑系統、水洗系統、控制系統、二氧化碳防火系統或潔淨藥劑滅火系統等，並附有乾式低氮氧化物燃燒器可減少氮氧化物排放，以符合環保法規要求。氣渦輪機並裝設有隔音裝置以降低噪音至最小的標準。以下為主要廠商之氣渦輪機外型參考圖(僅供參考，非本案預定裝置之設備)：

Gas turbine generators here are heavy-duty type using natural gas as the fuel. In terms of structure, it has air inlet room, compressor, combustion chamber, turbine, generator, instrumentation control, auxiliary equipment and exhaust devices. In general, such gas turbine generators are supplied as a turn-key system by the manufacturer to also include support systems for fuel, cooling, starter, air-filter, lubricants, water washing, control, CO2 fire-prevention or clean chemicals to put out fire. Dry low NOx burner is also provided to reduce NOx emission to meet environmental standards. Gas turbines also have silencers to minimize noise. The followings are reference pictures from main suppliers. (For reference only. They are NOT the equipment for this project)

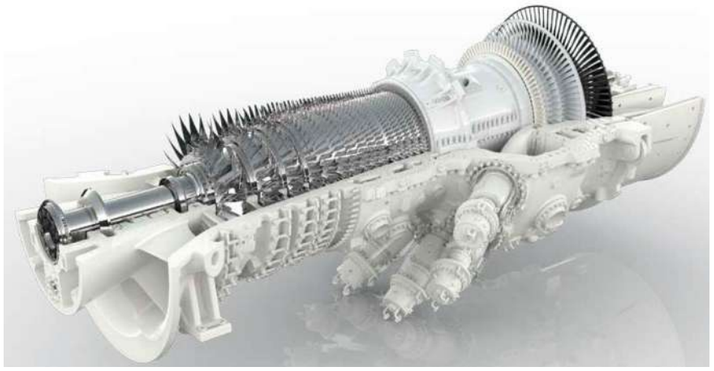


GE 7HA型氣渦輪機外型圖
The Look of GE 7HA Gas Turbine

日本MHPS M501J型氣渦輪機實體外型圖
The Look of Japanese MHPS M501J Gas Turbine



德國Siemens SGT8000H型氣渦輪機高壓氣道示意圖
Diagram of Germen Siemens SGT8000H Gas Turbine High-Pressure Air Duct



義大利Ansaldo GT36-S6型氣渦輪機外型圖
The Look of Italian Ansaldo GT36-S6 Gas Turbine

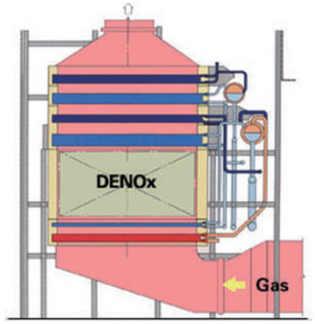
4.3.4 熱回收鍋爐 Heat Recovery Boiler

複循環發電機組為回收氣渦輪機之排氣廢熱，每一氣渦輪機均配置一座熱回收鍋爐。熱回收鍋爐其構造主要包括預熱器、節熱器、蒸發器、過熱器、汽鼓及飼水泵等。

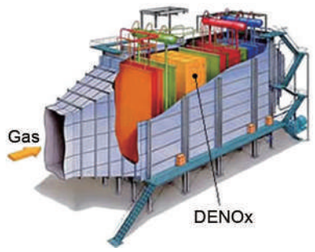
CCGT units here have one heat recovery boiler for each gas turbine to collect exhaust heat. The main structure of a heat recovery boiler includes pre heater, heat economizer, evaporator, super heater, steam drum and feed water pump and so on.

熱回收鍋爐依其形體結構，可分為水平式鍋爐及直立式鍋爐兩種。前者特徵在氣渦輪機排氣係水平流向通過垂直佈置爐牆管；後者則係氣渦輪機排氣為垂直流向，爐牆佈置為水平方式。

Depending on the structure a heat recovery boiler could be of horizontal or vertical type. In the former, exhaust heat from gas turbine flows horizontally through vertically arranged heater tube wall; while the latter features vertical flow of exhaust heat passing through horizontally arranged heater tube wall.



直立式熱回收鍋爐示意圖
Diagram of a Vertical Heat Recovery Boiler



水平式熱回收鍋爐示意圖
Diagram of a Horizontal Heat Recovery Boiler

4.3.5 汽輪發電機 Steam Turbine Generator

汽輪機為三汽缸串列、雙流向排汽、直接冷凝式，係利用熱回收鍋爐所產生之蒸汽推動汽輪機發電，汽輪發電機組主要設備包括汽輪機、發電機、潤滑油系統、控制系統及保護系統等。由於本計畫廠址靠近海邊，冷凝器將採用海水冷卻式，蒸汽在汽輪機作功發電後直接排至冷凝器，經與海水熱交換冷卻成冷凝水，再以冷凝泵送至系統經由熱回收鍋爐加熱成蒸汽。為達到減少用水之目標，未來汽機房內蒸汽系統之排放水將完全回收。本計畫每部複循環機組裝置1台汽輪機。每台汽輪發電機之出力約佔該機組總出力之35%。

The steam turbine generator is of serial three-cylinder, dual-flow exhaust type with direct condensation. It is propelled by steam generated from heat recovery boiler. The main structure of a steam turbine generator unit includes the turbine, generator, lubrication system, control system and protection system. The project site is next to the ocean, seawater is used to condensate: after the steam drives turbine to generate power, it is discharge to the condenser to cool off by seawater through heat exchange, then pumped back to be heated into steam by the heat recovery boiler. This water-recycling scheme reduces water usage. In the future, all the discharge water will be fully recovered in the steam system in the steam turbine room. In this project, each CCGT will have one steam turbine whose output will be about 35% of the total generator unit’ s output.

4.3.6 電氣設備 Electrical Equipment

包括：主發電機、發電機斷路器、發電機引線、昇壓主變壓器、輔助變壓器、4.16(or 6.9)kV裝甲開關箱、480V電力中心及馬達控制中心、緊急柴油引擎發電機、120V交流不斷電電源系統(UPS) 、直流電源系統、高/低壓馬達、其他電氣設備、電廠電力調度設備(CDCS RTU) 等。

Electrical equipment includes the main generator, generator breaker, generator terminal, main step-up transformer, auxiliary transformer, metal clad switch gear (MCSG) for 4.16kV (or 6.9kV), 480V power center and motor control center, emergency diesel engine generator, 120V AC (alternating current) UPS (uninterruptable power supply), DC (direct current) power supply, high/low pressure motor, other electrical equipment as well as CDCS RTU (central dispatch and control system remote terminal units).

4.3.7 儀控資訊設備 Instrument Control and IT Equipment

包括中央控制室、電腦室、電子設備室及模擬訓練室。

There are central control room, computer room, electronics room and simulator room.

儀控系統之架構將包括以下四種階層：現場儀錶及控制元件、控制器、中央控制室人機介面、資訊管理階層(MIS)。

There are four tiers of instrument control: on-site meter and control components, controllers, human-machine interface at the central control room, management information system (MIS).

控制系統之主要控制項目：機組負載控制及協調控制、機組自動起機/停機控制、氣渦輪機控制系統、熱回收鍋爐控制系統、汽輪機控制系統、汽輪機旁路控制系統、鍋爐飼水及蒸汽取樣分析及化學加藥控制系統、煙氣排放連續自動監測系統、冷卻循環水監測系統、電力監控系統(SCADA-Supervisory Control and Data Acquisition)。

Items to be controlled by the system are: load control and coordination control of generator units, automatic switch on/of of generator units, gas turbine control system, heat recovery boiler control system, steam turbine control system, steam turbine bypass system, boiler water feed and steam sampling analysis and chemical doping system, vapor discharge automatic continuous monitoring system, cool circulating water monitoring system, and SCADA-Supervisory Control and Data Acquisition.

訓練模擬器之目的如下：

The training simulator has the following purposes:

a. 使操作人員熟悉機組各主要設備之操作，包括各種起機及停機之模式，以避免實際運轉時發生誤操作的情形。

a. To help operators become familiar with manipulation of various major equipment of generator units, including assorted modes of turning the systems on and off, to avoid accidents from mis-handling during actual operation.

b.使操作人員熟悉機組的各種異常狀況，提昇操作人員於緊急狀況下之應變能力。

b. To help operators get familiar with all kinds of abnormal conditions to build their competency in handling emergency situations.

c.使工程師熟悉電廠主要控制系統之控制程式及參數以利系統維護，並可於控制邏輯及參數需要修改時，利用模擬器事先進行測試及驗證。

c. To help engineers get familiar with control programs and relevant parameters of the main control system to facilitate system maintenance. When it becomes necessary to modify control logics or parameters, such intended modification could be tested and verified in the simulator in advance.

訓練模擬器將以主發電設備之重要操作設備作為模擬範圍，其範圍包括下列項目：氣渦輪機設備、熱回收鍋爐設備、汽輪機設備、冷卻循環水系統 、電廠電力設備、空壓機系統。

Training simulator will train the staff to operate core consoles of main power generators. The scope includes gas turbine control system, heat recovery boiler control system, steam turbine control system, cool circulating water system, power plant electricity equipment and air compressor system.

4.4 既有燃氣複循環機組電廠照片 Photos of the Existing CCGT

為讓參賽者進一步了解燃氣複循環機組電廠之安裝後之現場情況，在臺灣目前既有燃氣複循環機組電廠中，以通霄電廠較接近未來興達生態電廠將安裝之機組，因此提供通霄電廠之燃氣複循環機組安裝後之現場情況照片供參考。

To help the tenderers further understand CCGT installations in the field, photographs of CCGT units at Tongxiao Power Plant are provided as reference. Of all existing CCGT power plants, the units at Tongxiao are closest to the future installation at Hsinta Ecological Power plant.

現有煙囪 Existing Chimney

氣渦輪機 Gas Turbine

通路(氣渦輪機房及汽輪機房之間)
Road (Between Gas Turbine Room & Steam Turbine Room)

汽輪機房 Steam Turbine Room

汽鼓 Steam Drum

施工中煙囪-1 Chimney-1 (Under Construction)

施工中煙囪-2 Chimney-2 (Under Construction)

施工中煙囪-3 Chimney-3 (Under Construction)

施工中煙囪-4 Chimney-4 (Under Construction)

施工中建築物 Building (Under Construction)

中央控制大樓Central Control Building

第伍章 Chapter 5

空間需求 Spatial Requirements

5.1 面積需求及設計考量重點
Area Requirements and Key Design Considerations

5.1.1 面積需求 Area Requirements

(下列為初步規劃面積須求，參賽者得依設計需要增加其他所需之空間或設施)

The area requirements listed below are preliminary only; participants may also add other spaces or facilities as the design requires.

本計畫所需之建築物及設施包括：行政區、生活區、營運區、氣渦輪機進氣冷卻系統區、主發電區(包括：一號機、二號機、三號機) 、公用設施區、開關場區等。建築面積總計：81,097 m^2、總樓地板面積總計：198,967 m^2，各分區面積需求如下表。

The required buildings and facilities include: administrative area, living quarters, MRO area, area for gas turbine intake air cooling system, primary power generation area (including units No. 1, 2 & 3), public amenity area and switchyard. The total building area is 81,097 m^2 and the total floor area is 198,967 m^2. Detailed area requirements are as follows:

為簡化本競圖之設計，參賽者之第一階段參賽圖面，得僅依分區面積需求表之內容，提出各分區規劃及量體配置即可(無須依詳細面積一覽表之內容，提出細分後之圖面)。

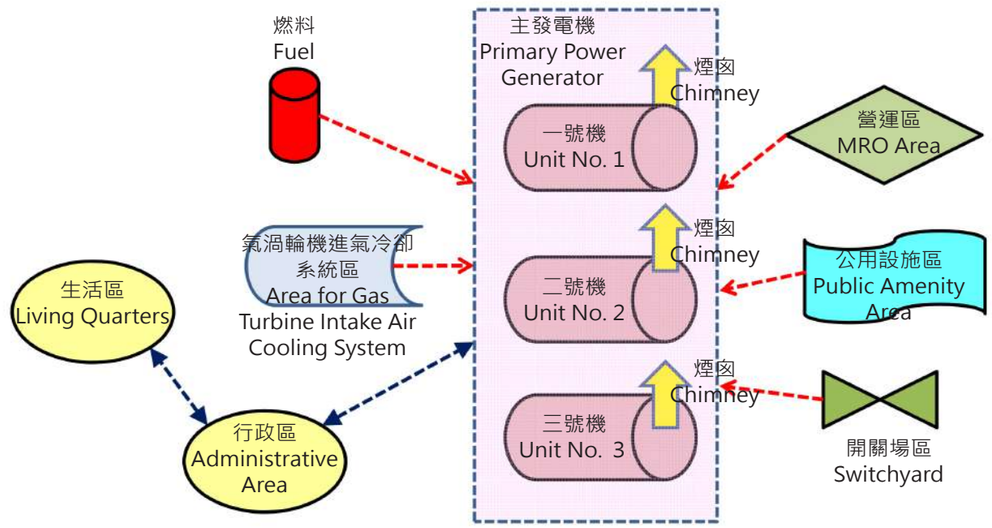
To simplify the design, during Stage One participants may submit only planning and massing for the various areas according to the Area Requirement Table (detailed plans showing individual spaces listed in the Table of Detailed Area Requirements are not necessary).

興達生態電廠各分區面積需求表
Area Requirement Table for Hsinta Ecological Power Plant

分區 Area	建築面積合計 Total Building Area (m^2)	總樓地板面積合計 Total Floor Area (m^2)	初步規劃方案所佔土地面積 (m^2- 僅供參考) (含道路、景觀綠化空間、開放空間、建築物鄰棟間隔等...面積) Land Area Occupied by the Preliminary Proposals (m^2-for reference only) (Including the area for roads, landscaping, open space, spacing between buildings, etc.)	空間內容 Content
行政區 Administrative Area	6,288	29,340	34,900	包括：中央控制大樓、行政大樓、接待中心、停車場、警衛室、大門、建廠辦公室...等。 Including: Central control building, administrative building, reception center, parking, security station, main gate, plant construction office.
生活區 Living Quarters	2,280	15,240	10,000	包括：備勤宿舍 2 棟及餐廳 Including: Two stand-by duty dormitory buildings and restaurant.
營運區 MRO Area	12,345	27,005	48,800	包括：高壓馬達維修廠 2 棟、氣渦輪機維修廠 2 棟、維修廠房、修理工場、公務車停車場 (約 80-100 部)、大型停車場 (可停巴士約 20-25 輛)、一般倉庫 3 棟、地下泵生水池泵、事業用電力站潤滑油槽區、噴砂室、電纜涵洞電氣室、溫排水中繼池、廢棄物暫存區、重件倉庫、危險氣體倉庫、潤滑油品倉庫。 Including: High-pressure motor workshops x2, gas

分區 Area	建築面積合計 Total Building Area (m^2)	總樓地板面積合計 Total Floor Area (m^2)	初步規劃方案所佔土地面積 (m^2- 僅供參考)(含道路、景觀綠化空間、開放空間、建築物鄰棟間隔等...面積) Land Area Occupied by the Preliminary Proposals (m^2-for reference only) (Including the area for roads, landscaping, open space, spacing between buildings, etc.)	空間內容 Content
				turbine workshops x2, workshop, repair yards, official vehicle parking (ca. 80-100 stalls), bus parking (ca. 20-25 buses), general warehouses x3, underground pumps and raw water reservoir pumps, power station lubricant tank area, sandblasting room, electric cable culvert electrical room, warm discharge water intermediate pool, temporary waste storage area, heavy item warehouse, dangerous gases warehouse, lubricant and grease warehouse.
氣渦輪機進氣冷卻系統區 Area for Gas Turbine Intake Air Cooling System	1,530	1,530	15,300	——
主發電區 Primary Power Generation Area				
一號機 Unit No. 1	13,658	34,016	約 25,000-30,000	包括：氣渦輪機房、變壓器區(氣渦輪機)、熱回收鍋爐、煙囪、汽輪機房、變壓器區(汽輪機)、電子設備室、電氣設備房。 Including: Gas turbine room, transformer area (gas turbine), heat recovery boilers, chimney, steam turbine room, transformer area (steam turbine), electronics room and electrical room.
二號機 Unit No. 2	13,658	34,016	約 25,000-30,000	包括：氣渦輪機房、熱回收鍋爐、煙囪、汽輪機房、電子設備室、變壓器區、電氣設備房。 Including: Gas turbine room, heat recovery boilers, chimney, steam turbine room, electronics room, transformer room and electrical room.
三號機 Unit No. 3	13,658	34,016	約 25,000-30,000	包括：氣渦輪機房、熱回收鍋爐、煙囪、汽輪機房、電子設備室、變壓器區、電氣設備房。 Including: Gas turbine room, heat recovery boilers, chimney, steam turbine room, electronics room, transformer room and electrical room.
公用設施區 Public Amenity Area	13,805	16,199	約 74,000-89,000	包括：天然氣計量站/處理站、水處理廠/除礦水槽、回收水處理區/回收水槽、液氨儲槽區、廢水處理廠、生水儲槽/飲用水槽及消防/生水傳送泵房、冷凝水儲槽、緊急柴油發電機房。 Including: Natural gas metering/processing station, water processing plant/demineralized water tank, recycled water processing area, recycled water tank, liquid ammonia tank area, wastewater processing plant, and raw water tank/potable water tank

分區 Area	建築面積合計 Total Building Area (m^2)	總樓地板面積合計 Total Floor Area (m^2)	初步規劃方案所佔土地面積 (m^2- 僅供參考) (含道路、景觀綠化空間、開放空間、建築物鄰棟間隔等...面積) Land Area Occupied by the Preliminary Proposals (m^2-for reference only) (Including the area for roads, landscaping, open space, spacing between buildings, etc.)	空間內容 Content
				& firefighting/raw water pump room, condensed water tank, emergency diesel generator room.
開關場區 Switchyard	3,875	7,605	14,900	包括：345kV GIS 設備房、開關場電氣設備房、氣象偵測站、微波站、微波鐵塔。 Including: 345kV GIS equipment room, electrical room for switchyard, weather station, microwave station, microwave towers.
合計 Total	81,097	198,967	287,900(僅供參考) (for reference only)	



各分區關係示意圖
Relationship Diagram for the Areas

興達生態電廠建築物及設施詳細面積一覽表
Table of Detailed Area Requirements for Buildings and Facilities

項次 Item	建物 / 設施名稱 Building/ Facility Name	建物面積表 Building Area (m^2) 建築面積 Building Area (m^2)	總樓地板面積 Total Floor Area (m^2)	樓層數 Level	長 x 寬 x 高 (m) (m) (m) (單一建物或設備) (Single building or equipment)	說明 Description	建議結構形式 Suggested Structural Type
行政區 Administrative Area							
1	中央控制大樓 Central Control Building	1,600.0	9,600.0	地上五層 地下一層 5 lvls above, 1 lvls below	40x40x40		SS
2	行政大樓 Administrative Building	1,536.0	10,752.0	地上六層 地下一層 6 lvls above, 1 lvls below	48x32x30		RC
3	接待中心 Reception Center	950.0	2,850.0	地上二層 地下一層 2 lvls above, 1 lvls below	38x25x10		RC
4	警衛室 Security Room	144.0	144.0	地上一層 1 lvls above	6x6x3.6	分為四座配置 Subdivided into 4	RC
5	大門 Main Gate	90.0	90.0		15x2x6	分為三座配置 Subdivided into 3	RC
6	建廠辦公室 Plant Construction Office	1,968.0	5904.0	地上三層 3 lvls above	40x12x13.5	分為四棟配置 Subdivided into 4	RC
7	停車場 Parking	約 40-50 部 Ca. 40-50 stalls		地上一層 1 lvls above			
	小計 Subtotal	6,288	29,340				

項次 Item	建物 / 設施名稱 Building/ Facility Name	建物面積表 Building Area (m^2) 建築面積 Building Area (m^2)	總樓地板面積 Total Floor Area (m^2)	樓層數 Level	長 x 寬 x 高 (m) (m) (m) (單一建物或設備) (Single building or equipment)	說明 Description	建議結構形式 Suggested Structural Type
生活區 Living Quarters							
8	備勤宿舍 Stand-by Duty Dormitory Building	1,200.0	12,000.0 (2 buildings in total)	地上四層 地下一層 4 lvls above, 1 lvls below	50x24x18	分為二棟配置 (A、B 棟) Subdivided into 2 (A, B)	RC
9	餐廳 Restaurant	1,080.0	3,240.0	地上二層 地下一層 2 lvls above, 1 lvls below	40x27x10		RC
	小計 Subtotal	2,280	15,240				
營運區 MRO Area							
10	高壓馬達維修廠 High-Pressure Motor Workshop	1,000.0	2,000.0	地上二層 2 lvls above	40x25x15	分為二棟配置 Subdivided into 2	RC
11	氣渦輪機維修廠 Gas Turbine Workshop	2,000.0	2,000.0	地上一層 1 lvls above	40x25x15	分為二棟配置 (A、B 棟) Subdivided into 2 (A, B)	RC
12	維修廠房 Workshop	1,200.0	7,200.0	地上五層 地下一層 5 lvls above, 1 lvls below	40x30x23	二棟合計 (2 buildings in total)	RC
13	修理工廠 Repair Yard	1,000.0	2,000.0	地上二層 2 lvls above	40x25x15		RC
14	一般倉庫 General Warehouse	1,560.0	4,680.0 (3 buildings in total)	地上一層 1 lvls above	52x30x8	分為三棟配置 (A、B、C 棟) Subdivided into 3 (A, B, C)	RC

項次 Item	建物 / 設施名稱 Building/ Facility Name	建物面積表 Building Area (m^2) 建築面積 Building Area (m^2)	總樓地板面積 Total Floor Area (m^2)	樓層數 Level	長 x 寬 x 高 (m) (m) (m) (單一建物或設備) (Single building or equipment)	說明 Description	建議結構形式 Suggested Structural Type
15	地下泵生水池泵 Underground Pump and Raw Water Reservoir Pump	690.0	690.0	地下一層 1 lvls below	23x30x3		RC
16	事業用電力站 Power Station	540.0	1,080.0	地上二層 2 lvls above	30x18x11		RC
17	潤滑油槽區 Lubricant Tank Area	792.0	792.0	地上一層 1 lvls above	36x22		SS
18	噴砂室 Sandblasting Room	480.0	480.0	地上一層 1 lvls above	40x12x6		RC
19	電纜涵洞電氣室 Electric Cable Culvert Electrical Room	50.4	50.4	地上一層 1 lvls above	7.1x7.1x6		RC
20	溫排水中繼池 Warm Discharge Water Intermediate Pool	214.1	214.1		26x8.3		RC
21	公務車停車場 Official Vehicle Parking	約 80-100 部 Ca. 80-100 stalls		地上一層 1 lvls above			
22	大型巴士停車場 Bus Parking	約 20-25 部 Ca. 20-25 stalls		地上一層 1 lvls above			
23	廢棄物暫存區 Temporary Waste Storage Area	1,050.0	1,050.0	地上一層 1 lvls above	50x21x8		RC
24	重件倉庫 Heavy Item Warehouse	1,000.0	4,000.0	地上四層 4 lvls above	40x25x10		RC
25	危險氣體倉庫 Dangerous Gases Warehouse	384.0	384.0	地上一層 1 lvls above	24x16x6		RC
26	潤滑油品倉庫 Lubricant and Grease Warehouse	384.0	384.0	地上一層 1 lvls above	24x16x6		RC
	小計 Subtotal	12,345	27,005				
氣渦輪機進氣冷卻系統區 Area for Gas Turbine Intake Air Cooling System							
27	氣渦輪機進氣冷卻系統區 Area for Gas Turbine Intake Air Cooling System	1,530.0	1,530.0	地上一層 1 lvls above	泵房 Pump Room: 50x14x6		RC
	小計 Subtotal	1,530	1,530				
主發電區 Primary Power Generation Area							
一號機 Unit No. 1							
28	氣渦輪機房 (一號機) Gas Turbine Room (Unit No. 1)	5,098.5	5,098.5	地上一層 1 lvls above	99x52x27		SS

項次 Item	建物 / 設施名稱 Building/ Facility Name	建物面積表 Building Area (m^2) 建築面積 Building Area (m^2)	總樓地板面積 Total Floor Area (m^2)	樓層數 Level	長 x 寬 x 高 (m) (m) (m) (單一建物或設備) (Single building or equipment)	說明 Description	建議結構形式 Suggested Structural Type
29	變壓器區 Transformer Room (氣渦輪機) (一號機) (Gas Turbine) (Unit No. 1)	331.3	331.3		27x13		RC
30	熱回收鍋爐含煙囪 (一號機) Heat Recovery Boiler Including Chimney (Unit No. 1)	2,800.0	11,200.0	地上四層 4 lvls above	35x40x36	煙囪 Chimney h:80m	SS
31	汽輪機房 (一號機) Steam Turbine Room (Unit No. 1)	3,600.0	10,800.0	地上三層 3 lvls above	90x40x40		SS
32	變壓器區 Transformer Room (汽輪機) (一號機) (Steam Turbine) (Unit No. 1)	241.7	241.7		24x10		RC
33	電子設備室 (一號機) Electronics Room (Unit No. 1)	1,080.0	4,320.0	地上四層 4 lvls above	90x12x16		SS
34	電氣設備房 (一號機) (GT 電氣設備) Electrical Room (Unit No. 1) (GT Electrical)	506.0	2,024.0	地上四層 4 lvls above	23x22x27		SS
	小計 Subtotal	13,658	34,016				
	二號機 Unit No. 2						
35	氣渦輪機房 (二號機) Gas Turbine Room (Unit No. 2)	5,098.5	5,098.5	地上一層 1 lvls above	99x52x27		SS
36	變壓器區 Transformer Room (氣渦輪機) (二號機) (Gas Turbine) (Unit No. 2)	331.3	331.3		27x13		RC
37	熱回收鍋爐含煙囪 (二號機) Heat Recovery Boiler Including Chimney (Unit No. 2)	2,800.0	11,200.0	地上四層 4 lvls above	35x40x36	煙囪 Chimney h:80m	SS

項次 Item	建物 / 設施名稱 Building/ Facility Name	建物面積表 Building Area (m^2) 建築面積 Building Area (m^2)	總樓地板面積 Total Floor Area (m^2)	樓層數 Level	長 x 寬 x 高 (m) (m) (m) (單一建物或設備) (Single building or equipment)	說明 Description	建議結構形式 Suggested Structural Type
38	汽輪機房 (二號機) Steam Turbine Room (Unit No. 2)	3,600.0	10,800.0	地上三層 3 lvls above	90x40x40		SS
39	變壓器區 Transformer Room (汽輪機) (二號機) (Steam Turbine) (Unit No. 2)	241.7	241.7		24x10		RC
40	電子設備室 (二號機) Electronics Room (Unit No. 2)	1,080.0	4,320.0	地上四層 4 lvls above	90x12x16		SS
41	電氣設備房 (二號機) (GT 電氣設備) Electrical Room (Unit No. 2) (GT Electrical)	506.0	2,024.0	地上四層 4 lvls above	23x22x27		SS
	小計 Subtotal	13,658	34,016				
三號機 Unit No. 3							
42	氣渦輪機房 (三號機) Gas Turbine Room (Unit No. 3)	5,098.5	5,098.5	地上一層 1 lvls above	99x52x27		SS
43	變壓器區 Transformer Room (氣渦輪機) (三號機) (Gas Turbine) (Unit No. 3)	331.3	331.3		27x13		RC
44	熱回收鍋爐含煙囪 (三號機) Heat Recovery Boiler Including Chimney (Unit No. 3)	2,800.0	11,200.0	地上四層 4 lvls above	35x40x36	煙囪 Chimney h:80m	SS
45	汽輪機房 (三號機) Steam Turbine Room (Unit No. 3)	3,600.0	10,800.0	地上三層 3 lvls above	90x40x40		SS
46	變壓器區 Transformer Room (汽輪機) (三號機) (Steam Turbine) (Unit No. 3)	241.7	241.7		24x10		RC
47	電子設備室 (三號機) Electronics Room (Unit No. 3)	1,080.0	4,320.0	地上四層 4 lvls above	90x12x16		SS

項次 Item	建物 / 設施名稱 Building/ Facility Name	建物面積表 Building Area (m^2) 建築面積 Building Area (m^2)	總樓地板面積 Total Floor Area (m^2)	樓層數 Level	長 x 寬 x 高 (m) (m) (m) (單一建物或設備) (Single building or equipment)	說明 Description	建議結構形式 Suggested Structural Type
48	電氣設備房 (三號機) (GT 電氣設備) Electrical Room (Unit No. 3) (GT Electrical)	506.0	2,024.0	地上四層 4 lvls above	23x22x27		SS
	小計 Subtotal	13,658	34,016				
公用設施區 Public Amenity Area							
49	天然氣計量站 Natural Gas Metering Station	1,100.0	1,100.0	地上一層 1 lvls above	50x22x13		SS
50	天然氣處理站 Natural Gas Processing Station	2,500.0	2,500.0	地上一層 1 lvls above	50x50x13		SS
51	水處理廠 Water Processing Plant	1,800.0	1,800.0	地上一層 1 lvls above	45x40x10		SS
52	除礦水槽 Demineralized Water Tank	428.0	428.0		Φ16.5m	分為兩座配置 Subdivided into 2	SS
53	回收水處理區 Recycled Water Processing Area	1,000.0	1,000.0		40x25x10		RC
54	回收水槽 Recycled Water Tank	213.7	213.7		Φ16.5m	一座 One	SS
55	液氨儲槽區 Liquid Ammonia Tank Area	1,250.0	1,250.0	地上一層 1 lvls above	50x25x12		RC/ SS
56	廢水處理廠 Wastewater Processing Plant	480.0	960.0	地上二層 2 lvls above	24x20x12		RC
57	生水儲槽 Raw Water Tank	3,250.0	3,250.0	地上一層 1 lvls above	65x50x6	一座 One (2000KL)	RC
58	飲用水槽 Potable Water Tank	225.0	225.0		15x15x5	一座 One	RC
59	消防 / 生水傳送泵房 Firefighting/ Raw Water Pump Room	600.0	1,800.0	地上二層 地下一層 2 lvls above, 1 lvls below	40x15x9		RC
60	冷凝水儲槽 Condensed Water Tank (Φ17.65m)	244.5	244.5			分為三座配置 Subdivided into 3	SS
61	緊急柴油發電機房 Emergency Diesel Generator Room	714.0	1,428.0	地上二層 2 lvls above	42x17x14		RC
	小計 Subtotal	13,805	16,199				
開關場區 Switchyard							
62	345kV GIS 廠房 345kV GIS Equipment Room	2,530.0	5,060.0	地上一層 地下一層 1 lvls above, 1 lvls below	115x22x15		RC

項次 Item	建物 / 設施名稱 Building/ Facility Name	建物面積表 Building Area (m^2)			長 x 寬 x 高 (m) (m) (m)	說明 Description	建議結構形式 Suggested Structural Type
		建築面積 Building Area (m^2)	總樓地板面積 Total Floor Area (m^2)	樓層數 Level	(單一建物或設備) (Single building or equipment)		
63	開關場電氣設備房 Switchyard and Electrical Room	1,200.0	2,400.0	地上二層 2 lvls above	48x25x10		RC
64	氣象偵測站 Weather Station	42.3	42.3	地上一層 1 lvls above	6.5x6.5x5		SS
65	微波站 Microwave Station	36.0	36.0	地上一層 1 lvls above	6x6x5		SS
66	微波鐵塔 Microwave Tower	67.2	67.2	地上一層 1 lvls above	8.2x8.2x15		SS
	小計 Subtotal	3,875	7,605				
	總計 Total	81,097	198,967				

5.1.2 防鹽害、防砂塵、防雨水及防颱之設計
Protective Designs Against Salt, Sand, Dust, Rain and Typhoons

由於本電廠位於濱海區域，對建築物內、外裝修材料及設備易造成嚴重銹蝕問題；同時由於冬季之季風強烈和夏季颱風侵襲之影響，建物在規劃時，有關防水、防潮、防風、防砂塵等，也是本電廠進行設計時必需考量之重要課題。

Since this power plant is located along the coast, its interior and exterior materials and equipment are susceptible to corrosion, in addition to assault from powerful winter monsoons and summer typhoons. Therefore, it is imperative to consider in the design protection against salt, sand, dust, rain and typhoons.

5.1.3 便利維護之空間及材料
Convenient Maintenance of Spaces and Materials

基於電廠營運及日後設備維護之需求，並考慮人性化、減少維護需要及降低人力需求，將為本計畫規劃時之主要原則。如充裕之維護空間及設置輔助機具、選用耐腐蝕性佳之建材、外牆選用防砂、防鹽害及防水之材料(如外牆磁磚採用全瓷化、吸水率低於3%、硬度高及耐鹽份污染者)；或彩色金屬版表面加強塗裝防蝕保護...等。

A primary planning principle for the plant is to consider its needs in daily operation and equipment maintenance, user-friendliness, and reduction of maintenance and manpower requirements. Key considerations include ample maintenance space and installation of assistive machinery/devices, anti-corrosion materials, dustproof/saltproof/waterproof exterior walls (e.g. all-porcelain exterior ceramic tiling, with water absorption rate <3% and high hardness and salt tolerance), or anti-corrosion coating on colored metal cladding.

5.1.4 省能環保與綠建築設計
Energy Efficient and Green Building Designs

考慮省能環保與綠建築設計是全球趨勢及目前政府大力推展之目標，因此電廠也應符合其原則，採用高效率之電器及照明(如LED燈具)設施、省水之衛生設備、低輻射之節能玻璃、外牆材料具有更佳隔熱效果者、加強自然通風...等，以降低設備散熱量及空調處理量，另外依本計畫能源使用說明書、能源管理措施說明，綠色能源導入之承諾，於適當位置設置太陽光電示範系統，以符合綠建築「日常節能指標」。

Energy efficient and green building designs are global trends as well as key objectives of our government. Therefore, the power plant should also aim to reduce heat generated from equipment and air-conditioning, through measures like using high-efficiency electrical appliances and lights (e.g. LED light fixtures), water-efficient sanitary fixtures, low-E glass, better insulated exterior wall materials, enhanced natural ventilation, etc. Furthermore, a demonstrative photovoltaic system should also be placed in a suitable location according to the energy use handbook, energy management brief and green energy commitment of the Plan, in order to conform with the "Daily Energy Saving" green building indicator.

5.1.5 建築防災及安全考量 Disaster Prevention and Building Safety

安全防災之規劃是重要的考量，不論在結構設計之安全性、消防設施之整體規劃、照明、接地及避雷設計、自動偵測系統、防震、防洪、防淹及防颱設計...等均同。各建材皆應採用防火及防爆材料，並配合周延之逃生路徑、防火區劃、防火填塞...等，以提供安全完善之建物使用空間。

Safety and disaster planning are critical, including everything from structural safety, fire protection planning, lighting, grounding and lightening protection, automatic sensor systems, and protective designs against earthquakes, floods and typhoons. All building materials should be fireproof and explosion-proof. Measures like comprehensive evacuation routes, fire zoning and fire resistant fillers should all work together to ensure safe and adequate building spaces.

5.1.6 塑造公共藝術意象 Power Plant as Public Art

突破傳統之電廠過度機械化及冰冷之設計，外觀造型(尤其是高達80m之煙囪)應融入當地人文及環境特色，以塑造公共藝術意象。

The exterior form of the plant (especially the 80m chimneys) should break from the cold and machine-like image of a traditional power plant. Rather, it should incorporate local cultural and environmental features to create the image of public art.

5.2 綠色電廠與永續建築規劃 Green Power Plant and Sustainable Building Planning

因應台電公司朝向符合綠色低碳潮流、永續發展及提升電廠景觀品質之目標，且有鑑於綠建築環保意識逐漸受到各界重視，省能環保與綠建築是全球設計趨勢，也是目前政府大力推展之方針，因此興建本新機組的同時也應考量對環境友善與生態保護為規劃目標，開創綠色電廠及永續建築的廠區環境。

TPC is striving toward low-carbon design, sustainable development and better power "plant-scape". Meanwhile, green building and environmental awareness are on the rise, with energy efficiency and green building becoming global design trends as well as key policies of our government. Therefore, planning and construction of the new units should also take into consideration environmental friendliness and ecology protection toward the realization of a green and sustainable power plant.

綠建築標章 Green Building Certificate

5.2.1 台灣綠建築評估及標章(EEWH)
Taiwan Green Building Assessment and Certificate System (EEWH)

我國的綠建築係以台灣亞熱帶高溫高濕氣候特性，掌握國內建築物對生態（Ecology）、節能（Energy Saving）、減廢（Waste Reduction）、健康（Health）之需求，訂定我國的綠建築（EEWH）評估系統及標章制度，並自1999年9月開始實施，為僅次於美國LEED標章制度，全世界第二個實施的系統。另為提昇國內綠建築水準，與國際綠建築接軌，激發民間企業競相提升綠建築設計水準，2007年又增訂完成「綠建築分級評估制度」，其綠建築等級由合格至最優等依序為合格級、銅級、銀級、黃金級、鑽石級等五級，而該分級評估制度除與國際趨勢同步，也是提升綠建築水準的有效策略，同時我國的「綠建築」可重新定義為「生態、節能、減廢、健康的建築物」。

Taiwan's green building assessment and certificate system, the "EEWH", incorporates characteristics of its subtropical climate --high temperature and high humidity--and focuses on ecology, energy saving, waste reduction and health. Its implementation began in September 1999, becoming the second implemented system in the world just after the U.S. LEED system. In order to enhance green building standards in Taiwan, align with international trends and encourage private business participation, the "Green Building Rating System" was added in 2007, with a total of 5 rating levels: Qualified, Bronze, Silver, Gold and Diamond. Aligned with international trends, the rating system is also an effective strategy in enhancing green building standards. A "green building" is thus redefined in Taiwan as an "ecological, energy-saving, waste-reducing and healthy" building.

興達生態電廠建築物及設施詳細面積一覽表
Table of Detailed Area Requirements for Buildings and Facilities

大指標群 Category	指標內容 Content of Indicator	
	指標名稱 Indicator	評估要項 Assessed Items
生態 Ecology	1. 生物多樣性指標 Biodiversity	生態綠網、小生物棲地、 植物多樣化、土壤生態 Ecological green networks, small-creature habitats, biodiversity and soil ecology.
	2. 綠化量指標 Greenery	綠化量、CO_2 固定量 Quantity of greening and CO_2 capture.
	3. 基地保水指標 Soil Water Retention	保水、儲留滲透、軟性防洪 Water retention, storage and permeation and soft flood-prevention measures.
節能 Energy Saving	4. 日常節能指標（必要） Daily Energy Saving (mandatory)	外殼、空調、照明節能 Building envelope, AC and lighting energy saving.
減廢 Waste Reduction	5. CO_2 減量指標 CO_2 Reduction	建材 CO_2 排放量 CO_2 emission from building materials.
	6. 廢棄物減量指標 Construction Waste Reduction	土方平衡、廢棄物減量 Cut-and-fill ratio balancing and waste reduction.
健康 Health	7. 室內環境指標 Indoor Environment	隔音、採光、通風、建材 Sound insulation, lighting, ventilation and building materials.
	8. 水資源指標（必要） Water Resource (mandatory)	節水器具、雨水、中水再利用 Water-saving fixtures and rainwater/graywater recycling.
	9. 污水垃圾改善指標 Sewage & Garbage Improvement	雨水污水分流、垃圾分類、堆肥 Rainwater/wastewater separation, waste classification and composting.

5.2.2 永續建築及綠能的運用
Sustainable Building & Green Energy Application

電廠的開發對環境的影響已是無法避免的課題，如何規劃電廠與自然生態共生，營造友善的環境，與環境和諧共處的空間營造策略，為「永續建築」的重要設計概念，概述如下：

The impact of a power plant on the environment is an issue that cannot be skirted. Key design concepts of "sustainable building" are outlined below, including how to design a plant that is symbiotic with nature, create a friendly environment and shape spaces in harmony with the environment:

a. 永續的內涵就是資源重複使用，長時間循環使用的資源，降低對環境破壞，以周遭環保、構造型式、物理環境，達成建築節能、自然能源之活用，使用建材採用可回收再利用，例如：鋼鐵產品、再生磚、再生玻璃、廢輪胎等，以減低廢棄物產生。

a. At the core of sustainability is the repeated use of resources. Over the long run, recycling and reusing resources reduce environmental destruction. Building energy efficiency and utilization of natural resources may be achieved through environmentally protective measures, structural types and physical environments. Waste may be reduced by using recycled building materials such as steel products, recycled blocks, recycled glass and waste tires.

b. 以多樣化的植栽達到基地綠化，營造廠區綠網促進生態環境豐富度，增加生物多樣性；為深化自然資源與廠區共生的利益，營造友善環境為目標，增進生物可生存的園區，下列三項規劃要點:

b. Diversified planting in site greening helps enrich the ecological richness of the green networks in the plant and enhance biodiversity. The following three key points contribute to the planning of a plant that is symbiotic with natural resources and creates a friendly environment conducive to the survival of living things.

(a) 多孔隙環境之營造 Creating porous environments

(b) 多層次植栽之營造 Creating multi-layered planting

(c) 廠區綠網之營造 Creating green networks

c.綠能的運用

c. Green Energy Application

太陽能光電之導入，包括屋頂太陽能板、太陽能路燈及太陽能熱水系統等，以增加再生能源之運用。

The introduction of solar power, including rooftop photovoltaic panels, solar street lamps and solar water heating systems, helps enhance the use of renewable energy.

太陽能熱水器
Solar Water Heating System

太陽能路燈
Solar Street Lamp

屋頂太陽能光電運用
Rooftop Photovoltaic Application

5.2.3 智慧節能運用 Smart Energy Application

因應資訊化時代的進步，透過無線網路聯結設備智慧系統裝置，提供各式機電控制與環控模式，智慧節能應用系統，整合高效率節能規劃、包含智慧變頻空調、智慧LED照明、智慧風扇、智慧電表、塑造智慧廠辦暨智慧建築之規劃，從電廠的電力、空調、空壓、熱水、照明、污水等系統採用節能儲能減廢方式。

Leveraging advances in an age of information, wireless networks may be used to connect smart systems, enable electrical, mechanical and environmental controls and smart energy saving applications, and integrate high-efficiency energy planning, including smart variant-frequency air-conditioning, smart LED lighting, smart fans and smart meters. In planning a smart plant and smart building, energy saving, energy storage and waste reduction may be applied in various systems including electricity, air-conditioning, air pressure, water heating, lighting and wastewater.

在智慧建築部分：針對建物依據原有設計理念，加入智慧建築節能指標，統包機電工程導入節能設備、系統整合管理系統，實現智慧節能與營運管理的目標。

Smart building: Energy efficiency indicators should be incorporated into the design concepts of the buildings. The electrical and mechanical designs should incorporate energy efficient equipment and a system integration management system to realize the goals of smart operation, management and energy use.

5.2.4 綠色低碳之規劃應用 Low-carbon Planning and Application

配合政府推動之節能減碳計畫，本電廠設計亦應符合綠色低碳之規劃原則，塑造綠建築電廠園區，可採用高效率電器設施、省水衛生設備、低輻射節能玻璃、選用綠建材、外牆材料具更佳隔熱效果、加強自然通風...等，以降低設備散熱量及空調處理量，建築物設計考量節約能源、隔熱節能、冷氣空調、電燈照明等以綠建築及具環保標章、節能及省水...等相關標章之省能設計為原則。

The plant design should adhere to low-carbon planning principles in keeping with the government's energy and carbon cutting initiatives. The plant as a green building should take measures to reduce heat production from equipment and air-conditioning, such as high-efficiency electrical equipment, water-efficient sanitary fixtures, low-E glass, green building materials, better insulated exterior walls and better natural ventilation. The building design should take into consideration energy conservation, thermal insulation, HVAC, lighting and, as a principle, use products with green, energy-saving and water-saving certificates where possible.

第陸章 Chapter 6

規劃準則 Planning Guidelines

6.1 規劃原則 Planning Principles

除本須知所規劃之基本原則外，參賽者須就設計需要提出先進且具創意之景觀及造型設計構想，賦予興達生態電廠更嶄新的風貌。

In addition to the basic principles outlined herein, participants must also propose advanced and creative ideas in landscape and form design to breathe fresh life into the Hsinta Ecological Power Plant.

6.2 規劃整體考量因素 Overall Planning Considerations

6.2.1 地標識別性： Landmark Identity:

電廠設施構造及量體相當龐大，加上高聳的煙囪，型塑了傳統的電廠印象，如何利用其特性，加以創意設計，融入在地文化地景，型塑成為重要地標，且應將地區環境特性及獨特意象納入設計考量。

The large-scaled structures of a power plant together with its tall chimneys are often associated with a very conventional image. Designer of this plant should think about how to infuse creative ideas into the plant's inherent characteristics, blend in local cultural landscapes and shape it into an important landmark. In addition, the local environmental features and the sculpting of a unique image should also be considered.

6.2.2 煙囪設計： Chimney Design:

電廠內最高之構造物為煙囪，本案共須設置3支煙囪(每部機組 1支煙囪)，每支煙囪之構造基本需求如下為原則：

The tallest structures in the plant are the chimneys. There are a total of 3 in this project (1 chimney for each unit). In principle, basic requirements for each chimney are listed below:

高度：至少80公尺

構造：鋼煙筒

直徑： 11m

並應考量維修電梯及樓梯空間，其外觀可視設計須要採鋼構或RC包覆

Height: at least 80m.

Structure: Steel Tube.

Diameter: 11m

Required spaces for one maintenance elevator and stair shall be taken into design consideration.

In the consideration of design, the Steel Tube may be covered by Steel or RC structure.

設計時，應考量其施工之可能性及安全性，同時應將地震及風力之影響納入設計考量。

Participants should consider the feasibility and safety of their construction, in addition to protection against earthquakes and wind.

煙囪之造型設計將對整體景觀帶來相當大之衝擊，參賽者須提出先進且具創意之景觀及造型設計構想，以降低其對環境景觀之影響，並融入周邊環境，將其轉化為本案之特色設計將是本競圖之重大課題。

The form design of the chimneys will have significant impact on the overall landscape. Participants must propose advanced and creative ideas in landscape and form design. A key issue in this competition will be how to reduce this impact on the surrounding environment and landscape, integrate them into the surroundings and transform them into a design feature.

6.2.3具永續性之生態電廠綠建築：
Ecological Power Plant as Sustainable Green Building

因應氣候變遷及世界環境保護的思潮，生態電廠的設置亦應將「永續」及「生態」納入設計考量，以肩負環境維護的責任。並採用再生能源技術（例如太陽能及風力發電等），輔以外部植生牆，落實政府節能省碳政策，成為一棟二十一世紀的環保示範性生態電廠綠建築。

In response to climate change and global awareness in environmental protection, the ecological power plant should also incorporate "sustainability" and "ecology" into its design to carry its part in environmental conservation. Renewable energy technologies should also be deployed (e.g. solar power and wind power generation) and should be supplemented by planted exterior walls. The project should echo the government's policy in energy and carbon cutting and become a demonstrative model for 21st-century ecological power plant.

6.2.4 環境友善策略： Ecofriendly Strategies

傳統電廠之設計往往只著重功能性之考量，因此電廠之傳統機械與冰冷之形象，對於環境及居民往往不是非常友善，如何擺脫此傳統之負面形象，以生態及永續觀念進行設計，同時增加一些友善性設施，創造出更親民及友善之新世代生態電廠。

Conventional power plant designs often focus only on functions, rendering a traditionally cold and machine-like image that is unfriendly to its environment and neighboring residents. The design of this plant should break free from the traditionally negative image, incorporate ecological and sustainable concepts and add friendly facilities toward creating a next-generation ecological power plant that is friendly and approachable.

可考量加入一些觀光休憩設施(如：電力展示館、電廠參觀走道、濕地/野鳥景觀瞭望台、休閒步道...等)，吸引民眾及遊客，亦可設置觀光及友善鄰里空間，提供在地民眾舉辦活動，既可營造友善鄰里之形象，同時維持環境之永續發展。

For instance, some sightseeing or recreational amenities may be added to attract residents and visitors (e.g. Power plant exhibition hall, plant-touring routes, wetland/bird-watching platforms, recreational pathways, etc.). Friendly neighborhood spaces may also be provided as event venues for the locals. These measures not only contribute to the image of a friendly neighbor but also ensure sustainable environmental development.

6.3 設計準則與注意事項
Design Guidelines and Key Points to Note

6.3.1 整體意象之創造： Shaping the Overall Image:

A. 整體意象 Overall Image：

興達生態電廠完成後將成為該區域最高之建築物，亦將成為最重要的視覺景觀焦點，因此透過興達生態電廠整體意象之設計，創造其的獨特魅力，並形塑興達生態電廠成為環境之一員。

Upon completion, Hsinta Ecological Power Plant will become the tallest building in the area as well as the most important visual focus. Therefore, it is especially important to create an overall image that carries unique charm and puts it in harmony with its surroundings.

B. 廠區配置特色 Site Planning Features：

廠區配置如何擺脫傳統以效率及功能為導向之配置，將生態、人文、景觀納入考量，形塑本電廠廠區兼具科技、觀光、休憩、環保、節能、減碳、永續特色之園區。

The site planning should break from the tradition efficiency- and function-centric layout and accommodate ecological, cultural and landscape considerations to create a power plant that also offers technological, tourism, recreational, environmental, energy-efficient, carbon-cutting and sustainability values.

C. 觀景特色 Scenic Features：

應充分利用本案之濕地及古蹟之特色，提供絕佳之觀景休憩功能，配合周邊臨海邊之特色，型塑不同高度、區域、方位之不同的觀景特色，參賽者應充分發揮此特色，創造具特色之觀景空間。

The unique local wetlands and historical architecture should be leveraged to create sightseeing and recreational functions. Participants should take full advantage of the coastal location and create scenic spots and unique spaces from different elevations, locations and orientations.

D. 成為區域觀光入口 Regional Tourist Portal：

以本基地內之濕地及古蹟之特色，結合周邊觀光人文資源，生態電廠完成後將成為本區之觀光入口及遊客進入本區觀光的第一站，因此除作為區域之地標建築外，應塑造本廠區為一個區域觀光入口。

Thanks to the wetlands and historical architecture within the site, which are complemented by surrounding tourism and cultural resources, the ecological power plant has the potential to become a regional tourist portal and the first stop for tourists visiting this region once it is completed. Thus, the plant should be designed as a regional tourist portal as well as a landmark.

E. 指標性綠建築 Benchmark Green Building：

廠房的設置應從各個層面考量綠建築之可能性，包括材料使用、營建方式及建築生命周期...等，儘量增設綠地及使用環保建材，同時利用再生能源技術，落實節能減碳政策，成為一棟具前瞻性的環保示範性廠房。

The various possibilities for green building should be explored, including material use, construction method, building lifecycle, etc. With a view to reinforce the policy of energy and carbon reduction and creating a pioneering eco-friendly plant, green space and green building materials should be maximized and renewable energy technologies utilized.

6.3.2 空間配置： Spatial Planning:

A. 外觀與配置 Appearance and Layout：

生態電廠外觀與配置須能充分反映新世代的生態電廠精神，同時應有別於傳統電廠之設計，提出先進且具創意的設計構想，同時必須與周邊環境相調和，尤其須與濕地與古蹟的特色互相結合，充分表達區域門戶的地標特色。

The appearance and layout of the plant should fully reflect the spirit of a next-generation ecological plant. Pioneering and creative ideas liberated from traditional power plant design should be proposed. At the same time, the plant should be in harmony with its surroundings, with special attention paid to integrate the features of the wetlands and historical architecture and fully express the merit of the project as a regional portal and landmark.

B. 材料使用 Material Use：

興建生態電廠使用之材料，應儘量與地方建築文化相結合，充分表達在地之文化與自然環境之特色，以象徵新世代的電廠精神。

To embody the spirit of a next-generation power plant, the materials used should echo the vernacular architecture wherever possible and celebrate the local cultural, natural and environmental features.

C. 動線設計 Circulation：

動線設計應考量電廠之營運、維護、管理之需求及民眾參觀時之進出動線，尤其是自行車、汽車、觀光巴士之進出與民眾參觀動線須清楚區分，進出廠區相關空間之配置及動線效率亦為設計之重要考量因素。

Design of the circulation should take into consideration the operation, maintenance and management needs of the plant as well as visitors' access routes. In particular, access routes for bicycles, automobiles and tour buses should be clearly separated from visitors' access routes. The layout of spaces relating to plant access and circulation efficiency are also key considerations.

D. 開放空間之視覺串連 Visually Linking Open Spaces：

基地南側為濕地及古蹟，為相當重要之開放空間，不得作任何變動，於配置廠區內之建築物時，應考量與該開放空間之視覺串連，避免形成阻礙，影響民眾觀景之視野。

The south side of the site is flanked by wetlands and historical architecture. They are extremely important open spaces and may not be modified. When laying out buildings within the plant, visual links should be made with these spaces to avoid creating obstacles that block views.

E. 造型量體 Form and Massing：

興達生態電廠的設計造型量體，必須要考量從周邊各個角度遠眺之視點，包括由高速公路及空中鳥瞰時，遊客由遠至近的視覺序列，形塑獨特之魅力。同時應考慮建築物量體對周遭環境之影響，尤其是對濕地及古蹟所產生之影響。

The form design and massing of the plant must carry unique charm when viewed from various angles and distances, including the visual sequence from far to near when viewing from the highways and the sky. Meanwhile, effect of the building massing on the surrounding environment, especially the wetlands and historical architecture, should also be considered.

F. 周邊人文環境之結合 Integrating with the Surrounding Cultural Environment：

充分利用興達生態電廠的特色，結合周邊之人文環境特色，創造聚焦景點，同時帶動區域之商業及觀光活動。

Leveraging features of the ecological power plant, the surrounding cultural environment should be integrated to create focal points and destinations while boosting commercial and tourist activities in the area.

G. 色彩計畫 Color Scheme：

電廠設施對視覺景觀影響較高的為量體大的「汽輪機房」、「熱回收鍋爐」、「氣渦輪機房」、「電氣設備房」及高聳的「煙囪」，設計時應將周邊環境之色彩特色(如永安鹽田濕地及古蹟)納入考量，以融入整體環境。

Plant facilities having greater impact on the visual landscape include those with greater masses, such as the "steam turbine room", "heat recovery boilers", "gas turbine room", "electrical room" and tall chimneys. The palette of the surroundings (e.g. Yongan Salt Field Wetlands and historical architecture) should be considered in the design for better integration into the overall environment.

6.3.3 節能及綠能設計： Energy Saving Design：

A. 節能設計：基地位於亞熱帶地區，夏天氣候炎熱，一年需要使用冷氣之時間長達半年以上，參賽者應考慮建築物能源之節省問題。

A. Energy saving design: The site has a subtropical climate and requires air conditioning for more than half of the year, so the designer should give careful consideration to energy saving issues.

B. 遮蔭空間：基地地區夏天陽光充足，氣溫偏高，參賽者應提供大量的半室外遮蔭空間，以滿足遊客及居民活動之須要，並充分反映在地環境之特色。

B. Shaded area: The site has abundant sun and hot summers, so extensive shaded areas and semi-outdoor spaces should be provided to accommodate the activities of visitors and residents and adequately reflect the local climatic conditions.

C. 綠能設計：配合基地氣候之特色及世界替代能源的潮流，應積極運用綠能系統（太陽能、風力發電...等）之特色，納入設計考量，除能符合節能減碳之世界潮流，成為一棟二十一世紀的環保示範性建築。

C. Green energy design: Green energy systems (e.g. solar and wind power, etc.) should be incorporated into the design as part of the global effort in energy conservation and carbon reduction and to make the project a 21st-century model for green building.

D. 燈光計畫：參賽者應特別考量本案之高度特性，整體燈光計畫應特別納入設計考量。

D. Lighting Plan: The unusual height of this project should be considered and special attention should be paid to the design of the overall lighting scheme.

6.3.4 交通動線： Circulation:

以本案之地標及設計特性，可能吸引相當多之參觀民眾，為避免造成對基地及周邊環境過大之交通衝擊，參賽者應特別考量人潮動線的設計，出入口應特別妥善配置，以避免造成交通擁擠。行人、汽車、巴士之出入動線應分別規劃，分散出入動線。

The landmark nature and special design of the project are bound to attract crowds of visitors. To avoid excessive impact on traffic within and around the site, pedestrian circulation should be carefully planned and entry and exit points tactfully arranged. The entry and exiting routes for pedestrians, cars and buses should all be separated to disperse the crowds.

6.3.5 其他必要空間： Other Required Spaces

除本競圖須知所列面積表外，參賽者應就其專業知識，另外自行酌加適當的必要空間。

The designer should use professional judgment to add any necessary spaces to the brief program as appropriate.

6.4公共藝術 6.4 Public Art

參賽者應於規劃設計時朝向將本案建築物作為公共藝術建築地標之方向進行設計。

The proposed design shall strive to make public art out of the architecture itself.

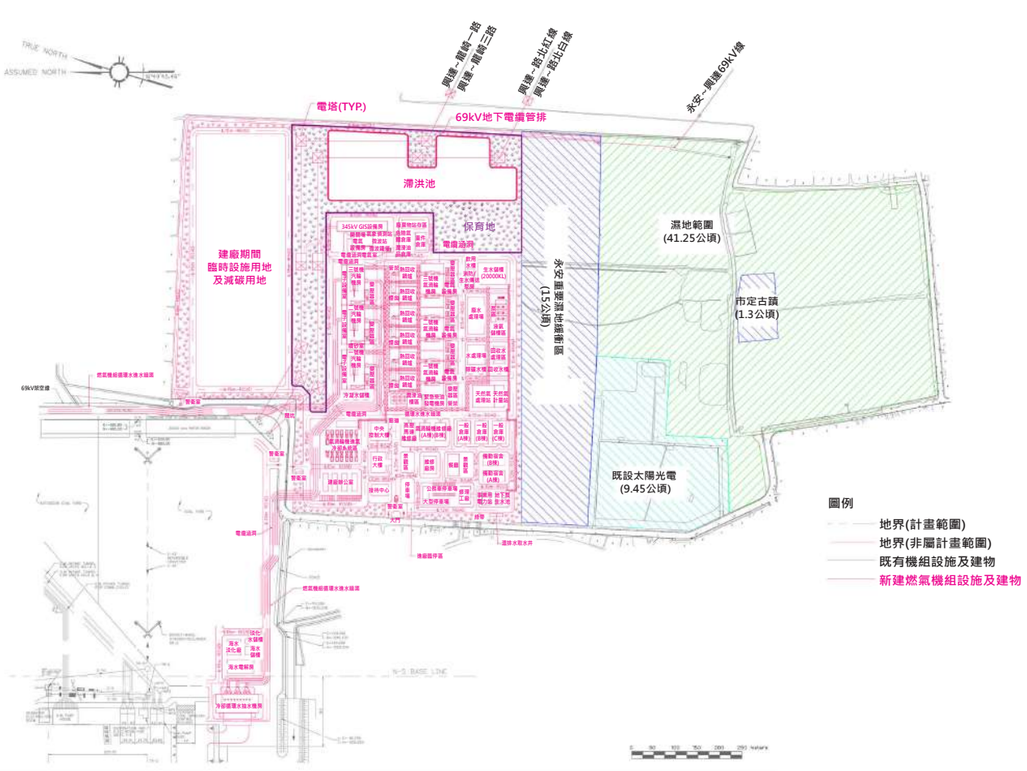
6.5 初步規劃參考方案
Reference Proposals from Preliminary Planning

提供本案先期規劃之參考方案，內容僅作為參考，參賽者應就其設計之構想，提出規劃設計圖說。

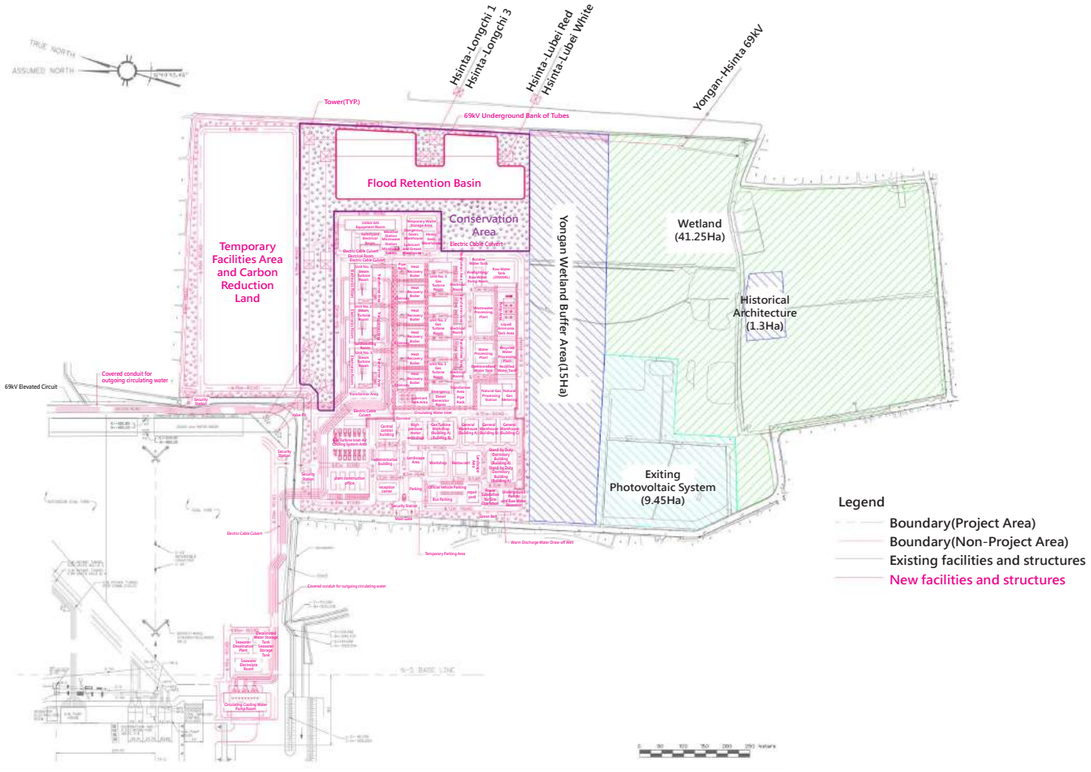
Proposals resulting from preliminary planning for the project are provided herein for reference by participants. The content is for reference only; participants should propose design and planning drawings based on their own ideas.

為簡化本競圖之設計，參賽者無須依提供之參考方案，細分空間內容，僅須依各區域之空間特性(各分區佈置考量因素請參閱4.2.4)，提出各分區規劃及量體配置即可(各分區面積及量體大小請參閱5.1.1)。

To simplify the design, tenderers do not need to show detailed arrangement of the individual spaces according to the proposals. They need only submit planning and massing for the various areas (see 4.2.4 for considerations in laying out the areas and 5.1.1 for their area and volume requirements).



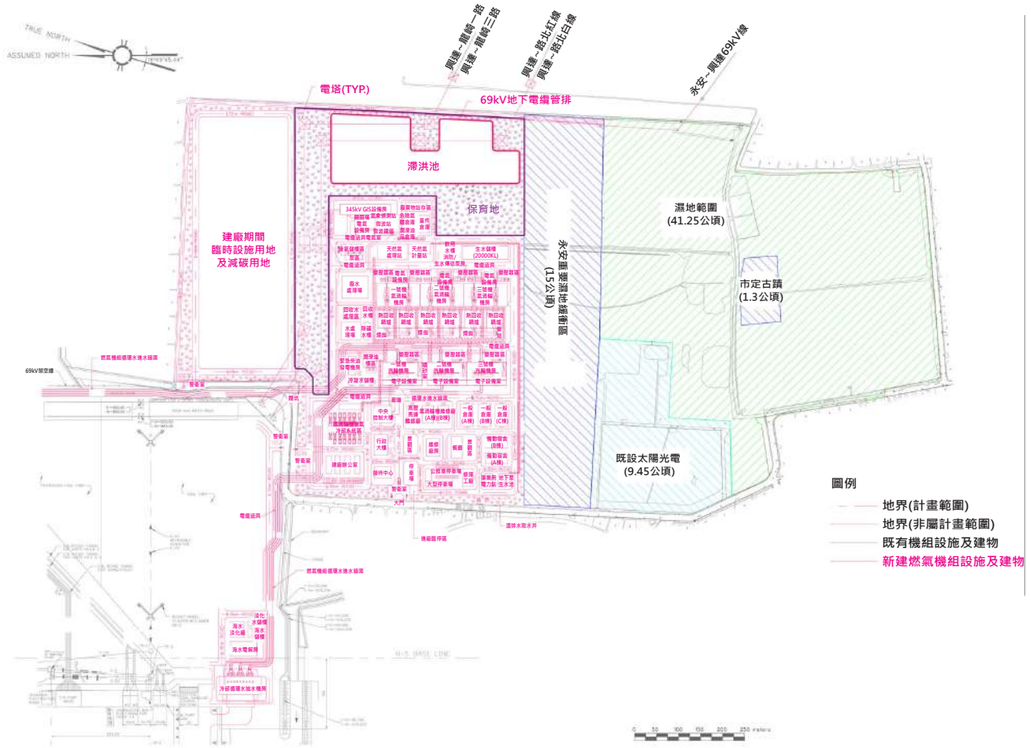
方案A 三部2配1燃氣複循環機組佈置圖(主發電設備南北座向)



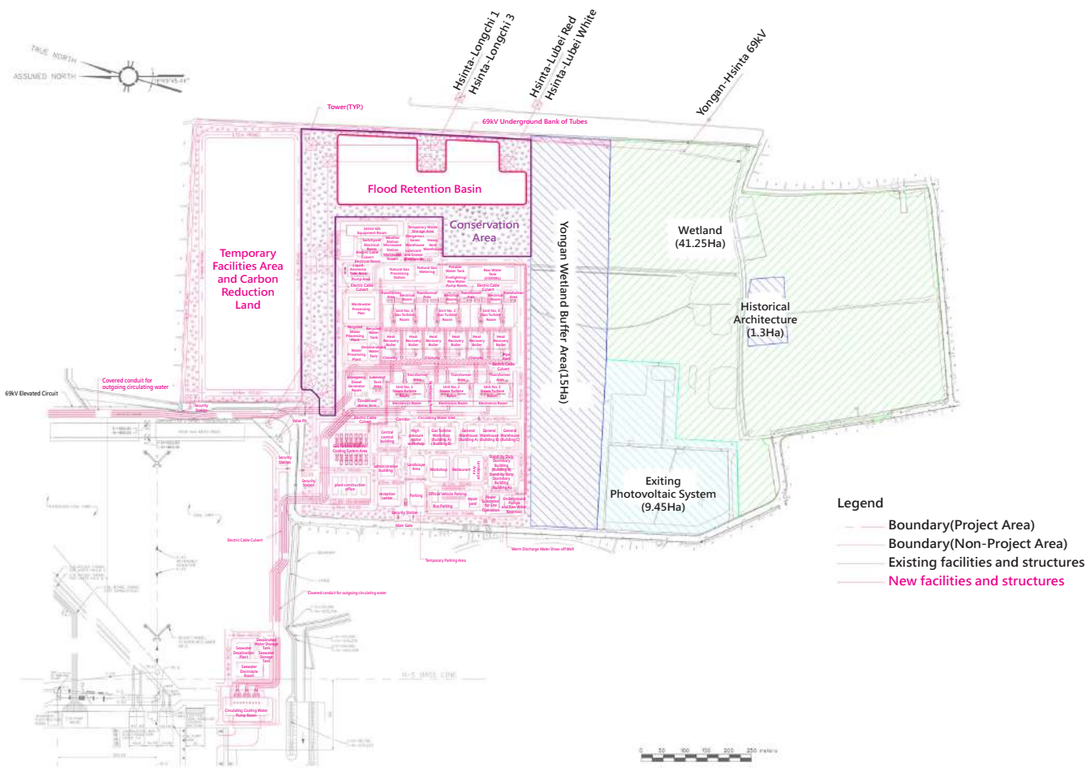
Proposal A. Layout of 3 Units of 2+1 CCGT (primary power generation system oriented north-south)

興達 HSINTA ECOLOGICAL POWER PLANT CONSTRUCTION PROJECT CONCEPTUAL DESIGN INTERNATIONAL COMPETITION

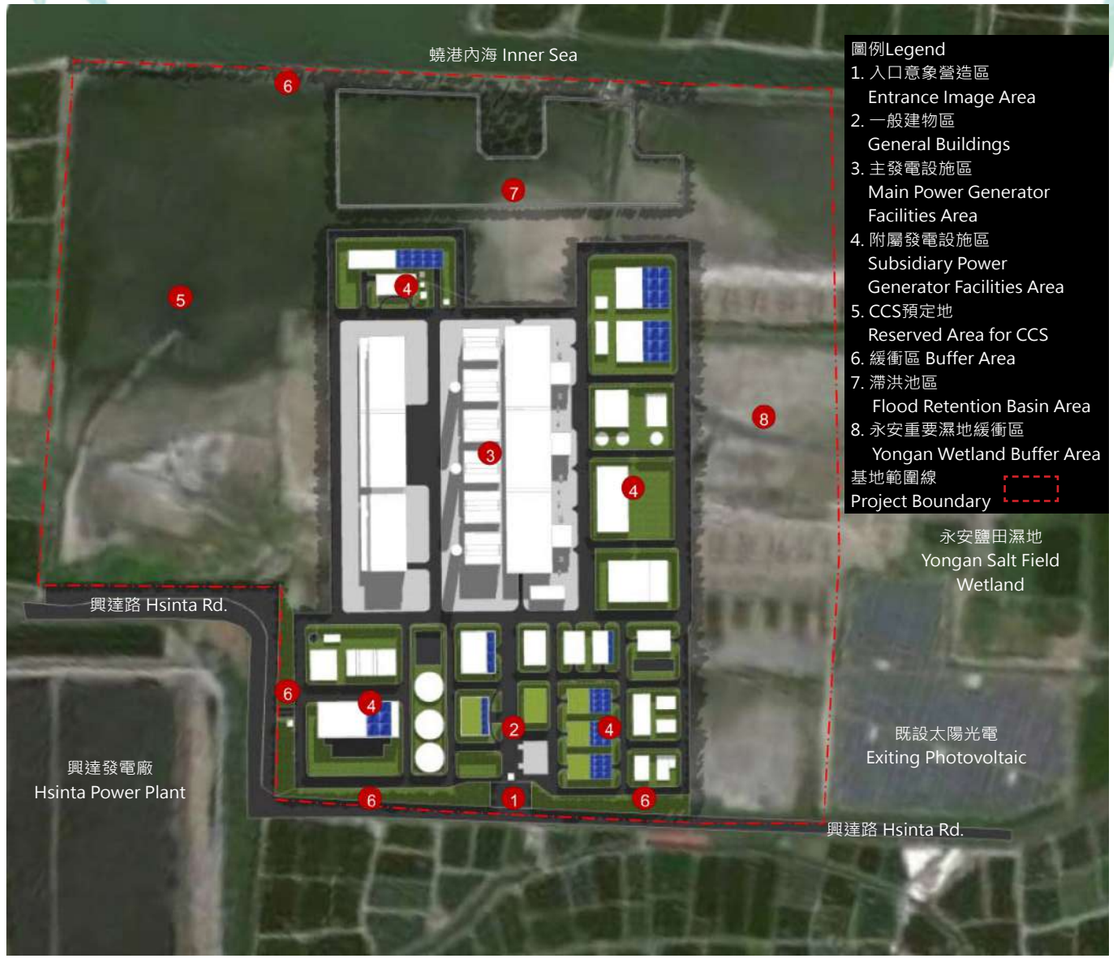
興達生態電廠興建計畫概念設計國際競圖



方案B 三部2配1燃氣複循環機組佈置圖(主發電設備東西座向)



Proposal B. Layout of 3 Units of 2+1 CCGT (primary power generation system oriented east-west)



規劃分區圖鳥瞰圖
Aerial View of the Areas

興達 HSINTA ECOLOGICAL POWER PLANT CONSTRUCTION PROJECT CONCEPTUAL DESIGN INTERNATIONAL COMPETITION 生態電廠興建計畫概念設計國際競圖

6.5.1 方案A：「烏樹領航」 Proposal A: Wushu Leading the Way

規劃構想圖
Conceptual Drawing

西向立面 West Elevation

東向立面East Elevation

北向立面North Elevation

南向立面South Elevation

各向立面示意圖
Elevation Diagrams

6.5.2 方案B：「鹽田飛羽」 Proposal B: Taking Flight in the Salt Fields

規劃構想圖
Conceptual Drawing

西向立面 West Elevation

東向立面East Elevation

北向立面North Elevation

南向立面South Elevation

各向立面示意圖
Elevation Diagrams

全區景觀鳥瞰圖—西面
Aerial View of the Entire Site — West

全區景觀鳥瞰圖—北面
Aerial View of the Entire Site — North

全區景觀鳥瞰圖—東面
Aerial View of the Entire Site — East

全區景觀鳥瞰圖—南面
Aerial View of the Entire Site — South

興達 HSINTA
ECOLOGICAL
POWER PLANT
CONSTRUCTION
PROJECT
CONCEPTUAL DESIGN
INTERNATIONAL
COMPETITION

興達生態電廠興建計畫概念設計國際競圖

II. 規劃設計背景說明
II. Background Information for the Project

興達 HSINTA ECOLOGICAL POWER PLANT CONSTRUCTION PROJECT CONCEPTUAL DESIGN INTERNATIONAL COMPETITION
生態電廠興建計畫概念設計國際競圖

目錄 Table of Contents

Note: The English translation is intended for reference only. If any discrepancy exists between the Chinese and English versions, the Chinese version shall govern unless the Competition Documents specify otherwise.

第壹章 Chapter 1

臺灣概況 Profile of Taiwan

1.1 地理環境 Geographic Environment

1.1.1 位置 Location

臺灣位於北緯21°53′ 50″與25°18′ 20″之間、東經120°01′ 00″與121°59′ 15″之間，北迴歸線經過臺灣島中部，因此全島為典型海洋與亞熱帶季風氣候。

Taiwan is located between latitude 21°53′ 50″ and 25°18′ 20″ degrees north and longitude between 120°01′ 00″ and 121°59′ 15″ degrees east. As Tropic of Cancer passes through central Taiwan, the island is shrouded in typical oceanic and sub-tropical monsoon climate.

中華民國（臺灣）位於西太平洋上，西臨臺灣海峽，與中國大陸遙遙相望。北邊隔東海與日本琉球群島相接，東邊為太平洋，南則隔巴士海峽與菲律賓相鄰。為西太平洋阿留申群島、千島群島、日本、琉球、菲律賓等眾多島嶼所形成的島之一。

Taiwan, Republic of China is located in the Western Pacific Ocean. To the west, it faces the Taiwan Straight and China is on the other side of the Straight. To the north is East Ocean and Okinawa, Japan. To the east is the Pacific Ocean and to the south are the Bashi Channel and the Philippines. Taiwan is one of the chains of many islands, including Aleutian Islands, Thousand Islands, Japan, Okinawa and the Philippines.

臺灣地理位置圖
Geographic Location of Taiwan

臺灣地理位置圖
Geographic Location of Taiwan

1.1.2 地形 Topology

臺灣土地面積約36,179平方公里，本島長約394公里，最寬處144公里；海岸線總計長達1,566公里（包括澎湖群島），平順且完整。

Taiwan has approximately 36,179 km2 in area. The length of the island is 394 km and the widest part is 144 km. The total length of the coastline is 1,566 km (including Penghu Islands). The coastline is smooth and intact.

臺灣島中心軸線為南北走向之山脊，有許多山峰高達3,000公尺以上，31%為1,000公尺以上陡峭的高山（最高的山峰---玉山：海拔3,952公尺）；38%為海拔100~ 1,000公尺之間的丘陵與台地，另外31%則為海拔100公尺以下的沖積平原，大多數為人口、農業、及工業密集區。其他地形尚有火山、梯田、海岸平原及盆地等。

The central axis of Taiwan is mountains extending from north to south. Many peaks are over 3,000 meters in height. The mountains towering over 1,000 meters account for 31% of the area (with the highest peak, Mt. Jade, reaching 3,952 meters in height). The hills and tablelands ranging from 100 to 1,000 meters in altitude account for 38% of the area. The remaining 31% area is occupied with alluvial plains below 100 meters in altitude. These plains are mostly densely populated with people, industries and agricultural developments. Other terrains are volcanoes, terrace fields, coastal plains and basins.

臺灣地形圖
Topology of Taiwan

1.2 自然環境 Natural Environment

1.2.1 氣候 Climate

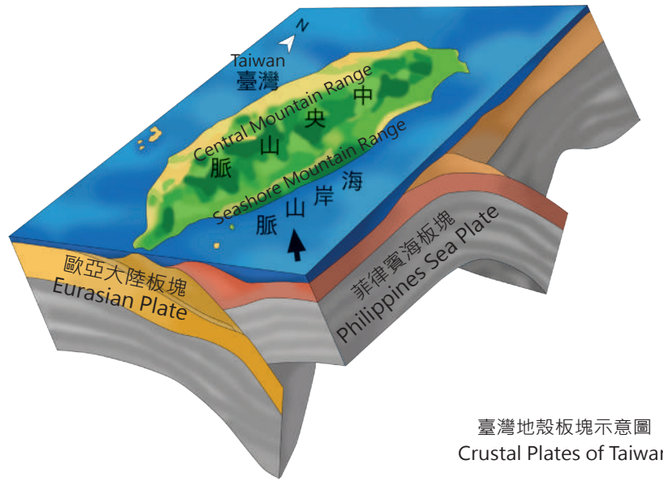
5月到9月為臺灣的夏季，氣溫約在攝氏27~37度之間，冬季較短也較溫暖。由於四面環海，氣候濕潤，平均相對濕度達80.6。年降雨量約在2,500公厘。夏季常有颱風。

TSummer in Taiwan starts in May and ends in September. In summer, the temperatures are in the range of 27~37℃. Winter tends to be short and warm. Taiwan is surrounded by seas so the climate is humid, with the average relative humidity of 80.6. The annual rainfall is approximately 2,500mm. Typhoons are frequent in summer.

1.2.2 地震 Earthquakes

臺灣位於環太平洋地震帶上，並處在菲律賓海板塊西側的馬尼拉與琉球海溝交界處，故地震活動十分頻繁。菲律賓海板塊及歐亞大陸板塊每年約以七到八公分的速度聚合。

Located in the Circum-Pacific seismic zone and situated at the interconnection between Manila Trench and Ryukyu Trench on the western edge of the Philippines Sea Plate, Taiwan experiences frequent earthquakes. The Philippines Sea Plate and Eurasian Plate are converging at the rate of 7~8cm per annum.



臺灣地殼板塊示意圖
Crustal Plates of Taiwan

1.3 人文環境 Cultural Environment

1.3.1 民主 Democracy

五十幾年來臺灣人民經由和平漸進的「寧靜革命」，一步步實現民主自由的理念，同時又能夠維持國家安定、經濟成長及社會穩定。2004年臺灣舉辦全民直選總統及立法委員，並進行第一次全民公投，臺灣持續捍衛民權及鞏固民主的努力也贏得國際肯定。

Over the past five decades, Taiwanese people have step by step achieved freedom and democracy through a peaceful and gradual "quiet revolution" while all the time maintaining political stability, economic growth and social order.

1.3.2 經濟 Economy

臺灣農業在GDP中的比重從1952年的35%下降到2%。傳統勞動密集型工業已經漸漸由高科技產業取代。臺灣的電子工業對世界經濟舉足輕重，大多數電腦電子零組件都是在臺灣生產的。105年服務業占GDP比重達63.15%，占總就業人數比重達59.17%，顯示服務業已為我國經濟活動之主體，亦為創造就業主要來源。

The percentage of agriculture in Taiwan declined from 35% in 1952 to 2%. The traditional labour-incentive industries have been gradually giving way to the high-tech industries. The electronics industry is Taiwan plays an important role in the global economy, as most IT components are made in Taiwan. In 2016, the service sector accounts for up to 63.15% of the GDP and 59.17% of jobs, indicating it has become the backbone of our economy as well as the main source of employment.

1.3.3 文化 Culture

臺灣在過去十年的政治民主化及經濟繁榮已引發一種多元文化環境，視覺、表演及文學藝術在此環境中生根茁壯。臺灣的藝術發展在戰後數十年與傳統中國文化密不可分，然而受到臺灣本土意識所驅動的藝術家及作家，現在越來越強調創作具有地方色彩的作品。2010年文化創意產業法的實施，將致力於保存臺灣的文化多樣性與遺產、推動地方社區的文化活動、發展相關產業、建立並擴展地方藝術設施。

Political democratization and economic prosperity in Taiwan in the past decade or so have brought about a pluralistic cultural environment in which visual, performing, and literary arts take root and flourish. While Taiwan's artistic development in the postwar decades was intimately interwoven with traditional Chinese culture, its artists and writers, driven by a sense of a Taiwan identity, are now placing increasing emphasis on creating works with local hues. Today's artists develop unique styles by combining traditional and contemporary elements, and Eastern and Western concepts. In 2010, the Taiwanese government passed Law for the Development of the Cultural and Creative Industries. With the efforts from the public and private sectors, the cultural and creative industries in Taiwan should promise prosperity.

1.3.4 教育 Education

中華民國憲法編列國家教育預算為百分之15，6到21歲人口的總入學率達百分之96.77。為了改善國家競爭力，政府已強調多元化及綜合教育制度，以培育高教育程度的人力。

According to the Constitution of the Republic of China, education should account for 15% of the national budgets. The percentage of the population aged between 6 and 21 going to schools is as high as 96.77%. To enhance its national competitiveness, the Taiwanese government emphasizes diversity and variety in the education system in order to develop human capital with higher education.

1.3.5 科技 Technology

根據瑞士洛桑管理學院（IMD）「2017年IMD世界競爭力年報」（IMD World Competitiveness Yearbook），在63個受評比國家，台灣排名第14。在亞太地區排名第3，僅次於香港、新加坡。同時，臺灣整體上網率達84.8%（2016.09統計），為全球第28。

According to the IMD World Competitiveness Yearbook, Taiwan ranks 14th among 63 assessed countries and 3rd in the Asia Pacific just after Hong Kong and Singapore. Meanwhile, Internet penetration rate in Taiwan is 84.8% (September 2016 data), ranking 28th in the world.

1.3.6 人口與族群 Population and Ethnicity

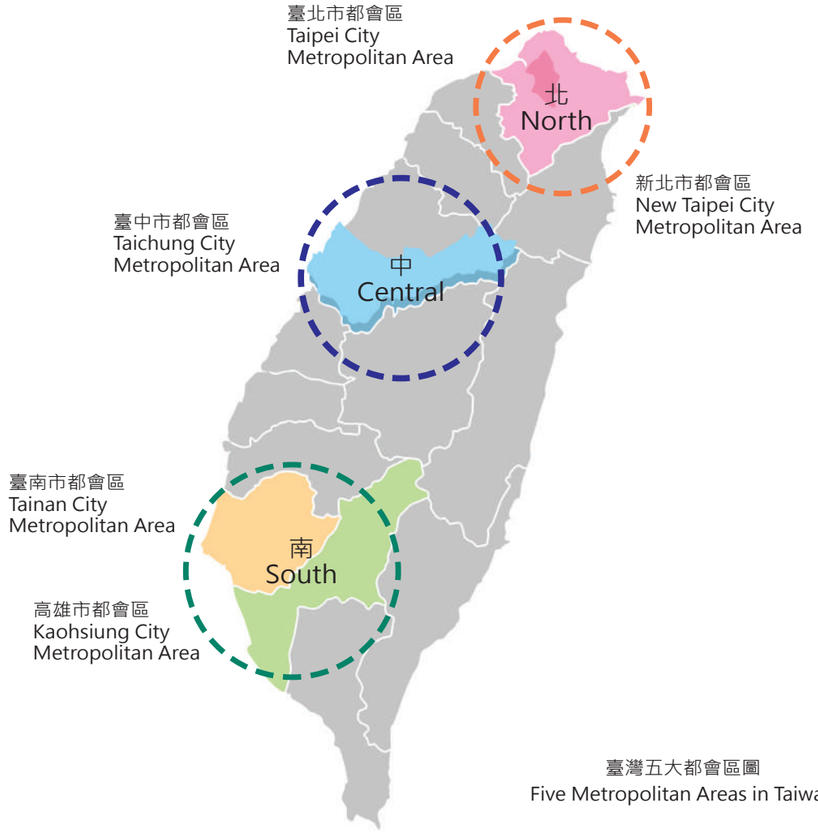
人口概況截至105年底，台灣的總人口數為2,353萬9,816人，大部分集中在五大都會區，占總人口之69.05%。臺灣的人口中以漢人為最大族群，約占總人口97%，其他2%為16族的臺灣原住民(臺灣原住民共有泰雅族、賽夏族、布農族、鄒族、邵族...等16族)，另外1%包括來自中國大陸的少數民族及已設戶籍之大陸港澳配偶及外籍配偶。

As of the end of 2016, the total population in Taiwan is 23,539,816. Most (69.05%) live in the five major cities. Han Chinese take up the highest ratio at 97%, with the 16 Taiwanese indigenous peoples (including Atayal, Sakizaya, Bunun, Tsou, Thao, etc.) taking up 2%, and Chinese minority peoples and spouses from Mainland China, Macau, Hong Kong and other countries accounting for the remaining 1%.

1.4 都會發展結構 Metropolitan Development Structure

地形上由於中央山脈的阻隔，大致上可劃分為西半部及東半部兩大發展區塊，由於西半部的面積較大，發展較東半部快，人口大部份都居住於此。西半部的發展，可大致分為北、中、南部三大都會區發展，分別為北部的「臺北市都會區」、「新北市都會區」、中部的「臺中市都會區」及南部的「臺南市都會區」、「高雄市都會區」。

Because of the Central Mountain Range, Taiwan can be divided into two halves of metropolitan development. Because the western side has more flatlands and was developed faster than the eastern side, most of Taiwan’ s population is concentrated there. The west side’ s development can be further divided into northern (Taipei Metropolitan Area), central (Taichung Metropolitan Area), and southern (Tainan Metropolitan Area, Kaohsiung Metropolitan Area) regions. Taipei City, Taichung City, Tainan City and Kaohsiung City are each the cores of development for their respective areas.



臺灣五大都會區圖
Five Metropolitan Areas in Taiwan

第貳章 Chapter 2

中華民國能源政策概述
An Overview of Energy Policy in the Republic of China (Taiwan)

行政院於105年9月17日發布「為邁向2025非核家園目標，推動新能源政策」新聞稿指出，能源轉型與電業改革以長短期策略相互搭配，確保電力供應；同時積極推動節約能源及擴大 再生能源發展，全面推動包括節能、創能、儲能及智慧系統整合等措施，希望帶動新興綠能產業發展與促進綠色就業，引領產業與全民共同朝非核家園邁進。

gressively pursued and measures to be taken include the conservation, creation and storage of energy and integration of smart systems. The measures are aimed at propelling development in the green energy sector and creating green job opportunities, as the government leads the industry and the general public toward realization of nuclear-free home.

新能源政策具體作為包含：

The government's new energy policy includes the following specific measures:

(1) 穩定開源及擴大需量管理，確保供電；

(2) 推動節能極大化，提升能源使用效率，抑低電力需求成長；

(3) 積極多元創能，促進潔淨能源發展；

(4) 加速布局儲能，強化電網穩定度；

(5) 推動智慧電網與智慧電表布建；

(6) 培養系統整合，輸出國外系統市場，拓展自主綠能產能；

(7) 完成電業法修法及檢討電價機制，提供能源轉型所需的市場結構與法制基礎等七項具體作為，以啓動能源轉型與電業改革，帶動自主綠能產業發展。

(1) Stabilize the sources of energy and expand demand management to secure power supply;

(2) Maximize energy conservation, enhance energy efficiency and suppress growth in power demand;

(3) Actively pursue a variety of energy sources and enhance the development of clean energy;

(4) Accelerate energy storage deployment and bolster grid stability;

(5) Deploy smart grid and smart meters;

(6) Implement system integration, export systems to oversea markets and enhance capacity in self-sufficient green energy;

(7) Complete amendment of the Electricity Act and review electricity pricing mechanisms to provide the necessary market framework and legal foundation for energy transformation. These seven specific measures will help initiate energy use transformation and utility reform and spearhead the autonomous development of green energy.

(資料來源請參閱網址Source:http://www.ey.gov.tw/News_Content2.aspx?n=F8BAEBE9491FC830&s=5DC876427A861AE2)

為全力推動我國發展綠能，並啟動國家能源轉型工程，政府業已完成電業法修正，並於106年1月26日由總統公布施行，以作為建構「能源轉型及電業改革」之市場機制與法制基礎， 重新架構我國電力市場運作方式，營造有利綠能發展之環境。

In order to put full support behind the development of green energy and initiate energy use transformation at the national level, the government has completed amendment of the Utility Act, which was promulgated by the President on January 26, 2017. This will serve as the market framework and legal foundation for energy use transformation and utility reform, restructure our electricity market and create an environment conducive to developing green energy.

面對國內外能源環境快速變遷，經濟部於106年5月16日對外說明能源轉型路徑規劃，以長短期策略相互搭配，引領產業跟全民共同朝114年非核家園，以及再生能源發電占比提升為20%、天然氣發電占比提升為50%、燃煤發電占比降為30%目標邁進。

In the face of rapid changes in energy environments local and abroad, the Ministry of Economic Affairs made a public briefing of its roadmap for energy use transformation on May 16, 2017. A combination of long- and short-term strategies will be deployed, as the government leads the industry and the general public toward realization of nuclear-free home by 2025. The goal is to raise the ratio of power generation from renewable sources to 20%, increase natural gas to 50%, and reduce coal to 30%.

政府為打造潔淨能源結構與營造永續能源發展環境，我國能源轉型，以發展無碳再生能源與擴大低碳天然氣使用，逐步降低燃煤發電比例為路徑，包含：

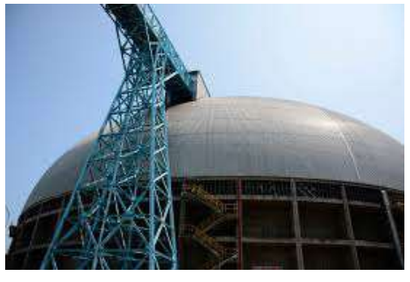
To ensure a sound structure for clean energy and sustainable development, the roadmap for energy use transformation will include the development of carbon-free renewable energy, increased use of low-carbon natural gas and incremental decrease in the ratio of coal-fired electricity generation, as detailed below:

(1) 再生能源： 以技術成熟可行、成本效益導向、分期均衡發展、帶動產業發展及電價影響可接受為原則，擴大設置再生能源，發展路徑由2016年發電量占全國總發電量比例約4.8%，於109年提高至9%，並於2025年達成20%目標。

(1) Renewable energy: Use of renewable energy is to be expanded on the principles of mature and feasible technology, cost-effectiveness, phased and balanced development, promotion of industry growth and tolerable impact on electricity price. The ratio of this source was 4.8% in 2016 and will be raised to 9% in 2020 and route to the final goal of 20% by 2025.

(2) 燃氣發電：推動新建或擴建天然氣電廠並採高效率複循環機組，其發電效率可達62%(現有燃氣機組平均效率約為51%)，同時新設或擴建液化天然氣卸收、輸儲設備，並確保如期完工運轉，發展路徑由2016年發電量占全國總發電量比例約32.4%， 於2020年提高至33%，並於2025年達成50%目標。

(2) Power generation from natural gas: New natural gas power plants will be built and existing ones expanded. High-efficiency combined cycle gas turbine units will be used, which have an efficiency of 62% (the average efficiency of existing gas units is 51%). New or expanded facilities for loading/unloading, transmitting and storing liquefied natural gas will also be constructed while ensuring their timely completion and operation. The ratio of this source was 32.4% in 2016 and will be raised to 33% in 2020 and route to the final goal of 50% by 2025.



(3) 燃煤發電：為確保能源轉型過程中電力供應穩定，將燃煤發電作為重要基載電力，於未來能源結構中維持適度燃煤，同時透過燃煤電廠汰舊換新並採超超臨界高效率機組，其發電效率可達45%(既有燃煤機組平均效率僅38%)，並以彈性調度，逐步降低燃煤發電占比，發展路徑由2016年發電量占全國總發電量比例約45%，2020年因核一及核二除役過程中，替代之再生能源裝置容量與天然氣發電機組尚未及趕上，爰總發電占比略升，在2020年為50%，惟至2025年占比降至30%以下。

(3) Power generation from coal: To ensure stable power supply in the interim, coal will be used as an important fuel. Moderate ratio of coal will be maintained in the future energy structure, while old units will be replaced with high-efficiency ultra-supercritical units, which have an efficiency of 45% (the average efficiency of existing coal-fired units is only 38%). A flexible deployment approach will be taken to incrementally reduce the ratio of this fuel starting from 45% in 2016. However, the ratio will be slightly increased to 50% in 2020 while Nuclear Power Plant No. 1 & No.2 are being decommissioned and replacement installed capacity and natural gas units are still being added. The ratio will be drop to under 30% by 2025.

(4) 核能發電：推動既有核電廠(核一、二、三)不延役，核能發電設備應於2025年以前，全部停止運轉，另依「核子反應器設施管制法」規定於預定永久停止運轉前3年提出除役計畫，同時核四廢止，於2025年達成非核家園目標。

(4) Nuclear power generation: A plan will be implemented to prevent extended use of Nuclear Power Plants No. 1, 2 and 3 and terminate operation of all nuclear units by 2025. In addition, a decommissioning plan should be submitted 3 years before the scheduled permanent operation stop in accordance with the "Nuclear Reactor Facilities Regulation Act". In the meantime, Nuclear Power Plant No. 4 is to be terminated. The goal is to achieve nuclear-free home by 2025.

(資料來源請參閱網址Source:https://www.moea.gov.tw/MNS/populace/news/News.aspx?kind=1&menu_id=40&news_id=65977)

第參章 Chapter 3

認識臺灣電力公司
Introduction to Taiwan Power Company

3.1 歷史與發展 History and Development

台灣電力公司 Taiwan Power Company TPC

3.1.1 前言 Foreword

電力是現代化生活的基石，也是經濟發展的動力，不論是一般傳統產業或是新興高科技產業無不以電力為動力。70多年來台電提供民生及經濟發展所需之充足電力，輸配電網路更已經深入台灣地區每一個角落，台電每天都與2千3百萬同胞生活緊密結合在一起。

Electricity is the foundation of modern life and the driving force behind economic development; both traditional and emerging high-tech industries rely on electrical power. TPC has dedicated itself to securing sufficient energy supply for both domestic needs and economic development for over 70 years, its distribution network now extended to every corner of Taiwan. TPC is closely tied with every life in Taiwan's population of 23 million, every single day.

3.1.2 發展歷程之回顧 Development History

台灣光復後，政府致力於台灣地區電業之發展，其沿革時期可劃分如下：

a. 接管修復時期（民國34年至42年）：水力為主

b. 初步擴充時期（民國43年至54年）：水火並重

c. 火力高度開發時期（民國55年至63年）：火主水從

d. 核能發電發展時期（民國64年至74年）：能源多元化

e. 促進電力供需平衡時期（民國75年至82年）：需求面管理

f. 開放發電業時期（民國83年至95年）：開放民間經營發電業

g. 節能減碳時期（民國96年迄今）

The government has stay committed to the development of the power industry in Taiwan since the liberation of Taiwan from Japanese rule. The evolution may be classified into the following periods:

a. Liberation and restoration (1945-1953): focus on hydro

b. Initial expansion (1954-1965): equal focus on hydro and fuel-fired

c. Rapid advancement on fuel-fired (1966-1974): fuel-fired complimented by hydro

d. Development of nuclear power (1975-1985): diversified energy source

e. Promotion of supply-and-demand balance (1986-1993): needs management

f. Private power generation legalized (1994-2006): power generation open to private sector

g. Energy and carbon conservation (2007-present)

3.1.3 未來展望 Future Vision

台電公司身為國營公用事業，肩負穩定供電、友善環境與維持合理成本電價之使命，以提供企業與民生發展所需基礎條件。在電業法通過後，開放綠能直供，與推動能源轉型逐步減核邁向114年非核家園之政府政策目標下，本公司將配合推動以下重點工作，力求穩定供電：

a. 穩定電力供應

b. 再生能源開發

c. 加強供電品質

d. 建立綠色企業

e. 落實顧客服務

f. 善盡社會責

As a public utility company, TPC is entrusted with the mission of stable power supply, eco-friendliness and reasonable electricity cost in order to fulfill the basic conditions of corporate and domestic development. We are working

toward the goals of direct supply of private green energy to the customer following passing of the Electricity Act and the government's policy of 2025 nuclear-free home. Our key areas of work to ensure stable power supply include the following:

a. Stabilize power supply

b. Develop renewables

c. Improve quality of supply

d. Establish green corporation

e. Ensure customer service

f. Fulfill social responsibility

3.2 使命願景與經營理念
Mission, Vision and Management Philosophy

使命：以友善環境及合理成本的方式，提供社會多元發展所需的穩定電力

願景：成為卓越且值得信賴的世界級電力事業集團

經營理念：誠信、關懷、服務、成長

Mission: Supply the necessary stable electricity required for diversified development of society using an eco-friendly and cost-effective approach

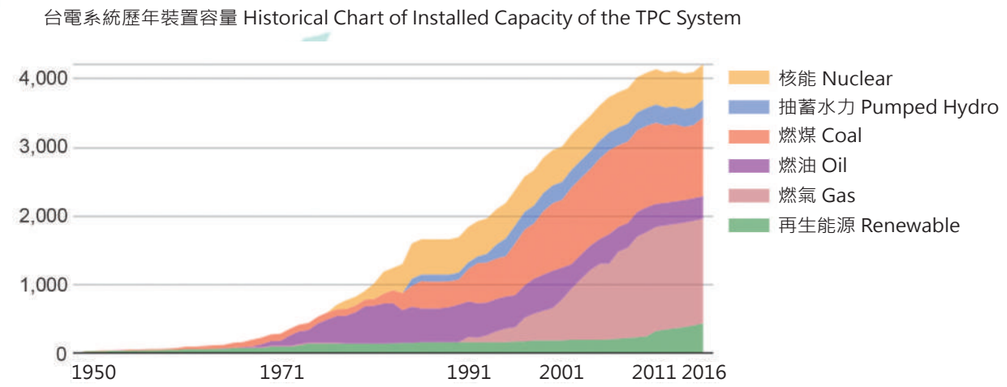
Vision: Become a trust-worthy world-class utility group with excellence

Management Philosophy: Integrity, Caring, Service, Growth

更詳細內容請參閱台灣電力公司網站：http://www.taipower.com.tw/

For further information, please visit Taiwan Power Company web site at: http://www.taipower.com.tw/e_content/index.aspx

3.3 歷年裝置容量占比
Historical Chart of Installed Capacity Ratio of the TPC System



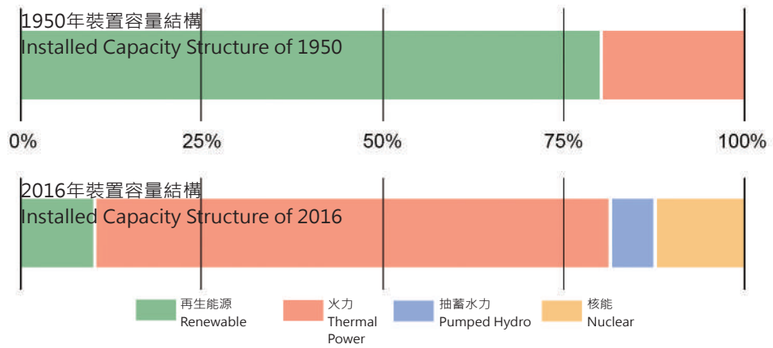
年 Year	再生能源 Renewable	燃氣 Gas	燃油 Oil	燃煤 Coal	抽蓄水力 Hydro	核能 Nuclear
105	432.13	1,524.5	332.31	1,149.71	260.2	514.4

臺灣光復初期的電力供應是「水主火從」，水力發電多於火力發電，民國40年代初期水力與火力占比約為80%比20%。之後人口逐年增加，經濟成長迅速，用電需求增加，水力發電無法滿足用電需求，開始擴大火力電廠的開發，並形成以火力為主局面；67年核能機組加入發電行列後，發電結構趨多元化；79年大林五號機及氣渦輪機改燃氣後，燃氣發電容量逐年增加。

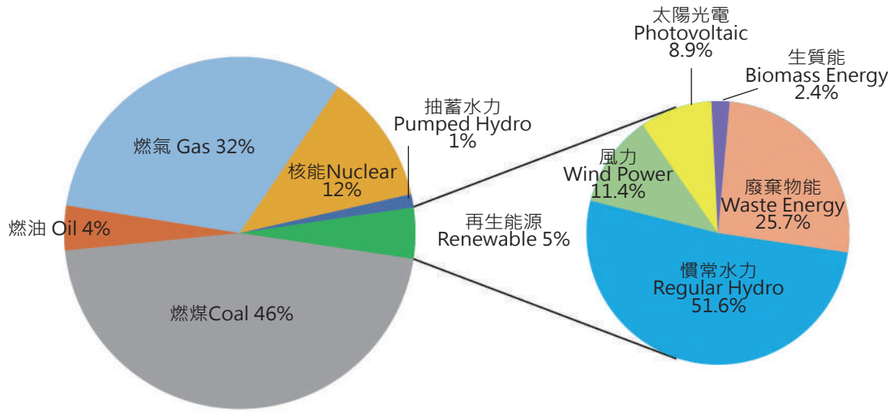
When the nationalist government first took over control of Taiwan from the Japanese colonial regime, the main source of power supply was hydropower supplemented by fossil fuel (coal) generation. At the start of the 1950s, the ratio of hydro vs. coal was approximately 80% vs. 20%. As population grew and the economy ballooned, electricity demand also rose. Hydropower could no longer satisfy the demand and new coal-fired power plants were constructed; coal became the major source. In 1978, the addition of nuclear power plants added diversity to the generation structure. In 1990, the fuel for Unit 5 and turbines at Dalin Power Plant was changed to natural gas, and the generation capacity for gas has gradually increased ever since.

截至105年底，台電系統總裝置容量為4,213.25萬瓩，其中火力發電容量占比達71.4%，另再生能源占比也逐漸提高至10.3%。

As of the end of 2016, the total installed capacity of the TPC system is 42,132.5kW, with fossil fuel-fired generation taking up 71.4% and renewable sources gradually increased to 10.3%.



(資料來源Source：http://www.taipower.com.tw/content/new_info/new_info-c36.aspx)



2016年臺灣發電結構與再生能源佔比
2016 Ration of Renewable Energy and Installed Capacity

台灣發電廠全覽圖
Overview of Power Plants in Taiwan

第肆章 Chapter 4

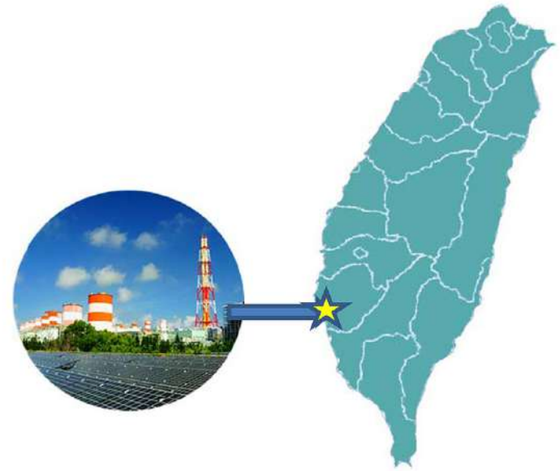
興達電廠簡介
Introduction to Hsinta Power Plant

興達發電廠 Hsinta Power Plant

4.1 位置 Location

既有興達發電廠位於高雄市永安區與茄萣區交界，廠區(第一廠區)面積147.8公頃，北臨興達漁港，興達港內海，整個潟湖景觀約略於明鄭時期形成，範圍由北而南尚包括竹滬鹽灘，興達發電廠、永安鹽灘、永安鄉、中油液化天然氣廠至阿公店溪（竹仔港溪）部分，東則以濱海公路（台17號）為界。

Hsinta Power Plant is located at the intersection of Yongan and Qieding Districts in Kaohsiung City and covers an area of 147.8 ha (Plant Area No.1). It borders Hsinta Fishing Harbor and an inner sea to the north. The lagoon landscape took shake around the Ming Dynasty under the Koxinga regime. Going from north to south, the site also covers Zhuhu Salt Beach, Hsinta Power Plant, Yongan Salt Beach, Yongan Township, CPC liquefied natural gas plant and part of Agongdian River (Zhuzigang River). Provincial Highway No. 17 (also known as the coastal highway) forms its eastern border.



興達電廠位置示意圖-1
Location of Hsinta Power Plant-1

4.2 沿革 History

1980年代台電為應付台灣南部地區工業之快速成長，必需在南部地區興建大型火力發電廠以供應該區之大量電力需要。經過一系列之環境與經濟評估後決定選擇高雄市興達港南側為廠址，並取名為興達發電廠。

In the 1980s, TPC had to build a large coal-fired power plant in the south to fill the massive power demand as a result of rapid industrial growth in southern Taiwan. After a series of environmental and economical assessments, the site to the south of Hsinta Harbor, Kaohsiung City was selected and given the name Hsinta Power Plant.

4部燃煤機組 Four Coal-Fired Units

為南台灣電力發展及電力供需平衡,1980年12月成立興達發電廠，建置4部燃煤機組

Hsinta Power Plant was constructed in December 1980 to ensure supply-demand balance and develop utility in southern Taiwan. Four coal-fired power generation units were built.

5部複循環機組 Five Combined-Cycle Units

1990年代國內用電迅速成長，於1999年1月16日完成5部複循環機組

Five combined-cycle units were completed in 1999/1/16 to meet rapidly growing demand in electricity in the 1990s.

太陽能發電系統 Solar Power Generation System

低碳時代，2009年開始興建太陽能發電系統

The construction of a solar power generation system starting in 2009 marks the advent of the low-carbon age.

4.3 發電容量 Generation Capacity

興達發電廠隸屬於台灣電力公司，廠區面積135公頃，儲煤場面積23公頃，以燃煤為燃料，北臨興達漁港，位於興達港內海區域。興達發電廠總裝置容量約為432.6萬瓩，次於台中發電廠及大潭發電廠，居台灣第三位，二氧化碳排放量則次於台中發電廠居第二位，總發電量約為全台灣的七分之一。

Hsinta Power Plant belongs to Taiwan Power Company TPC. It covers an area of 135 hectares, 23 hectares of which used for coal storage. It borders Hsinta Fishing Harbor to the north and sits along the inner sea of Hsinta Harbor. The total installed capacity is approximately 4.326GW, ranking third in Taiwan just after Taichung Power Plant and Data Power Plant; its CO2 emission is ranked second just after Taichung Power Plant. It accounts for 1/7 of Taiwan's total power generation.

4.4 機組與裝置容量
Power Generation Units and Installed Capacity

興達火力發電廠裝設有以燃煤為主之4部機組；並裝設有以天然氣為燃料之5部複循環機組，裝置容量合計約432.6萬瓩。

Hsinta Fossil Fuel Power Plant is equipped with 4 coal-fired units and 5 combined cycle gas turbine (CCGT) units, with a total installed capacity of approximately 4.326GW.

各機組裝置容量如下表：
The installed capacity for each unit is outlined below:

機組 Unit	商轉日期 Operation Start Date	裝置容量（瓩） Installed Capacity (W)	燃料種類 Fuel
興一機 Hsin-1	71.09.28	500,000	煤 Coal
興二機 Hsin-2	72.07.31	500,000	煤 Coal
興三機 Hsin-3	74.06.19	550,000	煤 Coal
興四機 Hsin-4	75.04.07	550,000	煤 Coal
興達複一機 Hsin-CCGT 1	87.04.26	445,190	天然氣 Natural gas
興達複二機 Hsin-CCGT 2	87.05.26	445,190	天然氣 Natural gas
興達複三機 Hsin-CCGT 3	87.06.29	445,190	天然氣 Natural gas
興達複四機 Hsin-CCGT 4	87.08.31	445,190	天然氣 Natural gas
興達複五機 Hsin-CCGT 5	88.01.16	445,190	天然氣 Natural gas

4.5 供電量 Power Supply

年度 Year	燃煤機組 Coal Units	複循環機組 CCGT Units	合計 Total	供電占比 Power Supply Ratio(%)	
				公司 Company-Wide	系統 System-Wide
2014	155.9	114.7	270.6	16.4	12.6
2015	149.6	117.5	267.0	16.2	12.4
2016	157.7	132.4	290.2	17.0	13.1
2017 (1~9 月 Month)	117.0	106.6	223.6	16.9	13.0

4.6 環保績效與榮譽
Environmental Performance and Honors

環保投資與效益 Environmental Nvestment and Benefit

工程 Project	效益 Benefit	投資金額 Investment
靜電集塵器 Electrostatic precipitator	靜化除塵 >99.8% Dust removal>99.8%	15.5
煙氣脫硝 +LNB Exhaust denitrification + LNB	降低氮氧化物 (DeNOx) NOx reduction (DeNOx)	18.9
排煙脫硫設備 Flue-gas desulfurization equipment	降低硫氧化物 (DeSOx) SOx reduction (DeSOx)	114
室內煤倉 Indoor coal storage	降低煤塵逸散 Reduce coal dust diffusion	47.7
興一二機空污改善 Air pollution improvement for Units Hsin-1 & Hsin-2	提升環境品質 Enhance environmental quality	97.3
合計 Total		293.4

榮譽 Honors

- 1999年921集集大地震，汽力機組維持滿載運轉，系統免於崩潰
- 2005~2007年中華民國企業環保獎(行政院環保署)
- 2008年榮獲亞洲電力獎最佳環保電廠金牌獎
- 榮獲2010~2011年水火力電系統二級責任中心機效評核火力電廠組第一名
- Full-load operation of the steam turbines was maintained and systematic collapse averted during the Jiji Earthquake on September 21, 1999
- R.O.C. Enterprise Environmental Protectioin Award (Environmental Protection Administration, Executive Yuan) 2005~2007
- Gold Medal, Best Environmental Performance Power Plant of the Year, Asian Power Award 2008
- First Place, fossil fuel power plant category, performance evaluation of tier-2 centers, hydro/fossil fuel power generation systems 2010~2011

興達 HSINTA ECOLOGICAL POWER PLANT CONSTRUCTION PROJECT CONCEPTUAL DESIGN INTERNATIONAL COMPETITION

興達生態電廠建設概念設計國際競圖

主辦單位 Host Organization

台灣電力公司