

行政院及所屬各機關因公出國報告

(出國類別：開會)

參加「2019年亞洲電力獎頒獎典禮與會議」

出國報告

服務機關：台灣電力公司系統規劃處

出國人員：黃張鴻/組長

出國地區：馬來西亞/吉隆坡

出國期間：108年9月3日至108年9月5日

報告日期：108年9月20日

行政院及所屬各機關出國報告提要

出國報告名稱：「2019 年亞洲電力獎頒獎典禮與會議」出國報告

頁數 34 含附件 是 否

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黃張鴻/台電公司/系統規劃處/組長/ 02-2366-6901

出國類別： 1.考察 2.進修 3.研究 4.實習 5.其他：開會

出國期間：108 年 9 月 3 日至 108 年 9 月 5 日 出國地區：馬來西亞

報告日期：108 年 9 月 20 日

分類號／目

關鍵詞：亞洲電力獎、超超臨界燃煤火力機組、氮氧化物、硫氧化物、粒狀物、
電能轉直供平台

內容摘要：

2019 年亞洲電力獎 (The Asian Power Awards)，於 2019 年 9 月 4 日在馬來西亞吉隆坡舉辦。亞洲電力獎每年由國際媒體集團 Charlton Media Group 旗下刊物「亞洲電力雜誌」(Asian Power)舉辦，總部在新加坡，其目的為發掘亞洲區域內表現優良傑出貢獻之電力工程、計畫或管理個案。自 2005 年起甄選迄本(2019)年度已邁入第 15 年，頒發獎項分為 4 大領域，共 25 個項目。

本公司今年參加 Charlton Media Group 亞洲電力雜誌主辦之 2019 年度亞洲電力獎甄選活動，其中核能火力發電工程處研提「大林電廠更新改建計畫」

獲頒「年度燃煤發電計畫」銀牌獎及「台中電廠空污改善計畫」獲頒「年度環境升級計畫-台灣」獎；系統規劃處研提「台灣電能轉直供制度與平台設計」獲頒「年度創新電力技術-台灣」獎及「年度智慧電網計畫-台灣」獎；合計本公司共獲頒 4 項獎項，肯定本公司在電業領域技術及規劃上之傑出表現，值此本公司電業管理革新之際，出席本屆亞洲電力獎，對提升本公司國際聲望及拓展國際視野很有助益。

本文電子檔已傳至出國報告資訊網(<http://report.nat.gov.tw/reportwork>)

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壹、出國緣由

2019 年亞洲電力獎 (The Asian Power Awards)，於 2019 年 9 月 4 日在馬來西亞吉隆坡舉辦。亞洲電力獎每年由國際媒體集團 Charlton Media Group 旗下刊物「亞洲電力雜誌」(Asian Power)舉辦，總部在新加坡，其目的為發掘亞洲區域內表現優良傑出貢獻之電力工程、計畫、管理個案或經營者。自 2005 年起甄選迄本(2019)年度已邁入第 15 年，頒發獎項分為 4 大領域，共 25 個項目。



□亞洲電力雜誌(Asian Power) □2019 年亞洲電力獎(The Asian Power Awards)

本公司今年參加 Charlton Media Group 亞洲電力雜誌主辦之 2019 年度亞洲電力獎甄選活動，其中核能火力發電工程處研提「大林電廠更新改建計畫」獲頒「年度燃煤發電計畫」銀牌獎及「台中電廠空污改善計畫」獲頒「年度環境升級計畫-台灣」獎；系統規劃處研提「台灣電能轉直供制度與平台設計」獲頒「年度創新電力技術-台灣」獎及「年度智慧電網計畫-台灣」獎；合計本公司共

獲頒 4 項獎項，肯定本公司在電業領域技術及規劃上之傑出表現，值此本公司電業管理革新之際，出席本屆亞洲電力獎，對提升本公司國際知名度及拓展國際視野很有助益。

頒獎典禮於本（2019）年 9 月 4 日在馬來西亞吉隆坡舉行，本公司亦指派系統規劃處一員代表出席及上台領獎，促進亞洲電力業界交流，提升本公司國際聲望。

貳、出國行程

本出國計畫，自 108 年 9 月 3 日起，至 108 年 9 月 5 日止，合計 3 天，行程概要如表。

表：出國行程

日期	起訖地點	活動內容
108/9/3	台北—吉隆坡	往 程
108/9/4	馬來西亞吉隆坡	出席頒獎典禮暨會議 並領取四座獎項
108/9/5	吉隆坡—台北	返 程

參、2019 年亞洲電力獎頒獎典禮暨會議紀要

一. 亞洲電力獎甄選活動簡介

亞洲電力獎 (The Asian Power Awards) 被稱為電力界的奧斯卡獎，由新加坡「亞洲電力雜誌」所主辦，自 2005 年起開始，迄今(2019)年為第 15 屆。亞洲電力獎接受亞洲優秀電力公司的提名，為表彰肯定亞洲電力部門的突破性計畫和開創性創舉之甄選活動。

「亞洲電力雜誌」隸屬國際媒體查爾頓媒體集團(Charlton Media Group)旗下雜誌刊物之一。查爾頓媒體集團(Charlton Media Group)係設立於新加坡之國際出版業者，其出版範圍除雙月發行亞洲電力雜誌 (Asian Power Magazine) ，還發行亞洲財經雜誌(Asian banking & finance)、香港商業雜誌(HongKong Business)、亞洲醫療保健雜誌(Healthcare Asia)及新加坡商業評論雜誌(Singapore business review)等刊物。

1. 亞洲電力獎甄選活動流程概述如下：

亞洲電力雜誌 (以下簡稱主辦單位) 約在每年 4 月以後，通知亞洲地區各國電力產業公司或機構，研提當年度績優之工程、計畫、技術、管理服務個案或經營者，參選再生能源計畫、火力計畫、支援計畫、年度經營者等 4 大領域共計 25 個甄選項目，並公告評審委員名單。

2. 參選者必須在當年 7 月截止日前，進入主辦單位之網站登錄參選提案，以電子郵件方式將少於 500 字中英文介紹提案內容及值得獎勵之處，並附上 2 張 jpg 檔案高解析度照片，傳給主辦單位。

3. 主辦單位於當年度 8 月通知獲獎單位，並於 9 月舉行頒獎典禮。
4. 2005 年至 2012 年主辦單位均提供獲獎單位頒獎典禮免費通行證，而鼓勵獲獎單位贊助付費宣傳套裝方案或專屬餐桌。惟自 2013 年起主辦單位取消頒獎典禮免費通行證，參加頒獎典禮須繳交出席費，出席費分四類：

(1) 以 16,900 美元取得 Asian Power Awards 獲獎者宣傳套裝方案(Winners Package)，含 10 人份餐桌、使用 2019 亞洲電力獎 logo、在亞洲電力雜誌上登載雙頁廣告，含一整頁廣告及一頁社論式廣告、頒獎典禮受訪。

(2) 以 13,900 美元取得 3 張通行證，費用還包括在亞洲電力雜誌上選擇登載一整頁廣告或一頁社論式廣告、於頒獎典禮受訪。

(3) 以 9,900 美元取得 3 張通行證，費用還包括在亞洲電力雜誌上選擇登載一整頁廣告或一頁社論式廣告。

(4) 以 9,900 美元取得 10 人份餐桌。

5. 今(2019)年甄選獎項分為 4 大領域共 25 個項目，如下所列：

再生計畫 RENEWABLE PROJECTS

- (1) 年度太陽能發電計畫 Solar Power Project of the Year
(2) 年度水力發電計畫 Hydro Power Project of the Year
(3) 年度生質能發電計畫 Biomass Power Project of the Year
(4) 年度風力發電計畫 Wind Power Project of the Year
(5) 年度地熱發電計畫 Geothermal Power Project of the Year

熱力計畫 THERMAL PROJECTS

- (1) 年度燃煤發電計畫 Coal Power Project of the Year
(2) 年度燃氣發電計畫 Gas Power Project of the Year
(3) 年度核能發電計畫 Nuclear Power Project of the Year

- (4) 年度天然氣發電計畫 Natural Gas-Fired Power Project of the Year
- (5) 年度沼氣發電計畫 Biogas-Fired Power Project of the Year
- (6) 年度柴油發電計畫 Diesel-Fired Power Project of the Year
- (7) 年度油頁岩發電計畫 Oil Share Power Project of the Year

□ 支援計畫 SUPPORTING PROJECTS

- (1) 年度快速施工電力工程計畫 Fast-Track Power Plant of the Year
- (2) 年度備用電源計畫 Standby Power Plant of the Year
- (3) 年度環保升級工程計畫 Environmental Upgrade of the Year
- (4) 年度輸配電工程計畫 Transmission & Distribution Project of the Year
- (5) 年度電廠升級計畫 Power Plant Upgrade of the Year
- (6) 年度創新電力技術計畫 Innovative Power Technology of the Year
- (7) 年度智慧電網計畫 Smart Grid Project of the Year
- (8) 年度資訊技術計畫 Information Technology Project of the Year
- (9) 年度雙燃料發電計畫 Dual Fuel Power Plant of the Year

□ 年度經營者 OPERATORS OF THE YEAR

- (1) 年度電力專案融資銀行 Power Project Finance House of the Year
- (2) 年度電力公用事業 Power Utility of the Year by Country
- (3) 年度獨立發電業 Independent Power Producer of the Year
- (4) 年度首席執行長 CEO of the Year

二. 2019 年亞洲電力獎獎項概況

亞洲電力獎堪稱為電力界奧斯卡獎，2019 年亞洲電力獎甄選活動於 2019 年 7 月 19 日報名截止，並於 2019 年 9 月 4 日舉行頒獎典禮。

本年度甄選結果頒發 25 個類別共 90 個獎牌，評審委員及得獎名單如下：

1. 評審委員：

- John Yeap , Partner, head of Energy – Asia at Pinsent Masons
- Mike Thomas, Partner, the Lantau Group
- Petteri Harkki, Regional Director for Asia of Poyry
- Wen Bin Lim, Director of Power and Utilities at KPMG; and
- Gervasius Samosir, Partner at YCP Solidiance.

2. 得獎名單：

水力計畫 Hydro Power Project of the Year

- Gold - Cordillera Hydro Electric Power Corporation Kapangan Hydro Project by GHD
- Silver - Murum Hydroelectric Plant by Sarawak Energy Berhad
- Bronze - Gulpur HydroPower Project by Mira Power Limited

生質能計畫 Biomass Power Project of the Year

- Gold - Chana Green Southern Thailand Renewable Biomass Project by Asian Development Bank
- Silver - Shandong Biogas CHP Power Project in China by VPower Group International Holdings Limited
- Bronze - RPG Impact Project by RE Power Group Company Limited

地熱計畫 Geothermal Power Project of the Year

- Gold - Rantau Dedap Geothermal Power Project by Asian Development Bank
- Silver - Sorik Marapi Geothermal Power Project by KS Orka Renewables Pte Ltd

燃煤計畫 Coal Power Project of the Year

- Gold - Ultra-supercritical Project of China Resources Power (Tangshan Caofeidian)

Co. by China Resources Power Holdings Co., Ltd. powered by Emerson

• **Silver - The Talin Power Plant Renewal Project by Taiwan Power Company**

- Bronze - Thar Coal Power Project by Engro Powergen Thar Limited

☐ 燃氣計畫 Gas Power Project of the Year

- Gold - Al Dur 2 CCGT IPP by ACWA Power
- Silver - Shanghai Caojing Cogeneration Co Ltd
- Bronze - Muara Karang Block 1 PLTGU by PT PEMBANGKITAN JAWA-BALI

☐ 核能計畫 Nuclear Power Project of the Year

- Gold - Tianwan Nuclear Power Plant Units 1-4, Lianyungang City, China powered by Rosatom East Asia (Beijing) Consulting Co., Ltd.

☐ 天然氣計畫 Natural Gas-Fired Power Project of the Year

- Gold - Jawa-1 Liquefied Natural Gas-to-Power Project by Asian Development Bank
- Silver - Tanjung Priok Power Plant powered by Mitsubishi Hitachi Power Systems, Ltd.

☐ 油頁岩 Oil Shale Power Project of the Year

- Gold - ATTARAT Project 400 KV S/S (Oil Shale) by National Electric Power Company

☐ 快速施工計畫 Fast-Track Power Plant of the Year

- Gold - Myingyan II Gas Power Plant in Myanmar by VPower Group International Holdings Limited
- Silver - Cat Hiep Solar Project 50 MW, Binh Dinh Province powered by juwi Renewable Energies Private Limited
- Bronze - Mobile Power Plant and Fixed Type Gas Engine Power Plant Package VII. PT PLN powered by Consortium of PT PP (Persero) Tbk. EPC DIVISION and WARTSILA

☐ 輸配電計畫 Transmission & Distribution Project of the Year - Gold

- Gold - Queen's Hill Substation: Fostering the Sustainable Development of Hong Kong through Green Innovations by CLP Power Hong Kong Limited
- Silver - ATTARAT Project 400 KV S/S (Oil Shale) by National Electric Power Company

- Bronze - Distribution Substation Automation by Dubai Electricity and Water Authority
- ❑ 雙燃料發電計畫 Dual Fuel Power Plant of the Year
 - Gold - Mobile Power Plant and Fixed Type Gas Engine Power Plant Package VII. PT PLN powered by Consortium of PT PP (Persero) Tbk. EPC DIVISION and WARTSILA
 - Silver - RPG Impact Project by RE Power Group Company Limited
- ❑ 太陽能發電計畫 Solar Power Project of the Year - China
 - The Heishui Photovoltaic Poverty Alleviation Project by China Resources Power Holdings Co., Ltd.
- ❑ Solar Power Project of the Year - India
 - Greenko's 816 MWp Kurnool Ultra Mega Solar Park by Greenko
- ❑ Solar Power Project of the Year - Indonesia
 - Solar PV Power Plants 42 MW in 4 locations - Vena Energy by JO PT PP (Persero) Tbk. EPC DIVISION and NARI GROUP
- ❑ Solar Power Project of the Year - Jordan
 - Green Corridor by National Electric Power Company
- ❑ Solar Power Project of the Year - Korea
 - Renewable Energy Complex and Challenging [Yeongheung Power Division] by Korea Energy (KOEN)
- ❑ Solar Power Project of the Year - Malaysia
 - Sarawak Alternative Rural Electrification Scheme (SARES) by Sarawak Energy Berhad
- ❑ Solar Power Project of the Year - Philippines
 - 2.16MWp Solar Rooftop Project - New Zealand Creamery, Philippines by PROINSO UK and Solaren Renewable Energy Solutions Corporation
- ❑ Solar Power Project of the Year - Thailand
 - B.Grimm Certified Climate Bond for Solar by Asian Development Bank
- ❑ Solar Power Project of the Year - UAE
 - DEWA Phase IV CSP Project by ACWA Power

- ❑ Solar Power Project of the Year - Vietnam
 - Dau Tieng Photovoltaic Solar Power Project in Vietnam - B. Grimm Power & Xuan Cau by Sinohydro Corporation Limited & POWERCHINA Huadong Engineering Corporation Limited
- ❑ 風力計畫 Wind Power Project of the Year - China
 - China Resources New Energy (Datong Yanggao) Wind Power Co., Ltd. by China Resources Power Holdings Co., Ltd.
- ❑ Wind Power Project of the Year - India
 - Greenko Rayala Wind Power Private Limited by Greenko
- ❑ Wind Power Project of the Year - Indonesia
 - Tolo 1 Wind Power Plant 72 MW - Vena Energy by Consortium of PT PP (Persero) Tbk. EPC Division, SIEMENS and SIEMENS Gamesa Renewable Energy
- ❑ Wind Power Project of the Year - Oman
 - Dhofar Wind Project by Rural Areas Electricity Company "Tanweer"
- ❑ Wind Power Project of the Year - Thailand
 - Hanuman Wind Project by Energy Absolute Public Company Limited
- ❑ 環保升級計畫 Environmental Upgrade of the Year - Australia
 - Coober Pedy Hybrid Renewable Project by EDL
- ❑ Environmental Upgrade of the Year - China
 - Shanghai Shenergy Chongming Power Generation CO. Ltd. powered by Siemens
- ❑ Environmental Upgrade of the Year - India
 - Greenko Rayala Wind Power Private Limited by Greenko
- ❑ Environmental Upgrade of the Year - Indonesia
 - PT. GH EMM Indonesia Coal Fired Power Plant 2 x 150 MW by China Energy Investment Corporation
- ❑ Environmental Upgrade of the Year - Korea
 - Performance Improvement of Desulfurization Facilities for Boryeong Thermal Power Plant 7 and 8 by KOMIPO
- ❑ Environmental Upgrade of the Year - Pakistan
 - Gulpur HydroPower Project by Mira Power Limited

- ❑ Environmental Upgrade of the Year - Philippines
 - Carbon Sink and Bioindicator Project - Eco Park and Butterfly Sanctuary powered by San Miguel Consolidated Power Corporation
- ❑ **環保升級計畫 Environmental Upgrade of the Year - Taiwan**
 - **Taichung Power Plant AQCS Retrofit Project by Taiwan Power Company**
- ❑ Environmental Upgrade of the Year - Thailand
 - RPG Impact Project by RE Power Group Company Limited
- ❑ Environmental Upgrade of the Year - UAE
 - DEWA Substation Sustainable Initiative - Go Green by Dubai Electricity and Water Authority
- ❑ 電廠升級 Power Plant Upgrade of the Year - Australia
 - Loy Yang B Unit 2 Turbine Upgrade Project by LYB Operation & Maintenance Pty Ltd
- ❑ Power Plant Upgrade of the Year - China
 - CRP Northern China Manzhouli Wind Power Heat Supply Project by China Resources Power Holdings Co., Ltd.
- ❑ Power Plant Upgrade of the Year - Indonesia
 - PT. Indonesia Power's Tambak Lorok Block 2 Gas Turbine Control and Excitation System Project powered by Emerson
- ❑ Power Plant Upgrade of the Year - Korea
 - Korea East-West Power CO., LTD.'s The Integrated Control System Retrofit for Boiler and Turbine Control by Donghae Bio-thermal Power Plant powered by Emerson
- ❑ Power Plant Upgrade of the Year - Philippines
 - Ship Unloader Upgrade for Masinloc Coal-Fired Thermal Power Plant powered by Masinloc Power Partners Co. Ltd
- ❑ 創新電力技術 Innovative Power Technology of the Year - Australia
 - Ballarat Battery Energy Storage System by EnergyAustralia powered by Fluence, a Siemens and AES Company (USA)
- ❑ Innovative Power Technology of the Year - China

- Huaneng Shanghai Combined Cycle Power Co., Ltd. powered by Siemens
- ❑ Innovative Power Technology of the Year - India
 - Implementation of Field Force Automation at Tata Power Delhi Distribution Limited Towards Optimization of Operations Field Crews to Improve Customer Satisfaction by Tata Power Delhi Distribution Limited
- ❑ Innovative Power Technology of the Year - Indonesia
 - PT. GH EMM Indonesia Large Scale Rotary Steam Tube Dryer Technology by China Energy Investment Corporation
- ❑ Innovative Power Technology of the Year - Korea
 - Performance Improvement of Desulfurization Facilities for Boryeong Thermal Power Plant 7 and 8 by KOMIPO
- ❑ Innovative Power Technology of the Year - Myanmar
 - Tamar VPower Energy Fund I - Orcan International ORC Waste Heat Recovery Technology in Myingyan II Power Plant by VPower Group International Holdings Limited
- ❑ Innovative Power Technology of the Year - Philippines
 - San Bernardino Ocean Power Project by H&WB Asia Pacific (Pte Ltd) Corporation
- ❑ Innovative Power Technology of the Year - Singapore
 - SP Group's Smart Metering For Open Electricity Market powered by Itron, Inc.
- ❑ 創新電力技術 Innovative Power Technology of the Year - Taiwan**
 - **Designing a Platform and System for Power Wheeling and Direct Supply in Taiwan by Taiwan Power Company**
- ❑ Innovative Power Technology of the Year - Thailand
 - Blockchain-based P2P Energy Trading Trial Project @T77 by BCPG Public Company Limited
- ❑ Innovative Power Technology of the Year - Turkey
 - EkoRE PV Panel Manufacturing Plant by EkoRe Renewable Energy
- ❑ Innovative Power Technology of the Year - UAE
 - 1,177 MW Noor Abu Dhabi, the world's largest single-site solar project by Abu Dhabi Transmission and Dispatch Company (TRANSCO)

- ❑ 智慧電網計畫 Smart Grid Project of the Year - Australia
 - Advanced Data Analytics – Unlocking Benefits of Smart Metering by Jemena
- ❑ Smart Grid Project of the Year - Singapore
 - SP Group’s Smart Metering For Open Electricity Market powered by Itron, Inc.
- ❑ **智慧電網計畫 Smart Grid Project of the Year - Taiwan**
 - **Designing a Platform and System for Power Wheeling and Direct Supply in Taiwan by Taiwan Power Company**
- ❑ Smart Grid Project of the Year - UAE
 - DEWA Smart Grid Station by Dubai Electricity and Water Authority
- ❑ 資訊技術計畫 Information Technology Project of the Year - Australia
 - Power Changers 1.0 by Jemena
- ❑ Information Technology Project of the Year - China
 - CR Power Eastern China New Energy Operation and Maintenance Co., Ltd. Early Warning System for Wind Turbines by China Resources Power Holdings Co., Ltd.
- ❑ Information Technology Project of the Year - India
 - Digital Transformation in TATA Power by AVEVA PTE LTD
- ❑ Information Technology Project of the Year - Indonesia
 - Information Technology Based on COMANDO [Condition Monitoring and Data Operation] Utilization in Power Plant Operation and Maintenance by PT PJB Services
- ❑ Information Technology Project of the Year - Philippines
 - SAP S4 and ARIBA Migration and Implementation powered by Masinloc Power Partners Co. Ltd
- ❑ 獨立發電業 Independent Power Producer of the Year - Indonesia
 - PT. GH EMM Indonesia by China Energy Investment Corporation
- ❑ Independent Power Producer of the Year - Malaysia
 - Quantum Solar Park Malaysia 150 MWac by ITRAMAS Corporation Sdn Bhd
- ❑ Independent Power Producer of the Year - Myanmar
 - VPower Group International Holdings Limited
- ❑ Independent Power Producer of the Year - Saudi Arabia

- ACWA Power
- 電力公用事業 Power Utility of the Year - Bangladesh
 - Bangladesh Power Development Board's Barapukuria 275 MW Thermal Power Plant powered by ABB
- Power Utility of the Year - China
 - Shanghai Caojing Cogeneration Co Ltd
- Power Utility of the Year - India
 - Tata Power Delhi Distribution Limited
- Power Utility of the Year - Indonesia
 - PT PEMBANGKITAN JAWA-BALI
- Power Utility of the Year - Jordan
 - National Electric Power Company
- Power Utility of the Year - Malaysia
 - Quantum Solar Park Malaysia 150 MWac by ITRAMAS Corporation Sdn Bhd
- Power Utility of the Year - Myanmar
 - VPower Group International Holdings Limited
- Power Utility of the Year - Pakistan
 - K-Electric Limited
- Power Utility of the Year - Philippines
 - San Miguel Consolidated Power Corporation
- Power Utility of the Year - UAE
 - Abu Dhabi Transmission and Dispatch Company (TRANSCO)
- 經營者 CEO of the Year
 - Preeyanart Soontornwata of B.Grimm Power Plc.

3. 本公司獲頒獎牌：

本公司以核能火力發電工程處研提「大林電廠更新改建計畫」獲頒「年度燃煤發電計畫」銀牌獎及「台中電廠空污改善計畫」獲頒「年度環境升級計畫-台灣」獎；系統規劃處研提「台灣電能轉直供制度與平台設計」獲頒「年度創

新電力技術-台灣」獎及「年度智慧電網計畫-台灣」獎；共獲頒 4 項獎項，獲獎成績十分優異，肯定本公司在電業領域技術及規劃上之傑出表現。本次各獎項獲頒獎牌照片如下所示：



「年度燃煤發電計畫」銀牌獎



「年度環境升級計畫-台灣」獎



「年度智慧電網計畫-台灣」獎



「年度創新電力技術-台灣」獎

三. 頒獎典禮及會議

2019 年亞洲電力獎頒獎典禮於 9 月 4 日在馬來西亞吉隆坡舉行，來自亞洲各國超過一百多名電力事業及廠商主要代表及高階經理參加本次頒獎典禮。

典禮由亞洲電力雜誌總編輯 Tim Charlton 主持，首先由 Tim Charlton 先生致詞，首先向獲獎者表示深深的祝賀，在第 15 屆的亞洲電力獎頒獎典禮上，看到這麼多與會代表熱情參與，感到很高興，今年是提名數量最多的一年。很高興看到本地區原被列為使用較多煤炭之代表，實際上在再生能源方面做得最多。

本次甄選提名數量更是創下新高紀錄，有 200 件計畫或個案參與角逐，五位獨立評審從眾多甄選案例中擇優選出獎項。今 2019 年本公司同時榮獲 4 項殊榮，職很榮幸參加此盛會代表領獎，深表感謝大會提供此機會，讓電力業者有機會展現及分享其努力成果，並有助提升本公司國際形象及聲望，頒獎典禮活動照片如下：



由大會主席 Mr. Tim Charlton 致詞



代表本公司上台領獎

肆、結論與建議

- 一. 本公司自 2008 年開始參加亞洲電力獎甄選活動以來，每年皆有獲獎，今（2019）年共榮獲 4 項獎項，表現優異成果豐碩，經由此次的選拔，顯示台電公司同仁之成果與實力獲得肯定，建議本公司各單位應持續努力參加各類甄選活動，提升員工之國際能力與視野。
- 二. 透過參加亞洲電力獎頒獎典禮，除可瞭解各國供應商之電力事業之動態、吸收全球亞太電業趨勢及獲獎案例之經驗，可讓全球電力業界更加認識台灣電力產業實力，建議本公司持續派員出席頒獎典禮，參與交流，有效提升本公司之國際企業形象。
- 三. 亞洲電力獎活動出席費每年持續調漲，今(2019)年已上漲至 9,900 美元。原綜研所統籌預算編列不足，須由代表出席單位配合勻用該單位當年度預算，排擠出席單位當年預定執行出國計畫。建議公司主辦單位綜研所爭取足額出國計畫預算，使本公司能持續參加亞洲電力獎，提升公司國際聲望。

伍、台電公司獲獎項目摘要概述

一、大林電廠更新改建計畫(The Talin Power Plant Renewal Project)

本計畫係核能火力發電工程處研提「大林電廠更新改建計畫」，獲頒 THERMAL PROJECTS (熱力計畫)類：Project of the Year 年度燃煤發電計畫」銀牌獎。

為因應台灣電力系統整體需求，規劃於大林電廠進行機組更新改建，設置 2 部超超臨界燃煤火力機組，發電量各 80 萬瓩，提升大林電廠營運績效與競爭力，以配合國家整體發展。

本計畫針對關鍵工程召開會議，並研訂精進施工及試運轉程序，在工安品質無虞下全力趕趕，1 號機已於 2018 年 2 月 13 日商轉，2 號機已接受調度並預定 2019 年 6 月 15 日商轉。

新機組毛效率為 45.6%(LHV)，相較於舊機組提升 5.57%，並裝置高效率脫硝設備(SCR)。經實測排放濃度範圍硫氧化物約 5-15ppm，氮氧化物約 18-20ppm，符合環評承諾值硫氧化物 30ppm，氮氧化物 30ppm 之規定。且新機組每單位發電量(每度電)排放二氧化碳量 0.789 公斤，遠比舊機組排放量 0.926 公斤為低，具明顯環保效益。另本計畫重視環境生態，投入環保及景觀費用約 305 億，佔投資總額約 29.4%。

本計畫亦兼具綠能特色，建築物以綠建築省能設計原則，並於設置裝置容量約 370kW 太陽光電系統；電廠產生之廢水回收後再利用，並規劃雨水回收系統用於綠化澆灌，另設置海水淡化廠可減少對水資源的消耗。

台灣 2017 年夏季尖峰供電緊澀，所幸 1 號機及時併聯發電，解除限電警戒；目前 2 號機亦已試運轉完成，可支援其他燃煤機組因空污議題降載之供電缺口。



The Talin Power Plant Renewal Project

In order to ensure a stable and sufficient supply of electricity, the Taiwan Power Company (TPC) undertook the Talin Power Plant (TLPP) renewal project. The project entailed the replacement of an older, ineffective unit with high-efficiency, low-emission equipment by installing two 80 MW Ultra-Supercritical Steam Turbine Generation units.

As the project progressed, TPC devoted significant effort to ameliorating construction processes and test procedures by deploying added human resources to ensure that work could be conducted around clock. The company also convened critical issue meetings to solve various conflicts that arose between construction interfaces. These actions led to improved overall work efficiency. In consequence, the new Unit 1 started commercial operation on February 13, 2018 and the new Unit 2 was synchronized on May 15, 2018.

The gross efficiency of the new units was found to be 45.6 percent (LHV) which represents a performance increase of 5.57 percent over the performance of existing units. A high-efficiency selective catalytic reduction system (SCR) was used to facilitate environmental protection. In consequence, the current units' emissions of SO_x and NO_x are 5ppm-15ppm and 18ppm-20ppm respectively. These levels are far lower than levels required by regulators (30ppm and 30ppm respectively). Furthermore, carbon dioxide emissions were reduced from 0.926 kg to 0.789 kg (per kWh). The project was heavily focused on the importance of environmental sustainability, and as a result, NT\$30.5 billion was invested in environmental protection and landscape design.

The project also sought to incorporate energy saving design, including green building design, and the installation of a solar system with a total capacity of 370 KW on the building roofs. Moreover, a wastewater collection system and rainwater storage reservoir allow drain water and rain to be recycled while a seawater desalination plant produces distilled water to reduce the facility's consumption of water resources.

During the summer of 2017, Taiwan's power surplus reached its lowest point

in recent history. Fortunately, the timely synchronization of Unit 1 helped alleviate the situation. Currently, commissioning of Unit 2 is expected to help meet increased power demands that arise when other, older coal power plants are forced to decrease generation in keeping with the government's policy of restricting regional coal use to reduce air pollution.



二. 台中電廠空污改善計畫(Taichung Power Plant AQCS Retrofit Project)

本計畫係核能火力發電工程處研提「台中電廠空污改善計畫」，獲頒 SUPPORTING PROJECTS (支援計畫)類： Environmental Upgrade of the Year 「年度環境升級計畫-台灣」獎；

台中電廠空污改善計畫

台中電廠共有 10 部 550MW 汽力機組，2018 年裝置容量為 5,500MW，占全系統比 12.99%，供電量為 37,285,240MWH，占全系統比 16.27%，無論是裝置容量及供電量均為全系統占比居冠。自 1991 年營運至今績效卓越，惟近年因環保法規日益趨嚴，為符合中央及地方環保法規加嚴標準，藉由改善鍋爐及空污防治設備減少各項污染物-氮氧化物(NO_x)、硫氧化物(SO_x)、粒狀物(PM)等，以符合最新法規標準。

本計畫先期以第一至四號機組進行空污改善工程，分別就鍋爐(Boiler)、除塵設備(ESP)、脫硫設備(FGD)進行相關改善方案。為維持台中電廠擔負穩定供電之重責，安排四部機組分別於非夏季尖峰用電期間進行停機改善作業。待第一至四號機組空污改善工程完成後，後續將進行第五至十號機組之改善工程。

台中電廠第一至四號機組約 30 年運轉老機組，歷經 AQCS 改善作業，其中第一號機於 2017.9.1 開始停機改善工程，於 2018.9.21 已完成性能測試，氮氧化物(NO_x)、硫氧化物(SO_x)改善前後約有 50%削減率，粒狀物(PM)改善成效更為卓越。性能測試結果顯示各項檢測數值均達到合約保證值，同時亦達到環保排放要求。

其中氮氧化物(NO_x)排放為 52ppm(法規標準為 70ppm)、硫氧化物(SO_x)排放為 7.42ppm(法規標準為 60ppm)、及粒狀物(PM)排放為 3.9mg/Nm³(法規標準為 20mg/Nm³)。

隨著生活水準不斷進步，民眾對環保議題的關注也不斷提昇。台中電廠經由 AQCS 改善作業，大幅改善各項污染排放，對環境保護貢獻卓著。

台中電廠全區照



台中電廠全區照



脫硫設備-吸收塔出口煙道

Taichung Power Plant AQCS Retrofit Project

The Taichung Power Plant is equipped with 10 550MW steam turbine units. In 2018, the installed capacity was 5,500 MW. This capacity accounted for 12.99 percent of total system capacity. The plant supplied 37,285,240 MWH, which accounted for 16.27 percent of the total electricity supplied by the system. The plant's capacity and power supply are both the highest rated in the whole system. Moreover, since 1991 the plant has achieved remarkable operational results. Despite this, in recent years, environmental protection regulations have become increasingly stringent. In response, Taipower sought to improve boiler and air pollution control equipment to reduce pollutants such as nitrogen oxides (NO_x), sulfur oxides (SO_x), particulate matter (PM), etc. These changes brought the plant in line with both the latest central and local government's environmental protection regulations.

The first stage of the project carried out air pollution improvement work on the boilers (Boiler), Electrostatic Precipitators (ESP), and Flue Gas Desulfurization (FGD) equipment for units 1 to 4. In order to maintain a stable power supply from the Taichung Power Plant throughout the duration of the project, downtime for the four units was scheduled during non-summer peak power consumption periods. With the

successful completion of the air pollution improvement work on units 1 to 4, work will ensue on units 5 to 10 during the next stage of the project.

Units 1 to 4 are older units and have been operating for approximately 30 years. Improvement work on Unit 1 began on September 1, 2017 and its performance test was conducted on September 21, 2018. Following the completion of the AQCS improvement work, the unit experienced reduction in its nitrogen oxide (NO_x) and sulfur oxide (SO_x) rates of approximately 50 percent. More remarkable still was the reduction in the rate of particulate matter (PM). Performance test results show that the detection value not only reached agreement guaranteed values, but also met 2

environmental discharge requirements. Nitrogen oxide (NO_x) emissions are now at 52 ppm (standard regulations require less than 70 ppm), while sulfur oxide (SO_x) emissions are at 7.42 ppm (standard regulations require less than 60 ppm). Particulate matter (PM) emissions are 3.9mg / Nm³ (regulatory standards are set at 20mg / Nm³).

As living standards continue to improve, public attention to environmental issues has been increasing. Through this project, Taipower has demonstrated its sensitivity to those concerns and its commitment to environmental protection through the AQCS improvement work at the Taichung Power Plant. The project significantly reduced pollution emissions from the facility and serves as an outstanding contribution to environmental protection.



Taichung Power Plant Photo



Desulfurization Equipment
- Flue Outlet of Absorption Towers

三.台灣電能轉直供制度與平台設計(Designing a Platform and System for Power Wheeling and Direct Supply in Taiwan)

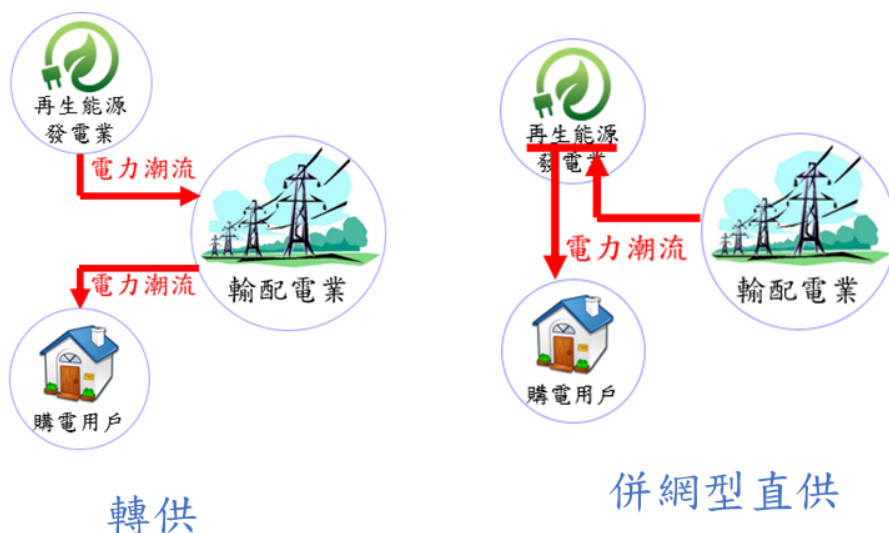
本計畫係系統規劃處研提「台灣電能轉直供制度與平台設計」，獲頒 SUPPORTING PROJECTS (支援計畫)類：「年度創新電力技術-台灣」獎及「年度智慧電網計畫-台灣」獎，共二項獎項。

一、 背景說明

台灣於 106 年 1 月通過電業法，啟動我國電力自由化改革。為降低改革對現行體制帶來衝擊，初步階段以「綠電先行」，開放綠電自由買賣與用戶購電選擇權。台電公司參考各國作法，配合本國能源產業架構，制定轉供與併網型直供相關作業規範，並建置「電能轉直供平台」負責轉直供相關業務運作。

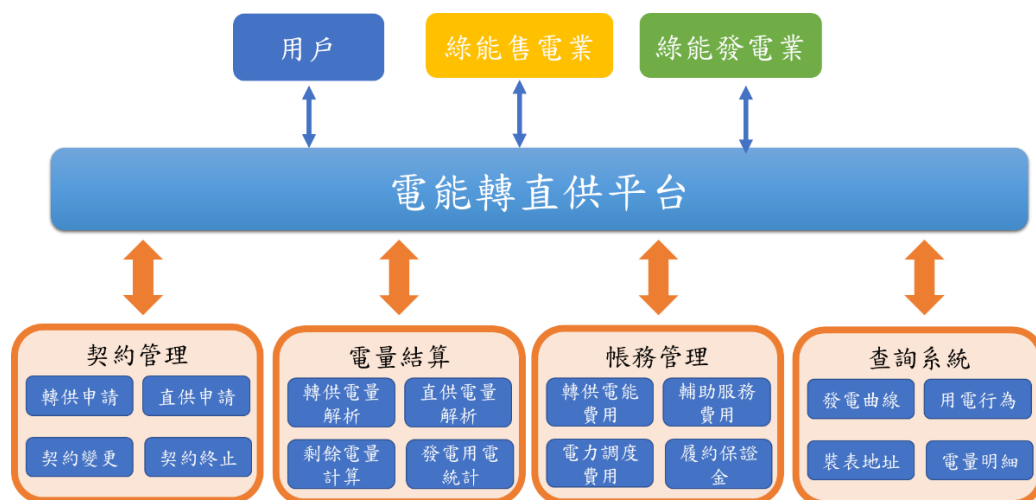
二、 計畫內容

電能轉供與併網型直供系統架構如圖一所示，轉供為電源端透過輸電公司將電能輸送至用戶端；而併網型直供電源端與用戶間以私有線路連接供電。因再生能源具間歇性發電特性，仍屬不穩定電源，當有多餘電能或供電不足時，由台電以公用售電業身分負責維持供電穩定。



圖一、電能轉供與併網型直供系統圖

「電能轉直供平台」為推行電能轉直供業務建置，平台架構如圖二所示，搭配 AMI 智慧電表精確計量每十五分鐘之發、用電量，解析各時段之轉、直供電量，作為後續辦理「電證合一」綠能憑證之依據。

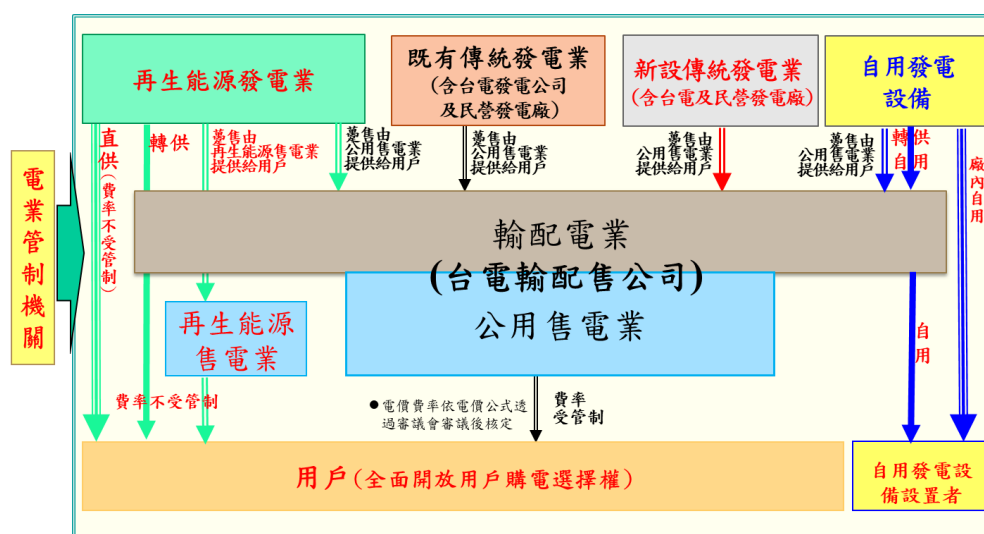


圖二、電能轉直供平台架構

三、 必要性

1. 提供多元售電管道

我國以往再生能源發電業所生產之綠電均以政府公告之費率躉售予台電公司，今透過電能轉直供制度提供業者多元售電管道，如圖三所示。



圖三、我國電力市場架構

2. 滿足產業需求

多家企業已宣示將使用綠電，我國法規也明訂用電大戶未來須使用一定比例之綠電，電能轉直供制度「電證合一」可滿足企業使用綠電與獲得憑證之需求。

3. 為全面自由化建構基礎

電力自由化為電業發展之趨勢，藉由推行過程中逐步完備相關法規與運作

機制，為將來開放全面自由化奠定基礎。

4. 平台優點

電能轉直供平台具備「契約管理」、「電量結算」、「費用核算」等完整功能，並與電能收購機制、公用售電機制介接。未來因應電力自由化全面開放，可擴充為中長期市場交易管理平台。

四、 預期效益

1. 對公司效益

推行電能轉直供制度有助於公司組織調整及培育相關人才，以因應將來全面自由化與電業轉型。

2. 對客戶效益

提供多元購電管道，透過市場機制自由選擇電力供應商，滿足使用綠電之需求；搭配不同售電方案亦可降低用電成本。

3. 對產業效益

藉由市場機制鼓勵各電業強化競爭力與提升效率，亦能吸引更多業者投入再生能源技術開發。

4. 促進智慧電網佈建

參加轉直供之用戶皆需裝設AMI智慧電表，有助於提高AMI普及率，加速智慧電網佈建。

5. 配合國家政策，加速再生能源開發

我國規劃於2025年達成20%再生能源發電比例，藉由推行電能轉直供制度，打造公平健全市場，鼓勵更多業者投入綠能產業，達成能源轉型目標。

五、 結論

電力自由化為世界之趨勢，現今我國法律規範、技術層面、產業環境與社會共識皆成熟。電能轉直供制度為我國電力自由化之開端，電能轉直供平台有助於執行轉直供契約，期望能以完善的規劃達成目標。

Designing a Platform and System for Power Wheeling and Direct Supply in Taiwan

I. Background

In January, 2017, Taiwan’s Electricity Act was amended to establish a framework for electricity liberalization. To mitigate the impact of the reform on the current system, the act called for several stages of transition. The first stage entails a so-called “renewable energy first” policy, that will permit the free trading of green energy and will allow customers to choose their power suppliers.

The Taiwan Power Company is currently learning from other countries’ experiences and working on the formulation of regulations for power wheeling and grid-connection types for direct supply. The company is also in the process of establishing a power wheeling and direct supply platform.

II. Project scope

The structure of the power wheeling and direct grid connection supply systems are shown in Figure 1. Power wheeling refers to the ability of a power producer to transmit power directly to customers through a grid-operating company. In direct grid connection supply, customers are connected directly to power sources through private transmission lines. Since renewable energy produces energy intermittently, it is generally considered an unstable power source. As an electricity retailing utility, TPC is responsible for maintaining a power supply, regardless of whether there is a surplus or deficit in power provided from renewable sources.

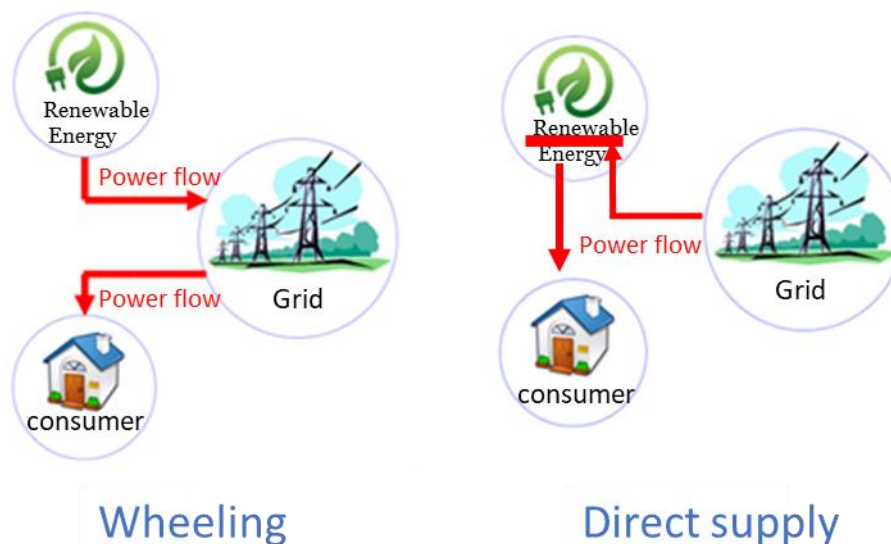


Fig1– An illustration comparing power wheeling and direct grid connection supply

The purpose of this project is to develop a platform that can promote both power wheeling and direct supply services. Figure 2 shows the structure of the

platform. With the help of AMI, which precisely records power generation and consumption information every 5 minutes, the amount of power, either delivered through power wheeling or direct supply, can be analyzed and used as the basis of reviewing of “bundled renewable energy certificates.”

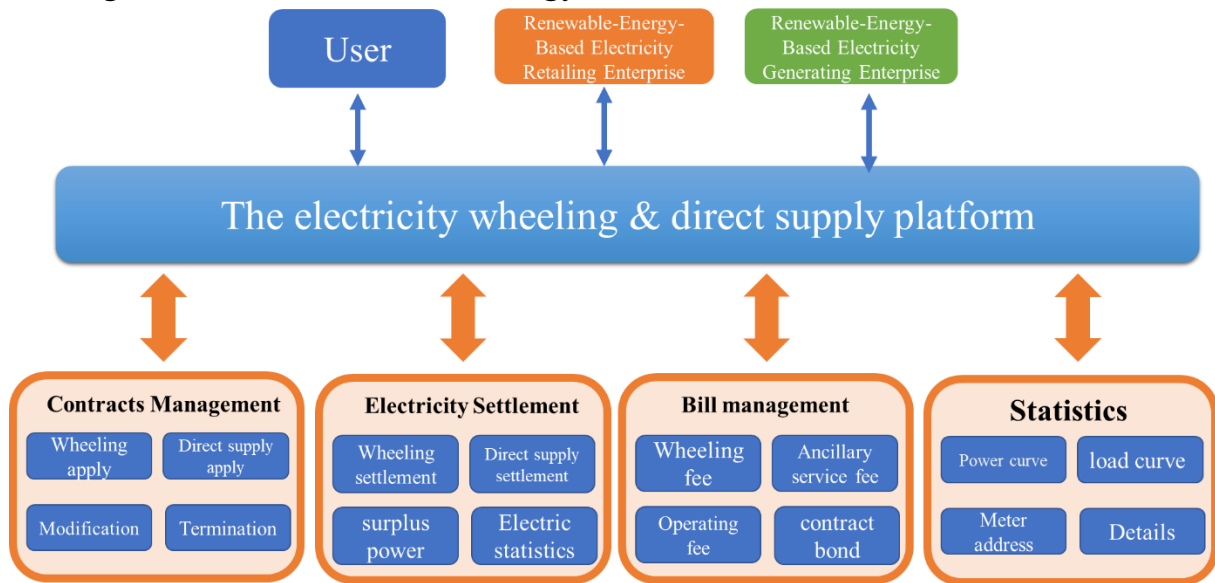


Fig 2 – The structure of the power wheeling & direct supply platform

III. Necessity of the project

(I) Providing alternative ways of selling power

In the past, power generated by renewable-energy-based electricity generating enterprises was sold to TPC at price determined by feed-in tariffs announced by the government. As the system changes, power wheeling & direct supply systems will provide renewable energy developers with additional options for selling their power. These options are outlined in Figure 3.

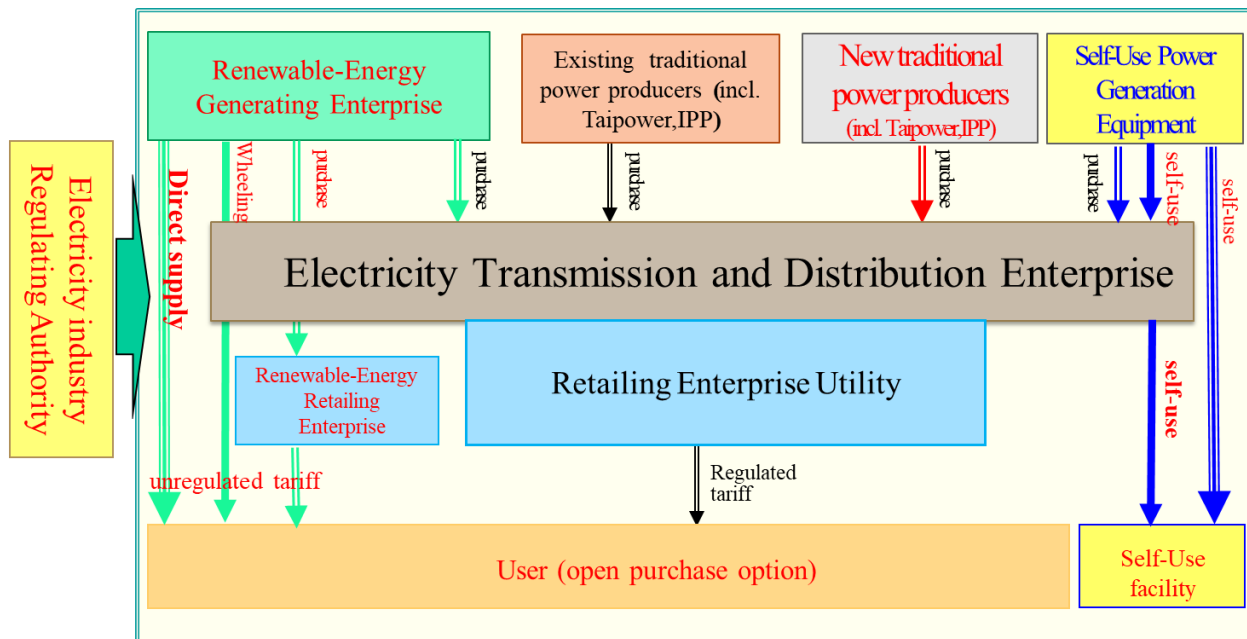


Fig 3 – Taiwan’s electricity market

(II) Satisfying the needs of industry

Many corporations have already announced that they will use green energy as their power sources. The government has also legislated that the percentage of green energy usage should reach specific levels. The power wheeling & direct supply system can help corporations not only satisfy regulatory requirements set by the government but also acquire bundled renewable energy certificates.

(III) Setting a foundation for overall electricity liberalization

Electricity liberalization is a trend in electricity development. This project will help to set a foundation for broad electricity liberalization by completing relevant regulations and operating schemes.

(IV) Advantages of the platform

The “power wheeling & direct supply platform” possesses several important functions such as wheeling contract management, power consumption settlement and cost accounting. The platform is also able to integrate with TPC’s power acquisition and public electricity retailing mechanisms. These features mean that if Taiwan moves toward overall electricity liberalization in the future, the platform can be expanded into a mid- and long-term electricity transaction management platform.

IV. Benefits of the project

(I) Benefits for TPC

It is believed that the promotion of this power wheeling & direct supply system will help TPC adjust its organization and facilitate

employee development to ensure that overall electricity liberalization is successful in the future.

(II) Benefits for customers

The power wheeling & direct supply system will offer customers alternative ways of purchasing electricity. Through a market mechanism, customers will be free to choose their own power suppliers to satisfy their green energy purchase needs. The system will also allow customers to combine different retailing schemes so they can reduce their power consumption costs.

(III) Benefits for industry

Through market mechanisms, corporations can be more competitive and efficient in their performances. In addition, more corporations can be attracted to invest in the development of renewable energy technologies.

(IV) Promoting a smart grid

Customers who participate in the power wheeling and direct supply platform are required to install AMI smart meters. This requirement is helpful for increasing the penetration of AMIs and speeding up construction of a smart grid.

(V) Promoting renewable energy development goals

Government policy seeks to have 20 percent of electricity derived from renewable sources by 2025. By promoting a power wheeling and direct supply mechanism that is both equitable and sound, TPC will encourage more corporations to participate in the green energy industry. This will help facilitate the achievement of the government's goal.

V. Conclusion

Electricity liberalization has become a global trend. In Taiwan, regulations, techniques, the industrial environment, and social consensus are all mature and ready for electricity liberalization. The mechanisms of power wheeling and direct supply will help kick-start the process of electricity liberalization in Taiwan. The platform for power wheeling and direct supply platform will also facilitate the execution of power wheeling and direct supply contracts. It is expected that through sound planning and these initiatives we will be able to reach the goal of electricity liberalization.