



The Most Reliable Global Engineering Services Provider / Trailblazer of Green Innovation /  
The Best Employer That Builds / A Corporate Citizen Willing to Commit

■ Operation and financial Impacts for climate risks

Physical climate scenario	Parameter assumption	2021 ~ 2040	2041 ~ 2060	Operation and financial Impacts			Management measures
				Upstream (supplier)	CTCI	Downstream (client)	
RCP2.6	The market demand for the low carbon products and services.	Predicted reduction of the fossil fuel industry investment is around 1-5% annually, and the proportion of it in CTCI revenue is predicted to be decreased annually by 1-8%.				Impact to the revenue, decreasing from 520 million NTD in 2021 to 40 million NTD in 2040, and negligible after 2040.	Every year, 50% of the R&D investment (over 70 million NTD) will be focused on environment technologies. Develop net-zero EPC technologies innovation with the introduction of CCS and energy recycling and transformation technologies to expand the low carbon green engineering business.
RCP4.5	Regulation of renewable energy	CTCI is committed to using 100% renewable energy and achieving zero emission from the office areas by 2030.	CTCI is committed to achieving net zero emission from the offices areas, services, and production sites by 2050 (or deadline according to the government's regulation).	To facilitate the achievement of scope 3 net-zero target, incentives will be implemented to encourage suppliers for the commitment of the ESG and net-zero emission, actions to carbon reduction, promotion for the GHG inventory, and setting of the reduction target for the formation of the low carbon supply chain.	To honor the commitment, CTCI will purchase 100% of renewable energy with the additional cost of 31.5 million NTD annually. Besides, it is also necessary to develop carbon negative technologies, such as CCS.		Join efforts with the R&D academies such as ITRI, for mastering the development of key technologies in the net-zero emission, and renewable energies sectors, such as hydrogen, for achieving the carbon neutralization/net-zero targets.
RCP6.0	Extreme rain fall and drought		It was found through the investigation to the future climates that the temperature increase depends significantly on various scenarios. Compared with the average temperature in the base years (1986-2005), the increase of the temperature will reach 3.7°C [+2.6~4.8] in the end of the century under the worst scenario (RCP 8.5), and according to the simulation results, the range may exceed 4°C . It will reach 1.8 °C [+1.1~2.6] in the end of the century under the NDC scenario (RCP 4.5). For the estimation under RCP 6, there will be 70% increase of the extreme rain fall for a 3°C increase.	The additional indirect cost is around 20 million NTD annually incurred by the OT expenditure of suppliers due to the calamity.	The lost of assets, such as buildings, equipment, land and tools, due to the calamity, is estimated to value about 10 million NTD annually.		<ol style="list-style-type: none"> <li>To adjust construction strategies, negotiate for schedule extension, and to include the risk in the proposals, with additional cost around 0.6 million NTD.</li> <li>Purchase insurances for prevention of natural disaster, with annual cost around 0.9 million NTD.</li> </ol>
RCP8.5	Change of the average temperature		It is pointed out that climate warming will increase the summer air condition demand , according to the "Working Group II Report: Impacts, Adaptation and Vulnerability to Climate Change" in the IPCC Fifth Assessment Report (AR5). According to the simulation mode for the global energy, under the reference condition, power consumption for the air-con of the dwelling house will increase from 300 billion KWh in 2000 to 4 trillion KWh in 2050 globally, within which around 25% is attributed to the climate change.	The additional indirect cost is around 30 million NTD annually incurred by the OT expenditure of suppliers due to the calamity	Predicted additional supply cost of power consumption for air conditioner or process equipment are, around 40 million NTD annually.		Development of the energy saving and management measures will cost around 0.6 million NTD annually.



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■ Operation and financial Impacts for climate opportunities

Climate change scenarios	2021 ~ 2040	2041 ~ 2060	Operation and financial impacts			Management measures
			Upstream (supplier)	CTCI	Downstream (client)	
1.5°C	Hi-Tech: The investment of the global data center in Taiwan will increase with a 9.9% compound annual growth rate, and there will be 100 billion USD investment for the expansion of the production capability by a giant of the semiconductor industry.			The potential business opportunity of CTCI after transition to the low carbon engineering in the hi-tech industry market will be around 143 billion NTD up to 2030.		Every year, 50% of the R&D investment (around 70 million NTD) will be focused on environment technologies. Besides, we establish the Advanced Technology Facility Business Operations to enhance related technologies and pursue business opportunities in the hi-tech industry.
2°C	According to the roadmap of energy transition in Taiwan 2025 energy policy highlighting coal reduction, gas increasing, renewable energy development, LNG will increase from 17.75 million tons import in 2020, up to 29.5 million demand in 2025.				The potential business opportunity for the gas-fired power plants will be 300 billion NTD, and 180 billion NTD for the LNG receiving terminals.	Every year, 50% of the R&D investment (around 70 million NTD) will be focused on the environment technologies. As for net-zero EPC technologies, we introduced CCS and technologies of energy cycling and transformation to expand into the low carbon green engineering business.
NDC (Nationally Determined Contributions)	Water resource: Taiwanese government announces many renewable water plant projects between 2019 and 2025. Railway transportation: 12 railway construction projects will be initiated between 2021 and 2026.			Potential business opportunity of CTCI after transition to the low carbon engineering: around 110 billion NTD for the water resource market, and 166 billion NTD for railway transportation market.		Every year, 50% of the R&D investment (around 70 million NTD) will be focused on the environment technologies. As for net-zero EPC technologies, we introduced CCS and technologies of energy cycling and transformation to expand into the low carbon green engineering business.