Asia Clean Energy Summit & Asia Carbon Summit 2024 Carbon Footprint Report

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Carbon Emission Profile Summary

The following table provides the total overall carbon emissions for the ACES and ACS 2024 event across the covered scopes. The breakdown is as follows:

Scopes	Emission Category	Emissions (tCO2e)
Scope 3	Local Participant/Visitor Transportation	2.564
	Overseas Business Transportation	1,100.980
	Guest Accommodations	34.545
	Material Acquisition for Event Usage	1.284
	Material Logistic Transportation	1.740
Total Emissions (tCO2e):		**1,141.113**
20% Buffer ~ rounded to nearest whole number (tCO2e):		**1,369**

Due to certain data gaps and limitations in data gathering, multiple assumptions were made during the quantification process of this carbon footprint assessment. These assumptions were developed in close agreement between CRX Int'l and SEAS, ensuring alignment with industry best practices and what is considered reasonable within the context of the available information. Where assumptions were made, explanations were provided in the respective sections to ensure clarity and transparency in the reporting. These assumptions were necessary to complete the assessment while maintaining the integrity of the carbon footprint calculation. It is recognised that data limitations can introduce a degree of uncertainty, but every effort was made to minimize potential errors and provide an accurate representation of the assessed activities.

The breakdown and quantification of the emissions according to each category are further detailed in the relevant sections below.

Introduction

Sustainable Energy Association of Singapore

The Sustainable Energy Association of Singapore (SEAS) represents the interests and provides a common platform for companies in Renewable Energy, Energy Efficiency, Carbon Management, e- mobility, smart grids and Financial Institutions to meet, discuss, collaborate and undertake viable projects together. The Association is a non-profit, non-government business association, and its mission is to assist its members in achieving sustainable growth locally and regionally through business and market development. SEAS plays a strategic role in supporting and promoting Singapore's vision to be a global centre for sustainable energy, where products and solutions are developed and exported.

Climate Resources Exchange

Climate Resources Exchange International Pte Ltd ("CRX Int'l") is a carbon asset management and carbon asset origination company from Singapore. CRX takes a holistic approach in producing business-driven initiatives through compliance and voluntary carbon market standards to address climate change mitigation & adaptation, circularity and sustainable development. Its initiatives are designed for the unique considerations faced in today's business world: meeting compliance targets, setting internal carbon pricing, facilitating differentiation, and boosting triple bottom line benefits. In its strategy, CRX also provides carbon assessments for events, such as this the purpose of this document.

Event Profile

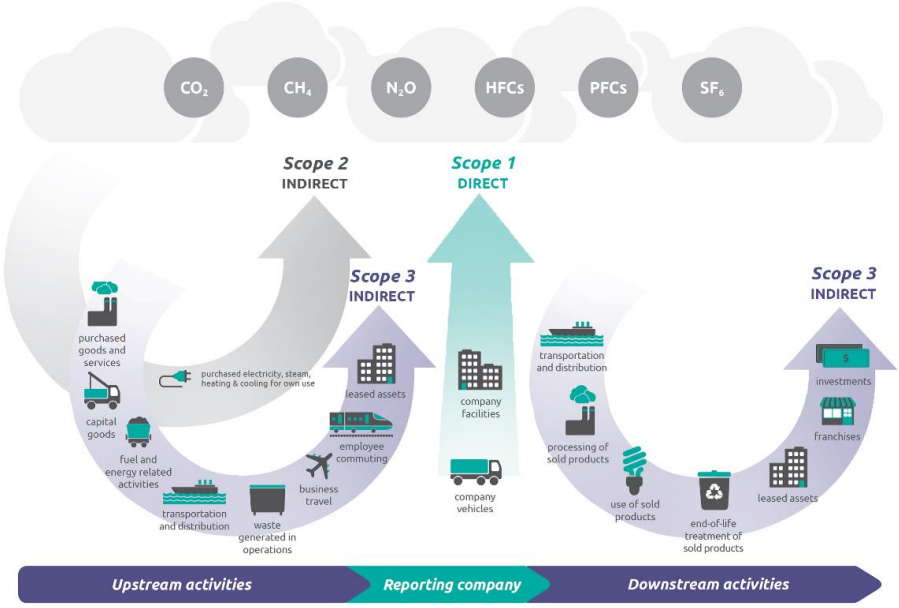
Asia Clean Energy Summit & Asia Carbon Summit 2024

Asia Clean Energy Summit (ACES) and Asia Carbon Summit (ACS) is the region's leading event focusing on clean energy technology, policy and finance supported by leading government agencies, research institutes and industry in Singapore. SEAS is the main organiser for the 2024 edition of ACES which is held as part of the Singapore International Energy Week (SIEW), ACES provides a common platform for regional thought leaders in both the public and private sector to collaborate on critical issues and opportunities in harnessing clean energy for the future.

ACES and ACS 2024 took place from 22 October 2024 to 24 October 2024, with a participation of over 3,000 exhibitors and visitors.

Methodology

The event carbon footprint assessment process took reference from the methodologies provided under the Greenhouse Gas Protocol (GHG Protocol), PAS 2060 Carbon Neutrality, and ISO14064-1 (2006) Standards where applicable, so as to underpin the classification of emission sources, quantification methods and reporting format. The carbon emissions are quantified in terms of CO2 equivalent (CO2e). The data used for calculation is based on that provided by the event organisers SEAS, and certain assumptions made by CRX, after consulting SEAS.



Other references where appropriate, (e.g., emissions factors), have also been obtained from formal sources and are referenced under the corresponding sections in this report.

All numbers calculated in this report will be rounded to the third decimal place (where applicable) whilst their final numbers (reflected in the 'Overall Carbon Emissions Profile') will be rounded to the second decimal place. The final rounding of the Carbon Emissions tonnage will be upwards to the nearest whole number.

Operational Boundaries

The operational boundaries indicate Carbon Emission sources to be quantified in this report. The boundaries are also limited to the availability of data provided due to the scale of the event.

Scopes/Activities Included in the Report Boundary		
Scope 1 **Direct GHG Emissions**	**Scope 2** **Indirect GHG Emissions**	**Scope 3** **Other Indirect GHG Emissions**
• N/A	• N/A	• Local transportation of event participants • Overseas business transportation of event participants • Guest accommodation • Material acquisition for event usage • Logistical transportation of materials used for the event
Scopes/activities excluded from the report boundary		
Scope 2 – Indirect GHG Emissions		
• Grid energy consumption during the event.		
Scope 3 - Other Indirect GHG Emissions		

- Food catering
- Waste

The scopes/activities that have been excluded from this carbon footprint assessment are due to them having already been accounted for and offset by Marina Bay Sands through their annual corporate carbon footprint assessment. These excluded scopes include emissions related to specific operational activities (ie, food catering and waste management) and energy consumption (indirect scope 2 emissions) that are part of Marina Bay Sands' broader sustainability and carbon management initiatives.

Scope 3

Local Participant/Visitor Transportation

A survey was undertaken by SEAS to gather responses from participants/visitors of ACES regarding the mode of transportation that was used to come from the event. Given that the survey was not able to capture the data across all participants, extrapolation of the gathered data was done to account for all the participants/visitors after consultation between CRX Int'l and SEAS.

Certain assumptions were made in agreement between CRX Int'l and SEAS to calculate the emissions generated from local transportation of participants/visitors that attended ACES 2024. The assumptions are further detailed in the footnotes below.

No. of participants[1]	Mode of transport	Average distance travelled per participants (km)[2]	Emission factor (kgCO2e/passenger/km)[3]	Emissions (tCO2e)
49	Bicycle	12.1	0	0
375	Bus		0.019	0.086
994	Car		0.187	2.250
1451	Train		0.013	0.228
293	Walk		0	0
Total Emissions				**2.564**

[1] Number of participants taking each mode of transport was extrapolated from a survey conducted by SEAS.
[2] Average distance travelled per participants is taken from a 2016 survey conducted by LTA showing the average distance that people commute to work - https://www.straitstimes.com/singapore/more-spore-residents-take-trains-and-buses-to-work-fewer-drive-to-the-office-population
[3] Emission factor source - LTMP2013Report.pdf

Overseas Business Transportation

Several participants were flown in from various parts of the world to Singapore to attend the ACES 2024 event. The following section focuses on the emissions generated from overseas travel by international guests that were specially flown in for the event. Emissions were calculated using the UK Government GHG Conversion Factors for Company Reporting 2023 by the Department for Environment, Food and Rural Affairs (DEFRA).

Certain assumptions were made in agreement between CRX Int'l and SEAS to calculate the emissions generated from overseas business transportation of participants/visitors that attended ACES 2024. The assumptions are further detailed in the footnotes below.

No. of participants[4]	Country of Origin	Distance travelled one way by all participants (km)	To and fro for all participants (km)	Emission Factor (kgCO2e/km) [5]	Emissions (tCO2e)
23	Algeria	10,608	21,216	0.17580	84.837
91	Australia	4,459	8,918		142.640
23	Bahrain	6,313	12,626		50.489
23	Cambodia	1,300	2,601		10.399
23	Cameroon	9,905	19,810		79.215
23	Canada	12,456	24,912		99.615
91	China	3,742	7,484		119.704
23	France	10,805	21,610		86.414
23	Hongkong	2,590	5,181		20.717
114	India	3,440	6,880		137.557
68	Indonesia	1,149	2,298		27.567
68	Malaysia	307	613		7.354
23	Mauritius	5,620	11,240		44.946
45	Philippines	2,385	4,771		38.153
45	Poland	9,464	18,927		151.371
Total Emissions					**1,100.980**

Guest Accommodations

The guests that were flown in to participate in the ACES 2024 events were provided with accommodations. It is assumed that each guest was provided with their own room during their stay in Singapore, the emission factor used reflects the emission for an average class of hotel in Singapore on a 'room per night' basis.

No of overseas participants[6]	No. of rooms[7]	No. of nights[8]	Emission factor (tCO2e/night) [9]	Emissions (tCO2e)
705	705	1410	0.0245	34.545
Total Emissions				**34.545**

[4] Number of participants travelled from each country of origin was extrapolated from a survey conducted by SEAS.
[5] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023
[6] Number of overseas participants derived from data gathered by SEAS.
[7] Assumes that each overseas participants were provided their own room during their stay in Singapore.
[8] Assumes that each overseas participants stays throughout the entire duration of the event of 3 days 2 nights.
[9] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023

Material Acquisition for Event Usage

Material acquisition refers to the materials that have been procured or manufactured for the purpose of the ACES 2024 event. These materials acquired were included in the carbon emission profile as the carbon emissions generated from the manufactured material would not have occurred in the absence of the event itself. The list of materials acquired for the event were provided by SEAS. The emissions in the table below represented the materials acquired only from SEAS (the event organiser).

To account for the emissions associated with materials acquired from the other 57 exhibitors that participated in ACES 2024, the emissions were estimated in proportion to the material used in accordance with the booth sizes. Based on information provided by SEAS, the booth sizes were categorised into standard and non-standard sizes.

Party	Items	Material	Quantity (kg)	Emission factor (kgCO2e/kg)[10]	Emissions (tCO2e)
Event Organiser (SEAS)	Carpentry structures (Main stage backdrop, techtalk backdrop, Welcome prop) recyclable	Wood	230	0.31261	0.072
	Compressed foamboards	Wood	145	0.31261	0.045
	Sticker print estimated of 6.5 rolls of vinyl stickers	Vinyl (PVC)	145	3.39918	0.493
	Cup sleeve (recyclable cardboard)	Cardboard	0.8	0.80152	0.001
	Foldable Tote Bag (RPET)	Recycled Polyethylene Terephthalate (RPET)	35	3.12134	0.109
	Needle punch carpet	Carpet (assumed made from PET fibres)	8	4.01848	0.032
	20mm lanyards c/w heat transfer printing + release buckle + oval hook (polyester) - 3,000 pc	Polyester (PET)	15	4.01848	0.060
	Customised Notebook FSC Environment Friendly paper (recyclable)	Paper	210	0.91048	0.191

[10] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023

57 Exhibitors	Items, material, and quantity assessed in proportion to the data provided by SEAS.	220[11]	Calculated in proportion to emission generated by SEAS according to quantity	0.280[12]
Total Emissions (tCO2e)				**1.284**

Material Logistical Transportation

The accounting of logistics material transportation in this carbon footprint assessment evaluates the carbon emissions generated from the movement of goods across various transportation modes resulting from the ACES 2024 event.

To account for the emissions associated with materials logistical transportation for the other 57 exhibitors that participated in ACES 2024, the emissions generated by SEAS is assumed to be from one exhibitor which will be extrapolated for the other 57 exhibitors.

Party	Mode of transport	Total distance travelled (km)	Emission factor (kgCO2e/km)[13]	Emission (tCO2e)
Event Organiser (SEAS)	10 ft lorry (HGV)[14]	10	0.87205	0.009
	14ft lorry (HGV)[15]	18	0.87205	0.016
	10ft van (Average Van)[16]	25	0.23128	0.006
57 Exhibitors	Assumes that each exhibitor generated the same number of emissions from material logistical transportation as the event organiser (SEAS)		57 x (0.009 + 0.016 + 0.006)	1.710
Total Emissions (tCO2e)				**1.740**

[11] The standard size booths used an average of 2.5 kg of materials per booth, the non-standard size booths are assumed to have used 2 times more material compared to the standard size booths at 5kg of materials per booth. Therefore, the total materials used for the 57 exhibitors across both standard and non-standard booths are estimated to be 220kg.

[12] Based on the composition of materials used by the event organiser (SEAS) which is 788.8kg, the assumed emissions for the rest of the exhibitors are calculated in proportion to the emissions generated by SEAS.

[13] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023

[14] Emission factor is taken from a generalised group of HGVs carrying an average laden

[15] Emission factor is taken from a generalised group of HGVs carrying an average laden

[16] Emission factor is taken from an average class van which uses diesel fuel

Appendix I - Carbon Credit Offsets

The carbon credits that would be used to offset respective emissions being validated in this carbon emission profile will be the Verified Carbon Credits under the VERRA Standard, specifically from the Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project (Project 903)[17].

Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project (hereinafter referred to as the project) is developed by Hebei Construction Investment New Energy Co., Ltd. It is located at the south of Guyuan County, Hebei Province, P.R.China.

The project involves the installation of 133 sets of wind turbine, each of which has a rated installed capacity of 1,500 kW, providing a total installed capacity of 199.5 MW. The annual output of the project is estimated to be 405,685 MWh and the electricity will be exported to the North China Power Grid (NCPG).

The scenario existing prior to the start of the implementation of the project is: the same electricity output by the project activity would have otherwise been generated by the operation of NCPG connected power plants and by the addition of new generation sources. That is the same as the baseline scenario. When the project is operated, the electricity generated will displace part of the electricity from fossil fuel-fired plants connected to the NCPG, and thus greenhouse gas (GHG) generated by coal-fired power plants could be reduced.

[17] More information regarding the VCUs retirement can be found in the following links -
https://registry.verra.org/myModule/rpt/myrpt.asp?r=206&h=175975
https://registry.verra.org/myModule/rpt/myrpt.asp?r=206&h=131308