Journal of Ecohumanism
2025
Volume: 4, No: 4, pp. 1771 – 1787
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i4.6920

Carbon Neutrality Design for SDG#3 Wellness and #12 Responsible Production and Consumption – Case Study of ESGSCHOOLHK

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Abstract

According to the definition of Brundtland Commission (1992) of the United Nations, "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." The basic element of sustainability in terms of ability to meet needs is to have an awareness to apply carbon neutrality design in the space usage to cater the needs of a coworking space for community events to learn how to transform with practices on SDG implementation. This is one of the United Nations Sustainable Development Goals (UNSDG) #3 and 12 – Well Being and Responsible Production and Consumption. It is suggested to implement ISO 14068-2023 Climate Change Management System for Transition to Net Zero in design of a coworking space and event planning to reinforce responsible management in workplace design with wellness and sustainable skills development.

Introduction

Today, various design principles with UNSDG#3 wellness, #10 remove equality, and #12 responsible production and consumption have been established for addressing workplace wellness, and equality, for example, Universal Design, Accessible Architecture, Inclusive Design, Barrier-Free Design, and application of eco friendly materials in the coworking space. It is noteworthy to analyze how architects, designers, SDG sustinability specialists, and SDG x ESG auditors interact to identify the key elements in carbon neutrality design for a 1,000 sq. ft. coworking space, integration of accessibility for individuals with disabilities in a eco-friendly environment within an indoor coworking design setting.

An online architectural journal highlighting a sports and fitness center for disabled individuals explains that "the concept was self-explanatory, and the campus design was based on achieving a 'total environment' that is providing complete freedom of movement" (Malhotra, "Architecture & Design for the Disabled People"). Terms such as "barrier-free," "accessible," and "freedom of movement" have become ingrained in our understanding of disability within architecture. This raises a critical question: Does disability merely equate to accessibility? Architect and theorist Juhani Pallasmaa asserts that architecture is a multisensory experience that engages the whole body (Robinson p. 337). A multisensory experience encompasses engagement through all senses—touch, hearing, smell, and sight. As Zumthor has suggested, the manipulation of multisensory experiences within a space can significantly affect a person's emotional state through the atmosphere created. Consequently, this paper seeks to explore how disability can be more effectively integrated into architecture through the lens of multisensory experiences rather than focusing solely on physical movement. Architects have invested considerable effort into crafting accessible environments for all individuals.

Research involving disabled individuals has revealed a disconnect between architects' perceptions of the needs of those with disabilities and the actual requirements of disabled individuals (Heylighen, Doren, and Vermeersch). Designers often base their concepts on preconceived notions or stereotypes surrounding disability. The proportions, dimensions, and details prevalent in our environments generally stem from a 'standardized' notion of what constitutes a 'normal' body (Heiss, Degenhart, and Ebe p.15). However, the system concept of ISO 9001 quality managemenet system – plan, do, ehck, act and ISO 14068:2023 focused on carbon neutrality process revealed that the students frequently leaned on their existing perceptions and

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personal experiences, rather than investigating available resources, for example eco-friendly materials and quality suppliers selection or consulting with user experiences (Boys p.55). This research highlights the need of applying ISO 9001 and 14068 into a coworking space design which may act as a carbon neutrality learning site for eco-friendly spatial practices with conventional architectual thinking dimensions, aiming to transform everyday life for bulding a sustainable community SDG#11. Moreover, this paper intends to illustrate strategies for integrating SDG#3 wellness, #12 responsible production and consumpton, #13 climate change and #17 partnerhisp through a multisensory perspective. The discussion will utilize a case study of ESGSCHOOLHK for re-thinking a carbon neutrality coworking space design with insights for the following three distinct areas of multisensory experience—

1. Physical quality of carbon neutrality coworking space design: i.e. materiality, dimension, proportion and organization;

2. Sensory aspects of carbon neutrality coworking user eco-friendly experience: i.e. vision, hearing, touch, smell, kinaesthetic; and

3. Mediating phenomena for SDG#3 Wellness: i.e. daylight, acoustics, air, art, movement and social interaction (Ryhl, Kajita, and Sørensen p.640)

Ultimately, this paper aims to inspire new thoughts in designing a small coworking space with consideration of ISO 14068-2023 climate change management system as a learning site for schools, hotels, and clinics which are committed to SDH#3 and #12/13. In this paper, the focus areas are focused on design and management approach to sutainability, for example:

1) ***Sustainable Materials:*** *green supplier selection with eco-friendly materials in furnishings a 1,000 sq ft. co-working space as a carbon neutrality learning site;*

2) ***Waste Reduction:*** *Based on niv'vo results, a staff handbook with elements of event wastes control and ICT non operating hour control programs and paperless initiatives will be the focus areas.; and*

3) ***Green Transportation:*** *Participants joining events organised in the planned carbon neurality site with bike storage and car pools with electric charging stations promote sustainable commuting.*

In order to build a sustainable community SDG#11 with consideration of light/ energy-efficient/ waste reduction/ sustainable design and materials practices and green partnership for reaching an integrated accessible for the community. For example, The Ramp House designed by Ian Mcmillan and Thea Chambers is one of the most well-known pieces of architecture that champions accessibility for the disabled, focusing on SDG#10 removing inequalities. A 28-meter-long ramp enables the wheelchair user of the family to access all the interior spaces. The ramp acts as the central focus that runs along the entire residence. In view of all the disability design principles and regulations – Universal design, Accessible architecture, Inclusive design and Barrier-free design, a large portion of the principles is devoted to the physical quality of a building.

Architects have also progressed in applying Sutainable Development Goals (SDGs) into designing buildings of commerical, residential and public purposes. For example, Lin et al. (2025) mentioned that "carbon neutrality usually involves balancing carbon footprint through offsetting measures and gradually reducing carbon fotprint zero or negative values that no longer rely on offsetting measures. This process requires not only to implement emission reduction measures within the boundary, but also to balance the remainig carbon emissons through carbon offsetting measures when it is not possible to futher reduce emissins." (Lin et al., 2025, p. 6)

For the examples on the use of ramps and stairs to caring physically impaired community, the Chicago House, Georg Schafer Museum, Museum M and Rolex Learning Center, are exceptionally outstanding examples for ramp and stair design. In the case of Georg Schafer Museum and Museum M, disabled users appreciate the emphasis of ramps at the main entrance. At the main entrance of these two museums, visitors

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must pass through a set of ramps and stairs to enter the museum. It clearly indicated how to enter the building and the disabled can share the same entrance as the non-disabled for equality, covering SDG#10 removing inequalities. From the architects' point of view, the design was to creatively merge ramps and stairs together so that both disabled and non-disabled can share the same route into the building.

Furthermore, the organization of interior space is also critical to consider adding SDG#11 sustainable cites and #13 climate change elements to the accessibility of buildings. Interior space is to be organized by functions and activities in a co-working space, and split-level is one way of organizing a large space without visual separation. Indeed, having multiple floor levels and the number of staircases with decarborization technologies, e.g. renewable energy generation, passive design system, daylight dimming control and insulation materials could make the building more sustainable. Hence, it is time to explore: 1) the key elements of carbon neutrality design of a coworkign space for building an accessible and eco-friendly community; and 2) explore the linkage of the ISO 14068 and SDGs for designing a carbon neutrality coworking space for skills development.

Sustainability and Corporate Social Responsibility (CSR)

According to the definition of Brundtland Commission (1992) of the United Nations, "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." The basic element of sustainability is the economic aspect to support the business in short term. For business survival and expansion, issues relating to the customers, suppliers, organizations, and the community must be considered in strategic planning, strategy implementation, performance measurement and process review. Environmental considerations in the core and supporting processes may also definitely contribute to sustainable business.

Besides, the Corporate Social Responsibility (CSR) guidelines of ISO 26000 highlight that a socially responsible organization needs to be aware of seven dimensions in their operations of business: labor practices, consumer issues, fair operating practices, human rights, organizational governance, community involvement and development and the environment. The priority of the seven dimensions is subject to the strategic planning of the management and the expectations of their stakeholders. For example, the management of a banking organization may need to understand the expectations of their customers when designing and launching different kinds of financial products and services, may need to identify not only their responsibility but also that of their business partners in the supply chain, may need to think about the environmental issues affecting their operations, their customers and their suppliers, and may need to consider ethical issues in their decision-making process so as to balance the economic, social and environmental impacts of sustainability; and the seven dimensions of CSR. The ISO Working Group on Social Responsibility (WGSR) has a high level of consensus in considering the needs of stakeholders in the guidelines of ISO 26000 for the benefit of the community.

"The decision to move to the CD stage is not only a milestone in the process of developing ISO 26000. It is also living evidence that the multi-stakeholder approach adopted by ISO for this task is an effective tool for dealing with complex subjects in large and highly diversified groups."

(Cajazeira, 2008)

According to **Cajazeira (2008),** the major principles for ISO 26000 are: accountability, transparency, ethical behavior, consideration for the stakeholders, legality, international standards, and human rights. It is the responsibility of organizations to consider the needs of the stakeholders in these seven aspects when designing work processes or executing business-related activities. In fact, ISO standard 26000 conveys a message that non-economic inputs and soft side of outcomes are the trend of quality management system (QMS).

This chapter explores the ways of integrating the programme accreditation-related requirements of accreditation body, the mission statements of the case institution and the use of internet-learning with

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overseas academic partners for the module of CSR in an supply chain related undergraduate programme in Hong Kong for developing higher-order skills for employability.

Sustainable Organization and Leadership for Alignment

Leadership in Carbon Neutrality Design

Ramdas, Sunil Kumar & Patrick, Harold Andrew. (2018). Driving Performance Through Positive Leadership. Journal of Positive Management, Vol. 9 No. 3, pp. 17-33.

"A descriptive methodology was adopted to explore the available literature. The paper presents the concepts of positive leadership, leadership theories that form part of the positive leadership style, approahces and dimensions to positive leadership. **They are defined and equated along with simiar relatiomships with other leadeship theories or concepts such as transformational, authentic and servant leadership." (**p, 17)

"Leaders who have adopted a positive leadership style are bound to have more engaged employees and deliver better results as leaderhip behaviour affects trust in workplace, work engagement and psychological empowermnet. The core characteristics that stand out among all the leaders as mentioned above are being authentic, available, transparent, and feel others wholeness. Authentic leaders, try to bring out the best in people by developing others' potential, by empowering people to take responsibility for their actions, and working together to make thngs better." (p. 18)

The phrases of sustainability and corporate social responsibility (CSR) have been used interchangeably in the past few years. Organizations of different nature are seeking to report not only their financial performance but also social performance for brand building and for trust gaining. Demand for social reporting with accountability and transparency has been on the rise. Research in the past decade has uncovered that management of organizations needs to care the expectations of stakeholders in a community for increasing their market competitiveness in the 21st century. In 2009, Wirtenberg uncovered seven qualities for building a sustainable enterprise, they were: top management support, centrality to business strategy, values, metrics, stakeholder engagement, systems alignment and organizational integration. From the findings of Wirtenberg, it was found that system alignment and organizational integration were the weakest dimensions of most enterprises. Hence, it is worthwhile to explore how to integrate the various aspects of sustainability to communicate to the public that the organization is a responsible one.

Elements affecting the system alignment and organizational integration include structures, processes, culture and issues of environment, health, safety in the supply chain are the concerns of the public. In fact, a responsible and sustainable organization needs to have a system to integrate all concerned issues of products or services that it is going to launch for the public in order to reduce unnecessary risks.

Wirtenberg (2009) mentioned that wisdom came from knowledge of converting data into information. He also mentioned that metrics for measuring performance is important for a sustainable organization. In order to manage people's behavior successfully internally and externally, management needs to have a system and a metric of measuring performance. Shani and Docherty (2003) highlighted that designing a sustainable learning organization needed to have a well-rounded planning, making learning more conscious with a better focused effort and measurement for accountability. Under globalization, it is time to learn how to build a framework for a sustainable organization – a plan with a sustainable strategy, with meaningful contextual measurements and issues related to its stakeholders, products and services. As Shani and **Docherty (2003)** mentioned that people's knowledge and skills and the way they organized were probably an organizations' most viable means of competition. That is to say learning how to plan, how to integrate, how to align, how to act responsible to the stakeholders are the key lessons of sustainability. In this chapter, the author is interested in exploring elements related to inclusive design for responsible management in architecture related learning platform.

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Accreditation Requirements and Programme Delivery

Through reviewing the mission statement of a the case institution in Hong Kong, the Hong Kong Qualifications Framework (QF) of the Education Bureau (EDB), and the teaching log of the author, it is expected that internet-learning with overseas academic and industry partners can widen the horizon of students and build up networking for developing problem-solving and solution-seeking skills, creativity and innovation for employability.

Yeung (2012) mentioned that **Palmer (2008) and De Jong et al. (2007)** highlighted the importance of mission statements in strategic planning in the sense of fiting into the school for implementation and improvement. Mission statements help unify internal stakeholders (faculty members and students) and establish a desired identity to external stakeholders (accreditation bodies, employers and the community).

Besides, **Christensen (2011)** also identified a few new traits of universities of which curriculum has been a focused area. For example,

- University program and accreditation with implications in advanced study opportunities;
- Integrated majors with implications in high customisability and low cost of curriculum creation;
- Activities program and leadership mode with implication in increasing student involvement and lowering operation cost; and
- Internship programme with implications in enhancing career

Placement.

Hence, educators need to consider integrating the accreditation requirements, customizing teaching materials with the use of internet to interact with overseas academic and industry partners to engage learners to develop higher order thinking skills for career development and personal development.

Misalignment among the mission statement of an institution, the requirements of an accreditation body and the teaching and learning activities may lead to disparity between programme objectives and learning outcomes; and finally making the programme cannot be sustained because of low student intake and low employability. Only through considering the key elements in a mission statement and the learning behavior of students can bring in insights in teaching and generate new business opportunities.

In recent years, international and local programme accreditation bodies have adopted an evidence approach to validate programmes. Assurance of learning is usually included in the requirements. In response to this, the Education Bureau (EDB) of Hong Kong has been promoting the use of outcome-based approach for attaining different levels of Qualifications Framework (QF) in both academic and vocational sectors in the past five years. According to Yeung (2011b), the Qualifications Framework (QF) was born in 2008 with an aim of having QF to help people in Hong Kong to set a goal for life-long learning with qualifications assured through the seven levels of qualifications covering academics, vocational and continuing education. The QF levels help visualize an articulation ladder for the learners. Level 1- 3 cover certificate level programmes while level 4-7 cover diploma, undergraduate degree, master degree and doctoral degree programmes. In each level, there are two to six descriptors to measure the learning outcomes of modules in a programme. And these descriptors are classified into the following four categories:

- Knowledge & Intellectual Skills;
- Processes;

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- Application, Autonomy & Accountability; and

- Communication, IT and Numeracy.

These QF levels and descriptors form a fundamental guideline for the programme accreditation body in Hong Kong to assess the quality of programmes organized by self-financed institutions. The QF levels of programmes delivered by institutes are assessed by an independent party named The Hong Kong Council for Academic Accreditation and Vocational Qualifications (HKCAAVQ) through programme validation exercises. The HKCAAVQ was established in 1990 as an independent statutory body to provide authoritative advice to the Hong Kong Government on academic standards of programmes, including sub-degree, and secondary as well as vocational qualifications in the higher education institutions. The role of HKCAAVQ in QF area is to assure the quality of the learning programmes. As an accreditation authority of QF, the HKCAAVQ assesses the programmes provided by institutes (programme providers) from the following perspectives:

1) Achieving stated educational objectives;

2) Operating learning programmes; and

3) Meeting the required standards to achieve stated learning outcome with reference to the Generic Level Descriptors (GLD) of QF.

Though understood that mission statement, programme accreditation requirements and learning outcomes are important in making curriculum sustainable, the thing is how to integrate inclusive design and carbon neutralization concepts with SDGs into architectural and project management related curriculum?

The Study – Inclusive and Carbon Neutralization Design and Space Usage for CSR

In the architectural world, split-level can help to differentiate spaces by function and navigate through interior space. "A split-level arrangement of paired classrooms allow interaction on multiple levels of the schools, which are spatially unified by the central space" (Hertzberger p.223). Yet, a disabled person stated that "navigating the interior spaces and the multiple floor changes and stairs was a pain" (Gissen, "Disability as architectural criticism"). In the case of the Yale Art + Architecture Building by Gwathmey Siegel & Associates Architects. The building consists of various split levels on the same floor. This experience informs architects that split level organization is beneficial in designing small residency, but has negative effects when applied to public institutions. It is important for architects to reconsider physical details that often seem normal and commonly used in buildings.

Vision is the most immediate architectural quality that one can perceive from afar among all senses. In most cases, users determines the quality of architecture first based on visual appearance. As Juhani Pallasmaa argued, recent architecture seemed to be "designed primarily to be seen rather than occupied" and "aesthetically rewarding only when experienced visually rather than with the whole body as one moves through a building" (Robinson p.337). The Museum M case study proved that it is important to reconsider the aesthetically pleasing architectural elements for the experience of disabled. The materiality of the floor surface is a contributing factor of burden for the disabled with regards to vision of physical accessibility. In the experiment, the disabled participants had trouble differentiating the ramps from the stairs because of the white color of the stairs and ramps. When the sunlight hit onto the ground, the visual impaired were unable to distinguish between ramps and stairs. In normal situation, the choice of whiteness in art museum design is appropriate for a smooth shadow-less space to exhibit artwork and a conceptual environment between artwork and viewer. But in the case of disability, architects and designers must be aware of the choice of material. Arguably, the idea of whiteness inherited from the period of modernism and Le Corbusier for reasons of visual neutrality, geometric purity and illumination of surfaces (Levent and Pascual-Leone p.240). Some design choices architects made were subconsciously derived from learned aesthetics and personal preference rather than based upon the need of users. In the case of the Multengut

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residence for the elderly, bright wall colors and contrasting materials were applied to help the elderly differentiate orientation and create a lively atmosphere. Corridors in red color contrast with the stairwells and balconies in blue colors help the elderly to orient themselves (Schittich p.64). Through content analysis on carbon neutrality design publications, insights are expected to gain for the research questions: 1) the key elements of carbon neutrality design of a coworkign space for building an accessible and eco-friendly community; and 2) explore the linkage of the ISO 14068 and SDGs for designing a carbon neutrality coworking space for skills development.

Content Analysis

The Study – Content Analysis, Quantitative Analysis and Participative Observation

Textual messages are data for conducting content analysis during the process of grounded theory that helps us to induce a concept for generalization and future prediction. From the following quotation, we can realize that content analysis is a technique to enable researcher to study human behaviour in an indirect way. It is analysis of written contents drawn from a certain kind of communication paper, like textbooks, essays and articles from newspapers. Through analysing these written works of people, the researcher can understand the behaviour of people and organizational patterns.

Communication is to send textual messages - verbal and non-verbal for co-ordinating, integrating, controlling and persuading purposes. Hence, textual messages are tools for persuading people's minds to accept ideas. Organizational behaviour is to understand, predict and control others' behaviour. Management is to manage resources within an organization for achieving organizational goals. These three principles – business communication, organization behaviour and business management bear an inter-related relationship as follows:

- Infer attitudes, values and cultural patterns in different countries or organizations;
- Gain ideas of how organizations are perceived;
- See the trend of certain practices; and
- Differentiate practices among certain groups of people.

"Content analysis as a methodology is often used in conjunction with

other methods, in particular historical and ethnographical research.

It can be used in any context in which the researcher desires a means

Of systematizing and quantifying data. It is extremely valuable in

analyzing observation and interview data."

(Fraenkel & Wallen, 2003 : 482)

Content analysis is a systematic and objective analysis of selected text characteristics. This includes counting the number, frequency of words, finding out the characteristics of themes, characters, building relationship among items, paragraphs, finally establishing meaningful concept. It is not simply a quantitative research method but also a qualitative one as the purpose of the writing is also reflected through the analysis.

In this research, the author built relationship of concepts on sustainable development, curriculum design and skill development in entrepreneurship education in higher education for closing the gaps of existing entrepreneurship related programmes with the skills required in the future.

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There are two levels of content analysis - describing fundamental inherent characteristics of messages and applying characteristics into related areas. The former one is objective as collected data are facts while the latter one is subjective as it is derived from researchers' point of view and personal life experience. When handling content analysis of this research, the author bears the research objectives in her mind:

Research Questions:

1) Identify the key elements of carbon neutrality design of a coworkign space for building an accessible and eco-friendly community; and

2) Explore the linkage of the ISO 14068 and SDGs for designing a carbon neutrality coworking space for skills development.

After describing the characteristics of content analysis of the above, its advantages can be summarized as follows:

- No people are involved;
- No experiments are required;
- Cost is minimal; and
- Texts found within a certain period of time in the past can reflect
- Social phenomenon.

However, researchers shall also realize that content analysis may have limitations in the availability of texts. Moreover, they may be subjective when interpreting the selected texts. As a result, they cannot demonstrate the cause and effect relationship within selected texts explicitly. When interpreting or making inference of documents received, researches should follow the ideas of Babbie (2001). That is to:

- Trace the person or authority composing the documents;
- Think about the reasons behind of having the existence of the documents;
- Find out the ways of acquiring the information contained in the documents;
- Investigate the magnitude of biases in the documents;
- Identify the main categories and concepts brought up by the writer;
- and
- Internalize the theories that the documents have demonstrated. 5.1

Table 1 – Key Factors for Carbon Neutrality Policy Governance

Name	Sources	References
'Strategies for Carbon Audit	11	1914

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'Human Production and Consumption Patterns	11	1102
'ICT Non Operating Hours Control	11	750
'Staff Engagement in Event Waste Control	11	519
'Data Stratefied to Analyze	11	428

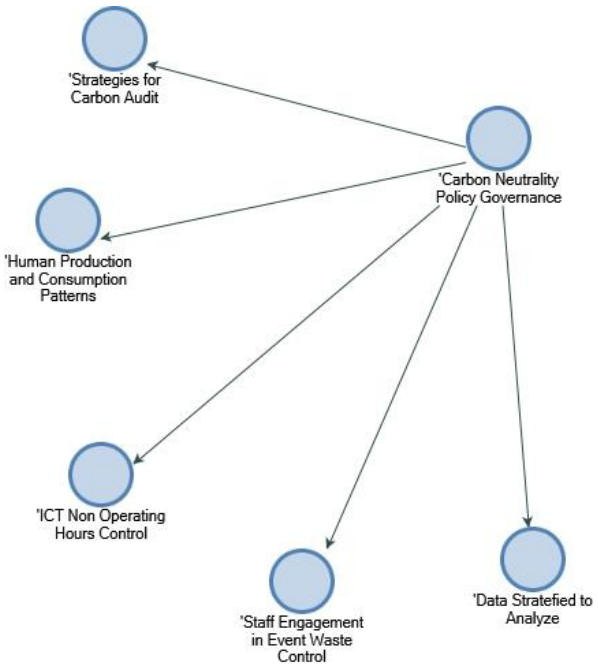

Diagram 1 – Key Factors for Carbon Neutrality Polocy Governance for SDG #3 Wellness and #12 Responsible Production and Consumption

Through analysing 11 research papers on carbon neutalization issues with nvivo analysis, the top 3 key elements of carbon neutrality design of a coworkign space for building an accessible and eco-friendly community are: strategies for carbon audit, human production and consumption patterns, and ICT non operating hours control.

Table 1.1 – Carbon Neutrality Policy Governance

Name	References	Coverage
2024 yoko01-05-en	80	0.17%
ARUP environmental-impact-assessment	5	0.05%
carbon Analysis of Social Sc Disciplines 2021 fenvs-09-761736	539	1.51%
Carbon N HE 2024 s10668-024-04596-4	222	0.74%
ecb.op334_4ddaea487d.en	126	0.33%
HiTHIUM 2024 ESG Report	555	0.53%
Low Carbon HK EPD_CA_Guidebook_Office_English	203	0.96%
Public_Sector_Readiness_for_Net_Zero_Carbon_by_2030	142	1.58%
SME Neutality Somerset Council pb13310-ghg-small-business-guide	11	0.39%
Strategies_toward_carbon_neutrality_comparative_an 2025	503	1.74%

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The_CarbonNeutral_Protocol_Feb_2024	358	0.53%

Table 2 – Strategies for Carbon Audit

Name	References	Coverage
2024 yoko01-05-en	43	0.08%
ARUP environmental-impact-assessment	6	0.06%
carbon Analysis of Social Sc Disciplines 2021 fenvs-09-761736	263	0.63%
Carbon N HE 2024 s10668-024-04596-4	215	0.71%
ecb.op334_4ddaea487d.en	96	0.23%
HiTHIUM 2024 ESG Report	368	0.29%
Low Carbon HK EPD_CA_Guidebook_Office_English	225	0.98%
Public_Sector_Readiness_for_Net_Zero_Carbon_by_2030	86	0.73%
SME Neutality Somerset Council pb13310-ghg-small-business-guide	7	0.20%
Strategies_toward_carbon_neutrality_comparative_an 2025	322	1.02%
The_CarbonNeutral_Protocol_Feb_2024	283	0.39%

Table 3 – Human Production and Consumption Patterns

Name	References	Coverage
2024 yoko01-05-en	9	0.01%
ARUP environmental-impact-assessment	2	0.02%
carbon Analysis of Social Sc Disciplines 2021 fenvs-09-761736	47	0.13%
Carbon N HE 2024 s10668-024-04596-4	94	0.51%
ecb.op334_4ddaea487d.en	27	0.08%
HiTHIUM 2024 ESG Report	536	0.57%
Low Carbon HK EPD_CA_Guidebook_Office_English	40	0.32%
Public_Sector_Readiness_for_Net_Zero_Carbon_by_2030	1	0.01%
SME Neutality Somerset Council pb13310-ghg-small-business-guide	2	0.06%
Strategies_toward_carbon_neutrality_comparative_an 2025	73	0.35%
The_CarbonNeutral_Protocol_Feb_2024	271	0.47%

Table 4 – ICT Non Operating Hours Control

Name	References	Coverage
2024 yoko01-05-en	72	0.14%
ARUP environmental-impact-assessment	11	0.14%
carbon Analysis of Social Sc Disciplines 2021 fenvs-09-761736	9	0.02%
Carbon N HE 2024 s10668-024-04596-4	16	0.06%
ecb.op334_4ddaea487d.en	34	0.10%
HiTHIUM 2024 ESG Report	430	0.42%
Low Carbon HK EPD_CA_Guidebook_Office_English	49	0.31%
Public_Sector_Readiness_for_Net_Zero_Carbon_by_2030	9	0.12%

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SME Neutality Somerset Council pb13310-ghg-small-business-guide	10	0.37%
Strategies_toward_carbon_neutrality_comparative_an 2025	24	0.07%
The_CarbonNeutral_Protocol_Feb_2024	86	0.14%

Table 5 – Staff Engagement in Event Wastes Control

Name	References	Coverage
2024 yoko01-05-en	44	0.09%
ARUP environmental-impact-assessment	54	0.66%
carbon Analysis of Social Sc Disciplines 2021 fenvs-09-761736	4	0.01%
Carbon N HE 2024 s10668-024-04596-4	30	0.09%
ecb.op334_4ddaea487d.en	8	0.02%
HiTHIUM 2024 ESG Report	248	0.18%
Low Carbon HK EPD_CA_Guidebook_Office_English	38	0.17%
Public_Sector_Readiness_for_Net_Zero_Carbon_by_2030	7	0.05%
SME Neutality Somerset Council pb13310-ghg-small-business-guide	12	0.35%
Strategies_toward_carbon_neutrality_comparative_an 2025	10	0.03%
The_CarbonNeutral_Protocol_Feb_2024	64	0.10%

Table 6 – Data Stratefied for Analysis

Name	References	Coverage
2024 yoko01-05-en	39	0.05%
ARUP environmental-impact-assessment	6	0.03%
carbon Analysis of Social Sc Disciplines 2021 fenvs-09-761736	35	0.06%
Carbon N HE 2024 s10668-024-04596-4	36	0.10%
ecb.op334_4ddaea487d.en	18	0.03%
HiTHIUM 2024 ESG Report	124	0.06%
Low Carbon HK EPD_CA_Guidebook_Office_English	20	0.06%
Public_Sector_Readiness_for_Net_Zero_Carbon_by_2030	25	0.14%
SME Neutality Somerset Council pb13310-ghg-small-business-guide	22	0.42%
Strategies_toward_carbon_neutrality_comparative_an 2025	20	0.04%
The_CarbonNeutral_Protocol_Feb_2024	83	0.07%

For the research question 2) exploring the linkage of the ISO 14068 and SDGs for designing a carbon neutrality coworking space for skills development, here the suggested 10 steps for designing a carbon-neutral coworking space with portable fixtures for the communities with creative art culture events and environmental materials demonstration, aligned with ISO 14068 standards and SDGs, tailored to the Hong Kong context. These five steps emerged upon recent literature on carbon neutrality has been incorporated:

1. **Conduct a Gap Analyisis with Design Plan on Carbon Footprint Assessment in Line with ISO 14068**

Based on ISO 14068 to conduct a gap analysis between requirements and existing carbon neutrality performance of the co-working space that is intended to designe for SDG#3 wellness and #11 sustainable

Journal of Ecohumanism
2025
Volume: 4, No: 4, pp. 1771 – 1787
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i4.6920

cities, for example, technology and framework for carbon footprint, social elements to be included, e.g. inclusiv design, and organizatinal mission to measure, like coworking for carbon neutrality learning site for targeted industries with clauses of **ISO 14068 guidelines**.

2. **Set Measurable and Achieveable Targets for Carbon Neutrality Aligned with SDG#3 and 13 and ISO 14068**

Based on targets on SDG #3 and 13 to set SMART (specific, measurable, achievable, realsitic, and time-bound targets to ensuring the intended carbon neutrality co-working space design space's carbon neutrality aligns with global climate goals (Schaeffer et al., 2021).

3. **Design for Energy/ Lighting/ Material Efficiency and Use of Product Life Cycle Concepts to Design Coworking Space's Functional Purposes**

Select environmentally friendly and efficient lighting system (e.g. LED), using renewable energy, (e.g. solar energy), applying flexible access design platforms with consideration of ventilation, and water conservation, minimizing operational impacts, creating bonding to a sustainable community with eco-friendly materials (e.g., recycled, biodegradable materials) for fixtures and furnishings, emphasizing movable and portability for various carbon neutrality learning site demonstration and re-design activities, e.g. hotel room, school common rooms and clinics, promoting flexibility and wastes reduction.

4. **Integrate Demonstration of Localised Environmental Materials with Upcycling and Circular Economy Principles**

Create displays to show upcycling and circular economy concepts applied in a co-working space to align with SDG 12 (Responsible Consumption and Production) and SDG#13 (Climate Change).

5. Engage Stakeholders with **Educational Values and Carbon Neutrality Actions**

Utilize the space to educate users about sustainability, carbon reduction, and SDGs, fostering behavioral change with Report Transparency. Partners to be engaged are: hotels, schools, and clinics for co-working space design and redesign with stakeholders' feedback for continual improvement

These 5 recommended steps provide a comprehensive, standards-based approach to designing a carbon-neutrality coworking space that promotes environmental awareness and sustainability within Hong Kong's unique urban context. Incorporating recent literature ensures the strategies are innovative, evidence-based, and aligned with current best practices. Based on the above 5 recommended steps, a checklist has been designed for implementing SDG x ESG Carbon Neutrality Co-working Space Design for ESGSCHOOLHK which is a subsidiary of Hanin Enterprises Limited and they are commited to the principles of UN Global Compact (https://unglobalcompact.org/what-is-gc/participants/183936-Hanin-Enterprises-Limited) , focused on educating schools, hotels and art-related communities on designing a carbon neutrality space with flexibility and standardization with SDGs as mentioned in their website

"We are Committed to a Sustainable Future – Achieve Sustainable Goal as suggested by the United Nation. One of the key initiatives is " Responsible Consumption and Production."

(https://www.hanin.com.hk/)

"This workshop aims to provide students, teachers, and principals with a deep understanding of the importance of fashion sustainability through hands-on activities. You can choose suitable activity modules based on the needs of your school."

(https://esgschoolhk.com/pages/sustainable-workshop)

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DOI: https://doi.org/10.62754/joe.v4i4.6920

Case Study – ESGSCHOOLHK

Renovating ESG SCHOOL Coworking Space for Carbon Neutrality: A Guide Aligned with ISO 14068 and SDGs

In the face of escalating climate change concerns and the global push towards sustainable development, organizations are increasingly adopting frameworks to achieve carbon neutrality. For a coworking space dedicated to ESG (Environmental, Social, and Governance) principles—like ESGSCHOOLHK, a subsidary of Hanin Enterprises Limited —integrating ISO 14068:2019 provides a structured approach to quantifying, managing, and reducing greenhouse gas (GHG) emissions. This guide outlines essential steps to renovate the coworking space with carbon neutrality elements, aligning with SDG #3 (Good Health and Well-being) and SDG #12 (Responsible Consumption and Production), emphasizing governance, strategy, carbon audits, staff engagement, and event design.

After conducting nvivo analysis of literatures on carbon neutrality and ISO 14068, the following checklist with ISO Plan, Do, Check, Act principles are derived for actions in designing a carbon neutrality coworking space for community events and education of SDGs.

ISO – PLAN – Objectives Setting

- Based on ISO 14068 to conduct a gap analysis between requirements and existing carbon neutrality performance related policies (PLAN)

- For example:
Policy of miniming organisation's carbon emission, policy of wastes reduction, policy of staff handbook with behaviour changes on environment protection

- Policy of stakeholder engagement via forums to discuss carbon neutrality objectives and ways to achieve the targets within a certain timeline wth a GNATT chart

- Policy of communciation of targets to meet the expectations of organizational management and / or investors, customers and internal/ external staff

- Policy of property strategy in relation to the location of the coworkign space and determine how reducing carbon emissions fit overall PLAN and POLICIES

- Handbook with Circular Economy Principles with internal staff training and external public communication

- The design principles, operational decisions and selection of materials and products will significantly impact the carbon emissions of a fit out project. Their impact on the environment will continue throughout the entire life cycle of your building.

ISO – DO - Design Principles and Actions for Continual Improvement

- Organise regular meetings for design concepts with key stakeholders based on ISO 14068

- Ensure the design is actionable and measurable with impacts to align with policies

- Choose a mutully-agreed design plan to implement within budget and timeline with minimal finishes, paints, wall coverings and sustainable materials

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DOI: https://doi.org/10.62754/joe.v4i4.6920

- Maximise stakeholders' satisfaction of occupancy and event management to mminmize carbon neutrality

- For example, minimising storage, using electronic archiving and devices for events, open floor plan/ movable installations to cater the needs of events and space usage,

ISO – CHECK with Flexibility Opportunities and Audit with Traceability / Tranparency

- Design using elements which allow the space to be easily adjusted for future changes in use or occupancy e.g. demountable partitions

- Design to include hot desk or flexible locations

- Consider how to allow areas or whole floors with low occupancy to be 'closed' at certain times. For example, leave only one floor open outside normal working hours to reduce energy use during very low occupancy times

- Use random, non-linear patterned finishes, such as carpets, where you can easily replace one tile with another without having to replace the whole floor

- Carry out the design process with factory prefabrication in mind - in order to avoid waste by procuring, pre-finishing or prefabricating to set lengths

ISO – ACT – Re-Design and Audit for Low Carbon Operations with Evidence and Rooms for Improvement

- For lighting aspect, consider undertaking an energy model or carbon neutrality framework with AI to anticipate operational energy requirements and carbon performance of your space. For example:

- Lighting improvements in energy control and efficiency systems, built-in daylight sensors and dimming capability, to make the most of your natural light, install infrared motion detectors for automatic lighting control with timers, conversion of old fluorescent fittings to LED

- For heating aspect, consider solar PV, renewable energy options in order to purchase efficiently and alternatives to replace high carbon systems (such as air source, ground source, water source heat pumps)

- For materials aspect, monitor, calculate and improve materials and products supplier selection

- Embodied carbon is the CO2 (and other greenhouse gases) emitted during the extraction, manufacture, transportation and assembly of materials and products. It makes up around 10% of all global emissions each year.

- Materials must be carefully considered and low embodied carbon products can be selected to ensure you significantly reduce the impact of your fit out project.

- Work with a SDG x ISO carbon neutrality co-working project team members for souring low carbon materials and engage manufacturers / supplier for measuring sopce 1, 2, 3 (if applicable) in carbon emission and SDG related disclosure reports

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- For example, environmental outsouced parties (local or overseas) in supply chain managemnt chain and demand chain management chain on environmental materials, semi-finished or finished products with declarations (EPDs), then use the contents of the EPD to inform decision making

- And, consider reduction of VOCs to improve air quality in the coworking space,

- paints

- varnishes

- coatings

- adhesives

- sealants

- composite wood products

- carpets and associated adhesives

ISO – PDCA Circular Flow on Operations Management

- For example, educate staff members and community members to have limits on temperature controls for day-to-day use in organising events

- Install an automatic shut-off system to put equipment on standby, e.g. projector and air-conditioner

- Ensure a user friendly way to measure total energy used on an event base or on a daily basis or on a monthly basis.

- Consider the usage of low occupancy days within a month

- Install 'workplace footprint tracker' software / timers/ auto-shut down devices …etc. to control and display energy use on dashboards to encourage staff members / community members to reduce their individual energy use/ carbon footprint

- Communication with staff members/ community members via ongoing training on how to use all the systems (lights, heating and air, etc.) with a handbook to comply with the policies set.

Implementation and Monitoring

Renovation Execution

Design renovation plans incorporating energy-efficient infrastructure, sustainable materials, and green building certifications (e.g., LEED). The goal is to reduce embodied carbon and operational emissions.

Monitoring and Reporting

Regular monitoring of energy use, waste reduction, and transportation impacts is essential. Using ISO 14068's guidance, the organization should produce annual GHG reports, verifying reductions and progress toward net-zero targets.

Conclusion and Discussion

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Renovating an ESGSCHOOLHK coworking space for carbon neutrality is a multifaceted process grounded in robust standards like ISO 14068. It requires committed governance, strategic planning, accurate carbon accounting, staff engagement, and sustainable event management. By adopting a systematic approach—set clear policies, perform comprehensive audits, involve staff, and monitor progress—the coworking space can significantly reduce its carbon footprint, contributing to SDG #3 and SDG #12. The integration of user-friendly tools like checklists ensures ongoing commitment and facilitates transparent reporting, ultimately fostering a sustainable and health-promoting environment for all participants.

In a nutshell, designing for disabled require nothing fancy but a dedicated and thoughtful

consideration to details. Physical details that often seem normal and commonly used in buildings because the proportions and dimensions were measured with "normal" body must be readjusted. Architectural approaches inherited from history, and design choices architects derived from learned aesthetics and personal capital must be reconsidered. Superficial framing of views do not have much benefits, whereas putting users from all ages into the same frame benefits for all. Even though there are numerous design principles for disability in use today, it is crucial to instill the idea that disability do not equal to physical accessibility. We have to recognize that the social and spatial practice we have been using, and the way we perceive things are not "ordinary" and "normal". Now is the time to find our way to experience disability, to translate our awareness and feelings about space into design that is practical for everyone. Small change in room temperature, the way light hit onto the floor, the warmth when you touch a surface, the sound of a cracking chair, all these tiny details allow us to rethink and remake our everyday life.

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