Swiss Agency for Development and Cooperation (SDC)
Sino-Swiss Zero Emission Building Project (ZEB)

External Project Evaluation

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FINAL REPORT

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TABLE OF CONTENT

Terms and Abbreviations

A2CE	Adrian Altenburger Consulting: Engineering
ADB	Asian Development Bank
AIIB	Asian Infrastructure and Investment Bank
ASEAN	Association of Southeast Asian Nations
BCEE	Beijing Research and Development Center of Building Energy Efficiency
BEEP	Indo-Swiss Project on Energy Efficiency in Buildings
BIPV	Building Integrated Photovoltaics
BoHURD	Bureau of Housing and Urban-Rural Development
CABEE	China Association of Building Energy Efficiency
CABR	Chinese Academy of Building Research
CAM	China Association of Mayors
CD	Capacity Development
CDE	Climate, Disaster Risk Reduction and Environment section. This is a section within SDC's division of thematic cooperation.
CEELA	Strengthening Capacities for Energy Efficiency in Buildings in Latin America
CO2e	Carbon Dioxide Equivalent
COP	Conference of the Parties, UN Climate Change Conference
CPC	Communist Party of China
CSTID	Center of Science, Technology and Industry Development
CW	Capacity Works
DAC	Development Assistance Committee
DENA	Deutsche Energie-Agentur/German Energy Agency
DGNB	Deutsche Gesellschaft für Nachhaltiges Bauen/German Sustainable Building Council
DoHURD	Department of Housing and Urban-Rural Development
DP	Demonstration Project
EAWAG	Wasserforschungsinstitut ETH/Swiss Federal Institute of Aquatic Science and Technology
EMPA	Eidgenössische Materialprüfungs- und Forschungsanstalt/Swiss Federal Laboratories for Materials Science and Technology
EPFL	Ecole Polytechnique Federal de Lausanne
ETHZ	Originally Eidgenössische Technische Hochschule Zürich
EU	European Union
FDFA	Swiss Federal Department of Foreign Affaires
GBEL	Green Building Evaluation Label
GHG	Greenhouse Gases
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GlobalABC	Global Alliance for Buildings and Construction
HQ	Head Quarters
HSLU	Hochschule Luzern/Lucerne University of Applied Sciences and Arts
HYR	Half Yearly Report
ICLEI	Local Governments for Sustainability (originally International Council for Local Environmental Initiatives)
IEA	International Energy Agency
LEED	Leadership in Energy and Environmental Design
MEE	Ministry of Ecology and Environment of the State Council, China
MoHURD	Ministry of Housing and Urban-Rural Development of the State Council, China
MoU	Memorandum of Understanding
NAMC	National Academy of Mayors in China

NDRC	National Development and Reform Commission
NEST	Next Evolution in Sustainable Building Technologies: Swiss modular research and innovation building of Empa and Eawag
NZEB	Nearly Zero Emission Building
OC	Outcome (of the ZEB Project)
OECD	Organization for Economic Co-operation and Development
PV	Photovoltaic
RACER	Relevant, Accepted, Credible, Easy, Robust
RbM	Results-based Monitoring
SAMS	State Administration for Market Supervision, China
SASAC	State-owned Assets Supervision and Administration of China (SASAC) of the State Council, China
SC	Steering Committee
SDC	Swiss Agency for Development and Cooperation
SDG	Sustainable Development Goals
SEVAL	Swiss Evaluation Society's Standards
SF	Success Factor
SGB	Swiss Green Building Association
SG-E	Switzerland Global Enterprise
SGNI	Schweizer Gesellschaft für Nachhaltige Immobilienwirtschaft/Swiss Sustainable Building Council
SIA	Swiss Association of Engineers and Architects
SMART	Specific, Measurable, Achievable, Relevant, Time-bound
SSLCC	Sino-Swiss Low Carbon Cities
SUPSI	University of Applied Sciences and Arts of Southern Switzerland
ToC	Theory of Change
ToR	Terms of Reference
UAD	Architectural Design & Research Institute, Zhejiang University
UNESCAP	UN Economic and Social Commission for Asia and the Pacific
UNFCCC	UN Framework Convention on Climate Change
UNHabitat	UN Human Settlements Programme
VC	Video Call
VNR	Voluntary National Review
VRV-Air	Variable Refrigerant Volume
WEF	World Economic Forum
YPO	Yearly Plans of Operation
YPR	Yearly Project Report
YR	Yearly Report
ZBP	Zentrum Bautechnologie und Prozesse, ZHAW/Center for Building Technology and Processes, ZHAW
ZEB	Zero Emission Building
(N)ZEB	(Near) Zero Emission Building
ZHAW	Zürcher Hochschule für Angewandte Wissenschaften/ZHAW Zurich University of Applied Sciences

EXECUTIVE SUMMARY

The **Sino-Swiss Zero Emission Building (ZEB) Project**, initiated and funded by the Swiss Agency for Development Cooperation (SDC), has been started in March 2021. The Project, based on the MoU between the Chinese Ministry of Housing and Urban-Rural Development (MoHURD) and the Swiss Federal Ministry of Foreign Affairs aims to reduce greenhouse gas emissions and enable the carbon neutral development of the building sector in China by sharing Swiss know-how on sustainable and zero emission building. The ultimate goal is to jointly address global climate change. After 3 years of implementing the Project, it has been decided by SDC to carry out an **external evaluation** in order to review the project progress and to make suggestions for improving and enhancing the Project results for the remaining months and the extension period until November 2025.

The **evaluation** took place from **mid-of September to the end of December 2024** with a 2-weeks mission in China from November 2nd to 14th. It followed the **SEVAL standards** and was based on the six evaluation criteria of the **OECD DAC Network on Development Evaluation** (EvalNet). Moreover, another analytical tool, the Capacity Works (CW)-Model was used to assess **5 success factors** of the ZEB Project. The design of the evaluation consisted of a profound desk review of all relevant Project documents and publications, virtual meetings as well as physical interviews with about over 40 actors/stakeholders and beneficiaries in Switzerland and China. For the interviews, a comprehensive, semi-standardized **questionnaire** was used. 3 ZEB Demonstration Sites in Beijing, Shanghai/Jiading and Shaoxing have been visited too.

Observations and findings of the evaluation team indicate that the concept of the Project is balanced, logic, consistent, reasonable and appropriate to address the needs of the beneficiaries through a multi-level and a multi-stakeholder approach. Swiss inputs on sustainable, green, energy-efficient and zero emission building are to be regarded as a frame of reference or the common thread of the Project. Despite the Covid-19 pandemic, which highly affected the Project for almost 3 years and caused high risks, uncertainties, obstacles and delays, the Project team showed a high flexibility and creativity to implement a number of important, target-oriented activities leading to the following results: (1) New Technical Standards for Zero-Carbon Buildings have been jointly drafted by Chinese and Swiss experts and submitted to MoHURD for approval and publication. Local standards have been similarly drafted for different climate zones, from NZEB to ZEB technical and evaluation standards. (2) 5 out of 10 originally planned ZEB Demonstration Projects in 4 climate zones are completed so far as a result of a joint Sino-Swiss discourse. (3) ZEB training material had been prepared, online and physical training conducted for several groups of stakeholders and beneficiaries and numerous ZEB knowledge products created.

The **assessment of the DAC criteria led to the following results**: The Project is highly relevant as it is in full compliance with China's overall climate targets and policies and in particular to the ZEB strategies; compliant with the needs and requirements of the society and in line with the policies, laws, objectives, regulations and strategies of the Swiss Confederation with regards to climate change and GHG emission reduction in the building sector. The Project can be confirmed a high internal coherence in a broader sense as a number of relevant networks and alliances inside and outside the Project are providing complementary contributions to the Project. The cooperation with the Swiss green building sector needs to be improved. External coherence is restricted to an exchange with other bilateral, regional or international organizations which are working in China in the ZEB/Green Building sector such as the World Bank, International Energy Agency, GABC, Energy Foundation, GIZ as well as BEEP and CEELA. Effectiveness is good, considering the effects of the Covid 19 pandemic. The DPs are not yet functional as real ZEB demonstration sites and not visible as Sino-Swiss projects; a very basic monitoring concept for the DPs is available only (OC-2). Capacity Development measures are not based on a CD strategy, which has to differentiate between the main actors and beneficiaries; a knowledge management and transfer concept is still missing.

However, it can be certified by the evaluation team, that the **Project is on the right track** and the **necessary and sufficient conditions are already met to achieve the 3 outcomes until the end of the Project**.

Swiss inputs have led to significant innovative, more target-oriented solutions and new change processes to tap undiscovered potentials for increasing energy efficiency and carbon emission reductions. Preliminary carbon emission reduction calculations by the Project are showing a positive trend but have to be extended and based on more scientific parameters. Institutional sustainability is ensured as the ZEB Project remains integrated into existing Government structures. MoHURD affirmed its high ownership and commitment to the evaluation team.

Referring to the **assessment of the 5 CW-success factors**" strategy, steering, cooperation, processes and learning/innovation", the Project can be considered as very successful to successful.

The **main Lessons learnt** discovered are the design and strategic approach of the ZEB Project with its learning and pilot character and worth to be replicated in other contexts; the harmonious Sino-Swiss cooperation through joint interventions and concerted actions on ZEB issues; how to manage a Project in times of a (pandemic) crisis with all the risks and uncertainties.

The evaluation team made **5 major recommendations** related to the ongoing and to be extended Project phase: (1) to consolidate and finalize all activities in order to achieve the

intended objectives and the impact; (2) to improve all sub-strategies in a way that they are easy to understand and tailor-made, related to the needs of the beneficiaries; (3) to improve the overall monitoring, reporting and documentation and to proceed with evidence-based and realistic approaches to calculate carbon emission reductions; (4) to ensure, that the existing ZEB demonstration projects are fully functional, visible and accessible to all stakeholders and the public; (5) to improve the CD-concept, to adjust the training contents and methods, to shift a major part of CD-activities to ZEB multipliers and protagonists and to proceed with scaling-up the technical ZEB standards and other knowledge products. Principal recommendations for a future cooperation with China as a development and knowledge partner has been made too.

1. INTRODUCTION AND BACKGROUND

1.1 Rationale

Both, the Swiss Government and the Chinese State Council have agreed on a joint co-operation in the field of building energy efficiency and signed a Memorandum of Understanding (MoU) in November 2020. Based on the MoU, the Sino-Swiss Zero Emission Building (ZEB) Project was launched in March 2021. The Project Synopsis is shown in **Annex I**. After 3 years of implementing the Project, it has been decided by SDC to carry out an external evaluation. The **reason for the evaluation** was to review the project progress and to make suggestions for improving and enhancing the Project results in the remaining months and the extension period until November 2025. The evaluation team understands, that SDC evaluations serve three interrelated purposes: to increase learning, to improve the effectiveness and efficiency of development cooperation, and to enhance its accountability and transparency towards the public. The ZEB Project evaluation approach is primarily based on the TOR and furthermore reflected in the Inception Report.

1.2 Evaluation Objectives, Scope and Principles

The **main purpose of the evaluation** was to review the progress of the ZEB Project and to make suggestions for improving and enhancing the Project results in the extension period. The **first objective** of the review was to assess the overall performance of the project, including the impact, outcomes, outputs, long-term sustainability and to identify key lessons-learnt. The **second objective was** to make recommendations for the planned extension period. Moreover, the evaluation team was asked to outline ideas as to whether results and knowledge products of the Project could be embedded in relevant Asian regional interventions of the Swiss Government and/or other regional organizations.

The external evaluation covered the period from March 1st 2021 to July 31st 2024, which is part of the ongoing Project (01.03.2021 – 28.02.2025, extended to 24.11.2025). However, main activities and achievements of the Project in the period between August and October 2024 have also been taken into consideration. The **geographical scope** of the evaluation was **China** where the main activities of the Project are taking place, with special reference to the ZEB Demonstration Sites in different Chinese climate zones. Project measures which took place in **Switzerland** with Chinese stakeholders have also been assessed. The **evaluation approach** was guided by the **Swiss Evaluation Society's Standards (SEVAL Standards**).

1.3 Evaluation Criteria and Evaluative Questions

To use the **six evaluation criteria of the OECD DAC Network on Development Evaluation (EvalNet), e.g** relevance, coherence, effectiveness, efficiency, impact and sustainability, is mandatory. For that reason, attention has been paid to the principles and quality standards of the DAC-evaluation criteria. All six criteria are relevant, but the focus shall be on **Relevance,**

Coherence, Effectiveness and Sustainability as stated in the TOR. An analysis of change processes, e.g. related to ZEB policies, regulations and standards as well as reflections on unintended effects and replicable results inter alia shall indicate the trend to achieve an **Impact. (Annex II).** The ZEB Project evaluation included, as recommended by the EvalNet, a basic review to what extent the Project contributes in principle to the **Sustainable Development Goals (SDGs)**, mainly to goal 7 and 11-13.

Another very useful evaluation instrument, **Capacity Works (CW)-tool**, was adopted too. CW analyses **5 success factors** for any cooperation intervention such as strategy, cooperation and partnerships, steering structure, processes as well as learning and innovation **(Annex III).**

The main task was to prepare a comprehensive, extended, semi-standardized **Evaluation Questionnaire** that goes beyond the indicative EvalNet evaluation questions (additional questions related to concept, strategic approach, LogFrame, main activities related to project interventions, lessons learnt and recommendations). The Evaluation Questionnaire was divided in 3 parts: (1) Questions related to the OECD-DAC Criteria; (2) Questions related to the Success Factors of the Capacity Works Model; (3) Questions related to the Demonstration Sites. It was foreseen to tailor and specify the questions according to the different interviewees **(Annex IV).**

1.4 Evaluation Methodology, Process and Sources of Information

The **methodology used** by the ZEB Project evaluation was primarily based on a mixed methods design: It consisted of a profound review of all relevant project documents, provided by SDC, a (comparative) literature analysis, virtual and physical interviews to the main actors on the basis of the evaluation questionnaire mentioned as well as an assessment of the demonstration projects through selected site visits and specific interviews.

The evaluation consisted of **3 phases and 5 major steps**: The **Inception Phase**, with the review of all relevant Project documents (**Step 1**). The evaluation team reviewed all important Project documents, comprising quantitative and qualitative data, which were provided by SDC such as the Project Documentation for Phase I, 2021, Yearly Plans of Operation (YPO), Half Yearly Reports and Yearly Reports, fact sheets and project-ppts as well as other knowledge products. Numerous information and data could be uploaded under Microsoft Teams. All **data and information** collected by the evaluation team, has been classified in 5 categories: 1) **Project Documents** incl. FDFA/SDC policies and strategies; 2) Climate and energy policies, strategies, road maps and programs, related to the building sector, of **Switzerland; Swiss** standards, labels, certification; 3) Relevant **Chinese** climate and energy policies and strategies, implementation plans, pilot activities and specific ZEB policies; 4) Policies and lessons learnt from **international organizations** as well as **other countries**, e.g. Germany; 5) Publications and reports related to the OECD-DAC-criteria (EvalNet) and the **evaluation methodology (Annex V).** Virtual and physical meetings in Switzerland with SDC and the

Swiss Project Team were held. At the end of this phase, the Draft Inception Report was submitted to SDC on October 21st and approved on October 31st 2024 (**Step 2**).

The **Implementation Phase** took place from November 2nd with internal preparatory meetings in Beijing to November 14th. During this phase, meetings were held with SDC, MoHURD, the Chinese implementation team and other primary and secondary Project actors and beneficiaries. Visits have been paid to the ZEB Demonstration Projects in Fangshan District, Beijing, with a community center with an exhibition hall and apartments for seniors; to Jiading district, Shanghai, with a market place with an exhibition hall in the Future City Project area; to Shaoxing, Zhejiang Province, with the Shaoxing Longshan Academy Training Center. Further interviews were carried at UAD of Zhejiang University in Hangzhou. Additional meetings were held with the China Association of Mayors (CAM) and GIZ in Beijing. At the end of the mission, a debriefing with the SDC Project Officer in charge took place at SDC's China Office **(Step 3 and 4).** The last phase, the **Reporting Phase**, was dedicated to the overall reporting, following the structure of the evaluation report as indicated in the TOR. During this phase, further virtual and physical meetings were held with the Swiss Project team, key experts as well as DENA. The draft final evaluation report and power point slides of the major findings, conclusions and recommendations of the ZEB project evaluation have been submitted and a virtual meeting took place with SDC to discuss SDC's comments (**Step 5**).

The Work Plan of the evaluation mission is presented in **Annex XI.** The persons interviewed are listed in **Annex XII.**

1.5 Limitations

The evaluation team could not interview all the institutions that were envisaged, e.g. the Ministry of Ecology and Environment (MEE), ADB Office Beijing and ICLEI. One of the reasons was the preparation and participation at the COP 29 in Baku, held from November 11th to 24th. The questionnaire elaborated was too comprehensive and sophisticated; only a few interviewees had prior access to the evaluation methodology, e.g. to the DAC criteria. The team therefore adjusted and simplified the questions. An in-depth assessment of the quality of a number of knowledge products was not possible at all. For that reason, samples have been selected and reviewed. Due to time and logistical constraints, only 3 DPs were visited.

2. FINDINGS

2.1 Preliminary Remarks

The **observations and findings** of the evaluation team are divided in **3 parts**: The Project concept; a brief assessment related to the 5 success factors; and the assessment of the DAC-criteria. The Sustainable Development Goals of the 2030 Agenda (SDGs) were stressed when analyzing the Impact of the Project.

2.2 Project Concept

The **concept and strategic approach** of the ZEB Project are documented in the "Project Documentation for Phase 1" of February 2021, sometimes also called "Baseline". The Project was originally named "Zero Energy Building Project but later changed into Zero Emission Building Project (see HYR-1). The Chinese partners call the Project "Zero Carbon (Emission) Building Project. The approach comprises **3 components/outcomes**, laid down in the **Logical Framework (LogFrame), which is consistent, reasonable and comprehensible**. The 3 outcomes are horizontally and vertically interlinked and interdependent. The **LogFrame, shown in Annex VI,** contains the hierarchy of objectives, key indicators, means of verification and assumptions & risks on the level of the overall goal (impact), outcomes and outputs. Activities were defined on the output level.

System of objectives: The **overall goal or impact**, defined as a super-ordinated objective, which reflects the long-term change the Project will contribute to, is "to reduce greenhouse gas emissions and enable the carbon neutral development of the building sector in China by sharing Swiss know-how on sustainable and zero emission building". This overall goal is in principle well formulated and clear. The contribution of the Project is to enable the carbon neutral development of the building sector in China whereas the **Swiss inputs** on sustainable, green, energy-efficient and zero emission building are to be regarded as a **frame of reference** or the **common thread** of the Project.

On the second level of objectives, **3 outcomes** have been defined as specific objectives to indicate medium-term changes of the intervention of the Project. The outcomes, related to national and local ZEB Standards (OC-1), ZEB-Demonstration Sites (OC-2) as well as Capacity Building/Development (OC-3) are also **very clear and reasonable**. They closely interlinked as mentioned and may contribute, if achieved, to the overall goal of the ZEB Project. At the very beginning, OC-2 was named "Lighthouse Project"; this was rightly changed after about one year to "Demonstration Projects" as a Lighthouse suggests already a "shining", innovative role model, representing best practices.

For **each outcome, 3 outputs** have been defined to follow the intervention logic. All **outputs are reasonable.** In order to achieve the results = outputs, outcomes and goal, about **30 activities** were formulated in the primary Project document. This document contains a **risk analysis** with core mitigation measures. At the core of the risk, the Covid-19 pandemic was identified. The **assumptions** formulated at the **OC-level** are acceptable and are considering in principle the willingness to support by the key and primary actors, the ZEB incentive policies and financial contributions required to implement the activities of the Project. Problems in the construction sector which already emerged at the beginning of the Project turned to a real estate crisis in the following years and consequently to a new risk factor.

Monitoring and Reporting: The Project team has developed several monitoring tools, e.g. **online evaluation (monitoring) tool** to *(i) monitor the measures, (ii) learn from the feedback, and (iii) adjust measures if needed.* (see YR3, chapter 6 and Annex 7.3); it furthermore prepared and used a **checklist for the monitoring of the demo-site**, e.g. the progress of the construction (see YPR3). In YPR and especially in HYR4.1 the Project documented attempts to calculate Co2e-emissions. However, an overall **systematic and structured monitoring framework has not been elaborated.** The evaluation team was expecting that the Project would have followed SDC's logic on monitoring "Monitoring refers to a process of systematic gathering, analyzing, collating and documenting of data during the running of a project. It is an important aspect of a responsible, results-based project management cycle".

The Project has **published** half-yearly (HYR) and yearly reports (YR) as well as technical reports, expert reports as well as outputs- and activities-related reports from the very beginning. Charrette-reports are mentioned in particular. Special attention has been paid so far to reports on Chinese delegations to Switzerland. These Project progress reports contain in principle **a target – actual situation comparison** on the outcome and output level and indicate whether the activities are completed, on track or delayed. Moreover, the reports analyze whether the 3 outcomes and the overall goal can be achieved. They are, however, very **comprehensive but too oversized and overloaded** with information, **not very well structured and not very systematic**. A positive aspect is the access to footnotes and links, e.g. to MS Teams or WeChat.

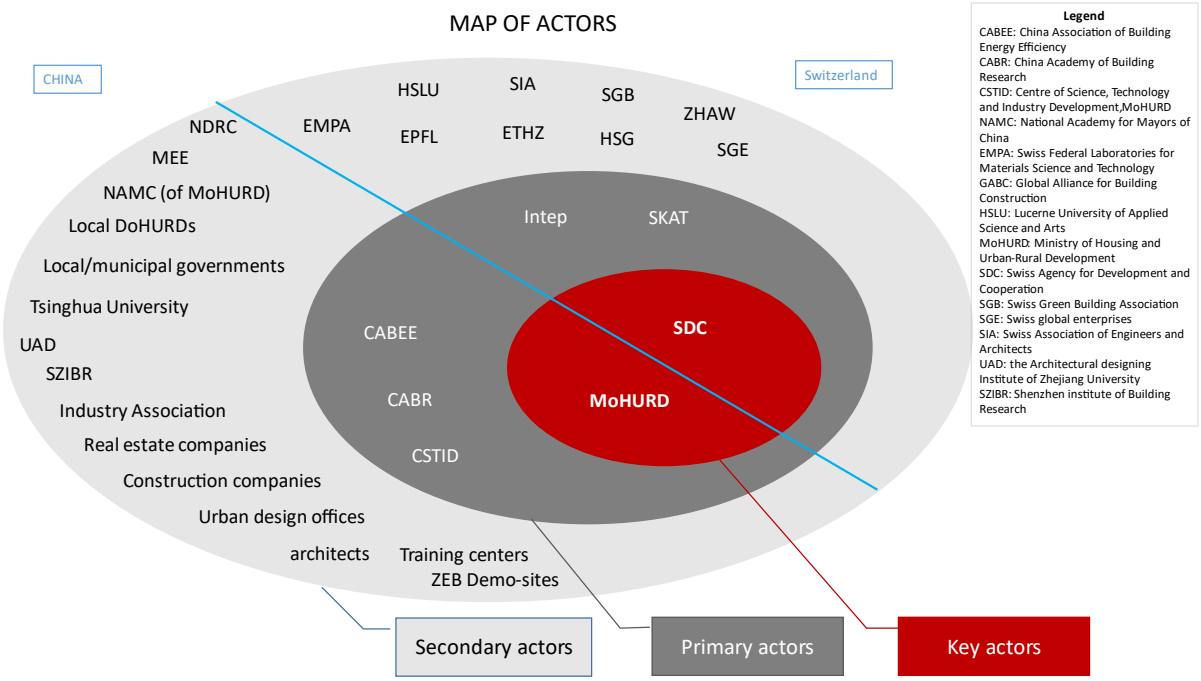
2.3 Assessment of the Success Factors according to the Capacity Works (CW)-Model

The following Table shows the main features and findings related to the 5 CW-success factors as a summary. A more profound analysis of the success factors of the ZEB Project is provided in **Annex VII.**

Success Factors (SF)	Main Features
SF Strategy	Multi-level and multi-stakeholder approach; strong links and close exchanges between the 3 intervention levels (macro, meso, micro level); 3 interlinked, interdependent and correlated OCs/components; mix of instruments and methods (inputs); very strong Sino-Swiss technical dialogue. The strategy contains all necessary elements, is consistent and provides the appropriate (strategic) framework for successful project implementation, the achievement of objectives and the realization of impacts. Some sub-strategies to be improved, adjusted, completed: CD strategy, a knowledge management strategy as well as a communication and visibility (dissemination/scaling-up) strategy. **Rating: Very successful**
SF Steering	Strategic or decision-making level: Steering Committee consisting of MoHURD and SDC = Key actors; Operational level: CABR, CSTID, CABEE and the Intep/Skat Consortium = Primary Actors; other partners on Chinese and Swiss side = Secondary Actors (see Fig. 1 Map of Actors and Project Organizational Chart in **Annex VIII**). Optimal choice of intervention partners. **Rating: Very successful**

SF Cooperation	Horizontal and vertical co-operation, interaction and networking are an essential part of the Project's target system; cooperation management satisfactory; core groups, networks, learning communities of institutions and experts; close Sino-Swiss university alliances; cooperation with Swiss business sector/SGB, SG-E; lack of cooperation with regional and international organizations. **Rating: Successful**
SF Processes	The Project manages, monitors and documents work processes and procedures and, at the end, significant (technical) innovations and structural and systemic changes. To implement the tasks related to the 3 OCs, core processes have to be induced with a special focus on learning and knowledge transfer processes. Managing and documenting these core processes have to be furthermore improved. **Rating: Successful**
SF Learning and Innovation	Learning and innovation is a key SF of the Project: A number of knowledge products have been developed. All 3 OCs are knowledge products themselves. The Project was quite successful to establish and/or extend Sino-Swiss learning networks and alliances to scale-up and mainstream innovative knowledge products. A very significant result of the Project is the exchange of knowledge and technical solutions between most of the existing DPs. The Project requires a suitable knowledge management system. Capacity Development, as mentioned, shall be focused on Government officials, Mayors as well as ZEB multipliers and protagonists to encourage a more broad-based scaling up. **Rating: Successful**

Fig. 1: Map of Project Actors



2.4 Assessment according to the DAC Criteria

2.4.1 Relevance

The **Sino-Swiss ZEB Project is in full compliance with China's overall climate targets and policies**: The high-quality sustainable development; the green transition to achieve a green, low-carbon and circular development economic system in 2035, newly underlined by the new CPC/State Council guidelines for green transition of August 11, 2024; the dual carbon targets 2030/2060; the NDRC-led strategy for energy consumption and production revolution (2016-2030); the annual report "China's Policies and Actions for addressing Climate Change, 2024, issued by MEE in November 2024.

Regarding the **building and construction sector** in China, **2 new documents** are highly relevant: *The Implementation Plan for Peak Carbon in Urban and Rural Construction* of June 30th, 2022 published by MoHURD and NDRC as well as the *Work Plan for Accelerating Energy Conservation and Carbon Reduction in the Construction Sector*, issued by NDRC/MoHURD on March 12th 2024. The 2022 Implementation Plan sets 21 targets to reduce carbon emissions, inter alia, *explore zero-carbon community building; encourage the construction of zero-carbon buildings and near-zero-energy buildings; establish and improve the standard measurement system for energy conservation and carbon reduction, and formulate and improve standards for green buildings, zero-carbon buildings, and green construction. Encourage qualified areas to formulate mandatory standards and recommended standards for local engineering construction that are higher than national standards.* These plans can be regarded as **directives** to the Sino-Swiss ZEB Project.

Table 2: Evolution of China's Climate Policies 2020 - 2024

Date	Chinese Climate Policies
September 2020	Dual Carbon Targets 2030/2060
October 2020	N+1 Policy Framework
March 2021	China's 14th Five Year Plan
May 2021	State Council Leading Group on Carbon Peaking and Carbon Neutrality
October 2021	Action Plan for Carbon Dioxide Peaking before 2030
June 2022	**The Implementation Plan for Peak Carbon in Urban and Rural Construction** Implementation Plan for Synergizing Reduction of Pollution and Carbon Emission
December 2023	Midterm assessment report on the implementation of the 14th Five-Year Plan for the National Economic and Social Development of the People's Republic of China and the Outline of the 2035 Vision Goals
March 2024	**Work Plan for Accelerating Energy Conservation and Carbon Reduction in the Construction Sector**

The Project is **in compliance with the needs and requirements of the society** (residential community) striving not only for a low carbon, nature-positive and climate-resilient (building) environment but for an overall well-being, which was mentioned to the evaluation team by several stakeholders and which is highlighted in the 2 MoHURD/NDRC documents mentioned (*Constantly meet the needs of the people for a better life*).

The ZEB Project has furthermore the advantage to build on the experiences and contacts of the former **Sino-Swiss Low Carbon Cities (SSLCC) Project**, implemented from 2016 to 2019 under the **Sino-Swiss Innovative Strategic Partnership**. This project was similarly aiming to reduce GHG emissions in Chinese urban areas while sharing Swiss long-term experience in this field.

The ZEB Project is **in line with the policies, laws, objectives and the strategies of the Swiss Confederation with regards to climate change**, e.g. Switzerland's Long-Term Climate Strategy 2050 and the Swiss Energy Strategy 2050. Switzerland's International Cooperation Strategy 2021-24, the China Strategy 2021-24, especially related to *Sustainability,* aiming *to support efforts to mitigate China's harmful greenhouse gas emissions*. SDC's Climate, DRR and Environment Thematic Network (CDE) is of further relevance to the Project. As the Agenda 2030 (SDGs) is of great importance to the Project, any policies to promote and achieve the SDCs, such as the Swiss 2030 Sustainable Development Strategy as well as the Stocktaking Survey have been taken into consideration.

Switzerland is a **global forerunner to combat climate change and to promote renewable energy resources and decarbonize the operational energy**. The net-zero emission-target in the building sector was supported by SIA which published the standard of Climate Path (Klimapfad), FprSIA 390/1:2024-08 to replace the Energy Efficiency Path (Effizienzpfad Energie), SIA2040. The approvement process is ongoing, the norm will be probably valid from February 1, 2025. The Swiss norms are of very high relevance to the whole system of objectives of the ZEB Project, as they reflect Swiss experiences and contribute to all 3 outcomes, OC-1 in particular and make a contribution to the overall goal (impact).

The design of the Project with the Intervention Logic is very appropriate to achieve the objectives set (see Chapter 3.2). The overall Intervention Architecture of the Project is similarly adequate with MoHURD as Political Partner and the only Government body in charge of the whole building and construction sector in China, having access to the local level through the Provincial DoHURDs and the Municipal BoHURDs.

2.4.2 Coherence

Internal coherence of the Project in a broader sense is given as a number of relevant networks and alliances inside and outside the Project are providing complementary contributions to the Project. The cooperation with the Swiss green building sector, e.g. SGB

could be improved and opened to other relevant companies in order to achieve Output 2.3 “Active Platform for facilitation of Sino-Swiss business cooperation on zero emission technologies and solutions”, to support the implementation of ZEB project. **External coherence** is restricted to an exchange with other bilateral, regional or international organizations which are working in China in the ZEB/Green Building sector such as the World Bank, International Energy Agency, GABC, Energy Foundation and GIZ.

2.4.3 Effectiveness

In the following tables, the evaluation team compares the statements of the Project team with their own observations for the 3 OCs. On this level, objectives have been achieved partly, mainly caused by the Covid pandemic with all its risks, uncertainties, obstacles and delays which seriously affected the Project for almost 3 years. The target system is heavily interlinked as already mentioned and delays to finally approve the ZEB standards OC-1 is affecting the other 2 OCs.

It has, however, to be stated by the evaluation team, that the Project was very effective in linking outputs with policies (s. Chapter “Relevance”); that the beneficiaries of the Project have access to the results due to the multi-level and multi-stakeholder approach and they benefitted to a high extent from the ZEB knowledge products (see also Success Factor “Learning and Innovation”); vertical and horizontal scaling-up is a key task of the Project which has to be intensified during the extension phase; unintended positive effects of the Project are the very satisfactory horizontal and vertical co-operation, interaction and networking, the performance of MoHURD and other Chinese partners as well as the Swiss participation and inputs, e.g. the great number of Swiss experts and relevant institutions involved. The main reasons of these positive effects are the high significance and relevance of the ZEB issue. Negative effects induced through Project interventions did not occur.

Table 3: OC-1: Standards: “Chinese standards on building energy efficiency and carbon emission become more ambitious”

Indicators	Assessment Project Team HYR4.1	Assessment Evaluation Team
Evidence based practices integrated into the updated national & local standards Effectiveness of existing or newly introduced national policies and legal frameworks	Achieving OC-1 depends on publishing the Chinese Technical ZEB Standards Upgrading the local standards depends on the speed of local standard development Teams Delay of publishing the ZEB standards has no major influence on most of the activities of the Project	ZEB Technical Standards have been jointly developed by the Chinese and Swiss experts. The Draft is ready, but not yet published (in Spring 2025 according to MoHURD) Evidence-based practices are integrated: Annexes of ZEB Standards Draft Co2e reduction potential quantified shows a trend only. It would be

	Effectiveness not yet assessed. First indications from Impact simulation study (ZHAW ZBP) OC-1 is very likely to be achieved provided that there is a 1-year extension phase	essential to validate the results with an improved data base through a more comprehensive monitoring. Local ZEB standards are in the process to be prepared but waiting for the final approval of the national ZEB standards The lack of an approved (final) ZEB standard will not only affect OC-3 but OC-2 too **OC-1 can be achieved within the extension phase**

Outcome 2: Guidelines and Demonstration (Lighthouse Projects): "Substantial investments are mobilized in constructing new or retrofitting existing buildings according to zero emission standards"

Indicators	Assessment Project Team HYR4.1	Assessment Evaluation Team
Provinces implementing incentive policies for zero-emission building projects Baseline: 0; Target: 4	12 Provinces are implementing ZEB incentive policies	Quantitative indicators not very useful. Important how attractive the policies are for the investors. It seems, that without monetary incentives, investors are not willing to adopt ZEB technologies
Additional funds allocated/invested at national and sub-national level for the implementation of zero emission building. [CHF] Baseline: 0; Target 200 million	6 DPs received about 9 million RMB as incentives Assuming incremental costs for reaching ZEB of 20-30%, the overall additional funds mobilised or invested for the demo-projects (?) account for CHF 300-450 million	Out of 10 originally planned DPs, 5 are completed so far, e.g. construction has been finalized and out of the 3 DPs the evaluation team was visiting, only 1 in Jiading is functional as a REAL Demo site. The DPs are not visible as Sino-Swiss projects.
Built and planned space meeting Zero Emission Building[8] standards Baseline: 0, Target: 500,000 m_2, Public 250,000 m_2, Private 250,000 m_2, Climate Zones:4	DP concept designs of floor area >240,000$m^{2;}$; Other ZEB >674,000 m^2; Total of 914,000 m^2	There is a basic monitoring concept for the DPs only, comprising a construction checklist (see Chapter 2.2). A more sound a profound monitoring system is necessary to get access to reliable data for energy savings and emission reduction.
Number of people who consider that their livelihood will improve thanks to better housing and a	No results yet: A baseline study is ongoing	

healthier environment Baseline: 0, Target: 1000	Conclusion of the Project Team: If all buildings in China would reach the ZEB level of the DP's the carbon emission could be reduced by1.23 Gt CO2 equivalents. DP's: The CO2 emissions compared to the baseline could be reduced by 27% to 40%. The carbon emission could be reduced by 1'700 t CO2 equivalents.	It seems ambitious to extrapolate the energy saving potential from the rather small lighthouse projects to large scale Chinese standard buildings. The CO2 reduction would be considerable, if correct, as the general design was already defined, when the project started. The intervention of Swiss experts led to the application of innovative technical elements and induced a significant contribution to achieve the emission reduction **OC 2 achieved only partly. The concept of the DPs is too isolated, less visibility and outreach. The question, how the DPs can reach and influence architects, designers, developers, construction companies, officials, is not yet answered.**

Box 1: Major findings related to the ZEB Demonstration Projects (DPs) visited

In general, the design of the DP's is on a very high ZEB state-of-the-art level. The pre-design phase of the DPs was already started by the Chinese planning teams, led by CABR, before the interventions by the Swiss side could be realized. Through workshops and other (virtual) formats, the Swiss experts provided a number of significant technical inputs such as BIPV façade systems, natural ventilation or ventilation with heat recovery, passive solar design, circular construction or construction for disassembly as well as timber structure. Other inputs were on general low carbon footprint lifestyle. Some of the proposals of the Swiss teams could not be realized for technical or financial reasons. The 3 DP's visited by the evaluation team are on a higher architectural and technical level.

DP Songchen Community Center, Fangshan District, Bejing

This DP of about 1,000 m^2, was completed in September 2023 and currently functions as a sales showroom with offices and a café. It was designed by SUP Atelier of THAD of the Tsinghua University; CABR was involved as an energy consultant. The DP adheres the principles of passive and active solar energy production, and of an effective natural ventilation. Through the advice of the Swiss experts, a number of market-relevant innovations could be materialized: Photovoltaic panels are integrated in the south façade and roof (BIPV building integrated photovoltaics) on a very high aesthetic level. The dimensions of photovoltaic surfaces and windows f were optimized. The idea of natural ventilation by the form of the interior spaces was optimized by precise simulations. Air-to-water heat pumps generate the necessary energy for heating and ventilation. The efficiency of the technical equipment, lighting and appliances were improved by the Sino-Swiss cooperation. The energy system is entirely electricity-based, resulting in zero carbon emissions during the life-span of the building. The optimization phase contributes to an estimated 40% reduction in energy demand.

Swiss experts introduced the concept of circularity of building material (re-use, re-cycle of building materials and design for disassembly). Some new ideas could not be realized due to the Chinese fire protection regulations and quality concerns. So, the originally planned timber construction could not be implemented and had to be replaced by a steel frame construction from recycled steel. The cladding of the north façade with timber shingles had to be replaced by cement shingles. The interior design intended to reuse materials but could not be implemented at the end. The concept of the project, based on a passive-solar strategy and natural ventilation, is convincing. The BIPV façade and roof can easily be adopted by other projects.

Longshan Academy Training Center and Middle School Shaoxing, Zhejiang Province

The DP building is a part of the entire Academy Training Center and school complex; it looks similar to the other school buildings. So, its advanced technology and energy efficiency is not obvious to see. To reduce embedded energy, the building uses a compact design and recycled concrete as a construction material. The importance of conceptual design could be shown. Swiss experts optimized with the planning team the insulation and the air tightness of the envelope. High quality doors and windows were installed. The importance of such detailed work on the construction could be proved by calculations. An integrated PV System of a local company has been used as roofing material, keeping consistent architectural details at the roof edges. The PV system shows a huge potential for the implementation of BIPV in China. The performance is high and the PV-modules can be replaced easily in case of disfunction. The installed Variable Refrigerant Volume (VRV) air conditioning systems are optimized and consume less energy than traditional AC-Systems. Additionally, an automation system is installed to control temperature and humidity of the indoor climate. Swiss experts showed how to use more realistic data of the energy consumption of a school building. Advanced technological equipment has been adopted resulting in a 40 % reduction in the calculated energy consumption, almost achieving the ZEB goal, according to the Project documentation. The concept of reducing energy demand and carbon footprint primarily relies on technical equipment. A heating system has not been installed. The enhanced insulation of the façade was not apparent. The BIPV roof design is readily replicable.

Chunxi Market Hall (Bazaar) and Exhibition Hall, Future City Shanghai, Jiading District

The market hall DP shows two main themes: the use of low carbon footprint materials such as wood and the quality of a low carbon lifestyle. The architectural planning and energy consultation were provided by the same company, the East China Architectural Design and Research Co. (ECADI). Consequently, the architecture, energy efficiency and structure are well integrated, resulting in a comprehensive concept. The climate of Shanghai is hot summers and rather mild winters. The interior shows an environmentally friendly life style with a lot of plants and little carbon emission. The integration of flora both inside and outside is the main theme of the project. Natural and artificial lighting are accurately designed to meet the needs of both plants and residents. Simulations and calculations had been done on indoor climate, natural lighting and humidity control. The ambiance is welcoming. A special theme was the disposal of wet kitchen waste, a quite important research field in China. Windows, doors and especially the large skylight are of very high quality and were calculated

precisely. The roof is a complex timber construction, which is quite new in modern Chinese architecture. Since China may lack sufficient timber resources for ordinary projects, this seemingly European concept may be questionable. According to the Project documentation, the Project achieved a calculated 25 % reduction in energy consumption although it only attained 60 % of the ZEB goal. The large glass facades are shaded by wide roof overhangs, the large skylights may be problematic in summer. The remaining roof area is covered by PV panels. The advice by the Swiss experts included the adjacent exhibition hall. There, a PVT installation is mounted on the roof which provides not only electricity, but solar heat as well. The BIPV roof is readily replicable and can be adopted by other projects. The focus of the project is to demonstrate sustainable, green and low carbon lifestyle of a future (Nexus) community.

Annex X gives a comprehensive assessment including photos of the DPs visited by the evaluation team.

Outcome 3: Capacity Building: Capacities on emission reduction in buildings are strengthened and the Sino-Swiss joint know-how is disseminated

Indicators	Assessment Project Team HYR4.1	Assessment Evaluation Team
Accumulated number of persons introduced or trained on climate change issues (ZEB) Proportion of targeted stakeholders aware and capable of better using information and tools to respond to climate change. Number of high-quality knowledge products and outreach events.	About 5.000 persons have been trained or informed about ZEB Know How The Project estimates that about 90 % of the stakeholders have a better understanding how to respond to climate change because of the interventions of the Project The Project developed 39 high-quality ZEB knowledge products and carried out 20 outreach events	Again, quantitative indicators to measure CD-interventions are not sufficient CD measures not based on a CD strategy, no knowledge management concept has been prepared Some of the online courses, e.g. webinars, were too isolated and the number of participants does not imply a knowledge transfer. However, a number of participants have been evaluated and access was provided to the contents of the courses via youtube, The video-sharing website bilibili and WeChat The CD concept needs to differentiate between the main beneficiaries: The focus are not students and/or professors but Government officials, Mayors, owners/investors and those persons who will act as multi-pliers, protagonists and ambassadors to promote the ZEB model **OC-3 has been achieved only partly.**

2.4.4 Efficiency

The **operational efficiency** of the Project is **very satisfactory** in principle: The project does not have its own infrastructure on site, but is utilizing the local structures, e.g. of the primary

actors. This economic advantage, however, may be hampered by higher mobility costs and may cause frictions for communication and day-to-day interventions. The yearly work plans are implemented as planned and the majority of delays are not caused by the Project.

The Swiss (key) experts assigned are generally well briefed, coordinate and exchange information with each other and are quite often involved in all 3 OCs for advice to prepare national and local ZEB standards, technical consultancy at the DPs and CD-activities, which create significant efficiency-enhancing synergies. It was not foreseen to assess cost-efficiency and the ratio of financial contributions by the Swiss Government, the Chinese Government, investors and in-kind. The Project itself did not comment on cost efficiency but reported on the budget and expenditures in the Yearly and Half-Yearly reports.

2.4.5 Impact

The project contributes to **achieving climate targets** in general and **in the building sector** in particular by anchoring them in the new ZEB standards on national and local level. The interviews with MoHURD, CABR, CSTID and the Swiss key experts have shown that the Swiss inputs in formulating the ZEB standards have led to **significant innovative and more target-oriented solutions.** New **change processes** on technical, policy, economic levels were initiated and undiscovered potential for increasing energy efficiency and carbon emission reductions were tapped.

The political discourse on ZEB-issues has intensified in recent years in China, coinciding with the start of the Project. It would be presumptuous to attribute this momentum to the Project. Nevertheless, a **suitable framework has been created for an in-depth discussion of this topic, supported by a number of relevant Project activities**.

After lengthy attempts to calculate the CO2e emissions, the Project came to the conclusion, that “the Project cannot provide a scientific calculation for the impact of the project’s activity on the national level as the activity is out of scope” as indicated in the YR3. These are indeed considerations of plausibility only and not evidence-based scientific statements. It is, however, recommended to address this very important issue during the extension phase. The evaluation team understands, that this task has already been planned and local and international experts are identified to undertake a quantification of emissions impacts of adoption of the new Chinese standards using existing building sector emission models. The results of this study can be extrapolated to quantify the impact of the Project on emissions reductions.

The project pursues a **broad-based approach** and is therefore very suitable for a targeted dissemination of the Project results.

The Project contributes, at least to a limited extent, to achieve **the Sustainable Development Goals** to which Switzerland and China have committed themselves and which are now also part of the DAC criteria (see the Voluntary National Review 2022 of Switzerland on the 2030

Agenda as well as China's VNR Report on the Implementation of the 2030 Agenda for Sustainable Development 2021). Of relevance and significance for the ZEB Project are the following Targets and Indicators;

Goal 7: "Ensure access to affordable, reliable, sustainable and modern energy for all". To improve energy efficiency, to promote renewable energy and clean energy technology;

Goal 11: "Make cities and human settlements inclusive, safe, resilient and sustainable" with a number of targets towards sustainable urban development, and implementing policies and plans towards resource efficiency, mitigation and adaptation to climate change and resilience to disasters;

Goal 12: "Ensure sustainable consumption and production patterns". Achieving sustainable management and efficient use of natural resources; substantially reduce waste generation through prevention, reduction, recycling and reuse;

Goal 13: "Take urgent action to combat climate change and its impacts". Integrate climate change measures into national policies, strategies and planning; improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning;

Goal 17: "Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development". This goal I addressing policy coherence for sustainable development and a multi stakeholder partnership for sustainable development.

Although not addressed in the Project documents and during the implementation process, the **Project is committed to all of the SDGs mentioned**.

2.4.6 Sustainability

Institutional sustainability is guaranteed to a high degree: The Project is by no means an isolated intervention as it is and remains integrated into the existing Governmental structures, namely MoHURD, CABR, CSTID, CABEE as well as the local stakeholders. The high level of relevance, coherence and compatibility of the Project and its results with the policies and targets of CPC and the State Council in the field of green and zero-carbon buildings have already been highlighted. It is not too much exaggerated to state, that the Project, especially after the 3 working packages (OCs) will have arrived its final stage, will contribute to a high extent to implement the future broad-based Chinese interventions, anchored in the 2 respective MoHURD/NDRC work plans for a zero-carbon-emission building sector. More specifically, the Technical ZEB standards will be published at the beginning of 2025 as noted to the evaluation team by MoHURD.

It's quite evident, that a substantial part of the networks, academic and research alliances, platforms and other communication channels will persist. They have to be, in any case,

improved and extended in the up-coming extension phase. Overall, most of the actors have developed an **ownership** that has become a guarantee for scaling up the ZEB Project approach. **In this context, MoHURD affirmed, that the results of the Project will be disseminated**, even without a Swiss participation.

Swiss companies will be furthermore supported by the Swiss Business Hub China/SG-E and it can be assumed, that SGB will furthermore facilitate Sino-Swiss business cooperation on green and zero emission technologies and solutions**.**

It can be, consequently, assumed that the **positive effects of the Project will be long-lasting**. Risk factors with regards to the quality of the sustainable structures, processes and instruments, are currently not evident. There are, of course, several other options to maintain the ZEB cooperation, e.g. to establish a Sino-Swiss Green/Zero Carbon High-level Dialogue (under the already existing Sino-Swiss Innovation Strategic Partnership) and/or to support a Sino-Swiss ZEB platform aiming to manage follow-up activities and to monitor the DPs by local resources, e.g. via UAD.

The **SDC Assessment Grid** is presented in **Annex VIII.**

3. LESSONS LEARNT

L1: The Sino-Swiss ZEB Project has been built on the experiences and relationships of the former **Sino-Swiss Low Carbon Cities (SSLCC) Project**. This Project, established under the Sino-Swiss Innovation Strategic Partnership and implemented by SDC and a Swiss Consortium from 2016 to 2019, was aiming to reduce GHG emissions in selected urban (pilot) areas while sharing Swiss experiences, know-how and technological knowledge. An important component of the SSLCC Project was a Sino-Swiss Low Carbon Innovation Park in Chongqing, a mega city where originally a ZEB demonstration Project has been planned.

Another Project of relevance was the **Indo-Swiss Building Energy Efficiency Project (BEEP),** carried out by SDC, the Indian Ministry of Power and a Swiss-Indian Consortium in different climate zones from 2017 to 2021. The objective of BEEP was to reduce the energy consumption in buildings through energy-efficient and thermally comfortable design and the application of renewable energy technologies. Important and relevant achievements are an energy conservation building code on national level, design guidelines for energy-efficient buildings, about 40 energy-efficient demonstration building projects as well as CD-activities.

L2: The Project started under **excellent (climate) political prerequisites and conditions**: The period from 2020 to this day can be called the most dynamic climate policy phase in the Chinese history to combat climate change which started in the year 2007 in the context of the 11th Five-Year Plan. In the last 4 years, numerous highly important policies, strategies and

plans to reduce carbon emissions have been promulgated and implemented by CPC and the State Council which have been facilitating the interventions of the ZEB Project.

L3: The ZEB Project was able to prepare a **balanced, logic, consistent and reasonable concept** where the 3 components (outcomes) were interlinked and correlated, leading to more harmonized intervention processes. The format of the Project was based on a quite challenging **multi-level and multi-stakeholder approach**, required to consider all intervention levels and a design, oriented to the needs of the wide range of beneficiaries. While planning the Project, the evolution of the relevant standards including the limits of the system, have been taken into consideration too, e.g. to differentiate at the beginning between green, low carbon, ultra-low energy, near zero energy, near zero carbon emission and zero carbon emissions solutions in the building sector.

L4: From the very beginning, the Project had to cope with the **Covid-19 pandemic** and its unforeseeable consequences. Despite all the frictions and obstacles and especially delays, the Project could manage and/or initiate a number of virtual activities and prepare substantial knowledge products.

L5: It can be stated, that the selection of **MoHURD as the key Project partner** and the choice of the Chinese implementing agencies by SDC were optimal with no alternatives at all. The active participation and ownership of the Chinese actors on all levels were and are crucial for the success of the Project, important for ensuring that the results match the needs of the Chinese beneficiaries.

L6: The **Swiss participation and inputs** have been highly appreciated and regarded as an asset and an added value to achieve an impact. The Project established and supported a network of key institutions and experts, initiated academic alliances and formed a Swiss core team which was involved in Project measures more regularly. The last HYR indicated a number of over 30 Swiss organizations, institutions, companies and individuals already involved in the Project. Swiss knowledge sharing was seen as very important to jointly work on a specific task such as the joint drafting of the national ZEB standards together with Swiss specialists over a period of more than 2 years.

L7: As a **Learning Project**, the ZEB Project has access to a number of relevant information and data and has prepared numerous learning tools and knowledge products which are not fully developed yet. To manage knowledge and experience more systematically and more structured and to synthesize (technical) reports will lead to a better understanding of processes and results of the Project. As scaling-up is a key task of the Project, it is even more crucial to take knowledge management more seriously.

4. CONCLUSION

C1: The Project was designed and implemented in times of high uncertainties, the Covid pandemic, and deserves therefore special attention: The success of the Project and the achievement of objectives and impact were exposed to high risks that could not be directly influenced by the Project. The frame to act was very limited and restricted and the only chance to proceed was to acquire a **high degree of flexibility and creativity**. However, the pandemic, which lasted at least 2 ½ years in its main phase, has caused numerous delays to implement the activities of the Project that have not yet been fully compensated for so far.

C2: This critical phase has left its mark on the Project and still continues to be characterized as a **learning and pilot Project**, guided to initiate policy (regulatory) changes and technical innovations and directed to achieve a significant progress (impact) towards a zero-emission building sector in China.

C3: The Project is based on a quite challenging **system of objectives**, set out in Logical Framework which serves as a frame of references to the overall logic of results and forms the core of the design of the Project. It succeeded in preparing a balanced, logic, consistent, reasonable and target oriented conception with 3 components or outcomes and a multi-level and multi-stakeholder approach, adequate to address the needs of the beneficiaries.

C4: The **strategy** underlying the Project contains all necessary elements, is consistent and provides the appropriate (strategic) framework for successful project implementation, the achievement of objectives and the realization of impacts**.** Some sub-strategies are missing or not yet completed such as a CD strategy, a knowledge management strategy as well as a communication and visibility (dissemination/scaling-up) strategy.

C5: It turned out that the Sino-Swiss cooperation in general, **Swiss inputs and knowledge sharing** and a joint, combined work and sharing of expertise related to all 3 components (outcomes) have led to significant innovative and more target-oriented solutions:

- New ZEB Technical Standards have been jointly drafted by Chinese and Swiss experts, elaborated in numerous loops and submitted to MoHURD for approval and publication. It is envisaged by MoHURD to publish the ZEB standards in Spring 2025. Local standards have been similarly drafted and further work depends on the approval of the national standards **(OC-1)**
- 10 ZEB Demonstration Projects (DPs) have been planned in 4 different Chinese zones, 8 have been constructed and out of them 4-5 completed. 2 DPs have been stopped for economic and political reasons. None of them are visible as Sino-Swiss Projects and fully functional as real demonstration sites. They are lacking of a sound monitoring tool with access to data required for carbon emission reduction calculations **(OC-2).**
- The cooperation and networking between SGB, SG-E, other Swiss green (ZEB) building product and system suppliers and the Project is not fully utilized (OC-2, Output 2.3). Those

business actors, being or becoming a part of the platform for facilitation of Sino-Swiss business cooperation on zero emission technologies and solutions may play a more important role to support the implementation of ZEB project.

- Training material had been prepared, online and physical training conducted, numerous knowledge products created. A CD concept and a knowledge management system is still not yet complete, the training shall be more needs-oriented and in favor of the key beneficiaries **(OC-3)**.

C6: The Project is **highly relevant** as it is in full compliance with China's overall climate targets and policies and in particular to the ZEB strategies; compliant with the needs and requirements of the society and in line with the policies, laws, objectives, regulations and strategies of the Swiss Confederation with regards to climate change and GHG emission reduction in the building sector especially.

C7: Internal coherence of the Project is given with the exception of a clear and structured coordination with the Swiss (green building) business sector. External coherence is restricted to an exchange with other international, regional and bilateral organizations which are working in China in the ZEB/Green Building sector such as the World Bank, International Energy Agency, GABC, Energy Foundation and GIZ.

C8: Effectiveness is good, considering the effects of the Covid 19 pandemic with all its risks, uncertainties, obstacles and delays which seriously affected the Project for almost 3 years. However, it can be certified by the evaluation team, that the Project is on the right track and the necessary and sufficient conditions are already met to achieve the 3 outcomes until the – newly agreed - end of the Project.

C9: Impact: It is evident, that the Project contributes to **achieving climate targets** in general and **in the building sector** in particular by anchoring them in the new ZEB standards on national and local level. Swiss inputs in general have led to **significant innovative and more target-oriented solutions.** New change processes on technical, policy, economic levels were initiated and undiscovered potential for an increasing energy efficiency and carbon emission reductions were tapped. The Project is committed to the SDGs 7, 11, 12, 13 and 17. The Project has jointly started with different modes of calculating CO2e emissions reduction in order to show trends to reach an evidence- based impact.

C10: Institutional sustainability is guaranteed to a high degree, as the Project remains integrated into the existing Government structures. In this context, MoHURD, with a high ownership, has affirmed, that the results of the project will be disseminated, even without a - highly appreciated - Swiss participation. It is also assumed, that Swiss companies will be furthermore supported by the Swiss Business Hub China/SG-E and SGB will furthermore

facilitate Sino-Swiss business cooperation on green and zero emission technologies and solutions.

C11: Referring to the assessment of the 5 CW-success factors" strategy, steering, cooperation, processes and learning/innovation", the Project can be considered as very successful to successful. In case of SF learning, some elements have to be adjusted, e.g. to improve the knowledge management and transfer system.

5. RECOMMENDATIONS

5.1 Introduction

The following recommendations are based on the major findings and conclusions of the evaluation team. They are divided in summarized major recommendations directly related to the ongoing and to be extended Project phase (R1-R5) and some principal recommendations towards a future cooperation with China in a different context (R6):

5.2 Major recommendations

R1: The Sino-Swiss ZEB Project, initially planned as a 2 phases Project and supposed to end in February 2025, shall and needs to be extended, using the remaining funds at least until the end of November 2025, e.g. until the MoU between the Swiss Government and the Chinese State Council is valid. Within this so-called extension phase, all activities shall be consolidated and finalized. All results and objectives shall be achieved, at least to a high degree. A concerted action is needed involving all Chinese and Swiss partners to fulfill these targets before the end of 2025. It is recommended in this connection, that the Swiss Consortium shall built up a (small) Project infrastructure with a (small) permanent core Project team in Beijing to be fully in the position to support the concerted action mentioned. The tasks ahead are very comprehensive and a closer cooperation with the Chinese partners and beneficiaries on all levels is urgently needed.

R2: The Project shall improve all strategic approaches needed to successfully implement the planned measures: a) the Capacity Building or Development concept and strategic approach already prepared; b) a knowledge management strategy; c) a strategic approach to improve the overall communication and visibility and d) a dissemination and scaling-up concept. These strategic approaches shall be practical and easy to implement. Knowledge products and processes as well as other important deliverables shall be prepared in such a way that they are easy to understand and tailor-made, related to the needs of the beneficiaries.

R3: The overall monitoring, reporting and documentation of the Project shall be substantially improved by more systematic, focused and structured. The final documentation, e.g. in form of synthesis reports, shall cover all knowledge products and processes related to the 3 OCs and comprise, in particular, the specific Swiss inputs/interventions. The Project shall further

develop an Overall Monitoring concept with a focus on a Results-based Monitoring (RbM) The Project shall furthermore proceed with a realistic approach to monitor and measure energy saving and carbon emission reduction by all means, models, (simulation) studies, trends, scenarios etc., based on a more evidence-based and scientific concept.

R4: The Demonstration Projects are operating as pilots and good examples how ZEB innovations can be realized and to what extent energy consumption and carbon emission can be reduced. The evaluation team strongly recommends to prepare a –simplified- monitoring concept (tool) to collect and analyses the technical data required, especially in the field of operational energy. Moreover, a communication and visibility concept have to be drafted and implemented using all kind of printed and online material and information, story books, exhibition area, exposure, films/video etc. A Sino-Swiss logo shall be displayed in- and outside the building. All DPs shall be fully functional as real ZEB showcases at the end of the extension period. The DPs shall be accessible to all stakeholders and the public. The exhibition hall of the Shanghai/Jiading Future City complex next to the Sino-Swiss DP could already serve as a good example how to visualize, e.g. the demonstrate a low-carbon life style.

The Project shall resume -exemplary- the process of certification of the DPs by the Chinese Star rating system and, if possible, by a Swiss label, e.g. by Minergie. This kind of quality label seems nowadays to be very important to convince owners/investors to invest in ZEB technologies. An exchange of knowledge and technical solutions between the DPs shall furthermore promoted and documented.

The Demonstration Projects shall be furthermore, if possible, be monitored after the Sino-Swiss ZEB Project has been completed. For this task, local resources shall be used such as the UAD of Zhejiang University. The duration of this DP monitoring process shall be at least 3 years.

R5: The existing training methods and tools shall be reviewed and more physical training activities shall be carried out. The active participation in webinars and other virtual training measures shall be verified, e.g. through a Q&A session, feedback or even tests. As recommended by NAMC, the CD-courses shall be more tailor-made, e.g. for Government officials, mayors and technical personnel and shall comprise not only technical ZEB issues but contents related to promotion and incentives policies as well as economic and financial issues, based on Swiss experiences. It was also proposed to focus on specific knowledge products such as handbooks, videos and other media to show relevant ZEB examples and good practices. Education and training activities within the academia shall be continued, e.g. with the UAD-led alliance of universities but the CD-focus shall be shifted to qualify more ZEB multipliers and protagonists, e.g. in the context of a Learning Network or Community. Other channels to strengthen ZEB competencies shall be opened, e.g. to initiate a cooperation with the China Association of Mayors (CAM), affiliated to MoHURD and with a strong cooperation

with NAMC. CAM showed interest in the Project and is willing to provide access to the existing Mayor's network in China.

R6: Principal recommendations for a future cooperation: (1) The evaluation team suggest to review the possibility to establish a Sino-Swiss Green/Zero Carbon High-level Dialogue, probably under the already existing Sino-Swiss Innovation Strategic Partnership to keep the long-term Sino-Swiss cooperation in the field of climate change, low carbon development, energy conservation and ZEB alive. (2) As already mentioned under R4, the DPs shall be furthermore monitored by local resources, e.g. UAD after the Sino-Swiss ZEB Project has been completed, to be financed by a Chinese partner and to be provided with a small local contract, financed by SDC in a transitional phase if possible. (3) It is recommended to SDC to analyze a potential regional ZEB cooperation with regional/international partners like UN-Habitat, UNESCAP and with South East Asian countries (ASEAN) or Central Asian countries where China is involved as a (knowledge) partner and not a beneficiary. A cooperation with ADB or AIIB shall be taken into consideration too:

- There are several options for an n-lateral cooperation with selected ASEAN countries in the context of the Swiss South East Asia Strategy 2023-2026, e.g with Cambodia and Vietnam and China as a development and knowledge partner (with Laos and Myanmar to be reviewed). The existing Swiss-ASEAN cooperation formats can be utilized in this connection. Laos and Cambodia are both partners of SDC's Cooperation Programme for the Mekong Region (2022-2025). The partners mentioned are members of the China-led Lancang-Mekong Cooperation (LMC). According to the ADB, June 2023, Cambodia and Vietnam agreed the following climate action in the context of their NDCs: Cambodia: Building codes, enforcement/certification to for new buildings to reduce electricity consumption by 10% in 2030. Improve cooling in public sector buildings to reduce 43,000 tCO 2 per year. Passive cooling in buildings to reduce 74.5 t CO2e. Updated 1st NDC (Dec 2020). Viet Nam Reducing GHG emissions by replacing construction materials and improving the cement and chemical production processes together with reducing the consumption of HFCs. Improving, developing and applying technology in manufacturing construction materials. Reducing clinker content and implementing other measures to reduce GHG emissions in cement production. Developing and using energy-saving construction materials and green materials in housing and commercial sectors Updated 1st NDC, (Sep 2020).
- The Swiss South East Asia Strategy addresses the cooperation with the ADB and AIIB. Switzerland is a member of ADB and a founding member of AIIB. A potential cooperation with these financial institutions in the field of ZEB shall be assessed. ADB leads the Greater Mekong Subregion (GMS) Program; Its Secretariat is based at the ADB HQ in Manila.

- ❑ The UN Economic and Social Commission for Asia and the Pacific (ESCAP) is a very reliable Partner to promote inclusive, low carbon, resilient, smart and sustainable urban development in the region. It supports countries to achieve the SDGs as well as the New Urban Agenda (NUA) targets. In cooperation with UN Habitat and other partners, ESCAP leads the Asia Pacific Mayors Academy for Sustainable Urban Development. The different formats of the NUA, guided by Habitat, could be an important dissemination channel for the ZEB Project
- ❑ The World Economic Forum (WEF) has recently presented a widely recognized study on green building value chains in China: WEF, Towards Green Building Value Chains. China and beyond, Insight Report, June 2024. As already recommended by the Project (see YR3), the Project/SDC shall get access to the excellent outreach of the Switzerland-based WEF for the highly relevant knowledge products (not before the end of the extension phase and not in the Davos Forum).

ANNEXES

ANNEX I - Project Synopsis

Project Title: Sino-Swiss Zero Emission Building (ZEB) Project ("the Project")
The Project aims to support low-carbon development of China's building sector, which is the biggest in the world, by upgrading building emission standards, supporting demonstration buildings and enhancing capacities of professionals with Switzerland's leading know-how on sustainable construction. The project will also benefit the public health by improving the thermal comfort of buildings and reducing air pollution resulting from heating and cooling.
Overall goal
The overall project goal is to reduce greenhouse gas emissions and enable the carbon neutral development of the building sector in China by sharing Swiss knowhow on sustainable and zero emission building.
Outcomes
Outcome 1 - Standards: Chinese standards on building energy efficiency and carbon emission become more ambitious. Outcome 2 - Demonstrations: Substantial investments are mobilized to construct new or retrofit existing buildings according to zero emission standards. Outcome 3 - Capacity Building: Capacities on emission reduction in buildings are strengthened and the Sino-Swiss joint know-how is disseminated.
Key outputs
2030/2060 building related carbon emission reduction potential quantified for China based on Swiss experience. Evidence-based suggestions for updating and strengthening National Standard for Zero Emission Buildings Demonstration buildings are constructed or retrofitted according to the technical guidance of the project expert team. Active Platform for facilitation of Sino-Swiss business cooperation on Green and energy efficient building technologies and solutions Professionals and students trained with stronger capacities to design zero emission building
Target group/s (Beneficiaries)
Chinese Central and local Governmental agencies, including policy makers, standards development authorities, etc.; building designers and planning professionals; academia and training institutions; private real estate developers and public investors; owners, inhabitants and users of the demonstration buildings
Project implementation period
01.03.2021 - 28.02.2025, extended to November 2025.

ANNEX II – The OECD-DAC Evaluation Criteria

ANNEX III – Capacity Works Model

The **Cooperation Management Model Capacity Works (CW) was** designed by GIZ to **manage complex cooperation systems successfully. CW**, guided by the principle of sustainable development, allows to **generate decisions** through processes of (structured and transparent) negotiations within the inter-organisational cooperation system (multi-organisational or multi-stakeholder system). Consequently, the negotiation process leads to a **joint result** (decision), which is supported by all actors involved (shared decision making).

CW incorporates five **Success Factors (SF)** for professional cooperation management: **Strategy, Cooperation, Steering Structure, Processes** as well as **Learning and Innovation**. The five **success factors** are **closely interlinked and cross-referenced**, and offer **five different perspectives** on the reality of the cooperation system.

A basic element of CW is the **Results Model**, derived from a joint objective. In this context it is helpful to make explicit the results hypotheses for the intended changes in the area of social concern, and to define the objective precisely. The results model brings to light the dynamics of the change process within the sector or social sub-system. This is to say that it describes (i. e. visualizes) the inputs to be generated by the cooperation system, the needed changes among the various actors and the ways in which these interact.

The CW provides a number of **toolboxes and questionnaires** which are very helpful to review and assess the success factors of a project.

Capacity Works Management Model with the five success factors

ANNEX IV – Evaluation Questionnaire

I DAC-Criteria Questions

Relevance	• Is the project concept with the Intervention Logic (LogFrame) and strategic approach complete, realistic, concrete, adequate and feasible to address the core problems and the needs of the beneficiaries in the (N)ZEB area in China? • Are the triangular outcomes of the project appropriate to cover the identified issues and to achieve the overall goal? [Detailed questions to the project implementation team regards validity and quality of the elements of the LogFrame]. • Is the project approach embedded in the overall Chinese reform policy and in compliance with the relevant targets, laws, policies, plans (FYPs), strategies, implementation plans, pilot programs etc. of the State Council related to the relevant sectors (e.g. climate change, energy transformation, ZEB) • Does the strategy of the project correspond with the relevant federal laws, targets, policies and priorities of Switzerland? To what extent Swiss standards, know-how and experiences on sustainable, energy-efficient and zero-emission buildings have been taken into consideration in the project planning phase and have been influencing the project implementation? • To what extent, relevant contextual factors are taken into consideration? How has the project adapted and evolved in response to changing country context, policy landscape and implementation challenges (e.g. evolving policy and economic contexts such as China's real estate sector crisis, the economic slow-down, the pandemic etc.)? • Another question related to the Pandemic: The project has started in 2021 when the restrictions in and outside China already took place. Did the project initiated conceptual changes when the policies toward the pandemic have been given up and the travel restrictions have been lifted in 2023? • Did the project analyse to what extent the interventions may contribute to achieve the Sustainable Development Goals (SDGs), e.g. goal 7, 11, 12 and 13?

Coherence **Internal and** **External**	• Does the Project align with the wider policy frameworks of the Swiss Development Cooperation, including the most recent Swiss international cooperation strategy and SDC's China strategy? • Is the Project coherent with relevant policies and interventions of MoHURD and other Governmental actors in China? Are the ZEB activities of the Governments on national and local level as well as between Governmental and commercial actors (real estate sector), e.g. related to the demonstration sites, in alliance? • Are the Chinese and Swiss project implementation structures in coherence? • Are the triangular dimensions of the project (Outcome level) in coherence (aligned and coordinated) • Is the project aligned with – external – global targets and policies (incl. challenges and risks), e.g. SDGs; Paris Agreement, GlobalABC • To what extent, the project approach has been coordinated with regional and international/EU institutions and organisations which are active in the similar thematic area, e.g. ADB, UNESCAP, WEF, European Commission, GIZ?
Effectiveness	• To what extent the overall goals/objectives, outcomes and outputs are achieved? To what extent are the indicators defined on the impact and outcome levels met? What is the estimated degree of the achievement of the objective? • How effective has the project been in linking implementation actions and research findings with policies? • Did the direct and indirect beneficiaries have access the results of the project and did they benefit from the outputs of the project? How the dissemination effectiveness can be assessed? • Are there unintended positive effects of the project identified? What are the reasons/influencing factors of these effects (benefits)? • Have unintended negative effects/risks occurred? If yes, for what reason and how the Project has responded adequately to them?
Efficiency	• Was the input of general resources appropriate so far to achieve the results of the project? • To what extent, the input of human resources and the personnel structure of the project is appropriate to generate value-added and to attain impact? How the project was dealing with changes of the HR-concept? How the concept of intermittent team assignments during and after the pandemic crisis is being assessed? • How cost-efficient synergies could be created in terms of resources utilisation between the partner institutions? • Were the financial partner contributions adequate to implement the activities of the project and in particular to realise the demonstration projects? • How existing networks and other channels to disseminate the outputs of the project? • To what extent has the Project delivered the results (outputs, outcomes) in a timely manner (within the intended timeframe or reasonably adjusted timeframe), and what efforts were made to mitigate delays? • To what extent, the mechanism of the ZEB Project creates favourable enabling conditions for green building finance?
Impact (Trends and Tendencies)	• Which positive, lasting effects and behavioural changes can be identified and attributed or can be expected that the project significantly attributes to achieve long-term overarching targets? • How has the project contributed towards policy processes and with what impact at the sub-national/national/international level? • Are the results of the project visible, accessible, replicable and aligned to a vertical and horizontal scaling-up? • How the Project contributes to the green building promotion in China, in particular on subnational and local level?
Sustainability	• To what extent, the project ownership and responsibility of the Chinese key actors can be assessed?

	• What evidence is there that the achieved effects will continue after the completion of the project? How the institutional sustainability is being assessed? • Which major factors might enhance the effects achieved or prevent them from continuing (key enablers and barriers)? • What strategies does the project need to adapt for mainstreaming its activities with national and sub-national priorities for the remaining period of the phase 1 and its extension period? • What are the risk factors that could influence the sustainability of the results of the project?
Extension of Phase	• What measures should the project consortium take to enhance the sustainability of them (anchorage of results in Chinese Policies)?

II Capacity Works – Success Factors - Questions

Strategy	• What strategies for change are being pursued by the actors operating in the sector? • What strategic options are available for achieving the ZEB objectives? Criteria for the strategic options? • What strengths can be developed? What weaknesses should the strategy respond to? What opportunities and energy for change should be harnessed? What risks need to be taken into account in this context? • How the development of learning capacities has been integrated into the strategy?
Cooperation	• • What mandates, roles and interests do the (secondary) actors of the Project have? How do they operate within the sector? • What forms of cooperation are appropriate? Which kind of cooperation systems has been chosen and integrated into the Project? • Do the main actors possess the resources necessary to achieve the objectives agreed? • Are there other actors relevant for the Project that are not considered yet? •
Steering Structure	• • Is the existing steering structure of the Project appropriate to achieve the targets, generate impact and create a valued added? • How the role of the Project Steering Committee (SC) on the level of Chinese and Swiss key actors is defined? • How the interaction between MoHURD and SDC on one hand and CABR, CABEE and CSTID on the other hand is organized. How is the coordination between the Chinese primary actors managed? • How decisions are negotiated, agreed and implemented within the existing steering structure? • How the Project is managed at the level of the primary actors? How changes of the Project Management have been handled in order to avoid any kind of frictions? • Is the existing (Results-based) Monitoring System of the Project adequate to support the steering of the Project? system is required in order to support steering of the cooperation system? •
Processes	• What are the core processes (output, cooperation and learning processes), steering processes and support processes of the Project, how do they work and interact? Where do strengths and weaknesses exist? • How the processes mentioned are managed by the Project? • Which processes shall gain priority in the last, extended phase of the Project? • To what extent can change processes may induce innovations and can't hey serve as pilots/models? •

Learning and Innovation	• What innovations created by the Project should be mainstreamed (scaled up)? • What learning goals do the Project objectives implicitly contain? • Does the Project have a functioning knowledge management system? • How the Project is supporting the development of learning capacities? • Does the Project have instruments for the development of multipliers? • Are there learning networks in the Project? If yes, how they are managed? •

III Specific Questions to the Demonstration Projects

- Is the project type a typical planning job or what was special about it? Size, team of planning partners, length of planning period?
- How is a planning team normally organized? Relation architects, engineers, general contractor, contractors, workers?
- Who orders a building? What is the role of the authorities of the community, building authorities?
- What were the differences in the planning processes of the DP's compared to usual planning processes? Time, team, planning process?
- What are the differences in the construction processes of the DP's compared to usual construction processes?
- What are the differences in the realized construction compared to an ordinary building?
- How can the new methods or constructions be applied to other planning or construction tasks?

ANNEX V – Data Sources - Main Documents reviewed

Category I: Project Documents
Intep/Skat, Zero Energy Building in China: Project Documentation for Phase I (November 2020 - October 2024) of the Project "Zero Energy Building (ZEB) in China", February 2021
Intep/Skat, Yearly Plan of Operation [YPO-2]; YPO-3 and YPO-4
Intep/Skat,, Yearly Report [YP1/Annual Report]; YRP2; YRP3; Half Yearly Report [HYR] March – August 2021; Half Yearly Report, 3rd Year, 1st Semester [HYR 3.1]
Stefan Kessler et al., Zero Emission Buildings in China. A Sino-Swiss Collaboration for Climate Responsive Building and District Development. Swiss experience on technical regulation for energy and emissions in the building sector. Learnings for China? Zurich, Switzerland, 2022 (power point presentation)
SDC, Sino-Swiss Cooperation on Zero Emission Building on China. Build A Zero Emission Future (ZEB Project Fact Sheet)
Federal Department of Foreign Affairs, Swiss China Strategy 2021-24, Bern, Switzerland, March 2021
SDC, Global Programme Climate Change and Environment. Programme Framework 2021-24, Bern, Switzerland, December 2020
SDC Network Climate, DRR and Environment https://www.shareweb.ch/site/disasterriskreduction/the-network/Pages/the-Network.aspx
Category II: Swiss (Technical) Documents and Publications
The Federal Council, Switzerland's Long-Term Climate Strategy, Bern, Januar 2021
Category III: China Documents and Publications
NDRC, MoHURD, The Implementation Plan for Peak Carbon in Urban and Rural Construction, Beijing, June 2022 NDRC, MoHURD, Work Plan for Accelerating Energy Conservation and Carbon Reduction in the Construction Sector, Beijing, March 2024 Leading Group on Carbon Peaking and Carbon Neutrality, Action Plan for Carbon Dioxide Peaking before 2030, Beijing, October 2021

The State Council, Progress on the Implementation of China's Nationally Determined Contributions (2022), (Unofficial Translation)
Category IV: International Data and Publications
UN-Habitat et al., Future Cities and New Economy, Carbon Neutrality Driven By Green Innovations, Nairobi, 2023 https://unhabitat.org/sites/default/files/2023/09/futurecitiesandneweconomy_carbonneutralitydrivenbygreeninnovations_2.pdf
UN-Habitat, World Cities Report 2024. Cities and Climate Action, Nairobi 2024 https://unhabitat.org/wcr/
World Economic Forum, Boston Consulting Group, Towards Green Building Value Chains: China and Beyond, Insight Report, Cologny/Geneva, June 2024 https://www3.weforum.org/docs/WEF_Towards_Green_Building_Value_Chains_2024.pdf
Wei Zhou, Accelerating Net Zero Transition of the Building and Construction Sector in Developing Asia and the Pacific, Asian Development Bank, June 2023 https://asiacleanenergyforum.adb.org/wp-content/uploads/2023/06/Wei-Zhou.pdf Asian Development Bank, Building a Low-Emission and Climate-Resilient Asia and the Pacific, 2022
Category V: Evaluation Methodology Documents and Reports
SEVAL, Evaluation Standards of the Swiss Evaluation Society, Fribourg, September 2016
OECD/DAC Network on Development Evaluation, Better Criteria for Better Evaluation. Revised Evaluation Criteria Definitions and Principles for Use, Paris, 2019
OECD, Applying Evaluation Criteria Thoughtfully, Paris, 2021

ANNEX VI – ZEB Project LogFrame

A.2 Logframe designed for Phase I.

Hierarchy of objectives Strategy of Intervention ⓘ	Key Indicators ⓘ	Data Sources Means of Verification ⓘ	
Impact (Overall Goal) ⓘ	**Impact Indicators ⓘ**		
To reduce greenhouse gas emissions and enable the carbon neural development of the building sector in China by sharing Swiss know-how on sustainable and zero emission building.	Reduced energy consumption by China's new urban buildings [kWh/m2] Baseline 2020: 0% Target 2030: 30% 2050: .75% Reduced carbon emissions by China's new urban buildings [kgCO_2e/m^2] Baseline 2020: 0% Target 2030: 50% 2050: 100% Avoided greenhouse gas emissions Baseline: 0 Target::2000 tons/year	Policies and Reports released by Chinese government Energy consumption and CO_2 emission calculation, measurement and verification of lighthouse projects	
Outcomes ⓘ	**Outcome Indicators ⓘ**		**External Factors (Assumptions & Risks)**
Outcome 1: Chinese standards on building energy efficiency and carbon emission become more ambitious.	Evidence based practices integrated into the updated national & local standards Effectiveness of existing or newly introduced national policies and legal frameworks	Upgraded NZEB standards and new compiled Zero Emission buildings standards	Relevant authorities and institutions support the standard development and issue resulting updates
Outcome 2: Substantial investments are mobilized in constructing new or retrofitting existing buildings according to zero emission standards.	Provinces implementing incentive policies for zero-emission building projects Baseline: 0 Target::4 Additional funds allocated/invested at national and sub-national level for the implementation of zero emission building. [CHF] Baseline: 0, Target: 200 million Built and planned space meeting Zero Emission Building[8] standards Baseline: 0, Target: 500,000 m^2, Public 250,000 m^2, Private 250,000 m^2, Climate Zones:4 Number of people who consider that their livelihood will improve thanks to better housing and a heathier environment Baseline: 0, Target: 1000	List of national and local ZEB incentives and resp. volumes List of ZEB project permits Designs documents Interviews with new or future residents, workers, users or other people having their livelihood affected by ZEB projects	Incentives availed by national or local authorities encourage private pilot investors to establish model ZEB projects within the expected timeframe

[8] See the ZEB definition in the ProDoc

Outcome 3: Capacities on emission reduction in buildings are strengthened and the Sino-Swiss joint know-how is disseminated.	Accumulated number of persons[9] introduced or trained on climate change issues (zero emission building) Baseline:0 Target: 1600 Proportion of targeted stakeholders aware of and capable of better using information and tools to respond to climate change. Baseline: 0 Target: 60% Number of high quality knowledge products and outreach events. Baseline: 0. Target: 25	Participants list of capacity buildings Lists of students, trainees from university courses and conferences	Private firms and provincial authorities avail time and required means for capacity building of relevant technical personnel

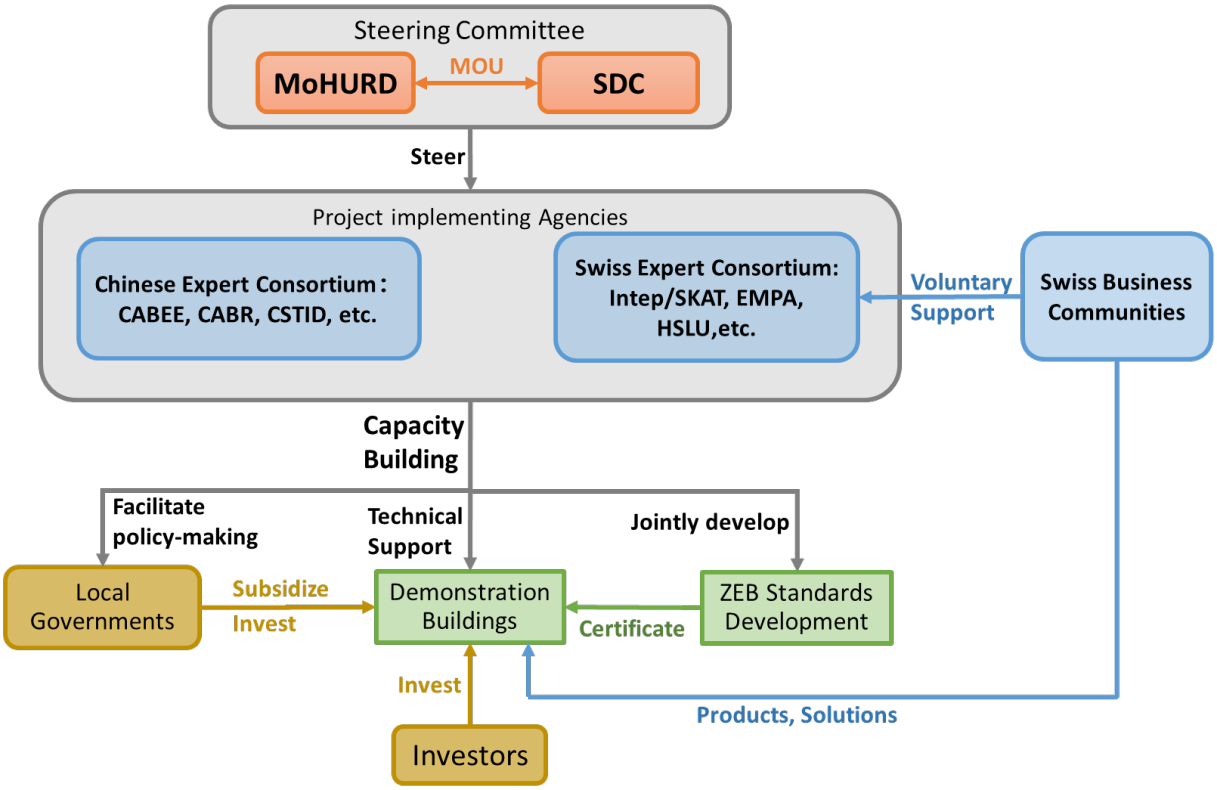
Outputs (per outcome) and costs ⓘ		Output Indicators ⓘ		
For outcome 1:				
Output 1.1	2030/2060 building related carbon emission reduction potential quantified for China based on Swiss experience	Published inventory of unused potentials for energy & CO_2 reduction Scenarios for optimized ZEB outreach /market penetration, based on swiss expert experiences	Reports submitted to MoHURD Technical road maps	Basic countrywide building market information is available and processed by local research institutes or website
Output 1.2	Evidence-based suggestions for updating and strengthening National Standard for nearly Zero Emission Building GB/T 51350-2019 (NZEB) are prepared, incl. specific elements for clusters projects, etc	Presented report on the optimization potential of standard GB/T 51350-2019 Presented evidence-based draft update of NZEB Standards for low-carbon and smart ZEB projects, including specific features for low-carbon neighbourhoods/clusters etc	Report on suggestions of updated standards submitted to MoHURD CO_2 emission simulation tools	ZEB standard Charrettes can be organized with committed institutions and relevant experts
Output 1.3	Based on GB/T 51350-2019 and Swiss standard, local NZEB standards for provinces in 4 climate zone[10] are developed based on the NZEB and Swiss standards,	Presented report on the potentials of, climate zone specific local standards for low-carbon and smart ZEB-projects # of standards developed and proposed to local authorities	Standards issued by local provinces	Travelling to the key locations in the different climate zones is possible, field visits be conducted and joint meetings can be organised
Costs of outputs for outcome 1: 1) amount of SDC contribution: CHF 760k 2) in % of total cost: 38% 3) Total cost: CHF 2010k intep/skat: CHF 575k CABR: CHF 185k SDC: 0				

[9] Authorities, professionals, students/professors, participants in seminars and events (detailed breakdown see in the output indicators)
[10] The *Code for the Design of Civil Buildings*, issued by MoHURD in 2015, identified 5 types of architectural climatic zones in China, including: (1) severe cold, (2) cold, (3) hot summer and cold winter, (4) hot summer and warm winter, and (5) temperate. The project will mainly working on the first 4 of them.

For outcome 2:				
Output 2.1	Demonstration buildings are constructed or retrofitted with the technical guidance of the project expert team.	Number of lighthouse buildings meeting NZEB standards Baseline: 0 Target: 8, Climate Zones:4 Offered service packages[11] A: 8+; B: 5+; C:4+ Investor's guides, project conception tools, Duty Books	Certifications or energy audit report	Investors in Lighthouse projects apply designs concepts and suggestions developed by the ZEB Expert team
Output 2.2	Incentive policies for zero emission building are formulated for selected local governments.	Swiss (e.g. EMPA) tool for smart optimization of incentives demonstrated # of incentive policies for low-carbon and ZEB projects Baseline: 0 Target:4, Climate Zones:4	Policy paper Local market study Policy influence analysis	Local Governments support the incentive formulation process and enter into the issuing process within the time required by the project
Output 2.3	Active Platform for facilitation of Sino-Swiss business cooperation on zero emission technologies and solutions	# of events # of business opportunities # of Participants in platforms and events Active companies:20 Visitors of events:2000.	Websites, social media and publications of events Reports on platforms and conferences Media coverage	Relevant institutions and authorities are co-hosting events and platforms
Costs of outputs for outcome 2: 1) amount of SDC contribution: CHF 2777k 2) in % of total cost: 65% 3) Total cost: CHF 4277k intep/skat: CHF 2077k CABR: CHF 350k SDC: 350k				

For outcome 3				
Output 3.1	High level dialogue on mid-long term goals, policy-making experience, standards and best cases are facilitated	Informed high level authorities and Minister's briefs Ministers:3 DGs: 10 Study tours	Reports of meetings and study tour Official web-portal for authorities and investors in low-carbon / ZEB projects	Relevant authorities engage in the dialogue on ZEB Standards and Investment promotion
Output 3.2	Capacities of local authorities and professionals are strengthened	Design, permitting & building guides For authorities 4. Privat 20. Climate Zones:4 Authorities trained in implementing new standards Baseline:0 Target 100 (officers) f: 30 m:70. Professionals familiar with low-carbon/ZEB guides Baseline: 0 Target: 500 f:150. m: 350	Authority guidelines, Design Guides of ZEB Seminar material	Relevant local institutions host the capacity building events and authorities avail relevant officers
Output 3.3	Capacities of university students and professors are strengthened	Prepared courses and rel. materials Target: 1 Provinces: 4 Climate Zones:4 University students with increased capacities Baseline:0 Target: 1000 f:400. m: 600	Materials Course records and evaluations	Universities host courses and events on ZEB
Costs of outputs for outcome 3: 1) amount of SDC contribution: CHF 845k 2) in % of total cost: 65% 3) Total cost: CHF 1'545k intep/skat: CHF 530k CABR: CHF 265k SDC 50k				

ANNEX VII – ZEB Project Organizational Chart



Swiss side:

Organization	Introduction	Role
Swiss Agency for Development and Cooperation (SDC)	SDC is Switzerland's international development agency. It is responsible for the overall coordination – among Switzerland's different federal offices – of international development and cooperation with developing and transition countries, as well as Switzerland's humanitarian aid.	• Overall coordination of the project; • Funding support
Swiss Implementing Agency	A consortium of Swiss experts from Intep, SKAT, EMPA and HSLU was selected by public tender.	• Carry out joint research with Chinese experts on building standards. • Capacity building for Chinese building related professional groups • Technical assistance to the design, construction and certification of pilot buildings
Swiss Companies, Swiss Business Hub and Swiss Green Building Association	The Swiss companies in designing and constructing Zero Energy Building, and in producing materials and equipment, will be mobilized to participate in the demonstration buildings. Swiss Business Hub and Swiss Green Buildings Association will support the project to link up with Swiss business community.	• Provide expertise to the research of standards on a voluntary basis; • Provide solutions and products to the pilot building on a market basis.

	Swiss Green Buildings is an Association of Swiss Enterprises for Swiss Quality, Technology and Sustainability in Planning and Construction in China.	

Chinese side:

Organization	Introduction	Role
Ministry of Housing and Urban-Rural Development (MoHURD)	MoHURD is the ministry that regulates housing, urbanization and construction activities in China	• Dialogue with Swiss counterpart • Overall steering of the project
China Association of Building Energy Efficiency (CABEE)	CABEE is a national non-profit social organization, established in 2011 and supervised by MoHURD. Its members include enterprises, design institutes, architects and engineers who engaged in improving building energy efficiency. CABEE has 5 professional committees, including the committees for building energy efficiency service, for building insulation, for solar energy integration, for ground-source heat pumps, and for HVAC.	• Overall coordination of Chinese partners. • Organize standards consultation meetings • Organize capacity building events.
China Academy of Building Research (CABR)	CABR, founded in 1953, is the largest research institution in building industry in China, with 14 research institutes (centers) and 77 laboratories. It used to be affiliated to the Ministry of Construction, the predecessor of MoHURD. Since 1 October 2000, it transferred from the public institution into a technology-based enterprise. Since 2017, CABR reports to the State-owned Assets Supervision and Administration of China (SASAC) CABR is responsible for the development of the major building engineering and product standards of China. CABR has become a GABC member since October 2019.	• Chinese leading technical implementing agency; • Coordination of the Chinese expert team; • Carry out joint research with Swiss experts. • Providing technical support to demonstration buildings
Center of Science, Technology and Industry Development (CSTID)	CSTID is a public institution affiliated to MoHURD. Its main functions include: carry out researches on building energy conservation, green building, urban and rural emission reduction, as well as economic policies, regulatory research and related technical advisory; promote new technologies, new product evaluation and certification; Organize relevant pilot demonstration work; provide support to MoHURD in relevant administrative functions.	• Coordination of local governments; • Facilitate the incentive policy making processes.
Local governments	Provinces or cities that are willing to participate in the demonstration.	Issue local incentive policies for promoting Zero Energy Building.
Investors	Public and private investors	Invest in the demonstration buildings.

National Academy for Mayors of China (NAMC)	NAMC was established in 1983.It is a professional training institution directly under MoHURD and guided by the of Central Organizational Department of CPC, MOHURD and China Association for Science and Technology (CAST)	The mission of NAMC is to train mayors and governors in the fields of urban development strategies, urban planning, urban construction and urban management. It is in charge for international cooperation and exchange (city partnerships)

ANNEX VIII – SDC Evaluation Grid

Assessment grid for evaluations of SDC projects/programmes

Key Aspects based on DAC criteria		**Score** (choose only one answer for each question)	**Justification - compulsory** (please write a short explanation with the main points and refer to the chapter(s) where the information that justify your assessment can be found)
Assessment of relevance			
1. The extent to which the objectives of the SDC projects/programmes are consistent with the demands and the needs of the target groups (incl. gender-specific requirements).	x ☐ ☐ ☐ ☐	*Very good: Fully consistent* *Good: Largely consistent* *Poor: Only partly consistent* *Bad: Marginally or not at all consistent* *Not assessed / Not applicable* [1]	The Project is in compliance with the needs and requirements of the society (residential community) striving not only for a low carbon, nature-positive and climate-resilient (building) environment but for an overall well-being (Chapter 3.4.1)
2. The extent to which the objectives of the SDC projects/programmes are consistent with the demands and the needs of partner country (institutions respectively society) as well as the sector policies and strategies of the partner country	x ☐ ☐ ☐ ☐	*Very good: Obvious consistency with demands and needs of society and in line with relevant sector policies and strategies* [2] *Good: Consistency with demands and needs of society and in line with relevant sector policies and strategies* *Poor: Consistency with demands and needs of society not visible but in line with relevant sector policies and strategies* *Bad: Not consistent* *Not assessed / Not applicable* [1]	The Sino-Swiss ZEB Project is in full compliance with China's overall climate targets and policies, especially in the building and construction sector: 2 very important documents on energy conservation and carbon emission reduction, issues by MoHURD and NDRC 2022/2024 (Chapter 3.4.1)
3. The extent to which the design of projects/programmes is adequate to achieve the goal and objectives (definition of target groups; choice of approach and operational elements; articulation of components; choice of partners; consistency with SDC policies and experiences)	☐ x ☐ ☐ ☐	*Very good: Fully adequate* *Good: Largely adequate* *Poor: Only partly adequate* *Bad: Marginally or not at all adequate* *Not assessed / Not applicable* [1]	The ZEB Project was able to prepare a balanced, logic, consistent and reasonable concept where the 3 components (outcomes). The strategy underlying the Project contains all necessary elements, is consistent and provides the appropriate (strategic) framework for successful project implementation andf the achievement of objectives. The system of objective indicators is deficient (Chapter 3.2)
Assessment of effectiveness			
4. The extent to which the planned objectives at outcome level have been achieved taking into account their relative importance. If possible, distinguish the quality and quantity of results achieved.	☐ x ☐ ☐ ☐	*Very good: Fully achieved or overachieved* *Good: Largely achieved* *Poor: Partly achieved* *Bad: Marginally achieved* *Not assessed / Not applicable* [1]	The objectives on the 3 OC-levels have been largely achieved. None of the tasks, necessary to reach the targets could be completed. It's possible and may be expected to achieve all objectives at the end of the extension phase 2025 (Chapter 3.4.3 and Table 3)
5. The extent to which the projects/programmes contribute to poverty reduction, inclusion and/or reduction of vulnerabilities.[3]	☐ ☐ ☐ ☐ x	*Very Good: Strong evidence of contribution* *Good: Evidence of contribution* *Poor: Few evidence of contribution* *Bad: No contribution* *Not assessed / Not applicable* [1]	The Project may contribute to the reduction of vulnerabilities, e.g. climate-related natural disasters/hazards

[1] This category applies a. if the ToR of the evaluation explicitly exclude the assessment of the criteria and/or of the key aspect(s) or b. if there is no information available to assess the criteria.

[2] The policies and strategies should not be in opposition to the needs of the society (applies mainly in governance and human rights).

[3] Dimensions for consideration are: a) economic (income and assets); b) human capacities (health, education, nutrition); c) ability to take part in society (status and dignity); d) political capacities (institutions and policies); e) resilience to external shocks.

6. The extent to which the outcomes achieved contribute to improved governance from a system perspective.[4]	☐ x ☐ ☐ ☐	*Very good: Strong evidence of contribution* *Good: Evidence of contribution* *Poor: Few evidence of contribution* *Bad: No contribution* *Not assessed / Not applicable* [1]	A high committment of the Chinese Government to combat climat change, high Project ownership and participation. Important ZEB policies and directives issued and implemented. Localisation is stongly promoted. Multi-level approach of the ZEB Project
7. The extent to which the outcomes achieved contribute to gender-specific results.	☐ ☐ ☐ ☐ x	*Very good: Strong evidence of contribution* *Good: Evidence of contribution* *Poor: Few evidence of contribution* *Bad: No contribution* *Not assessed / Not applicable* [1]	Click here to enter text.

Assessment of efficiency			
8. The extent to which the relation between resources (mainly financial and human resources) and time (e.g. delays compared to planning) required and results achieved is appropriate (Cost-benefit ratio - CBR).	☐ ☐ ☐ ☐ x	*Very good: Positive CBR based on a cost-benefit analysis (CBA)* *Good: Positive CBR, based on qualitative justification* *Poor: Poor CBR, based on qualitative justification* *Bad: Bad CBR demonstrated* *Not assessed / Not applicable* [1]	Click here to enter text.
9. The extent to which the approaches and strategies used by the SDC projects/programmes are considered efficient (Cost-efficiency).	☐ ☐ ☐ ☐ x	*Very good: Highly efficient* *Good: Efficient* *Poor: Partly efficient* *Bad: Not efficient* *Not assessed / Not applicable* [1]	Click here to enter text.
Assessment of sustainability			
10. The extent to which the positive results (outputs and outcomes) will be continued beyond the end of the external support. Considering also potential risks in the context.	x ☐ ☐ ☐ ☐	*Very good: Very likely based on evidence* *Good: Likely based on evidence* *Poor: Little likelihood based on evidence* *Bad: Unlikely based on evidence* *Not assessed / Not applicable* [1]	Institutional sustainability is guaranteed to a high degree, as the Project remains integrated into the existing Governmental structures. In this context, MoHURD, has affirmed, that the results of the project will be disseminated, even without a - highly appreciated - Swiss participation (Chapter 3.4.6)
11. The extent to which partner organizations are capable to carry on activities. Capacity includes technical, financial capacity, human resources and importance of the activity for the organization.	☐ x ☐ ☐ ☐	*Very good: Strong capacity (also to further develop without support)* *Good: Reliable capacity* *Poor: Little capacity (require further support)* *Bad: Still too weak capacity* *Not assessed / Not applicable* [1]	Relevant partner organisations such as CABR, CSTID and CABEE have already been involved in the ZEB Project and they are very competent to continue with the activities. CD on all levels was and is a core component of the Project (OC-3). On local level, CD measures are furthermore needed and also planned.

Additional information (if needed): Click here to enter text. Project: Sino-Swiss Zero Emission Building (ZEB) Project
Assessor: Dr. Jürgen Steiger
Date: February 15th 2025

[4] Dimensions for consideration are: a) structure (informed policies, laws, corresponding to basic HR obligations; degree of decentralization/multilevel concertation/cooperation); b) good governance in the performance/interaction of responsible actors/institutions (GGov principles: participation, transparency, accountability, equality&non-discrimination, effectiveness & efficiency,
rule of law); c) capabilities, behavior, empowerment of actors/institutions for positive change; d) consideration of important global or regional governance dimensions.

ANNEX IX - Assessment of the CW-Success Factors

Success Factor (SF) Strategy: The ZEB Project Strategy provides in principle the general orientation and direction to act/implement, defines the present and future desired position and implies a blueprint of decisions to show how targets and objectives can be achieved. The Project is based on a very balanced and innovative **strategic approach**, jointly developed on the basis of context and problem analysis, actor's analysis and mapping on the Chinese and Swiss side. A fundamental understanding was reached by the partners on how to address desired changes in the ZEB-sector and how to achieve objectives and impacts. The Project has rightly chosen a **multi-level approach of interventions**: a) macro level, comprising Government(s) as well as the society as a whole (Governmental-political-institutional level) with MoHURD and SDC in the lead; b) the meso level with relevant business organizations, building research and design institutes as well as all institutions to be involved in capacity development such as NAMC, other training institutes and academia; c) micro level, comprising investors, planners, real estate developers, architects and construction companies. A very important element of the Project strategy, which has already been incorporated by the Project team is a **vertical scaling-up approach** due to its pilot and demonstration character, by offering innovative and replicable solutions in the ZEB area. **Strong links and close exchanges between the 3 intervention levels** have proven very appropriate for the success of the Project.

The Project, moreover, has chosen a **mix of instruments and methods (inputs)** to implement the Project activities with respect to a **very strong Sino-Swiss technical dialogue** to be regarded as a kind of overarching mission statement for the Project. In particular, the following **main instruments** have been applied:

Outcomes	Interventions
OC-1 Standards	Documents and publications on Swiss energy and climate-related building policies and standards; joint studies, virtual workshops; exchange with and advice by Swiss experts; discourses/joint elaboration of National ZEB Technical Standards; advice on local standards, e.g. on cantonal standards; physical missions to China; participation in high-level national ZEB-conferences; Chinese delegations to Switzerland;
OC-2 Demo-Sites	Advice during the selection, planning and building process of DPs; information on Swiss DPs (ZEB buildings); launching of selected DPs combined with workshops; cooperation with SGB und SG-E; monitoring of DPs (CO2e-accounting/calculations); Project presentations in Switzerland; delegations to Switzerland
OC-3 Capacities	Training Material on ZEB; Opening remote training channels; cooperation with NAMC and UAD of Zhejiang University; technical webinars with Swiss experts; training of mayors, other Government officials and students (alliance of 13 Chinese universities); joint ventures/cooperation between Chinese and Swiss universities

The strategy underlying the ZEB Project contains all necessary elements, is consistent and provides the appropriate (strategic) framework for successful project implementation, the achievement of objectives and the realization of impacts**.** Some sub-strategies are not yet fully completed such as a CD strategy, a knowledge management strategy as well as a communication and visibility (dissemination/scaling-up) strategy. These strategies will be stressed later.

Success Factor (SF) Steering Structure: The steering structure of the ZEB Project consists of the strategic or decision-making level and the operational level. On the strategic level, a **Steering Committee (SC)** was established, comprising MoHURD, represented by the DDG of the Department of Planning, Finance and Foreign Affairs and the SDC, represented by the Head of international Cooperation Beijing. Both institutions are representing the key actors of the Project. The 1st SC-Meeting took place at the end of May 2021 in Beijing. Observers of the SC Meetings are: Other departments of MoHURD, such as the Department of Standards and Quota, CABR, CSTID, SDC HQ as well as the Swiss Project team. **SC** is acting as the overall decision-making body of the Project and approving the Yearly Plans of Operation as well as the Yearly Progress Reports. Decisions and agreements made by the SC are documented in **SC meeting minutes** and are followed up by the Project team. The evaluation team randomly reviewed the SC minutes of July 20, 2022 and found, that these meetings are of a very high importance for the ZEB Project as not only decisions are made, but discussions on the future direction of the Project, technical details, policy matters and organizational aspects are held too. At the end, the next steps are defined to follow up the SC meeting.

The **operational level**, the so-called architecture of intervention, composes on the Chinese side of 3 institutions, affiliated or authorized by MoHURD: CABR, CSTID and CABEE and the Intep/Skat Consortium on the Swiss side, selected and assigned by SDC through an international tender. They are the **primary actors** called Project Implementing Agencies or Organizations. A minor critical issue is that CABR, as the lead Chinese Project implementer, is mandated by MoHURD but reporting to SASAC due to its status as a technology-based enterprise. The organizational chart of the Project is shown in **Annex VII.**

To complete the main operational team of the Project, Empa and HSLU are named as (international) partners whereas a small Financing Contract was signed by SDC with SGB and its Chinese partner Sharvix Technologies Co. Ltd. The Swiss Consortium signed a sub-contract with UAD of the Zhejiang University, starting from 2023. Another main partner of the ZEB Project on the Chinese side is the National Academy of Mayors (NAMC) under MoHURD.

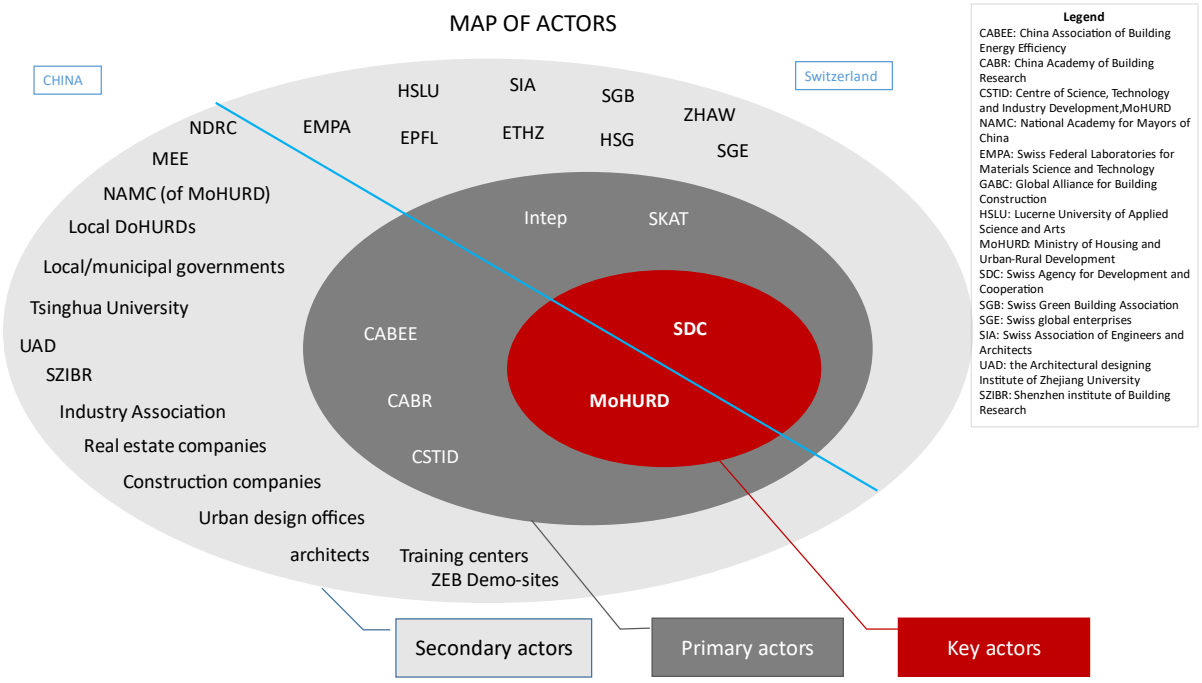
The Project assumed an increasing **localization** from the very beginning. Local participation plays an important role throughout all 3 components, e.g. local standards, all DPs on local level as well as CD-activities on provincial and municipal levels. Despite the number of activities on local level, there is a lack of a formalized steering structure. It seems, that the respective Departments of Housing and Urban-Rural Development (DoHURD) and the Bureaus of Housing and Urban-Rural Development (BoHURD) on provincial and municipal level respectively, are taking over a management function on behalf of MoHURD. CABR itself has access to the local level through various business units, companies and local offices.

The **Core Project team on the Swiss side**, based in Zurich and St. Gallen respectively, consists of a Project Director, a Technical Lead, a Team and Strategy Lead, a Deputy Team Lead and China Operations, a Capacity Building and Communication Key Expert as well as staff to support the management, altogether a minimum of 5 persons working on a temporary basis. The Project Director, at the same time Managing Director of Intep, is providing strategic advice and not being involved in daily operations. The Yearly Plans of Operation (YPO), jointly prepared by both sides, does not contain any statement to the working division between the Swiss team and CABR, CSTID and CABEE respectively. The Swiss Consortium has no **permanent Project Team.** However, an Intep China Office was established in Beijing simultaneously with the start of the Project which was providing backstopping services and other support. In the meantime, the Intep China Office was not directly involved anymore in activities of the Project. Despite a triple change of the team leaders, the whole Project team remained quite stable and the changes had no obvious negative effect on the Project implementation. It seems, that the Project Officer at the SDC Office Beijing is playing an important role as a liaison, interlocutor and moderator to communicate with MoHURD and the Chinese implementers.

During the main pandemic period from March 2021 to mid-of 2023, the Project was using a variety of virtual communication tools to jointly proceed with the implementation. Due to the fact, however, that over 90 % of the activities are taking place in China, operating in 4 climate zone and numerous provinces and municipalities all over the country, managing and monitoring up to 10 DPs, intensifying the Swiss inputs and strengthening scaling-up activities, a **permanent physical presence of a core Swiss team**

is very essential to successfully finalize the intended Project measures and the achieve all desired objectives.

Map of Project Actors



Success factor (SF) Cooperation: Horizontal and vertical co-operation, interaction and networking are an essential part of the Project's target system and are therefore of significant importance for the ZEB Project. All Sino-Swiss cooperation partners bear responsibility, operate in a process based on the division of labor and support each other.

The **map of actors** shows the key and primary actors, already described under SF Steering, as well as the great number of the (main) secondary actors. The relationships between the actors, are, however, not yet visualized. The Project is using existing relevant networks in China and Switzerland to promote ZEB-technologies. The **cooperation management** of the Project has improved in the course of the Project implementation. A core group of key experts and cooperating institutions has emerged, consisting of Empa, SIA, A2CE, sympheni/NEST as well as the partner universities (HSLU, ETHZ, EPFL). A research cooperation has been starting between CABR and the ZHAW. Initiated by the Project, university alliances have been established and/or supported, e.g. between Zhejiang University and the University of Applied Sciences and Arts of Southern Switzerland (SUPSI) in Manno. Webinars on green building/ZEB have been organized by **UAD of the Zhejiang University** with 13 other national universities. The evaluation team got the impression, that **UAD** is ascending more and more to a **primary partner** of the Project, having been involved in all 3 components (OCs). It could play, moreover, a future key role as multiplier and protagonist to manage the university alliances, to implement the local ZEB standards and to monitor the DPs, beyond the Sino-Swiss Project if possible. The Project has already recognized the **importance of universities** as an asset of quality, indicated in YPO3. It was proposed inter alia to build up a ZEB Network of Universities and make best use out of their role as *multipliers of change.*

The **Swiss business community**, represented by the Swiss Green Building Association (SGB) and the Swiss Business Hub in China of the Switzerland Global Enterprise (SG-E) is another very essential partner of the Project. *Support to SGB to promote know how on ZEB technologies and solutions* is a part of the Project's system of objectives under Output 2.3 and specified in the Financing Contract between SDC and SGB, signed in March 2021, as already mentioned.

Further relevant networks may be taken into consideration, also with regard to the sustainability of the Project. The evaluation team had a fruitful meeting with the China Association of Mayors (CAM), associated with MoHURD and closely connected with NAMC: The head of NAMC is at the same time the Deputy General Secretary of CAM. CAM, having access to 768 municipalities, is interested to cooperate with the ZEB Project and offered their network and channels to promote ZEB and Sino-Swiss knowledge products. On the international side, the channels of GlobalABC where SDC and coincidentally CABR are members, could also be utilized; the same applies to the Swiss Sustainable Building Council (SGNI) which was mentioned at the beginning by the Project but was obviously no longer taken up as a partner. The **cooperation management** of the Project, so far, is **satisfactory** but it urgently needs a profound communication and visibility strategy as already announced in the last yearly plans and reports.

Success factor Processes: Objectives and results of the ZEB Project suggest technical **innovations as well as structural and systemic changes** which have an impact to political decision makers, the construction and building industry as well as to the society. It is therefore a core task of the Project to manage, monitor and document **work processes and procedures** and, at the end, **significant changes**. CW distinguishes between steering processes (s. SF steering), core processes as well as support processes. Core processes are defined as output processes, e.g. advisory processes, cooperation processes (s. SF cooperation) and learning processes (s. SF learning). The Project has obviously concentrated on **learning/knowledge transfer processes** in order to consolidate its pilot and model function. Another important core process is the joint development of ZEB standards on national and local level to highlight the working steps and Sino-Swiss interventions, to show the challenges and trade-offs, to assess the quality of the process and how to improve or optimize it if necessary (process optimization). Selection, design, planning, construction and monitoring of the DPs of the ZEB Project have claimed all processes mentioned and it's very worthwhile to assess the experiences and define lessons learnt.

Success factor Learning and Innovation: According to the last HYR 4.1, the Project developed a great number of **knowledge products** – 39 are mentioned – such a booklets, training material/videos, so-called ZEB Talks, presentations, podcasts, story books, technical reports and guidelines etc. The main knowledge products, however, are the 3 outcomes itself: (1) The Technical Standards for Zero-Carbon Buildings, prepared in the context of the ZEB Project by MoHURD and CABR with Swiss inputs and announced by MoHURD and the State Administration for Market Supervision (SAMS) with Appendix A "Calculation of Carbon Emission Indicators for Buildings", Appendix B "Report on Calculations of Carbon Emission for Buildings" and Appendix C "Calculation of Regional Carbon Emission Targets"; (2) The Demo-Sites themselves including all the innovative ZEB-related technologies, introduced on pilot basis and (3) all the knowledge products in the field of Capacity Development. **Knowledge products in a wider sense** are innovative approaches and solutions, experiences, lessons learnt, best practices

as well as (learning) processes, created by the Project. It is using, as already mentioned, all kind of communication channels and tools to disseminate the ZEB knowledge products either by a horizontal or vertical scaling-up. The Project was in this connection quite successful to establish and/or extend **Sino-Swiss learning networks** and alliances to scale-up and mainstream innovative knowledge products and to bring out qualified multipliers. A very significant result of the Project is the exchange of knowledge and technical solutions between most of the existing DPs, partly accompanied by the Project, e.g. via UAD.

The project, this has also to be stated, has not yet succeeded in establishing a suitable **knowledge management system** to coordinate more systematically the (knowledge) needs of the sheer number of actors and beneficiaries. Moreover, a functioning knowledge management helps that knowledge products are not too fragmented, knowledge and lessons learnt may be better safeguarded and knowledge sharing and transfers can be better organized.

Finally, another observation of the evaluation team may be discussed internally: Output 3.3 assumes that *capacities of university students and professors are strengthened.* **Students shall not be the primary target group**. Instead, it's more important to shift the resources to key beneficiaries such as mayors and Government officials, owners and investors, architects and engineers etc. More attention shall be paid, as mentioned, to further qualify ZEB multipliers and protagonists.

ANNEX X – Assessment of the ZEB Demonstration Projects

(1) Songchen Community Center, Fangshan District, Bejing

Context

The Beijing Fangshan DP is a public building and part of a residential development named Chinese Mansion comprising approximately 12 buildings and over 800 apartments and located in the Fangshan district. The DP serves as a Community Center with an exhibition hall and café for the neighbourhood. About 12 apartments for seniors are foreseen too. The gross floor area of the entire development is about 60,000 to 100,000 m^2. The meticulous detailing and the exquisite garden show the high standard of the condominiums. In accordance with old Chinese traditions all apartments are oriented precisely toward the south, resulting in slender slab structures. This design approach represents an appropriate passive solar concept for northern China.

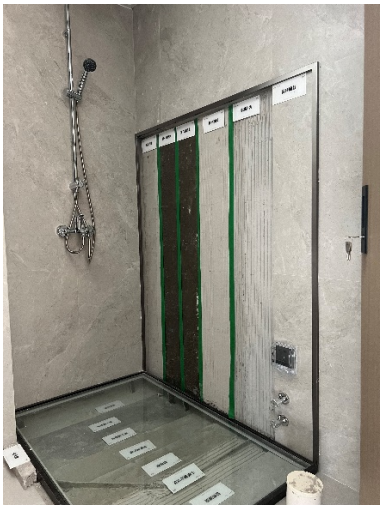
Model of the housing project

Garden and south façade

Entrance

The apartments feature a floor heating system as an innovative design with municipal centralized heating, which is common in northern China. PV panels are installed on the roofs, but the surfaces are relatively small compared to the size of the buildings. Each apartment is equipped with an individual A/C unit on the façade, which is aesthetically integrated into the building's exterior; these units are installed and owned by the tenants.

In the show case apartment, all construction elements and distinctive features are on display. High quality windows, doors and various wall surfaces are demonstrated too. Quantitative data for energy efficiency or carbon emissions could not be provided.



Construction display in shower

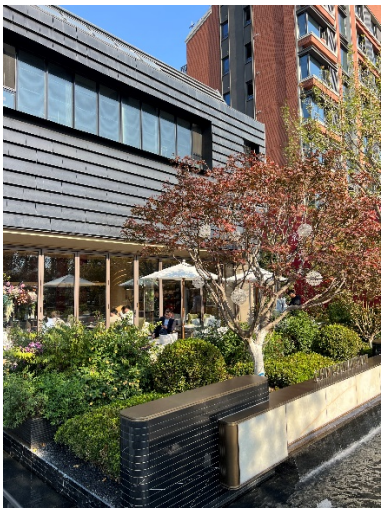
Floor construction

Windows and doors

Demo Project

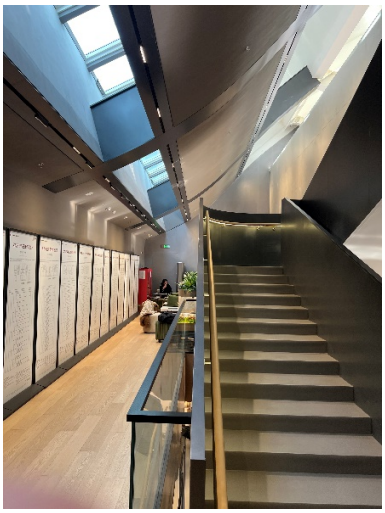
The Community Center, covering approximately 1,000 m^2, was completed in September 2023 and is currently functions as a sales showroom with offices and a café. It was designed by SUP Atelier of THAD of the Tsinghua University; CABR was involved as an energy consultant. The DP adheres the principles of passive and active solar energy production, and the building's design section allows an effective natural ventilation. Through the advice of the Swiss experts involved, a number of very market-relevant innovations could be materialized: Photovoltaic panels are integrated in the south façade and roof (BIPV

building integrated photovoltaics) on a very high aesthetic level. The dimensions of photovoltaic surfaces for production of electricity and windows for natural lighting were optimized. The idea of natural ventilation by the form of the interior spaces was optimized by precise simulations. Air-to-water heat pumps generate the necessary energy for heating and ventilation. The efficiency of the technical equipment, lighting and appliances were improved by the Sino-Swiss cooperation. The energy system is entirely electricity-based, resulting in zero carbon emissions from the building. The optimization phase contributes to a 40% reduction in energy demand, according to the Project. The access to a municipal centralized heating system could not be confirmed by the architect in charge, Dr. Sun Jinfeng. Swiss experts introduced the concept of circularity of building material (re-use, re-cycle of building materials and especially of construction for disassembly) to the Chinese team.



BIPV façade

Ground floor café



Upper floor with skylights

Some new ideas could not be realized due to the strict fire protection regulations and quality concerns. The originally planned timber construction could not be implemented had to be replaced with a steel frame construction from recycled steel. The cladding of the north façade shingles from recycled timber had to be replaced by cement shingles. The interior design intended to reuse materials but could not be implemented at the end.

Findings

Project: The concept of the project, featuring a passive-solar strategy and the option of natural ventilation, is convincing. The visible BIPV façade is readily replicable and be adopted by other projects.

Communication: The DP is not yet operational as it's being used as a sales office until September 2025. Hence, calculations of the project cannot be verified. The advanced construction and the innovative technology were not explained to the evaluation team. The investor has built a show-case apartment, which could serve as a good example to show the superior quality of the demonstration building. The Sino-Swiss cooperation is not visible and expertise of the Swiss experts are not prominently displayed.

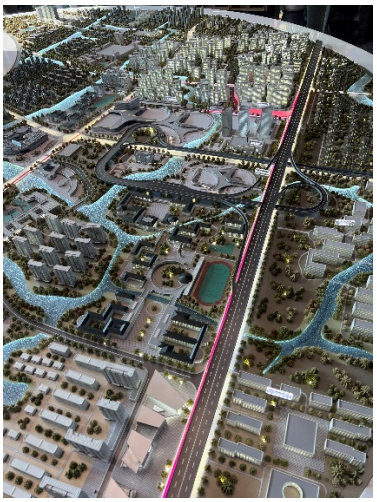
Monitoring: No technical data regarding energy consumption or carbon emissions could be provided. The optimization during the process shown on the chart is relatively modest. During winter, the building requires external electricity supply or connection to the municipal centralized heating system. In the

extension phase, a simple monitoring system should be implemented to prove the functionality and to demonstrate the efficiency to visitors.

(2) Longshan Academy Training Center and Middle School Shaoxing, Zhejiang Province

Context

A new residential development is under construction, comprising 1,000 to 2,000 apartments in slender high-rise structures of about 25 stories. The residential area provides with leisure, culture and sport facilities. A model shows the entire development, and a showcase apartment displays the high standard of Chinese construction quality. The climate in Shaoxing is warm in summers and mild in winters. So usually buildings are not equipped with heating systems.



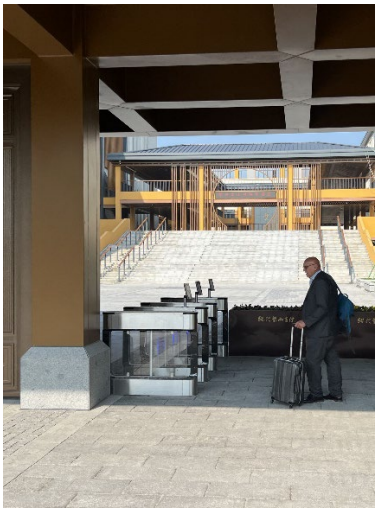
Sandbox of the whole neighbourhood
School in foreground

Apartment on high level

Balcony

The project comprises a huge school complex, including accommodations for students and teachers. The gross floor area measures is estimated at about 100,000 m^2, and the DP is less than 10% of the whole area. CABR is acting as the architect in charge and CSTID is responsible for energy issues. The project is scheduled for completion by the end of 2024/beginning of 2025. The complex's design is in a unpretentious and classical style. Compact buildings offer functional spaces for learning and living. Multiple courtyards and roofed outdoor areas are available for students from grade 7 to 9, most of whom will live on campus.

School complex from outside



Main entrance

Inner courtyard

In addition to academic, training and school facilities, housing for teachers and students are provided. Student accommodations consist of shared rooms for 4 persons, each with a workspace and bed, which accounts for the generous ceiling height of the rooms. Each room is equipped with a private bathroom and balcony.

Teacher room

Student room

Kitchen and dining hall

The Demo Project

The DP building is a part of the entire Academy Training Center and school complex; it looks similar to the other school buildings. So, its advanced technology and energy efficiency is not obvious to see. To reduce embedded energy, the building uses a compact design and recycled concrete as a construction material. This was quite a good basis for lighthouse project to show the importance of conceptual design.

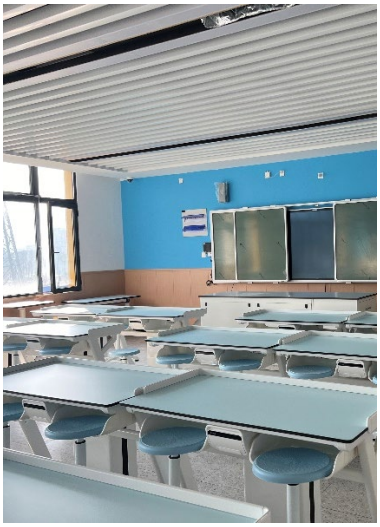
Swiss experts dealt with the planning team on various technical issues. The insulation and the air tightness of the envelope were clearly optimized. High quality doors and windows were installed. The importance of such an improved detailed work of the construction could be proved by calculations.

An integrated PV System of a local company has been used as roofing material, keeping consistent architectural details at the roof edges. The PV system of outstanding architectural and technical quality

shows a huge potential for the implementation of BIPV in China. The performance is high and the PV-modules can be replaced easily in case of disfunction. The installed Variable Refrigerant Volume (VRV) air conditioning systems are optimized and consume less energy than traditional AC-Systems. Additionally, an automation system is installed to control temperature and humidity of the indoor climate. Swiss experts showed how to use more realistic data of the energy consumption of a school building. Advanced technological equipment has been adopted resulting in a 40 % reduction in energy consumption, almost achieving the ZEB goal, according to the Project documentation.

Left Demo Project with PV roof

Interior Hall



Classroom Physics

Some new ideas of the Sino-Swiss planning team were discussed intensively, but could not be realized for different reasons: The interior design using timber panels had to be abandoned due to fire safety. This explains the reason that the indoor spaces are less aesthetic and the quality of the finishing decorations is somehow not too convincing. The idea of using the nearby river as a source of energy was not allowed by the authorities and stripes of white PV panels in the façade had to be given up for financial reasons. Swiss experts provided a number of relevant ZEB technologies and applications such as optimized construction materials, advanced energy saving technologies, ultra-low energy building design and reducing the carbon footprint during the construction process.

It would be quite interesting to find out whether the air tightness and additional insulation of the envelope or technical components play are more significant role in addressing the new challenges.

Findings

Project: The concept of reducing energy demand and carbon footprint primarily relies on technical equipment. A heating system has not been installed. The enhanced insulation of the façade was not apparent. The BIPV roof design is readily replicable and can easily be adopted by other projects.

Communication: The DP will be used as a school and training center from February 2025. The project's success and calculations cannot be verified. The Sino-Swiss cooperation is not apparently displayed and visible. The concept of an innovative waste disposal system was not addressed. The extension phase should be used to elaborate profound technical documents to explain the advantages of the DP to scholars, teachers and visiting architects.

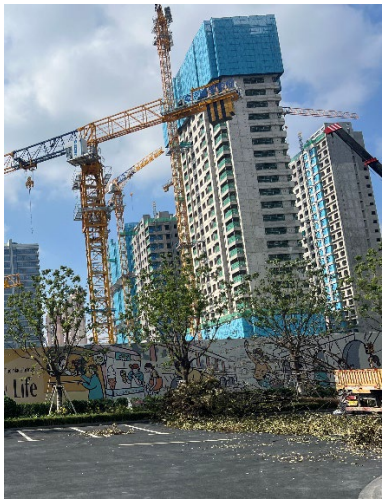
Monitoring: No technical data regarding energy consumption or carbon emissions could be provided. The DP should be monitored for a period of one year or more and compared with another building of the campus to determine their respective effect.

(3). Chunxi Market Hall (Bazaar) and Exhibition Hall, Future City Shanghai, Jiading District

Context

The project is part of a huge development with more than 1,000 apartments. These luxurious apartments are very well designed. This development also consists of a slender, tall buildings, mainly oriented southward. There is a main road in the center of the new neighbourhood along with public buildings, a park and pedestrian area. This construction is by far from completion; the apartments are currently being marketed.

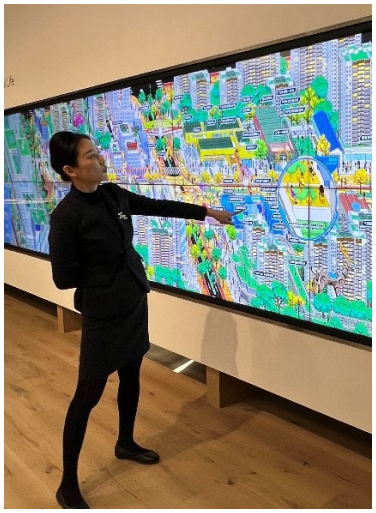
Urban center of the future city



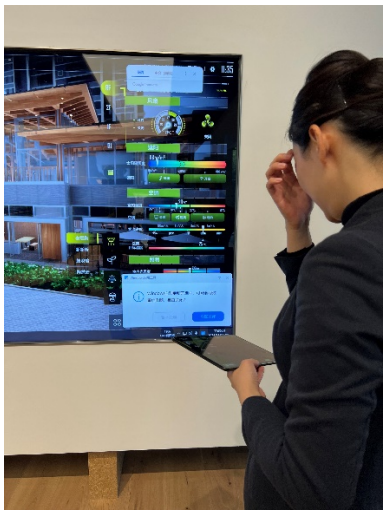
Housing under construction

green façade of the sales pavilion

The exhibition hall shows the future lifestyle of the NEXUS-community through interactive screens. A large-scale model of the entire community is exhibited, demonstrating the energy balances and commodities in general to potential clients.



Interactive demonstration



All technical data available

Contributors and planners

Demo Project

Compared to the high-tech exposition sales hall, the market hall shows a traditional approach. Two main themes are shown: the use of low carbon footprint materials such as wood and the quality of a low carbon lifestyle. The architecture and energy consultation were provided by the same company, the East China Architectural Design and Research Co. (ECADI). Consequently, the architecture, energy efficiency and structure are well integrated, resulting in a comprehensive concept. The climate of Shanghai is hot summers and relatively mild winters.

The interior of the house shows an environmentally friendly and minimalist life style with a lot of plants and little carbon emission. The integration of flora both inside and outside the building is the main theme of the project. Natural and artificial lighting are accurately designed to meet the needs of both plants and residents. Different simulations had been done on indoor climate, natural lighting and humidity control. The ambiance is welcoming. A special theme was the disposal of wet, kitchen waste, a quite important research field in China. Windows, doors and especially the large skylight are of very high quality and were calculated precisely.

The roof is a complex timber construction, which is quite new in modern Chinese architecture. Since China may lack sufficient timber resources for ordinary projects, this seemingly European concept may be questionable. The timber used was obviously imported from Russia.

The project achieved, according to the documentation, a 25 % reduction in energy consumption although it only attained 60 % of the ZEB goal. The large glass facades are shaded by wide roof overhangs, problematic in summer are probably due to the strong skylights. The remaining roof area is covered by PV panels. The advice by the Swiss experts included the adjacent exhibition hall. There, a PVT installation is mounted on the roof which provides not only electricity, but solar heat as well. Unfortunately, it is not yet possible to use the energy across the street, as the buildings have different owners.

Findings

Project: The concept adopts a passive-solar strategy but the strong skylights is questionable: Overheating could possibly problematic in summer. The BIPV roof is readily replicable and can be

adopted by other projects. The focus of the project is to demonstrate sustainable, green and low carbon lifestyle of a future (Nexus) community.

Communication: The DP is not yet functional. Few information of the flora and biodiversity and their impact on human health is provided. The Sino-Swiss cooperation is not prominently displayed. The time of the extension phase should be used to document and explain these very useful themes to the public. The appealing project has the potential to convince people to live a low-carbon lifestyle.

Monitoring: No technical data on energy consumption or carbon emissions could be provided for the market hall. The DP could be easily monitored for a one-year or more period and compared with another buildings to determine its positive effects.

ANNEX XI – Work Plans of the Evaluation Mission

(1) Inception Phase: September 20th–October 31st 2024 - Milestones

Date	Time	Activity/Institution	Participants
07.10	09:30-10:30	VC – Kick-off meeting with SDC	SDC: Nadia Benani, Gao Hui, Bai Jie; Evaluation team
17.10	09:00-13:00	Meeting with Intep/Skat at Intep Office Zürich	Intep: Feng Lu-Pagenkopf, Roland Stulz; Skat: André Ullal, Fabienne Hugi; Per VC: Li Yin, Wang Zhu Jilong; Wesley Wojtas; Steiger, Kämpfen
18.10	07:00-08:00	VC-Meeting with SDC	SDC: Gao Hui; Evaluation team
21.10		Inception Report submitted to SDC	Evaluation team;
28.10	09:00-10.00	VC-Meeting with SIA	Mr. Martin Menard; Steiger, Kämpfen
29.10	13:20-14:30	VC-Meeting with Minergie	Mr. Robert Minovsky
31.10		Inception Report approved by SDC	Evaluation Team

(2) Implementation Phase in China – November 1st to 15th 2024

Date	Time	Institution	Participants
Fr, Nov 1st		Arrival in Beijing Internal Meetings	Steiger, Kämpfen
Sa, Nov 2nd		Internal Meetings	Steiger, Kämpfen
Su, Nov 3rd		Internal Meeting	Steiger, Kämpfen, Sun = Evaluation team;
Mo, Nov 4th	09:30-11:00 14:00-15.30 15:30 – 16:45 16:45- 17:45	Briefing with the **SDC** China Team Meeting with **CABR, Institute of Building Environment and Energy Research** Meeting with Mr. Dr. Kang Yanbing, DDG of the National Energy Conservation Center of **NDRC** (at CABR) Meeting with the designer of the **Shaoxing DP** (at CABR)	Evaluation team; SDC: Ms. Gao Hui; Ms. Bai Jie Evaluation team; CABR: Ms. Dr. Yang Xinyan Evaluation team; Kang Yanbing Evaluation team; CABR: Mr. Cheng Yanwei
Tu, Nov 5th	09:00 – 09:30 09:30-10:15 10:15-10:45 11:00 – 14:00 14:30 – 15:15 15:15-16:00	Meeting with **CABR, Institute of Building Environment and Energy Research, Development Strategy Center (DSC)** Meeting with **CSTID** (at CABR) Meeting with **CABEE** (at CABR) Meeting and Working lunch with **SDC** Meeting with **SGB** Meeting with **SG-E**	Evaluation team; CABR: Mr. Dr. Zhang Shicong, Director DSC Evaluation team; CSTID: Ms. Liu Younong, Chief Engineer Evaluation team; CABEE: Ms. Wang Jiali Evaluation team; SDC: Ms. Nadia Benani, Ms. Gao Hui, Ms. Bai Jie Evaluation team; SGB: Ms. Wang Ze Evaluation team; SG-E: Ms. Wang Ke, Chief Trade Officer

We, Nov 6th	10:00-12:30 15:00-16:30	Visit of the **Fangshan DP**, Songchen Community Center, Beijing Meeting with the designer and representative of the investor C-Land Meeting with **NAMC**	Evaluation team; Ms. Dr. Sun Jingfen, architect, SUP Atelier, Tsinghua University; Mr. Mao, C-Land Evaluation team; NAMC: Ms. Zhang Ning, Mr. Di Yang, Mr. Yuan Chen Yu
Th, Nov 7th	11:00-13:30 14:30 – 16:00	Meeting with the **GIZ Energy Team** at GIZ Tayuan Building Visit of the **Zero Carbon Office and Exhibition Building of the Beijing Research and Development Center of Building Energy Efficiency (BCEE)**, 29, Guangxi Men Bei Li, Chaoyang District	Steiger, Kämpfen; GIZ: Ms Yin Yuxia, Head, Mr. Hu Ning Steiger, Kämpfen; BCEE: Ms xxx
Fr, Nov 8th		Internal meetings of the Evaluation Team	
Sa, Nov 9th		Internal meetings of the Evaluation Team Preparation of other site visits in Shanghai/Jiading and Shaoxing	
Su, Nov 10th	09:00-13:30	Travel to Shanghai by train Overnight in Jiading	Evaluation team
Mo, Nov 11th	09:00-12:30 16:30-18:00	Visit of the Shanghai Jiading DP, Chunxi Market Hall of the Future City Meeting with real estate developers, architects, construction company Visit of the exhibition hall and sales office of the Nexus Community (Guided tour) Travel to Hangzhou by car Meeting with the International Design Center (IDC) of UAD, Zhejiang University Overnight in Hangzhou	Evaluation team; Shanghai Jiading Demonstration Site Ms. Shao Qi, Vanke; Ms. Chen Zhan, Senior Engineer, ECADI; Mr. Li Yin, Lead Architect, IDC/UAD Evaluation Team; Mr. Li Yin, Ms. Wu Jia Yan; Prof. Yang Yi, Director
Tu, Nov 12th	08:30-09:30 09:30-10.00 10:00 13:00-15:00 15:00	Meeting at the College of Civil Engineering and Architecture of Zhejiang University Prof. Wu Jindong Meeting with Prof. Chen… Transfer to Shaoxing DP by car Visit of Shaoxing DP	Evaluation team; Prof. Wu Jindong, Lecturer; Mr. Li Yin Evaluation team; Li Yin

	19:00-21.30	Transfer to Hangzhou Xiaoshan Airport by car Flight to Beijing	Evaluation team
We, Nov 13th	10:00-11.00 14:00-15:15 15:30	Meeting with MoHURD De-briefing with SDC Internal meeting	Evaluation team; MoHURD: Mr. Li Zhe DDG, Ms. Liu Younong, CSTID, Ding Hongtao, Du Hui, Ming Xianrui Evaluation team; SDC: Ms. Gao Hui Evaluation team
Th, Nov 14th	14:00-16:00	Internal meetings Meeting with CAM	Steiger, Kämpfen Steiger; CAM: Mr. Zhang Meng, Director, International Cooperation
Fr, Nov 15th	10:30	Departure	Steiger, Kämpfen

(3) Reporting Phase – November 16th - December 31st 2024 - Milestones

Date	Time	Activity/Institution	Participants
26.11	13:00-14.00	VC-Meeting with Intep/Skat	Intep: René Sigg; Feng Lu-Pagenkopf; Skat: André Ullal; Steiger, Kämpfen
27.11	15:00-16.00	VC-Meeting with SIA	Mr. Martin Menard; Steiger, Kämpfen
29.11	17.00-18.00	Meeting with DENA in Heidelberg	Mr. Thilo Cunz, Head of Building International; Steiger
04.12		Submitting Draft Final Evaluation Report to SDC	Evaluation Team
16.12		Received comments on the draft report from SDC	Evaluation Team
18.12		VC-Meeting: Discussing the comments	SDC: Nadia Benani, Gao Hui, Bai Jie, David Beritault; Evaluation Team

ANNEX XII – Persons Interviewed

Organization	Name	Function
SDC	Nadia Benani	Counsellor and Head of International Cooperation, Beijing
	Ms. Gao Hui	Programme Officer, International Cooperation, Beijing
	Cornelia Hett	Programme Officer of Thematic Cooperation Division-Section Climate, DRR and Environment, Bern
	David Beritault	Consultant, Energy and Environment, FDFA
MoHURD	Mr. Li Zhe	DDG, Department of Planning, Finance and Foreign Affairs
	Ding Hongtao	Section Chief, Dept. of Building Energy Efficiency and Low Carbon Development, Technology & Industrialization Development Center
	Du Hui	Vice Section Chief, Energy Efficiency Section, Standard and Quota Department,
	Ming Xianrui	Programme Officer, Department of Planning, Finance and Foreign Affairs
CSTID	Ms. Liu Younong,	Chief Engineer
CABR, Institute of Building Environment and Energy Research, Development Strategy Center (DSC)	Mr. Dr. Zhang Shicong	Director; Project Leader China
	Ms. Dr. Yang Xinyan	Project Senior Advisor
	Mr. Cheng Yanwei	Architect
CABEE	Ms. Wang Jiali	
Intep/Skat Consortium	René Sigg	CEO Intep; Project Director
	André Ullal	Project Team Leader, Skat
	Feng Lu-Pagenkopf	Deputy Project Team Leader, Intep
	Roland Stulz	Technical Lead, Intep
	Wesley Wojtas	Project Team Leader, Skat (until September 2024)
	Zhu Jilong	General Manager, Intep Beijing
	Fabienne Hugi	Architect, Skat
NAMC	Ms. Zhang Ning	Vice Chief of the Dean's Office, NAMC
	Mr. Di Yang	
	Mr. Yuan Chen Yu	
NDRC	Mr. Kang Yanbing	DDG, National Energy Conservation Center
Zhejiang University		
UAD IDC	Prof. Yang Yi	Director

	Ms. Wu Jiayan	Energy Expert
	Mr. Li Yin	Lead Architect and ZEB Project Advisor
	Prof. He Yong	Dean of School of Architecture
DP Fangshan, Beijing	Mr. Mao Pengfei	C-Land
	Ms. Dr. Sun Jingfen	Architect, SUP Atelier, Tsinghua University
DP Shanghai, Jiading	Ms. Shao Qi	Vanke
	Ms. Chen Zhan	Senior Engineer and Low Carbon Consulting Director, ECADI
DP Shaoxing	Mr. Gu Yangsheng	General Manager, Shaoxing Communications Investment Group Co. Ltd
BCEE	Ms. Yang Ming	Engineer, Passive House Consultant
CAM	Mr. Zhang Meng	Director International Cooperation
SGB	Ms. Wang Ze	Chief Representative China
SG-E	Ms. Wang Ke (Susi Wang)	Chief Trade Officer, Swiss Business Hub China
SIA	Martin Menard	President SIA Commission Climate Path; CEO Low Tech Lab GmbH; Key ZEB Project Advisor
Minergie	Robert Minovsky	Director Technical Department and Board Member
GIZ	Ms. Yin Yuxia	Head Energy Team
	Mr. Hu Ning	Programme Officer
DENA	Thilo Cunz	Head of Building International

Management Response

Introduction

The Swiss Agency for Development and Cooperation (SDC) commissioned an independent evaluation of the Sino-Swiss Zero Emission Building (ZEB) Project (2021-2024). The evaluation assessed the project's performance against the Organization for Economic Cooperation and Development (OECD) Development Assistance Committee (DAC) criteria: relevance, coherence, effectiveness, efficiency, impact, and sustainability. Additionally, it identified lessons learned and provided recommendations to enhance project implementation in the remaining period and future cooperation.

The Management Response presents the position of the SDC and its partners regarding the evaluation's findings and recommendations.

Assessment of the Evaluation

The evaluation was conducted by a team of three independent experts, following international standards. The evaluation process involved extensive document reviews, stakeholder interviews, and site visits to selected demonstration projects. SDC acknowledges the comprehensive nature of the evaluation and appreciates the insights provided.

SDC values the evaluation team's thorough assessment of the project's strengths and areas for improvement and commits to addressing the recommendations where feasible.

Main Findings

The overall findings of the evaluation are as follows:

- **Relevance**: The evaluation confirms that the ZEB Project aligns with China's climate goals and policies, particularly those related to sustainable buildings and carbon reduction. The project is also in line with Switzerland's international cooperation and climate strategies. The intervention logic and multi-level stakeholder engagement approach are considered appropriate and effective.
- **Coherence**: Internal coherence is strong, as the project integrates well with other Swiss initiatives and stakeholders. However, external coherence could be improved through enhanced coordination with other international organizations and regional actors in the green building sector.
- **Effectiveness**: Despite challenges posed by the COVID-19 pandemic, the project has made significant progress in drafting and submitting national and local ZEB technical standards, completing demonstration projects, and developing training materials. However, the visibility and full operationalization of demonstration projects need improvement, and monitoring frameworks require enhancement.
- **Efficiency**: The project has been efficiently implemented, utilizing existing institutional structures and leveraging expertise from Swiss and Chinese partners. However, delays due to external factors have impacted the timely achievement of certain objectives.
- **Impact**: The project has contributed to policy and technical advancements in ZEB in China. Swiss expertise has been instrumental in improving building energy efficiency

and carbon reduction strategies. Further efforts are needed to scientifically quantify carbon emission reductions and demonstrate replicable best practices.

- **Sustainability**: Institutional sustainability is ensured through the integration of project outcomes into MoHURD's framework. However, strengthening the long-term engagement of stakeholders and ensuring continuous knowledge transfer and monitoring of demonstration projects remain key challenges.

Key Elements of the Management Response

Out of the five major recommendations, two are 'fully agreed' (green), and three are 'partially agreed' (orange).

1. To consolidate and finalize all activities in order to achieve the intended objectives and the impact.	
2. To improve all sub-strategies in a way that they are easy to understand and tailor-made, related to the needs of the beneficiaries.	
3. To improve the overall monitoring, reporting and documentation and to proceed with evidence-based and realistic approaches to calculate carbon emission reductions.	
4. To ensure, that the existing ZEB demonstration projects are fully functional, visible and accessible to all stakeholders and the public.	
5. To improve the capacity development concept, to adjust the training contents and methods, to shift a major part of capacity development activities to ZEB multipliers and protagonists and to proceed with scaling-up the technical ZEB standards and other knowledge products.	

Beijing, March 2025

Annex: Table overview on recommendations and measures

Recommendation 1		
The Sino-Swiss ZEB Project, initially planned as a 2 phases Project and supposed to end in February 2025, shall and needs to be extended, using the remaining funds at least until the end of November 2025, e.g. until the MoU between the Swiss Government and the Chinese State Council is valid. Within this so-called extension phase, all activities shall be consolidated and finalized. All results and objectives shall be achieved, at least to a high degree. A concerted action is needed involving all Chinese and Swiss partners to fulfill these targets before the end of 2025. It is recommended in this connection, that the Swiss Consortium shall built up a (small) Project infrastructure with a (small) permanent core Project team in Beijing to be fully in the position to support the concerted action mentioned. The tasks ahead are very comprehensive and a closer cooperation with the Chinese partners and beneficiaries on all levels is urgently needed.		
Management response		
Fully agree	Partially agree	Disagree
SDC's management had decided to extend the project to the end of November, 2025. And the budget had been raised accordingly. SDC's objective for the requested extension phase is to consolidate and communicates the results and expand the group of beneficiaries, specifically by promoting the new ZEB national standard and good practices of the project's demonstration buildings, as well as more capacity building for professionals in Chinese building sectors. Finally, to finish the project activities in a manner that optimizes sustainability and long-term impacts. Since the extension phase will be less than one year, it is difficult for the Swiss consortium to build up a permanent team in Beijing. But the Swiss consortium extend the contract with their subcontractor in China, the subcontractor is led by a Chinese architect who had studies and worked in Switzerland. In the past year, he has worked closely with the Swiss consortium and has fulfilled the tasks well, in fact playing the role of a permanent team.		

Recommendation 2
The Project shall improve all strategic approaches needed to successfully implement the planned measures: a) the Capacity Building or Development concept and strategic approach already prepared; b) a knowledge management strategy; c) a strategic approach to improve the overall communication and visibility and d) a dissemination and scaling-up concept. These strategic approaches shall be practical and easy to implement. Knowledge products and processes as well as other

important deliverables shall be prepared in such a way that they are easy to understand and tailor-made, related to the needs of the beneficiaries.

Management response

Fully agree	Partially agree	Disagree

SDC fully acknowledge the importance of strengthening key areas such as capacity development, knowledge management, communication, and dissemination to enhance the effectiveness and impact of ZEB project.

Implementing partners are taking concrete steps to refine and implement practical and accessible strategies, including: Expanding Knowledge Sharing, Harmonizing Project Outputs, Synthesizing Project Knowledge, Enhancing Accessibility and Dissemination.

By implementing these measures, SDC aims to ensure that the knowledge products and processes remain practical, tailored to beneficiary needs, and easy to understand.

Measures	**Responsibility**	**Timing**
• Continuing the series of ZEB Talks and academic lectures that have developed into efficient and effective means disseminating ZEB knowledge and expertise • Review and harmonization of all project outputs, including publications, videos and training modules, including editing and formatting, to optimize the diverse range of media for coordinated publication • Synthesis of project knowledge in a publication that concisely and strategically communicates the wide range of knowledge and achievements of the project • Coordinated publication of the range of knowledge products across digital platforms in a manner that enhances accessibility and long-term dissemination.	• Implementing partners • SDC	Mar.-Nov. 2025

Recommendation 3

The overall monitoring, reporting and documentation of the Project shall be substantially improved by more systematic, focused and structured. The final documentation, e.g. in form of synthesis reports, shall cover all knowledge products and processes related to the 3 OCs and comprise, in particular, the specific Swiss inputs/interventions. The Project shall further develop an Overall Monitoring concept with a focus on a Results-based Monitoring (RbM). The Project shall furthermore proceed with a realistic approach to monitor and measure energy saving and carbon

emission reduction by all means, models, (simulation) studies, trends, scenarios etc., based on a more evidence-based and scientific concept.

Management response

Fully agree	Partially agree	Disagree

The project is monitored strictly according to SDC internal guidelines. The monitoring plan is aligned with SDC's aggregated indicator system and has been approved by SDC's Operations Committee, so it cannot be changed at this stage.

However, SDC fully understands your suggestion on results-based monitoring, and the Beijing Office has been working closely with the implementation team and will maintain the momentum. The office will also monitor the specific indicators for the project, in addition to the aggregated indicators required by Headquarters.

The project is also conducting research to better estimate and calculate the emission reductions resulting from the project.

Measures	**Responsibility**	**Timing**
• Undertaking a top-down study quantifying emissions impacts of new national ZEB standards to provide a reliable impact assessment for project reporting.	• Implementing partners	Mar.-Nov. 2025

Recommendation 4

The Demonstration Projects are operating as pilots and good examples how ZEB innovations can be realized and to what extent energy consumption and carbon emission can be reduced. The evaluation team strongly recommends to prepare a –simplified- monitoring concept (tool) to collect and analyses the technical data required, especially in the field of operational energy. Moreover, a communication and visibility concept have to be drafted and implemented using all kind of printed and online material and information, story books, exhibition area, exposure, films/video etc. A Sino-Swiss logo shall be displayed in- and outside the building. All DPs shall be fully functional as real ZEB showcases at the end of the extension period. The DPs shall be accessible to all stakeholders and the public. The exhibition hall of the Shanghai/Jiading Future City complex next to the Sino-Swiss DP could already serve as a good example how to visualize, e.g. the demonstrate a low-carbon life style.

The Project shall resume -exemplary- the process of certification of the DPs by the Chinese Star rating system and, if possible, by a Swiss label, e.g. by Minergie. This kind of quality label seems nowadays to be very important to convince owners/investors to invest in ZEB technologies. An exchange of knowledge and technical solutions between the DPs shall furthermore promoted and documented.

The Demonstration Projects shall be furthermore, if possible, be monitored after the Sino-Swiss ZEB Project has been completed. For this task, local resources shall be used such as the UAD of Zhejiang University. The duration of this DP monitoring process shall be at least 3 years.

Management response

Fully agree	Partially agree	Disagree

SDC management fully recognizes the importance of ensuring that these pilot buildings serve as effective examples of ZEB innovations, with clear monitoring, communication, and visibility strategies to maximize their impact.

In line with your advice, the implementation team has already made the following changes:

- Began preparation of a comprehensive communication and visibility strategy that will include a range of print and online materials, storybooks, display areas, videos, and other media to showcase the achievements of the demonstration buildings.
- The Sino-Swiss logo has been displayed outside the buildings since their completion,

As originally envisioned by the project, all demonstration buildings will be open and accessible to the public once they are fully operational.

The project will support the demonstration building to be certified according to Chinese or Swiss high standards. However, this is not required by the project.

The SDC Beijing Office will certainly monitor the operation of the demonstration buildings after the end of the project. However, SDC cannot continue the contract with the implementing partner to mandate them for future monitoring once the project is completed.

Measures	**Responsibility**	**Timing**
• Preparing storybooks, videos, and on-line plarform to showcase the achievements of the demonstration buildings. • Jointly develop display areas in the demonstration building with the investors and designers of the buildings.	• Implementing partners	Mar.-Nov. 2025

Recommendation 5

The existing training methods and tools shall be reviewed and more physical training activities shall be carried out. The active participation in webinars and other virtual training measures shall be verified, e.g. through a Q&A session, feedback or even tests. As recommended by NAMC, the CD-courses shall be more tailor-made, e.g. for Government officials, mayors and technical personnel and shall comprise not only technical ZEB issues but contents related to promotion and incentives policies as well as economic and financial issues, based on Swiss experiences. It was also proposed to focus on specific knowledge products such as handbooks, videos and other media to show relevant ZEB examples and good practices. Education and training activities within the academia shall be continued, e.g. with the UAD-led alliance of universities but the CD-focus shall be shifted to qualify more ZEB multipliers and protagonists, e.g. in the context of a Learning Network or Community. Other channels to strengthen ZEB competencies shall be opened, e.g. to initiate a cooperation with the China Association of Mayors (CAM), affiliated to MoHURD and with a strong cooperation with NAMC. CAM showed interest in the Project and is willing to provide access to the existing Mayor's network in China.

Management response

Fully agree	Partially agree	Disagree

The implementing team has been keeping in developing more effective capacity building tools, including increasing the physical training after the pandemic of Covid-19.

Training for policymakers and professionals will be strengthened in the Extension phase through increased collaboration with local government and professional associations.

CAM is a sister organization of NAMC, both under MoHURD. The project had already established a partnership with NAMC. Therefore, it is not necessary to repeat the same cooperation with CAM. CAM can participate in the project through NAMC if interested.

Measures	**Responsibility**	**Timing**
• Organizing tailer-made capacity building events in response to the needs of local governments and professional associations.	• Implementing partners	Mar.-Nov. 2025