SDGs by Built Environment

(SDGs: Sustainable Development Goals)

March 2019

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SDGs by Built Environment

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1 About the Sustainable Development Goals

The Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all.

They address the global challenges we face, including those related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice.

The Goals interconnect and in order to leave no one behind, it ís important that we achieve each Goal and target by 2030.

"The 2030 Agenda for Sustainable Development" was adopted by all United Nations Member States in 2015.

At its heart are "the 17 Sustainable Development Goals (SDGs)," which are an urgent call for action by all countries - developed and developing - in a global partnership.

They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

The SDGs build on decades of work by countries and the UN, including "the UN Department of Economic and Social Affairs."

In June 1992, at the Earth Summit in Rio de Janeiro, Brazil, more than 178 countries adopted "Agenda 21," a comprehensive plan of action to build a global partnership for sustainable development to improve human lives and protect the environment.

Member States unanimously adopted "the Millennium Declaration" at the Millennium Summit in September 2000 at UN Headquarters in New York. The Summit led to the elaboration of eight "Millennium Development Goals (MDGs)" to reduce extreme poverty by 2015.

"The Johannesburg Declaration on Sustainable Development" and "the Plan of Implementation," adopted at the World Summit on Sustainable Development in South Africa in 2002, reaffirmed the global community's commitments to poverty eradication and the environment, and built on Agenda 21 and the Millennium Declaration by including more emphasis on multilateral partnerships.

At the United Nations Conference on Sustainable Development (Rio+20) in Rio de Janeiro, Brazil, in **June 2012**, Member States adopted the outcome document "The Future We Want" in which they decided, inter alia, to launch a process to develop a set of "**SDGs**" to build upon the **MDGs** and to establish the UN High-level Political Forum on Sustainable Development.

The Rio+20 outcome also contained other measures for implementing sustainable development, including mandates for future programmes of work in development financing, small island developing states and more.

In **2013**, the General Assembly set up a 30-member Open Working Group to develop a proposal on the SDGs.

In **January 2015**, the General Assembly began the negotiation process on the post-2015 development agenda.

The process culminated in the subsequent adoption of "the 2030 Agenda for Sustainable Development," with 17 SDGs at its core, at the UN Sustainable Development Summit in **September 2015**.

2015 was therefore a landmark year for multilateralism and international policy shaping, with the adoption of several major agreements:

1) Sendai Framework for Disaster Risk Reduction (March 2015)

2) Addis Ababa Action Agenda on Financing for Development (July 2015)

3) Transforming our world: the 2030 Agenda for Sustainable Development with its 17 SDGs was adopted at the UN Sustainable Development Summit in New York in September 2015.

4) Paris Agreement on Climate Change (December 2015)

Now, the annual High-level Political Forum on Sustainable Development serves as the central UN platform for the follow-up and review of the **SDGs**.

Today, "the Division for Sustainable Development Goals (DSDG)" in the United Nations Department of Economic and Social Affairs (UNDESA) provides substantive support and capacity-building for the SDGs and their related thematic issues, including water, energy, climate, oceans, urbanization, transport, science and technology, the Global Sustainable Development Report (GSDR), partnerships and Small Island Developing States.

DSDG plays a key role in the evaluation of UN system-wide implementation of the 2030 Agenda and on advocacy and outreach activities relating to the SDGs. In order to make the 2030 Agenda a reality, broad ownership of the SDGs must translate into a strong commitment by all stakeholders to implement the global goals.

DSDG aims to help facilitate this engagement.

Extract from https://sustainabledevelopment.un.org/sdgs

Overviewing the17 SDGs

The 17 Goals are associated with the 169 Targets,
to be measured by the 232 Indicators

Structure of the SDGs

Basic human needs

Economic growth

Environment

Infrastructure for achieving the SDGs

Goals

The 17 Goals are associated with the 169 Targets, to be measured by the 232 Indicators.

Goal #11: Make cities and human settlements inclusive, safe, resilient and sustainable.

Targets: SDG#11's targets are most relevant to the Built Environment.

11.1 By 2030, ensure access for all to **adequate, safe and affordable housing** and basic services, and **upgrade slums.**

11.2 By 2030, provide access to safe, affordable, accessible and sustainable **transport systems** for all, improving road safety, notably by expandingpublic transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

11.3 By 2030, enhance inclusive and sustainable **urbanization** and capacity for participatory, integrated and sustainable **human settlement planning** and management in all countries.

11.4 Strengthen efforts to protect and safeguard the world's **cultural and natural heritage.**

11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by **disasters**, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.

Targets (cont'd)

11.6 By 2030, reduce the adverse per capita **environmental impact of cities**, including by paying special attention to air quality and municipal and other waste management.

11.7 By 2030, provide universal access to safe, inclusive and accessible, **green and public spaces**, in particular for women and children, older persons and persons with disabilities.

11.a Support positive economic, social and environmental **links between urban, peri-urban and rural areas** by strengthening national and regional development planning.

11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the **Sendai Framework for Disaster Risk Reduction** 2015-2030, holistic disaster risk management at all level

11.c **Support least developed countries**, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials.

Indicators: Extract from the 16 Indicators of the 10 Targets for the Goal#11

11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing

11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities

11.3.1 Ratio of land consumption rate to population growth rate

11.3.2 Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically

11.4.1 Total expenditure (public and private) per capita spent on the preservation, protection and conservation of all cultural and natural heritage, by type of heritage (cultural, natural, mixed and World Heritage Centre designation), level of government (national, regional and local/municipal), type of expenditure (operating expenditure/investment) and type of private funding (donations in kind, private non-profit sector and sponsorship)

11.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population

11.5.2 Direct economic loss in relation to global GDP, damage to critical infrastructure and number of disruptions to basic services, attributed to disasters

2 About the UIA Commission on the UN Sustainable Development Goals

The Sustainable Development Agenda

The International Union of Architects

Mission

In this era of population shifts, climate change and unprecedented levels of urbanisation, architects have an important role in responding to the complex challenges of the built environment.

The UN Sustainable Development Goals (SDGs) set a framework for this agenda, as well as for alleviating poverty, protecting the planet and ensuring prosperity at a global scale.

The UIA is well positioned to create a bridge between the initiatives of the UN and the practical activities of architects around the world.

Through the establishment of a Commission that responds directly to the SDGs, the UIA can be influential in raising awareness, creating knowledge, facilitating communication and disseminating information across its global network of members.

The Commission aims to ensure that architects are not just responsive to the new Agenda for Sustainable Development, but prescriptive in its implementation and evolution.

Aims

1. To respond to each of the 17 Goals through adopted **policy statements**.

2. To have a visible and **active presence** at important UN meetings, including COPs and World Urban Forums.

3. To **champion the importance of architecture** in the development of well-functioning sustainable societies.

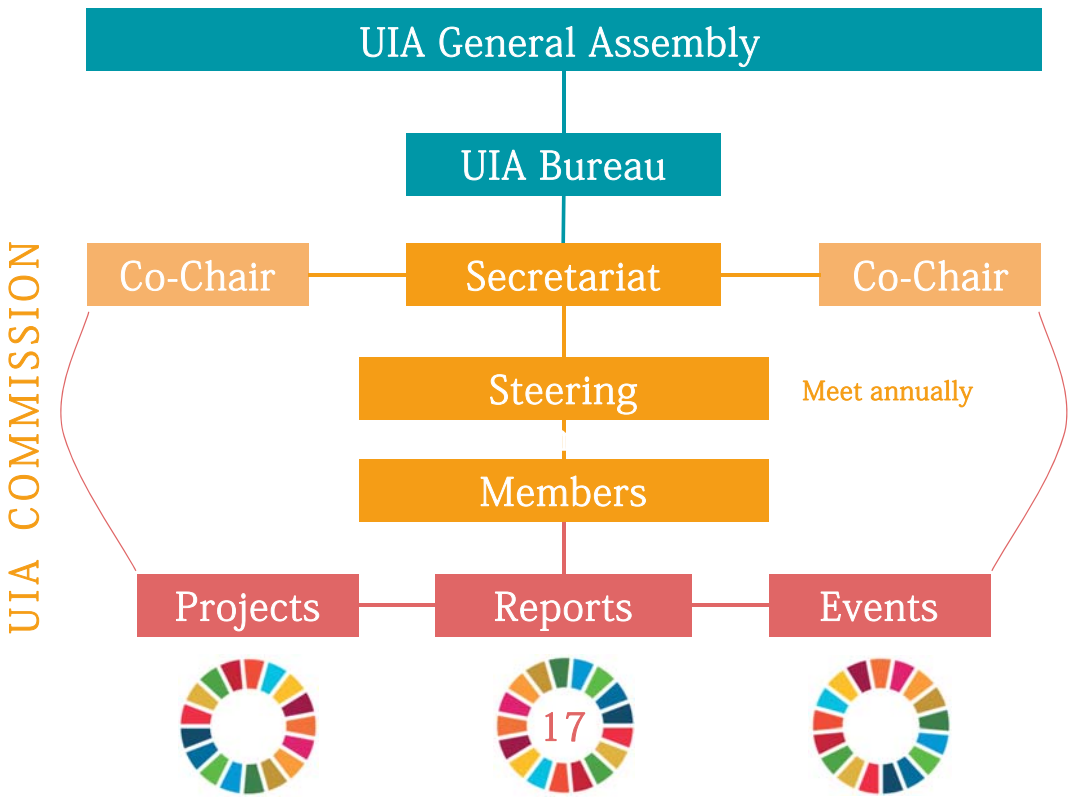
4. To establish a **platform for exchange** between members of the UIA.

5. To **promulgate** the Commission's policy statements as widely as possible.

Structure-1

Co-chairs
Natalie Mossin
Ishtiaque Zahir Titas

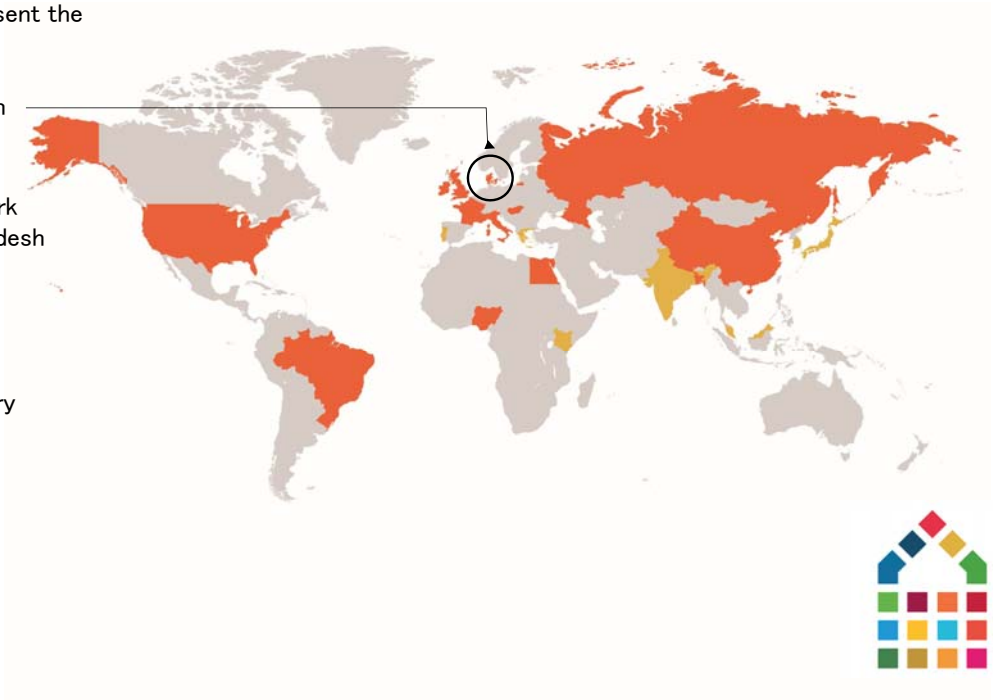
Secretariat
Annette Blegvad
based in Copenhagen



Structure-2

10 Steering Committee members represent the 5 regions of the UIA

The Secretariat is based in Copenhagen



Co-chairs

Natalie Mossin	Denmark
Ishtiaque Titas	Bangladesh

Steering Committee Members

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Alessandro MARATA	Italy
István Kistelegdi	Hungary
Yaroslav Usov	Russia
Z SMITH	USA
Cid BLANCO Jr.	Brazil
Qingqin WANG	China
Sudeep PAUDYAL	Nepal
Mona RADY	Egypt
Ramatu ALIYU	Nigeria

Structure-3

Council Members

Peter Oborn	UK
Mohammed Munyanya	Kenya
Prakash Desmukh (alt)	India

Members

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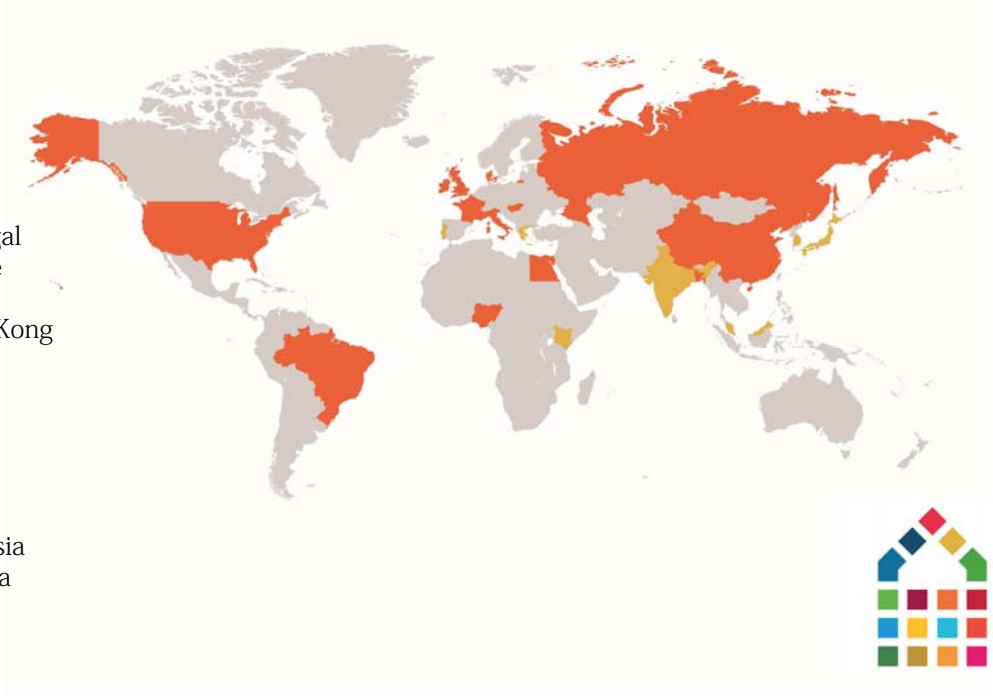
Nikos Tsinikas	Greece
He Jianqing	China
CHAN Cho Sing Joel	Hong-Kong
Sunil Degwekar	India
Lalichan Zacharias	India
Kazuo Iwamura	Japan
Chul Hee Kang	Korea
Jo, Seung Koo	Korea
Lee, Kiwan	Korea
Alice Leong PEK LIAN	Malaysia
Flora Runumi	Uganda



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SUMMARY OF ARCHITECTURE GUIDE

to the UN 17 Sustainable Development Goals (SDGs)
January 2019

Original Book in English edited by : The Institute of Architecture and Technology at The Royal Danish Academy,
The Danish Association of Architects and
The UIA Commission on the UN SDGs

Summarized Book by Kazuo IWAMURA (Member, UIA Commission on SDGs & JIA Editing Committee of SDGs)

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PREFACE

The Sustainable Development Goals are a call for action
by all countries – poor, rich and middle-income –
to promote prosperity while protecting the planet.

Architects can provide basic ideas and proposals for regulations that make it possible for us to have sustainable cities and communities in the future.
Architects can facilitate the open dialogue and work in partnerships to give us good solutions and can encourage authorities to make the regulations necessary to move forward.

Mogens Lykketoft

Former Danish Minister of Finance and of Foreign Affairs,
President of the United Nation's General Assembly
from September 2015 to September 2016

November, 2018

INTRO

The 17 UN Sustainable Development Goals define the challenges we need to address to achieve a better and more sustainable future for all. The Goals are deeply interconnected, and to leave no one behind, the world must move significantly towards achieving each Goal by 2030.

The built environment, planning, architecture and design, interact with every goal. And most crucially: not just on an aspirational level or as future potential, but through realized buildings, settlements and cities all over the world. Architectural solutions are already there, everywhere, contributing to sustainable communities and quality of life.

However, the built environment is also a part of the current challenges a major consumer of energy and natural resources, and producer of waste. Furthermore, how we build can exacerbate inequalities and affect health.

That is why the Institute of Architecture and Technology at The Royal Danish Academy of Fine Arts Schools of Architecture, Design and Conservation, the Danish Association of Architects and the UIA Commission on the UN Sustainable Development Goals have created this architecture guide to the Goals.

With this guide book we hope to make it tangible how the built environment interacts with the goals and to inspire architects and stakeholders involved in the built environment to engage with the challenges. It is for each and every one of us to contribute to the realization of the goals.

The intention of this book is to provide an architecture guide to the Goals. The 17 chapters present how each Goal is defined by the UN, outlines how it interacts with the built environment and gives examples of realized projects that illustrate architectural contributions.

Many of the cases address more than one goal, but the aim here is not to explore sustainable projects in their full complexity, but to understand the Goals as they relate to architecture.

All cases are realized architectural projects, planning initiatives and structures. Our hope is that the cases will form a basis on which to start a conversation about how the built environment can contribute to each Goal.

In this first edition of the guide we have 2-3 cases to illustrate each goal, many from Denmark. In future editions we would like to expand the range of projects, and we welcome suggestions of cases to be included in the second edition, planned for 2020.

Each case in this guide is inspiring and noteworthy, but they are not the final answer to how the built environment can contribute to the realization of the Goals. There is no one answer to that.

To move towards the realization of the Goals, we need many new solutions, adapted to local climate, culture and challenges, and we need them not as ideas, but on the ground, implemented and in use. It is through realized buildings, settlements and planning the effect is achieved; environmentally and on our quality of life.

This publication is dedicated to the architecture students who will shape the future of architecture, planning and design; to the politicians who will aid them by understanding the intersections between architecture and the Goals; and to all citizens, professionals and institutions who join in the collective challenge ahead – to address social needs while protecting the planet.

On behalf of the Editorial Committee

Natalie Mossin

Chief Editor

Lists of the ACHITECTURE GUIDE
to
The UN 17 Sustainable Development Goals

(The following lists are the summary of the original Architecture Guide.)

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Legend BM: Building Material, BE: Building Element, ED: Equipment Design, AD: Architectural Design, CD: Community Design, LD: Landscape Design, TP: Town Planning, PD: Politics Design

SDGs	General Goal		Architecture Guide		Case Practices					
No.	Logo	Basic Goal	Major Issue	Typical Solutions	No.	Name/Photo	Place	Type	Specific Solutions	Category
#01	1 NO POVERTY	NO POVERTY *End poverty in all its forms everywhere*	Architecture cannot lift people out of poverty, but the built environment can affect the impact of poverty on people's life through access to housing and institutions that are affordable.	1) Support to provide housing as a policy against poverty 2) Improve the living through social housing, co-op, and urban improvement 3) Affordable housing technology and supply system 4) Relationship with the local community during the building process 5) Secure available funds and resources as well as effective use of them	01-1	Volontariia Home for homeless children  Photo: Sonja Winkler	Pondicherry, India	Housing	①Homes for homeless children and their foster parents ②Experimental affordable house ③Mud-brick house burnt on-site ④Use of local natural materials & techniques ⑤Ceramic materials produced using the house as a kiln ⑥Upcycling waste materials	PD, AD AD BM, AD BM BE, AD BE ME
					01-2	Non-profit Affordable Housing  Photo: Rasmus Hjortshøj - COAST	Dortheavej, Denmark	Housing	①Social housing to low-incomes ②Pre-fab units stacked along a curve, creating a public space ③Healthy & comfortable buffer-zones of small terraces between housing units ④Simplified materials & colors characterizing in- and outdoor ⑤Public curved place opened to neighborhood	PD AD AD AD LD, CD
#02	2 ZERO HUNGER	ZERO HUNGER *End hunger, achieve food security and improved nutrition and promote sustainable agriculture*	The built environment contributes to the securing of food supplies through planning, landscape design and building complexes that protect existing ecosystems and prioritize the preservation and expansion of areas for food production.	1) Supportive development & land use for sustainable agriculture 2) Urban farming, co-operative production activities, and regenerative landscaping design 3) Secure the gravest reflecting the regional conditions 4) Design to cope with the climate change 5) Relationship between agriculture & building materials 6) End-users' participation into the process	02-1	Impact Farm  Photo: Abdellah Ihadian	Radonia, Denmark	Green house	①Economizing resources & time by using local agriculture ②New hydroponic system of high resource efficiency ③Significant freshwater saving ④Structure for lease & mobility ⑤Local and/or on-site production & consumption to be shared by the community ⑥Incorporated social facilities for events of mind-setting	PD, TP, LD AD, LD ,ED ED, AD, LD AD CD AD, CD
					02-2	The Michigan Urban Farming Initiative  Photo: Michigan Urban Farming Initiative	Michigan, USA	Urban farm	①Improvement of poor food metrics by using vacant areas ②Innovative forefront of sustainable urban agriculture ③Farmland: 1/3, Interactive agriculture: 1/3, Hardscape: 1/3 ④NPO of all volunteers ⑤Correction of social imbalance & strengthening urban community ⑥Sustainable urban agrihood by mixed-use development	PD, TP TP, LD LD, TP CD CD PD, TP

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End poverty in all its forms everywhere

Architecture cannot lift people out of poverty, but the built environment can affect the impact of poverty on people's life through access to housing and institutions that are affordable.

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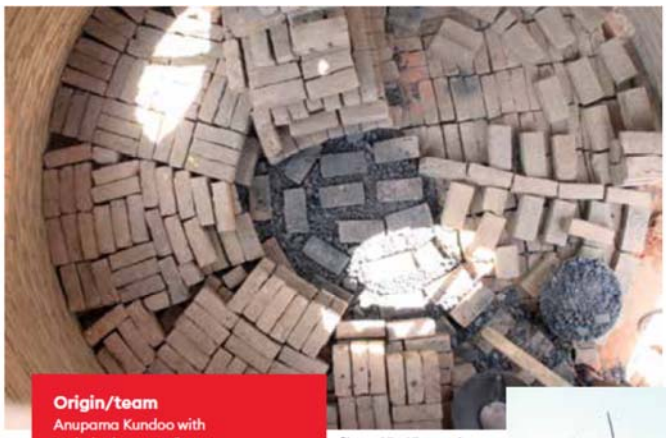

Origin/team
Anupama Kundoo with technical support from Ray Meeker, Volontariat NGO, M. Vinayagam

Photo: Alka Hingorani

1-1.
Volontariat Home for Homeless Children

Pondicherry,
India

Homes for homeless children and their foster parents are experimental affordable mud-brick houses burnt on-site, using local natural materials & techniques, such as ceramic materials produced in the house as a kiln.

Photo: Sonja Winkler

End hunger, achieve food security and improved nutrition and promote sustainable agriculture

The built environment contributes to the securing of food supplies through planning, landscape design and building complexes that protect existing ecosystems and prioritize the preservation and expansion of areas for food production.

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Photo: Abdellah Ihadian

2-1.
Impact Farm

Radonia,
Denmark

Economizing resources & time by using local agriculture, this is a new hydroponic system of high resource efficiency enabling significant freshwater saving. Locally and/or on-site produced & consumed foods are shared by the community.

Origin/team
Human Habitat,
Miljøpunkt Nørrebro,
Realdania,
Københavns Professionshøjskole

Photo: Human Habitat

Legend: BM: Building Material, BE: Building Element, ED: Equipment Design, AD: Architectural Design, CD: Community Design, LD: Landscape Design, TP: Town Planning, PD: Politics Design, PS: Partnership

SDGs	General Goal		Architecture Guide		Case Practices					
No.	Logo	Basic Goal	Major Issue	Typical Solutions	No.	Name/Photo	Place	Type	Specific Solutions	Category
#03	3 GOOD HEALTH AND WELL-BEING	GOOD HEALTH AND WELL-BEING *Ensure healthy lives and promote well-being for all at all ages*	Most people spend the majority of their life indoors, making indoor climate an influential factor of health.	1) Healthy indoor environment is a fundamental issue of architectural design. 2) This should be primarily considered if the users are vulnerable in the hospital for instance. 3) Use of environmentally hazardous materials & substances should be avoided. 4) In addition to AD, CD & TP are also crucial to curb the spreading of diseases & exposure to bacteria. 5) Built-environment design must include the promotion of citizen's activities. 6) Also, the layout of districts & city itself should be elaborated to reduce risk of any accidents.	03-1	The Magoda Project  Photo: Konstantin Ikonomidis	Magoda, Tanzania	Housing	① House improvement to protect residents from epidemics ② Affordable building methods for health, hygiene & comfort, to be understood by the residents ③ Integration of traditional techniques of natural ventilation & building methods in Asia & Africa ④ Cooperation of the local technicians, handworkers, doctors & sociologists ⑤ Use of local woods & equipped with sanitary facilities ⑥ Experimental house to be investigated as a research tool ⑦ Involving the leaders of local communities, who promote to accept & understand the house	PD, AD AD, CD AD BM, AD PS BE BM, ED AD, PD CD, PS
					03-2	Konditaget Lüders -th e fitness roof  Photo: Rasmus Hjortshøj - COAST for Lokale og Anlægsfonden	Lüders, Denmark	Car Parking	① Secure exercise space in urban area for the citizens' health & well-being ② Space for recreation & exercise added to infrastructural facility (car parking) ③ Car parking + Green facade + Roof-top playground (2,400 ㎡) ="Park & Play", creating a new urban skyline	AD AD, LD AD,LD, CD
					03-3	Maggie's at the Robert Parfett Building  Photo: Nigel Young-Foster + Partners	Manchester, UK	Refuge	① Maggie's Centre socially supporting cancer patients & their families ② Architectural roles of contribution for healing by silence & clean air ② Curing effects promoted by space, color, sound, safety & comfort ④ "Home away from home" with daylighting, greenery & vista ⑤ Central kitchen & common table surrounded by a variety of spaces such as personal niche, library, exercise & meeting room ⑥ Devices in- and out-side of greenhouse to enjoy curing effects	PD, CD AD, LD AD AD, LD AD AD, LD

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3 GOOD HEALTH AND WELL-BEING

Ensure healthy lives and promote well-being for all at all ages

Most people spend the majority of their life indoors, making indoor climate an influential factor of health.

3-3. Maggie's at the Robert Parfett Building

Manchester, UK

Maggie's Centre socially supports cancer patients & their families, and the major architectural roles are to contribute to healing by silence & clean air

Origin/team
Foster + Partners,
HE Simm, Gardiner & Theobald,
Dan Pearson Studio,
Maggie's

Photos: Nigel Young-Foster + Partners

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Legend: BM: Building Material, BE: Building Element, ED: Equipment Design, AD: Architectural Design, CD: Community Design, LD: Landscape Design, TP: Town Planning, PD: Politics Design, PS: Partnership

SDGs	General Goal		Architecture Guide		Case Practices					
No.	Logo	Basic Goal	Major Issue	Typical Solutions	No.	Name/Photo	Place	Type	Specific Solutions	Category
#04	4 QUALITY EDUCATION	QUALITY EDUCATION *Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*	Schools and educational spaces are a crucial part of our investment in the future.	1) In whatever situations, access to school for receiving education determines the future of children. 2) Affordable & productive learning environment, therefore, should be provided as an architectural design. 3) As examples, independent energy supply system and moveable classroom for seasonal immigrant workers are found. 4) These can be good opportunities to learn the significance for users & craftsmen of buildings, settlements & urban areas. 5) The collaboration with the community at design & usage stages can promote sustainable local culture. 6) Especially, at the primary education level, the key is to focus on developing the knowledge of sustainable design.	04-1	Avasara Academy  Photo: Case Design	Avasara, India	School	① Half of all girls in India never make it secondary education, and get married before the age of 18. ② This academy provides such girls with education, as well as the community mind-set change ③ As a boarding school, it creates safe and familial atmosphere in- and outside. ④ Supporting girls' characters, special structure is elaborated for individuality, concentration and social life. ⑤ Using traditional & local materials, soft & characteristic spaces have been realized.	PD AD, CD AD AD, CD BE, AD
					04-2	Frederiksbjerg School  Photo: Hufton+Crow	Aarhus, Denmark	School	① Physical exercise just after classes is beneficial for keeping memories of knowledge. ② Buffer zones for this purpose should be therefore activated. ③ This public school has been designed to promote indoor & outdoor physical activities based on the national relevant policy. ④ A variety of roots between 2 points are provided to multiply the exercise possibilities. ⑤ Diverse in- & outdoor spaces including class theaters with stairs instead of tables & chairs	AD AD, LD PD, AD AD, LD AD, LD
					04-3	The Community Dome  Photo: Martina Bo Rubino	Za'atari Village, Jordan	School	① No access to educational facility for most of refugee children from Syria. ② The purpose of "100 classrooms for refugee children" is to provide affordable & easy-to-build schools, as well as to promote this technique through participatory workshop ③ In cooperation with NGO Acting for Change Jordan, spaces for children were built by means of Super adobe method. ④ Transfer of the method to the region strengthens its economy.	PD PD, PS AD, CD, PS AD, CD

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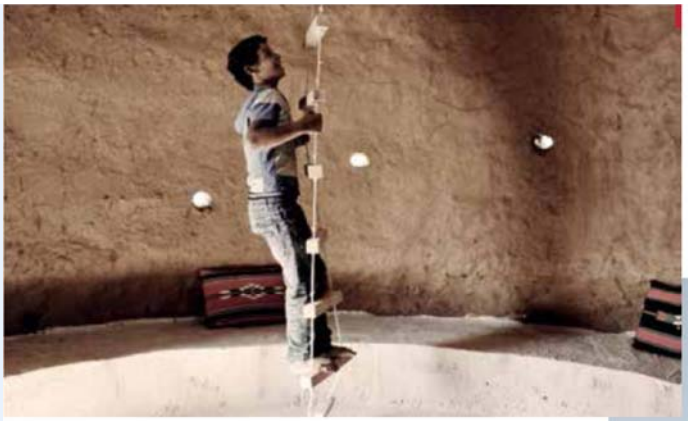
4 QUALITY EDUCATION

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Schools and educational spaces are a crucial part of our investment in the future.



4-3.
The Community Dome

Za´atari Village,
Jordan

The purpose of "100 classrooms for refugee children" is to provide affordable & easy-to-build schools, as well as to promote this technique through participatory workshop.

Photos: Martina Bo Rubino

Origin/team
Emergency Architecture & Human Rights (EAHR), Acting for Change Jordan, Social Science advisor: Jawhara Hammuh

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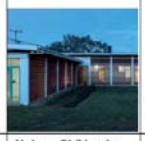
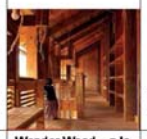
Legend: BM: Building Material, BE: Building Element, ED: Equipment Design, AD: Architectural Design, CD: Community Design, LD: Landscape Design, TP: Town Planning, PD: Politics Design, PS: Partnership

SDGs	General Goal		Architecture Guide		Case Practices					
No.	Logo	Basic Goal	Major Issue	Typical Solutions	No.	Name/Photo	Place	Type	Specific Solutions	Category
#05	5 GENDER EQUALITY	GENDER EQUALITY *Achieve gender equality and empower all women and girls*	To support a movement towards gender equality, the design of buildings, settlements and urban areas must be inclusive to all citizens regardless of gender.	1) Public spaces, facilities & services must secure safety for girls, women, LGBT+ and citizens, as well as minimize risks of abuse. 2) These are the keys for social self-supporting of women & girls. 3) Affordable and safe facilities with health & sanitary services and meeting places should be provided. 4) Examples can be maternity clinics, safe houses or secure bathrooms. 5) Design of playgrounds, public parks & sports facilities should offer the similar services. 6) The building industry must work towards equal pay, promote diversity and oppose sexual harassment. 7) The industry, from design through construction, must avoid a narrowly gendered work culture, so that more women can join the industry.	05-1	Kachumbala Mate mity Unit  Photos: HKS Architects	Kachumbala, Uganda	Maternity unit	① Eastern Uganda is extremely poor and suffers high maternal & infant mortality rate. ② New maternity clinics are needed in such areas with limited access to basic services. ③ This is maternity facility provides possibility of staying for post-observation and the family, due to poor access to transportation. ⑤ More than 90% of BM is locally produced and no electricity is needed for building. ⑥ With the assistance of UK-based professionals, it provides training & local health care.	PD AD, PD AD AD PD, CD
					05-2	Nakuru Children's home  Photo: Orkidstudio	Nakuru, Kenia	House	① In Kenia, over half the female lives under the poverty line, and less than 50% of girls are educated beyond primary school level. ② The building sector has been growing very fast, and a huge potential for education & employment of women. ③ Women who took part in building this Children's Home have proved their skill & value. ④ It brought them economic independence & transformation of life and changed the mind-set of their male counterpart.	PD AD, PD AD, CD CD
					05-3	Wonder Wood – a lo op of movement  Photo: Leif Tuxen for the Danish Foundation for Culture and Sports Facilities	Skørping, Denmark	Play-ground	① Men and women have different preferences for exercise facilities and space. ② This project's aim was to promote physical exercise of girls at the school. ② The cluster-wise dispersed play zones for girls are integrated with trees and a variety of wooden elements. ④ These Edge Zones are open to all children and successfully proved to be much more used for exercises by girls than before.	PD PD, AD AD, LD AD, LD

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5 GENDER EQUALITY

Achieve gender equality and empower all women and girls

To support a movement towards gender equality, the design of buildings, settlements and urban areas must be inclusive to all citizens regardless of gender.

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Photo: Leif Tuxen
for the Danish Foundation for Culture and Sports Facilities

Origin/team
VEGA landskab
Rebild Municipality
Frandsen & Søndergaard
Skørping School management

Drøn på Skolegården:
Realdania,
Lokale og Anlægsfonden,
Kræftens Bekæmpelse

Men and women have different preferences for exercise facilities and space.

This project's aim was to promote physical exercise of girls at the school.

The cluster-wise dispersed play zones for girls are integrated with trees and a variety of wooden elements.

5-3.
Wonder Wood – a loop of movement

Skørping,
Denmark

Legend: BM: Building Material, BE: Building Element, ED: Equipment Design, AD: Architectural Design, CD: Community Design, LD: Landscape Design, TP: Town Planning, PD: Politics Design, PS: Partnership

SDGs	General Goal		Architecture Guide		Case Practices					
No.	Logo	Basic Goal	Major Issue	Typical Solutions	No.	Name/Photo	Place	Type	Specific Solutions	Category
#06	6 CLEAN WATER AND SANITATION	CLEAN WATER AND SANITATION *Ensure availability and sustainable management of water and sanitation for all*	To take advantage of rainfall where clean water is scarce, buildings and urban areas must be designed so that rainwater can be collected, purified and used as drinking water.	1) Rainwater should not be mixed with wastewater in order to let enter the groundwater. 2) Building & sewage systems should be designed to keep bacteria & contaminated water separate from clean water and out-of-contact with citizens. 3) The key point is to ensure access to toilet facilities handling the waste produced. 4) Also BM should be chosen from those which do not contaminate the groundwater, whether during extraction, construction or in use. 5) Built-environment must be designed to withstand the climate change related to water, including extreme precipitation, drought and floods. 6) And the water resource conservation can be promoted by integrating with recreational function. 7) Examples are found in water handling features at building & urban levels, and communal toilets for slum areas.	06-1	Warka Tower  Photo: Warka Water Inc.	Dorse, Ethiopia	Water collection tower	① Major health problems in Ethiopia are caused by the lack of clean water & sanitation systems. ② Warka Tower makes it possible to harvest portable water from the atmosphere by collecting rain, fog and dew through the use of gravity, condensation & evaporation, without electrical power. ③ It is designed to be operated by the villagers, who can also use the associated shaded spaces as communal meeting facility. ④ BMs are locally produced and 100% recyclable & biodegradable. ⑤ It can be therefore easily built with simple tools and maintained by local villagers.	PD AD, MD AD, LD BM AD, CD
					06-2	Frederiksbjerg School  Photo: Carsten Ingemann	Aarhus, Denmark	Park	① Climate change causes heavier rainfall putting a growing pressure on wastewater treatment & sewer systems, in Denmark too. ② It results in overflow & outlet to lakes and harbors with the risk of water contamination to vital natural habitats. ③ The municipality expanded its treatment facilities into a multi-purpose recreational park with the water surface of 2.6ha. ⑤ It provides play-areas related to sports on water, as well as an educational center about water resources and treatment systems.	PD PD, LD PD, LD PD, AD, LD
					06-3	Living Machine  Photo: Carmen Pagano	San Francisco, USA	Office building	① Sustainable water treatment system & recycling are the central issues of built-environment design. ② This building is the 1st example in US of treating greywater and waste water on-site by means of Living Machine System. ② This was executed for the wide spread of its system, and obtained LEED Platinum, producing 3 million liters of recycled water a year.	PD AD, MD AD, PD, MD

6 CLEAN WATER AND SANITATION

Ensure availability and sustainable management of water and sanitation for all

To take advantage of rainfall where clean water is scarce, buildings and urban areas must be designed so that rainwater can be collected, purified and used as drinking water.

Origin/team
Architecture and Vision (Arturo Vittori), Warka Water Inc.

6-1. Warka Tower

Dorse, Ethiopia

Major health problems in Ethiopia are caused by the lack of clean water & sanitation systems.

Warka Tower makes it possible to harvest portable water from the atmosphere by collecting rain, fog and dew through the use of gravity, condensation & evaporation, without electrical power.

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SDGs	General Goal		Architecture Guide		Case Practices					
No.	Logo	Basic Goal	Major Issue	Typical Solutions	No.	Name/Photo	Place	Type	Specific Solutions	Category
#07	7 AFFORDABLE AND CLEAN ENERGY	AFFORDABLE AND CLEAN ENERGY *Ensure access to affordable, reliable, sustainable and modern energy for all*	The built environment is a major source of energy consumption and a potentially crucial energy producer.	1) Reduction of energy consumption through optimal building layout and BE selection to minimize the excessive heating. 2) Energy recycling system by storing excessive heat during the day and employing it at night. 3) The key of the above is to analyze the given geographical, climatic and cultural conditions, and to design the built-environment accordingly. 4) Examples include the use of day-lighting & natural ventilation, as well as BMs that support heating & cooling the building. 5) Building industry should contribute to the reduction of total energy consumption from the BM extraction, through the construction phase, to the use and disassembly.	07-1	Powerhouse Kjørbo  Photo: Ketil Jacobsen	Oslo, Norway	Retrofit of existing building + Power Station	① Energy consumption can be largely reduced by effective retrofitting the existing building. ② This project in Norway has succeeded to produce more renewable energy than it uses by refurbishing an office building of 80s'. ③ Renewable energy system has been employed by means of collaboration with the experts of related areas. ④ Energy load is reduced by the effective use of well water, solar panels and simple zoning. ⑤ Consequently, the lifecycle embedded energy is considerably reduced.	PD, AD AD, MD AD, MD AD, MD, LD AD
					07-2	Øvre Forsland Hydropower Plant  Photo: Helgeland Kraft	Forsland, Norway	Hydro-power Station	① Alternative energy resources, in the place of fossil fuels, can improve the air potation and reduce greenhouse gas emission. ② This project in northern Norway attained high efficiency by retrofitting the existing hydraulic power station, which became a tourist destinations. ③ By visualizing the power plant process, corresponding to the surrounding environment, it gives the visitors specific & effective experiences of power production for 1,600 households.	PD PD, LD PD, AD, LD
					07-3	Paramit – factory in the forest  Photo: Lin Ho	Penang, Malaysia	Factory	① Architectural design can affect the energy performance and ecological footprint. ② This example, constituted of factory, warehouse and offices, is designed for engineering, manufacturing and post-manufacturing services. ② Its high energy efficiency gives 45% reduction of energy consumption, compared to the former factory. ④ A variety of passive solutions are employed for environment.	AD AD, MD AD, LD AD, LD

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7 AFFORDABLE AND CLEAN ENERGY

Ensure access to affordable, reliable, sustainable and modern energy for all

The built environment is a major source of energy consumption and a potentially crucial energy producer.

Photos: Lin Ho

Origin/team
Paramit Malaysia Sdn Bhd,
Design Unit Sdn Bhd,
IEN Consultants Sdn Bhd

7-3.
Paramit – factory in the forest

Penang,
Malaysia

Architectural design can affect the energy performance and ecological footprint.

This is constituted of factory, warehouse and offices, designed for engineering, manufacturing and post-manufacturing services.

Its high energy efficiency gives 45% reduction of energy consumption, compared to the former.

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SDGs	General Goal		Architecture Guide		Case Practices					
No.	Logo	Basic Goal	Major Issue	Typical Solutions	No.	Name/Photo	Place	Type	Specific Solutions	Category
#08	8 DECENT WORK AND ECONOMIC GROWTH	DECENT WORK AND ECONOMIC GROWTH *Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all*	The built environment interacts with decent work and economic growth on both a planning level and on a building level.	1) Safe public spaces & affordable transit routes are crucial for finding employment. 2) Transit system is above all key factor for the access to a work-place from home. 3) The work-place should be designed as a healthy & productive space for employees. 4) Investing in good working environments back to a company's economic growth through higher productivity & fewer sick days. 5) In the building industry, focus is needed on decent working conditions and safety for workers. 6) Consequently, by emphasizing investment in human resources, the industry can develop towards more sustainable economic growth by using raised skills and knowledge to reduce the amount of raw materials and energy needed while raising productivity.	08-1	Atelier Gando  Photo: Kere Architecture	Burkina Faso	Atelier	① The population's literacy in Burkina Faso is only 20%, which calls for increased educational support to create local at grows & employment. ② Atelier Gando is a center for sustainable building technology, aiming to exchange between local craftsmen, architects, students, visitors to study and innovate building methods. ③ The building process itself was an opportunity for the creative exchange of tradition and contemporary building techniques. ④ The students visiting the atelier will be able to work with site specific challenges & the dynamic collaboration across nationality and culture.	PD AD, PS AD AD, PS
					08 -2	SiteCover  Photo: Dragor Luftfoto ApS	Denmark	Site house	① Construction sites are exposed to the vagaries of weather, which calls for provision of simple solutions for the safety of building workers as well as keeping the building quality and period. ② SiteCover is a combined cover and crane for construction that allows an indoor building activity. ③ It provides safe & comfortable working environment, and can minimize the construction period.	PD AD, ED AD
					08-3	Moving Schools  Photo: Mette Lange	Goa, India	Class-room	① The seasonal migrant labor population of India is estimated as high as 100 million, and their children face a crucial lack of education. ② Moving School is a series of mobile classrooms that are designed to float, roll and unfold. ③ The 4th school in Goa opened in 2005 on a floating platform in the river for the children of labor groups moving on the river to extract the sand. ④ Semi-permanent structures & a hostel also opened in 2012.	PD AD AD AD

8 DECENT WORK AND ECONOMIC GROWTH

Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

The built environment interacts with decent work and economic growth on both a planning level and on a building level.

8-3. Moving Schools

Goa, India

Origin/team
Mette Lange Architects,
Anders Linnet

The seasonal migrant labor population of India is estimated as high as 100 million, and their children face a crucial lack of education.

Moving School is a series of mobile classrooms that are designed to float, roll and unfold.

The 4th school in Goa opened in 2005 on a floating platform in the river for the children of labor groups moving on the river to extract the sand.

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SDGs	General Goal		Architecture Guide		Case Practices					
No.	Logo	Basic Goal	Major Issue	Typical Solutions	No.	Name/Photo	Place	Type	Specific Solutions	Category
#09	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	INDUSTRY, INNOVATION AND INFRASTRUCTURE *Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation*	The building industry is producing massive amounts of waste and is consuming large amounts of natural resources and energy.	1) To advance the building environment sustainability, it is needed to develop innovative process of production and assembly as well as the related industrial infrastructure. 2) It includes also trans-portation and services related to the production. 3) The building industry is by nature site-specific, and we must aim at utilizing local industries and developing sustainable products locally in all countries. 4) This requires the development of both physical and digital infrastructure to promote more sustainable trade. 5) For example, the focus must be shifted from no waste in production to a lifecycle perspective. 6) And a prototype should be needed to be able to promote training & developing the new capacity at all levels as well as test the possibility.	09-1	Soft Cells by Kvadrat  Photo: Ed Reeve	Denmark	Wall & Ceiling Panel	① A comfortable environment is influenced by architecture and its materiality, and how it affects all our senses. ② In order to produce sustainable BEs on an industrial scale, the whole chain of production, disassembly and biodegradability must be taken into consideration. ③ Soft Cells is an acoustic wall and ceiling panel system that delivers sound absorption and creates a comfortable environment. ④ The panels can be customized in shape and color and can be integrated in various design schemes, being resistant to humidity and temperature. ⑤ Consisted of two layers of tensioned textile and acoustic padding, the panels absorb sound on the low & md-range frequencies. ⑥ The modular design makes it easy to disassemble and reuse. ⑦ Most components and materials can easily go into recycling streams.	AD AD, BM, BE AD, BM, BE BM, BE BE BE, BM BM, BE
					09-2	Plastic: recycled and hand-crafted  Photo: Smile Plastics		Building Material	① Since 1950 around 9 billion tons of plastic has been produced, and closed to 7 billion tons have become waste. Less than 10% of the discarded plastic has been recycled and it is estimated more than 450 years to biograde. ② Simple Plastic integrated technology and art to disseminate the unexpected beauty of scraps. ③ All the BM is handmade and composed of 100% harmless plasties that can be recycled and up-cycled. ④ Those BM can be applied to from interior to exterior finishing, and a variety of recycle resources are used to produce them.	PD BM BM BM, AD

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9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

The building industry is producing massive amounts of waste and is consuming large amounts of natural resources and energy.

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Origin/team
Smile Plastics,
Adam Fairweather
and Rosalie McMillan

Architecture:
Clifton Park project by
Marsh Grochowski Architects

Since 1950 around 9 billion tons of plastic has been produced, and closed to 7 billion tons have become waste. Less than 10% of the discarded plastic has been recycled and it is estimated more than 450 years to biodegrade.

Simple Plastic integrated technology and art to disseminate the unexpected beauty of scraps.

All the building materials is handmade and composed of 100% harmless plastics that can be recycled and up-cycled.

Photo: Smile Plastics

9-2.
Plastic: recycled and hand-crafted

Legend: BM: Building Material, BE: Building Element, ED: Equipment Design, AD: Architectural Design, CD: Community Design, LD: Landscape Design, TP: Town Planning, PD: Politics Design, PS: Partnership

SDGs	General Goal		Architecture Guide		Case Practices					
No.	Logo	Basic Goal	Major Issue	Typical Solutions	No.	Name/Photo	Place	Type	Specific Solutions	Category
#10	10 REDUCED INEQUALITIES	REDUCED INEQUALITIES *Reduce inequality within and among countries*	The built environment can act as an amplifier and enforcer of inequalities.	1) Disabled citizen risk being confined in their homes or unable to hold a job due to limited access to the transportation systems and facilities. 2) Building design may segregate the users due to religion, race, gender and/or LGBT+. 3) To improve such inequalities, social responsibility of architecture should be fulfilled through focusing on the inclusive design. 4) Building, settlements and towns should be all elaborated on the central theme of accessibility and usability. 5) Inclusive design should aim at being used by all as well as elaborating the program based on the regional culture and needs. 6) Examples include office buildings, public places of spirits, parks and public facilities of universal design.	10-1	Kamppi Chapel of Silence  Photo: Marko Huttunen	Helsinki, Finland	Place of spirit	① Regardless of political or religious belief, we require sometimes a moment of reflection in silence. ② Traditionally, spaces o refuge and spirituality have been linked to specific beliefs with a different set of rituals and special concepts, which rarely facilitated inclusion and interaction of audiences. ③ This chapel has a space for cure & peace irrespective of religion, faith and origin. ④ It is located in the lively commercial center of Helsinki, and provides citizens with warm and comfortable atmosphere by using thick Finnish woods.	PD AD, PD AD, PD BM, AD, CD
					10-2	Small-scale neighbourhoods in Chon gqing  Photo: Gehl Architects	Chongqing, China	District	① Over the next 30 years, 300 million people will move to the cities in China, and the human streets are replaced with high-ways. The result is megacities full of large-scale mono-functional zones devoid of human life. ② In this example, local municipality and architects have improved the urban public spaces through re-vitalizing the streets. ③ Consequently, much more people spend their time in the old and small streets, and public spaces are now being permanently implemented by local planning and design teams.	PD, CD, TP CD, TP, PS PD
					10-3	The House of the Disabled People's Organization  Photos: Martin Schubert	Taastrup, Denmark	Center for disables	① UN Rights of Persons with Disabilities states that "all parties shall tale appropriate measures to ensure that people with disabilities are treated equally to others." ② The Disables People's Organization in Denmark has built its headquarters as a model. ③ The design team elaborated more integral and low-tech methods from the beginning.	PD, AD AD AD, BM

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10 REDUCED INEQUALITIES

Reduce inequality within and among countries

The built environment can act as an amplifier and enforcer of inequalities.

Photo: Marko Huttunen

Origin/Team
K2S Architects LTD
Helsingin seurakuntayhtymä
Insinööritoimisto Vahanen Oy
Pakrak Oy

10-1.
Kamppi Chapel of Silence

Helsinki,
Finland

Photo: Tuomas Uusheimo

Regardless of political or religious belief, we require sometimes a moment of reflection in silence.

Traditionally, spaces of refuge and spirituality have been linked to specific beliefs with a different set of rituals and special concepts, which rarely facilitated inclusion and interaction of audiences.

This chapel has a space for cure & peace irrespective of religion, faith and origin.

It is located in the lively commercial center of Helsinki, and provides citizens with warm and comfortable atmosphere by using thick Finnish woods.

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SDGs	General Goal		Architecture Guide		Case Practices					
No.	Logo	Basic Goal	Major Issue	Typical Solutions	No.	Name/Photo	Place	Type	Specific Solutions	Category
#11	11 SUSTAINABLE CITIES AND COMMUNITIES	SUSTAINABLE CITIES AND COMMUNITIES *Make cities and human settlements inclusive, safe, resilient and sustainable*	The built environment is crucial to the development of sustainable cities and communities.	1) Architecture, design & planning contribute in multiple ways to make cities and settlements inclusive, safe, robust, resilient and environmentally sustainable. 2) Among them, most important challenge is to provide affordable and healthy living environment as well as urban traffic systems enabling walking, biking and commuting by public transport. 3) Participation of all the stakeholders into the design process makes it possible to create inclusive and less risky urban design. 4) This should also help reduce and counteract the environmental impacts of overuse, traffic, waste, noise and light pollution in urban areas. 5) Also it includes vegetation and green areas to help counteract the loss of biodiversity. 6) Examples can be found in housing renewal, climate change adaptation, collective reuse station etc.	11-1	Low Impact Living Affordable Community (LILAC)  Photo: White Design	Leeds, UK	Resi-dential district	① Design can make our cities more inclusive , safe and resilient, sharing the common resources, reducing the use of space & energy. ② LILAC is a co-housing project mixing private areas and common facilities. ③ A common house with household facilities surrounded by green areas promotes social activities of the residents. ④ By employing prefabricated building methods, using locally produced woods, straw bale and high efficient BE, an extremely low energy consuming and comfortable living environment has been created. ⑤ In addition, car-sharing, training of how to use equipment and tools, sharing of meals and growing food on allotment are managed and operated.	PD, AD, TP AD, CD CD BM, ED, AD CD, AD
					11-2	Taasinge Square in the Climate Resilient Neighbourhood  Photo: Steven Achiam, GHBLandskabsarkitekter	Copen-hagen, Denmark	Square	① Even in Copenhagen, new natural disasters like serious flooding due to heavy rain by climate change requires more tremendous costs to maintain the old existing infrastructure. ② This example is an early urban square that aiming at relaxing those problems, playing the roles of treating and storing rainwater as well as being a meeting place for citizens. ③ It reduces the sewage impact and strengthens the biodiversity by the greenery that is visualized. ④ In addition, through the participation of local residents, it succeeded to share the significance of the project and to help in strengthening familiarity, community and sense of ownership among the local residents.	PD, TP LD, TP, CD MD, LD LD, PS

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11 SUSTAINABLE CITIES AND COMMUNITIES

Make cities and human settlements inclusive, safe, resilient and sustainable

The built environment is crucial to the development of sustainable cities and communities.

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11-1. Low Impact Living Affordable Community

Leeds, UK

Design can make our cities more inclusive , safe and resilient, sharing the common resources, reducing the use of space & energy.

LILAC is a co-housing project mixing private areas and common facilities.

A common house with household facilities surrounded by green areas promotes social activities of the residents.

By employing prefabricated building methods, using locally produced woods, straw bale and high efficient BE, an extremely low energy consuming and comfortable living environment has been created.

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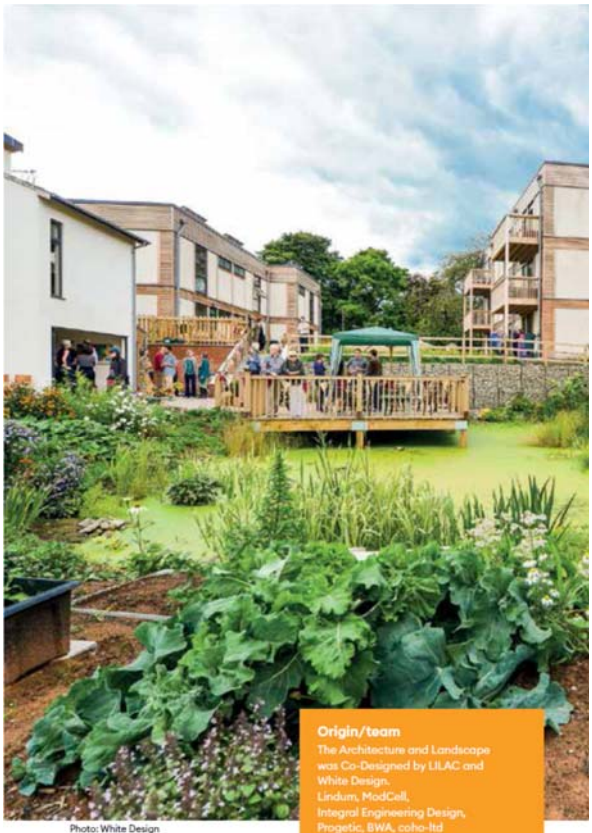

Photo: White Design

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SDGs	General Goal		Architecture Guide		Case Practices					
No.	Logo	Basic Goal	Major Issue	Typical Solutions	No.	Name/Photo	Place	Type	Specific Solutions	Category
#12	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	RESPONSIBLE CONSUMPTION AND PRODUCTION *Ensure sustainable consumption and production patterns*	The building industry is a major contributor to waste.	1) When buildings are renovated or demolished most of the value of existing materials and components are lost, and huge amount of diverse wastes are produced including from cut-off bits, over discarded formwork and the wrapping. 2) Therefore, long-life design, continuous maintenance and careful renovation are the keys of sustainable consumption of the built-environment. 3) Although the initial use changes and become obsolete, building design allows them to transform into different uses over time, so that the BMs retain their value. 4) And respective BM can be recycled or up-cycled through the design and the application. 5) New construction as well as renovation should put the priority on reducing the amount of BM used and wastes produced.	12-1	DESI Training Center  Photo: Kurt Hoerbst_ Alexandra Grill	Rudrapur, Bangladesh	School	① In developing countries, living conditions depend traditionally on household production and self-sufficiency. But with increasing living standards come a change of life-style towards higher level of consumption and dependency on imported materials, which result in a large carbon footprint. ② This example is a vocational school built in a rural area of Bangladesh, mixing traditional and modern building methods. ③ An affordable & beautiful learning space has been created by using passive natural energy, rationalizing the space constitution, respecting the local aesthetics & lifestyle and applying self-build process, which the residents highly proud of.	PD, BM, AD AD, MD BM, AD, CD
					12-2	Upcycle Studios  Photo: Arkitekt Gruppen	Chongqing, China	Studio	① Urbanization increases the demand for housing, which rapidly produces a huge amount of wastes. Up-cycling of them is a crucial challenge for making their potential value much higher. ② In this example, by using the up-cycled local wastes, it became highly compatible with market conditions. ③ Consequently, it succeeded in commercial implementation and being changing the perception of stakeholders.	PD, BM, AD BM, AD BM, CD
					12-3	Mjøstårnet  Photo: Moelven webcam 16.11.2018	Brumunddal, Norway,	Office building	① It is expected that huge amount of floors will be built with BMs of large CO_2 emission, which calls for employment of as much sustainable BMs as possible. ② This example in Norway is the highest wooden building, built by timbers from the sustainably managed forest in the region, based on the 12th century's wooden churches.	BM, AD AD, BM

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12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Ensure sustainable consumption and production patterns

The building industry is a major contributor to waste.

Photo: Kurt Hoerbst _ Alexandra Grill

Origin/team
Anna Heringer, Shanti-Partnerschaft Bangladesh e.V., Shanti Schweiz, Dipshikha (Non-formal Education Training and Research Society for Village Development), Bangladesh for DESI (Dipshikha Electrical Skill Improvement)

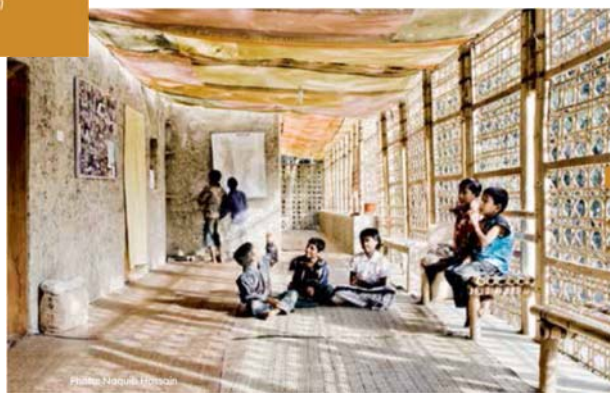
12-1.
DESI Training Center

Rudrapur,
Bangladesh

With increasing living standards come a change of life-style towards higher level of consumption and dependency on imported materials, which result in a large carbon footprint.

This is a vocational school built in a rural area of Bangladesh, mixing traditional and modern building methods.

An affordable & beautiful learning space has been created by using passive natural energy, rationalizing the space constitution, respecting the local aesthetics & lifestyle and applying self-build process, which the residents highly proud of.



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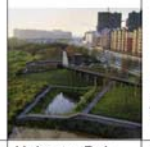
SDGs	General Goal		Architecture Guide		Case Practices					
No.	Logo	Basic Goal	Major Issue	Typical Solutions	No.	Name/Photo	Place	Type	Specific Solutions	Category
#13	13 CLIMATE ACTION	CLIMATE ACTION *Take urgent action to combat climate change and its impacts*	The CO_2 footprint of the built environment must be reduced, and buildings and settlements must be adapted to the changing climate.	1) The CO_2 impact of built environment must be reduced through energy renovation by integrating renewable energy production, expanding sustainable transportation systems, reducing transport of BMs and emphasizing the use if local & renewable BMs. 2) By applying region specific building design, energy consumption for air-conditioning & lighting can be minimized, while maximizing the comfort of indoor environment. 3) And existing built environment must be adapted to the climatic changing conditions, including extreme rainfall, floods, hurricanes, drought and heat waves. 4) Those solutions should be based on the minute considerations about the local culture, geo- and topography and climate. 5) An example is a park for recreation as well as for storing heavy rainwater, which is co-benefit.	13-1	Qunli Stormwater Park  Photo: Kongjian Yu, Turenscape	Harbin, China	Park	① Chinese president Xi said "A city should be like a sponge," supporting a new movement Chinese urban planning against floods called "Sponge City," which reintroduced traditional methods into the rapid urbanization in China. ② This example in Harbin is a landscape design, following the policy to renew the former wetland to a huge park. ③ This park stores and purifies the storm water coming from developed areas and provides wonderful green landscape.	PD, LD, TP LD LD
					13-2	Lindevangs Park  Photo: Carsten Ingeman	Frederiksberg, Denmark	Park	① Global warming will result in more extreme weather phenomena such as heavy rains during summer & autumn, which requires sustainable urban sewage solutions. ② This example is a green urban space in Denmark integrating meeting space for citizens and a solution for climate change. ③ Water and its flow are the key aspects of the integral landscape with a variety of plants.	PD, LD LD, CD LD
					13-3	Portland Green Streets Programme  Photo: Bureau of Environmental Services	Portland, USA	Green walkway	① Extreme precipitation events have produced more rain in the world, which became a crucial risk for the sewage system in urban area. ② City of Portland is a leader of vitalizing the neighborhood and strengthening its local economy by controlling the storm rain. ③ This Green Street that is designed to reduce the above-mentioned risk using natural systems has been built in more than 2,000 places within the city to date.	PD PD, CD LD, PS

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13 CLIMATE ACTION

Take urgent action to combat climate change and its impacts

The CO_2 footprint of the built environment must be reduced, and buildings and settlements must be adapted to the changing climate.

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Origin/team
Kongjian Yu, Turenscape,
The Municipal Government of Harbin City

Chinese president Xi said "A city should be like a sponge," supporting a new movement Chinese urban planning against floods called "Sponge City," which reintroduced traditional methods into the rapid urbanization in China.

This example in Harbin is a landscape design, following the policy to renew the former wetland to a huge park.

This park stores and purifies the storm water coming from developed areas and provides wonderful green landscape.

13-1.
Qunli Stormwater Park

Harbin,
China

Photos: Kongjian Yu, Turenscape

Legend: BM: Building Material, BE: Building Element, ED: Equipment Design, AD: Architectural Design, CD: Community Design, LD: Landscape Design, TP: Town Planning, PD: Politics Design, PS: Partnership

SDGs	General Goal		Architecture Guide		Case Practices					
No.	Logo	Basic Goal	Major Issue	Typical Solutions	No.	Name/Photo	Place	Type	Specific Solutions	Category
#14	14 LIFE BELOW WATER	LIFE BELOW WATER *Conserve and use the oceans, seas and marine resources for sustainable development*	Most of the built environment is situated on land, but its activities affect the oceans	1) Building industry affects the oceans through transport of BMs at sea, while existing settlements and cities discharge waste-water and other wastes to the oceans as huge impacts. 2) To help preserve life under water, we must reduce transport of BMs over long distances by sea through the development of local industries, and abolish plastic wrapping of BMs to reduce the source of non-degradable waste that ends up in the ocean. 3) By means of LD & TP, pollutants must be handled on-site so that they do not reach the groundwater or the ocean. 4) AD and TP may able to reduce the cost and also build the water treatment infrastructure with co-benefits, while LD can regenerate the polluted land facing the ocean. 5) In addition, through such built environment for coastal eco-system, new knowledges can be created, which help increase public awareness.	14-1	The Wadden Sea Centre  Photo: White Design	Waden Sea, Denmark	Museum	① The largest natural park of Denmark, Wadden Sea, is appointed World Heritage by its unique landscape, rich bio-diversity and many migratory birds and the others. ② This center was built in order to disseminate and strengthen the knowledge & understanding about the mudflats and the sea banks as well as to preserve them. ③ AD was focused on making harmony with the horizontal landscape of the vast area between sea and land, associated with various facilities for visitors provided with the information about the wild life. ④ Students, pupils and kinder-gardens can effectively learn about the flora & fauna and the geography through the experience.	PD PD, AD AD PD, AD, LD
					14-2	Fischer Family 'August'   Photos: Adam KR Fischer Lighting	Copenhagen Denmark	Lighting system	① To create sustainable architecture, we must pay attention to use as many BMs that can be recycled or up-cycled as possible. ② As ca. 20% of all the plastics is used in the building industry, there is a tremendous possibility of recycling them. ③ This example represents an energy efficient lighting system with LED that can be applied to existing system, while all the materials and components are recycled and can be further recycled later. ④ Taking the serious problem of "Ghost fishing" by "Ghost nets" into account, this lighting has been developed using the ghost nets to be up-cycled, and installed in the National Aquarium Denmark.	PD, BM BM BM, ED, AD BM, AD

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14 LIFE BELOW WATER

Conserve and use the oceans, seas and marine resources for sustainable development

Most of the built environment is situated on land, but its activities affect the oceans

Origin/team
Fischer Lighting,
3XN/GXN, Plastix

Photo: Adam KR

14-1.
Fischer Family 'August'

Copenhagen,
Denmark

We must pay attention to use as many BMs that can be recycled or up-cycled as possible.

As ca. 20% of all the plastics is used in the building industry, there is a tremendous possibility of recycling them.

This is an energy efficient lighting system with LED that can be applied to existing system, while all the materials and components are recycled and can be further recycled later.

Taking the serious problem of "Ghost fishing" by "Ghost nets" into account, this lighting has been developed using the ghost nets to be up-cycled, and installed in the National Aquarium Denmark.

Photo: Fisher Lighting

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Legend: BM: Building Material, BE: Building Element, ED: Equipment Design, AD: Architectural Design, CD: Community Design, LD: Landscape Design, TP: Town Planning, PD: Politics Design, PS: Partnership

SDGs	General Goal		Architecture Guide		Case Practices					
No.	Logo	Basic Goal	Major Issue	Typical Solutions	No.	Name/Photo	Place	Type	Specific Solutions	Category
#15	15 LIFE ON LAND	LIFE ON LAND *Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss*	The amount of buildings, settlements and cities taking up land is rapidly growing.	1) To protect, restore, and support ecosystems & bio-diversity, buildings and settlements must include habitats for plants, insects and animals. 2) This means that green-field developments should be kept to a minimum and that planning and development of all new settlements must ensure sustainable conditions for local eco-system, and the natural networks that allow plant life to attain the symbiotic relations with the built environment. 3) Building industry can avoid excessive harvest of forests through the use of BMs from the sustainable and renewable resources. 4) AD & LD must consider the local flora & fauna as its basic elements to help support and chain with the local ecosystems. 5) By minutely laying out the buildings in vulnerable and ecosystems or wildlife parks, it can add to their preservation through sustainable tourism and raised public awareness.	15-1	Red Rib bon Park  Photo: Kongjian Yu, Turenscape	Qinhuangdao, China	Park	① Supporting natural wild life while creating access to green and lush areas in densely populated regions is a balance between intervention and preservation. ② This example is a landscape architecture for recreation, which responds to the above purpose. ③ The impressive ribbon-like red object curves along the river bank, and invites the users to the open space associated with a variety of elements. ④ The boardwalks are the access for the citizens toward the river and wetlands.	AD, LD, TP LD LD LD, TP
					15-2	Novo Nordisk Nature Park  Photos: Torben Petersen & SLA Architects	Fredensksberg, Denmark,	Office building land-scaping	① Wide-spread modernist urban-planning made vast surfaces asphalted, which deprived habitat from wild life due to this mono-functionality. ② This example is a landscape of a headquarters building, which strengthens the sustainable biodiversity according to the local forest and the characteristic geography. ③ A variety of biotope methods are applied to provide the employees, visitors and citizens with a recreational destination.	TP, LD LD LD, CD
					15-3	The Norwegian Wild Reindeer Centre Pavilion  Photo: Dephoto designer. de	Hjerkinn, Norway	Pavilion	① Urbanization to date made stresses on the natural environment rapidly growing, and consequently our future generations will lose the possibilities to enjoy the realm of benefits from the basic ecosystem. ② This example is an observation & research center of wild reindeer, and both researchers and visitors can access by a hiking trail through the surrounding areas with rich indigenous plants. ③ The design team gave efforts to focus on BM quality and their durability with a unique beauty.	PD, TP, LD AD, LD AD, LD

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15 LIFE ON LAND

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss

The amount of buildings, settlements and cities taking up land is rapidly growing.

Photos: Kongjian Yu, Turenscape

Origin/team
Kongjian Yu, Turenscape,
Yang Lina, The Landscape Bureau, Qinhuangdao City, Hebei Province, and Peking University Graduate School of Landscape Architecture in Beijing

15-1.
Red Ribbon Park

Qinhuangdao,
China

Supporting natural wild life while creating access to green and lush areas in densely populated regions is a balance between intervention and preservation.

This is a landscape architecture for recreation, which responds to the above purpose.

The impressive ribbon-like red object curves along the river bank, and invites the users to the open space associated with a variety of elements.

The boardwalks are the access for the citizens toward the river and wetlands.

36

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SDGs	General Goal		Architecture Guide		Case Practices					
No.	Logo	Basic Goal	Major Issue	Typical Solutions	No.	Name/Photo	Place	Type	Specific Solutions	Category
#16	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	PEACE, JUSTICE AND STRONG INSTITUTIONS *Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels*	Parliaments, courthouses and public libraries are cornerstones in a just and peaceful society, while local community centers, places of worship and safe houses can represent citizens' commitment to an inclusive and compassionate society.	1) Architecture does not make an institution just, but the effort and values put into a building can represent society's commitment to justice, democracy and inclusiveness. 3) Examples of this span from prestigious building for ministries or town halls to the establishment of UN emergency architecture in disaster zones. 4) To support society's expression of its values through buildings and public space, architecture and planning must ensure that public spaces and institutions are inclusive, welcoming, secure, and non-discriminatory. 5) The building industry itself must pay close attention to procurement and construction processes in order to discourage all forms of organized crime, as well as ensure not to rely on abuse, exploitation, human trafficking or child labor.	16-1	The International Criminal Court (ICC) in Hague  Photo: SLA/Architects	Hague, Nether-lands	Court-house	① Such institutions as ICC have a dilemma to keep them as public domains with the transparency & inclusion, while safety. ② This case has been designed not only to deal with risk issues but also to undermine inclusion & equal access to public space. ③ The design team has coped with a variety of themes including terror-prevention, identity making, climate adaption, storm-water management and safety for stakeholders. ④ The international significance is symbolically expressed in the biodiverse courtyard.	PD, AD, LD AD, LD AD, LD LD
					16- 2	Bogotá – policies of change  Photo: Vladimir	Bogotá, Colombia	Town develop-ment	① In the mid-90s Bogota reached a critical point of the least livable city in Latin America due to the mass immigration, poverty and soared criminal rates. ② Therefore, The city's leader-ship level has committed to sustainable urban development. ③ Massive developments of public infrastructure as well as a series of unconventional campaigns have developed citizenship and participation, which made Bogota as forerunner of sustainable urban development.	PD, TP PD TP, CD
					16 -3	Tingbjerg Library and Culture House  Photo: Rasmus Hjortshøj - COAST	Copenhagen, Denmark	Public culture center	① This region in Copenhagen suffered from social problems of its high criminal rate. ② The municipality has decided to extend the school with a new library and culture house, respecting the existing framework. ③ Its unique tower-like form and the transparent façade towards the road side warmly welcome the citizens and make the indoor activities visible ④ And also it supports community-based activities under the same roof.	PD, TP PD, AD AD, CD CD

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16 PEACE, JUSTICE AND STRONG INSTITUTIONS

Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Parliaments, courthouses and public libraries are cornerstones in a just and peaceful society, while local community centers, places of worship and safe houses can represent citizens' commitment to an inclusive and compassionate society.

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Photo: SLA Architects

Origin/team
ICC, SLA Architects,
Schmidt Hammer Lassen Architects, Royal Haskoning Nederland B.V.
and Esbensen - Consulting Engineers AS, Brink Groep, Courtys

16-1.
The International Criminal Court in Hague

Hague,
Netherlands

Such institutions as ICC have a dilemma to keep them as public domains with the transparency & inclusion, while safety.

This was designed not only to deal with risk issues but also to undermine inclusion & equal access to public space.

The design team has coped with a variety of themes including terror-prevention, identity making, climate adaption, storm-water management and safety for stakeholders.

The international significance is symbolically expressed in the biodiverse courtyard.

Photo: Torben Petersen

Legend: BM: Building Material, BE: Building Element, ED: Equipment Design, AD: Architectural Design, CD: Community Design, LD: Landscape Design, TP: Town Planning, PD: Politics Design, PS: Partnership

SDGs	General Goal		Architecture Guide		Case Practices					
No.	Logo	Basic Goal	Major Issue	Typical Solutions	No.	Name/Photo	Place	Type	Specific Solutions	Category
#17	17 PARTNERSHIPS FOR THE GOALS	PARTNERSHIPS FOR THE GOALS *Strengthen the means of implementation and revitalize the global partnership for sustainable development*	Every city is built by many hands, and similarly we need to work together to reach the 17 sustainable development goals, as no single stakeholder can reach them alone.	1) The challenge of achieving the goals requires the involvement of all; from governments and institutional actors to researchers, businesses and citizens. 2) Architects, planners and designers can contribute by sharing knowledge, promoting sustainable solutions and engage in collaboration with research and institutional partners for the implementation. 3) Examples span from non-profit partnerships to provide homes for homeless to commercial partnerships to develop new sustainable products and services to the building industry. 4) Key to the partnership is a willingness to include new knowledge, test new practices, engage with local climate, culture & resources and work with end-users in a life-cycle perspective. 5) The global issues of SDGs require us to work together across professional fields and national borders.	17-1	TECHO – a youth led non-profit organization  Photo: TECHO	Latin America	Organ-ization	① 104 million people live in slums in Latin America, lacking a proper home and access to basic services. ② To cope with those problems, a NPO TECHO was established, led by youth. ③ The strategic objectives : I I : Promotion of community development in slums II : Fostering social awareness and action III : Political advocacy ④ TECHO is engaged in corporate partnerships with major international businesses who bring funding, knowledge and manpower.	PD PD PD PD, PS
					17- 2	Climate Tile  Photo: Torben Petersen & SLAArchitects	Frederiksberg, Denmark,	Product	① Climate adaptation is a big challenge to overcome today, but also an opportunity to innovate and collaborate across fields and interests. ② This is a new scalable tile system with water treatment capabilities, developed by a cross disciplinary partnership and collaboration. ③ It can catch and redirect 30% of the projected extra rainwater falling due to climate change.	PD BM, LD, PS LD
					17- 3	Architecture without borders, Magburaka Education and Computer Center  Photo: Carina Refsing Nissen	Magburaka, Sierra Leone	Activity	① Many of the world's problems relating to inequality are embedded in the built environment, and to be able to combat this inequality we have to collaborate across borders, while preserving the historical heritage o people. ② SF-Int. is one of the most representative NPOs, promoting such capacity building activities in the five continents as those in Sierra. Leone	PD, AD, PS PS, AD

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17 PARTNERSHIPS FOR THE GOALS

Strengthen the means of implementation and revitalize the global partnership for sustainable development

104 million people live in slums in Latin America, lacking a proper home and access to basic services.

To cope with those problems, a NPO TECHO was established, led by youth.
The strategic objectives:
1) Promotion of community development in slums
2) Fostering social awareness and action
3) Political advocacy

TECHO is engaged in corporate partnerships with major international businesses who bring funding, knowledge and manpower.

Photos: TECHO

Origin/team
TECHO is based in Miami, Florida and New York, NY.

Every city is built by many hands, and similarly we need to work together to reach the 17 Sustainable Development Goals, as no single stakeholder can reach them alone.

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17-1.
TECHO – a youth led non-profit organization

Based In Miami, Florida & NY, USA

ORIGINAL BOOK OF ARCHITECTURE GUIDE

to the UN17 Sustainable Development Goals

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An Architecture Guide to the UN 17 SDGs

The 1st Book in Japanese compiled by JIA
January 2019

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Appendix:
Additional case practices

(The following additional examples are included in preparation for the 2nd edition.)

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Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Schools and educational spaces are a crucial part of our investment in the future.

44

Appedix-1:
Solar School

Kobe, Japan

2013 Grand Prix, JIA Environment Award,

by Kazuo IWAMURA
(IWAMURA Atelier Inc.)

To commemorate the 100 year's anniversary, the German School in Kobe was rebuilt in 2009 as a highly environmentally conscious school, according to the following goals;

1) Region specific & adaptive design
2) Consideration for town-scaping
3) Wooden construction for all
4) Passive design by daylighting & natural ventilation
5) Diverse buffer zones
6) Active design by PV solar roofing
7) Waste reduction etc.

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Schools and educational spaces are a crucial part of our investment in the future.

A huge erthquaque hit the northern Thailand in 2014, leaving 2,000 pupils no access to their schools.

NPO "Design for Disasters" has started to build 9 schools, one of which was designed by J. Sekino associated with a variety of institutions including fund raising.

Much efforts were given to design as much light and flexible construction as possible to meet the future changing demands.

Appendix-2:

Baan Nong Bua School

Baan Nong Bua, Thailand

2018 Building of the Year, ARCASIA
by Jun Sekino
(JUNSEKINO Architect & Design Co.,Ltd.)

Make cities and human settlements inclusive, safe, resilient and sustainable

The built environment is crucial to the development of sustainable cities and communities.

The 1st Open Building housing in Japan, built in 1993, is composed of the following experimental technology and management systems,

1) Skelton + Infill + Cladding (Open Building System)
2) Flexible Floor Plan
3) Fuel Cell Cogeneration
4) Gas-turbine Cogeneration
5) PV Power Generation
6) Waste Disposal System
7) Aqua-loop System
8) Urban Biotope
9) 3D Passage System
10) Life Cycle Analysis
11) Environmental Accounting

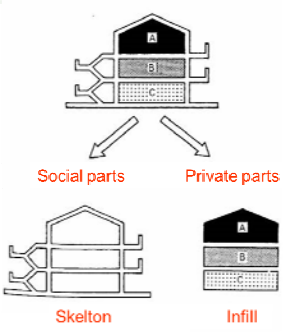
Skelton + Infill for longevity & flexibility

Appendix-3

NEXT 21

Osaka, JAPAN

by Prof. UCHIDA et al.



13 CLIMATE ACTION

Take urgent action to combat climate change and its impacts

The CO_2 footprint of the built environment must be reduced, and buildings and settlements must be adapted to the changing climate.

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Appendix-4:

JCCU Plaza

Shibuya-ku, Tokyo, Japan
by NIKKEN Sekkei Inc.

2018 Grand Prix, JIA Environment Award

Japanese Consumers Cooperative Union (JCCU) set up the new policy of "CO-OP for SDGs (the 7 Goals of #12, #7, #1, #16, #5, #11, #13 and #3)," as core activities of the consumers' cooperative organization.

Accordingly, the new headquarters was designed and build in a central area of Tokyo, to create a region specific and decent office building including;
1) Energy efficiency using solar and co-generation
2) Safe interior with no hanging facility from the ceilings
3) Stable & comfortable indoor temperature at ave.20C.
4) Supporting space and provisions for disaster victims

17 PARTNERSHIPS FOR THE GOALS

Strengthen the means of implementation and revitalize the global partnership for sustainable development

Every city is built by many hands, and similarly we need to work together to reach the 17 Sustainable Development Goals, as no single stakeholder can reach them alone.

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Photos: SHIGERU BAN ARCHITECTS

Appendix-5:

Voluntary Architects Network (VAN)

Based In Tokyo, Japan

by Shigeru BAN (SHIGERU BAN ARCHITECTS)

The Great Earthquake and the following Tsunami hit the East Japan in 2011, and left huge amount of affected people evacuated in unhuman gymnasiums as refuges for long time.

Paper Partition System designed and provided by VAN for human dignity at Ohtsuchi High-School's gymnasium as an aftermath refuge, set up by the refugees themselves

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Photos: TOYO ITO & ASSOCIATES, ARCHITECTS

Since Mar.11th, 2011, Toyo ITO has been energetically committed in relief and recovery activities in the affected regions.

"Home-for-All" projects are among them, providing a place for peace of mind for the victims to meet and communicate each other.

More than 10 "Homes-for-All" have been thereafter completed to date for a variety of affected people.

Appendix-6:

"Home-for-All" Networking

Based In Tokyo, Japan

by Toyo ITO et al. (TOYO ITO & ASSOCIATES, ARCHITECTS)

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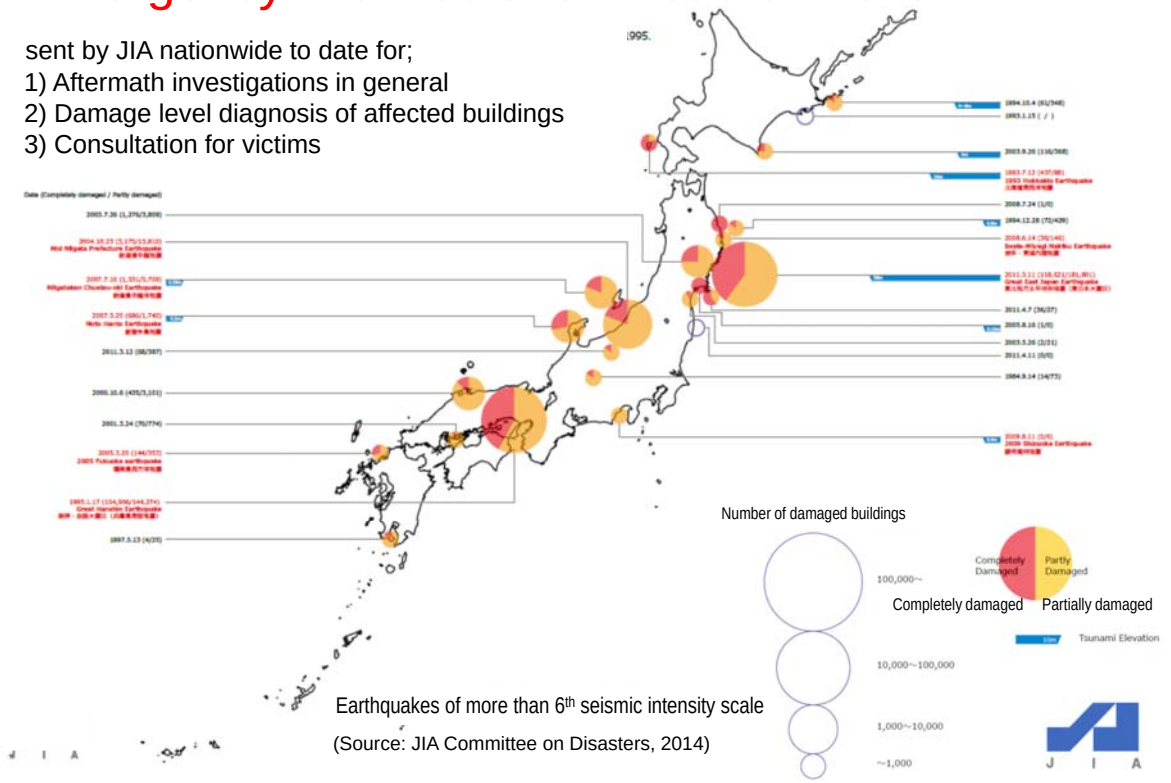
Emergency Architects for Disaster Relief

sent by JIA nationwide to date for;
1) Aftermath investigations in general
2) Damage level diagnosis of affected buildings
3) Consultation for victims



Earthquakes of more than 6th seismic intensity scale

(Source: JIA Committee on Disasters, 2014)

4 NEXT STEPS TO GO

The next steps are planned to be executed as follows;

Communication

Communication campaign / platform for wide scale promulgation

Data Bank

Data bank of case studies and urban professionals.
Develop an index of architectural qualities (in relation to SDG)
Source, categorise, analyse case studies representing each UIA region

Education

Develop education policies and summer school programme

To be continued…