APEC Sustainable Energy Center

Report to EGEE&C55 – Updates

Steivan DEFILLA

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Outline

- **Research**
  - **Research on Forms of Low-Carbon Energy Systems**
  - **Research on the Role of Urban Planning for Addressing Climate Change and Disasters**
- **Projects**
  - **Solar Powered Emergency Shelter Solutions Phase II**
- **Events**
  - **6th Asia-Pacific Energy Sustainable Development Forum and 5th Workshop on Sustainable Cities, Sept 2020**

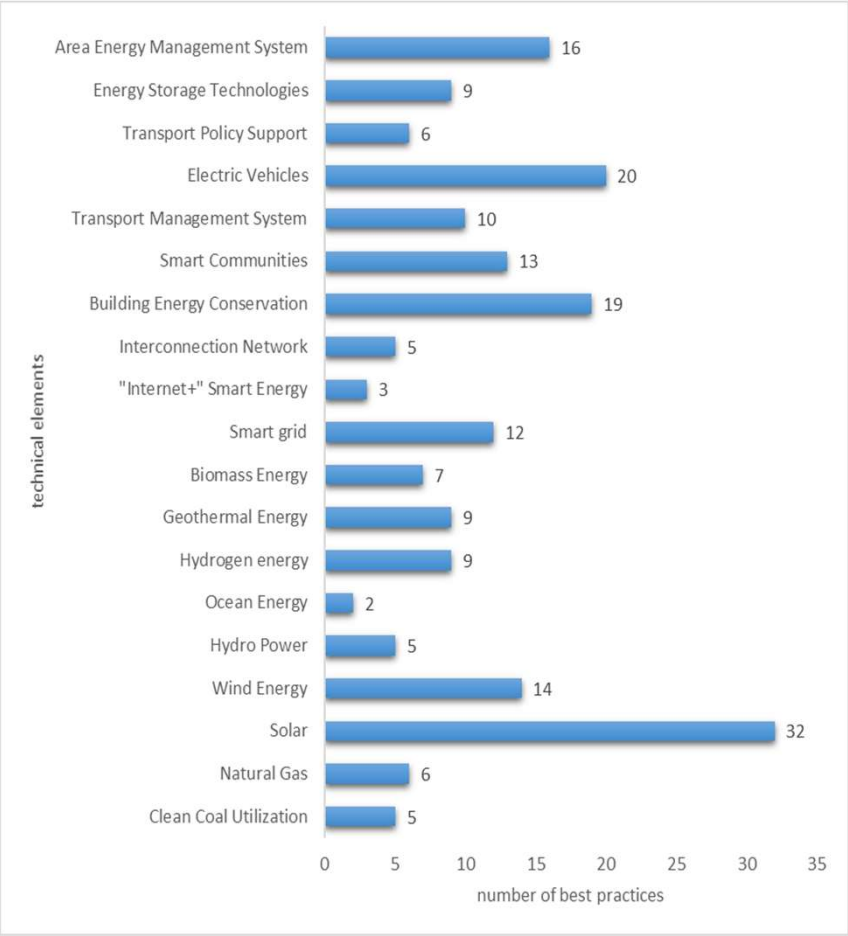
Research on Forms of Low-Carbon Energy System and Best Practices for APEC Sustainable Cities (EWG 12 2018S)

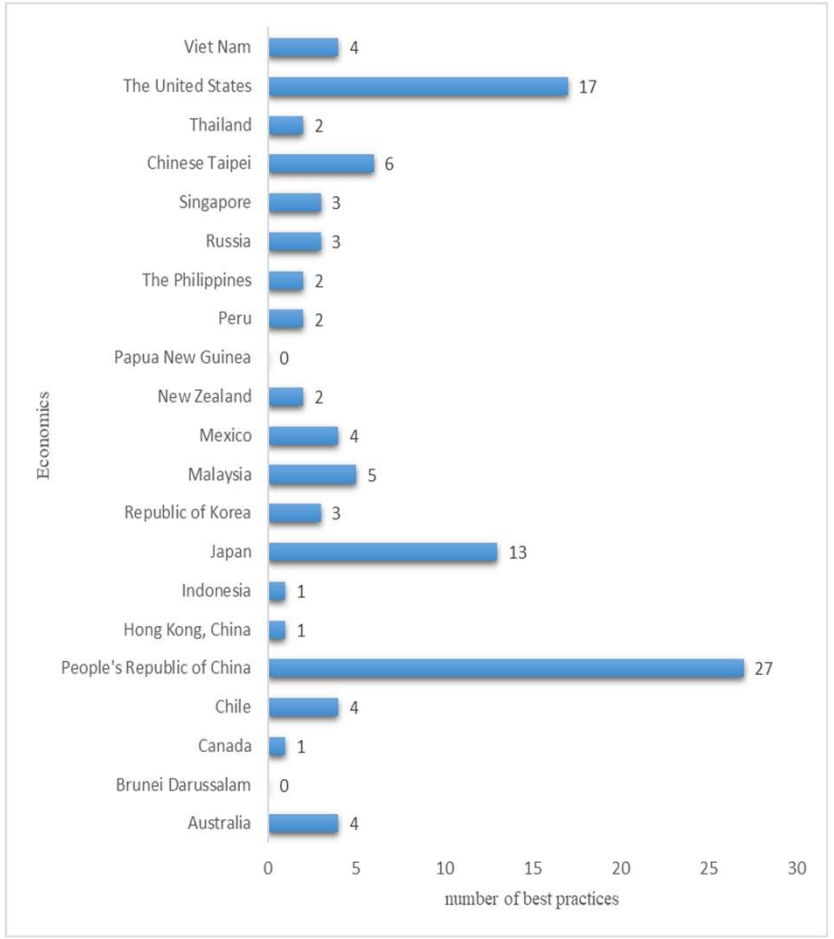
- Output of self-funded project **EWG 12 2018S**
- Research on city energy supply and city energy use;
- Cases studies of 122 excellent practices;
- Forms of Low-Carbon Energy System;
- APEC publication (APEC#220-RE-01.10)

“Research on Forms of Low-Carbon Energy System and Best Practices for APEC Sustainable Cities”

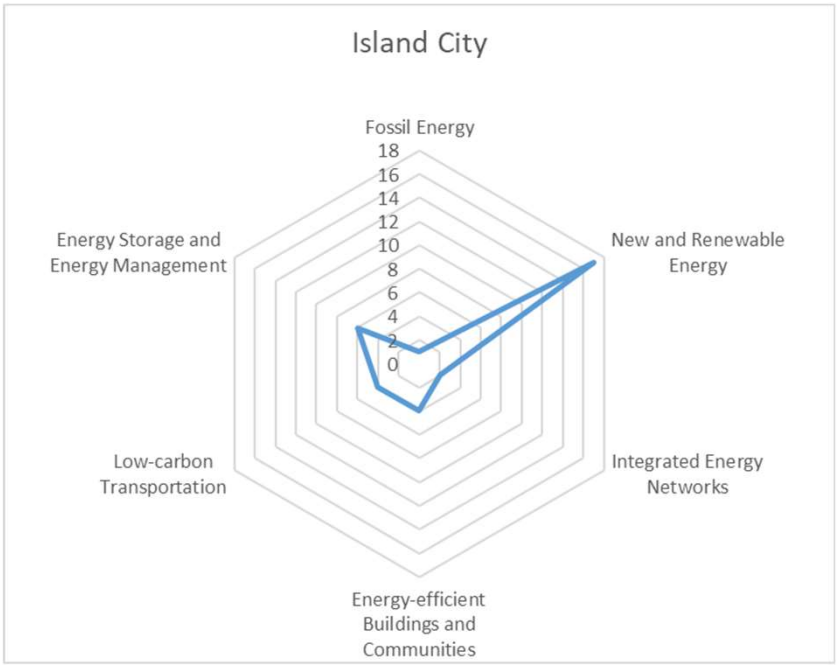
https://www.apec.org/Publications/2020/09/Research-on-Forms-of-Low-Carbon-Energy-System-and-Best-Practices

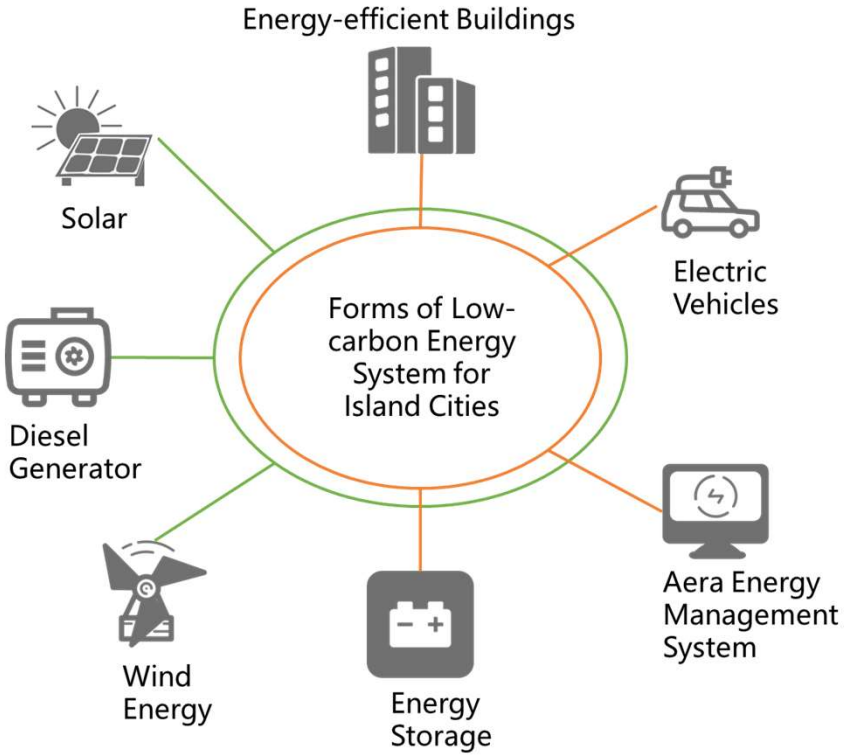
Key technical elements and Best practices among economies





Forms of Low-Carbon Energy System





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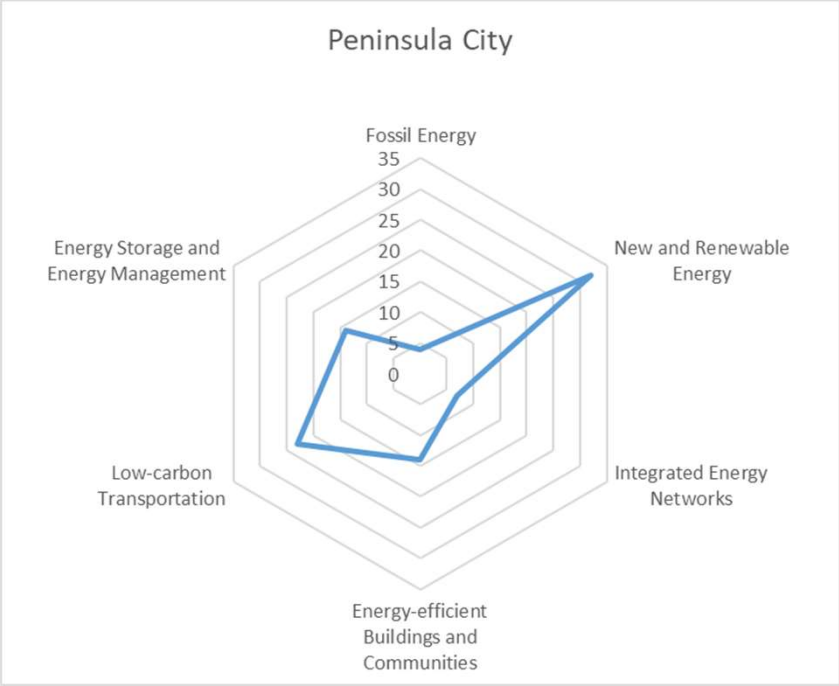
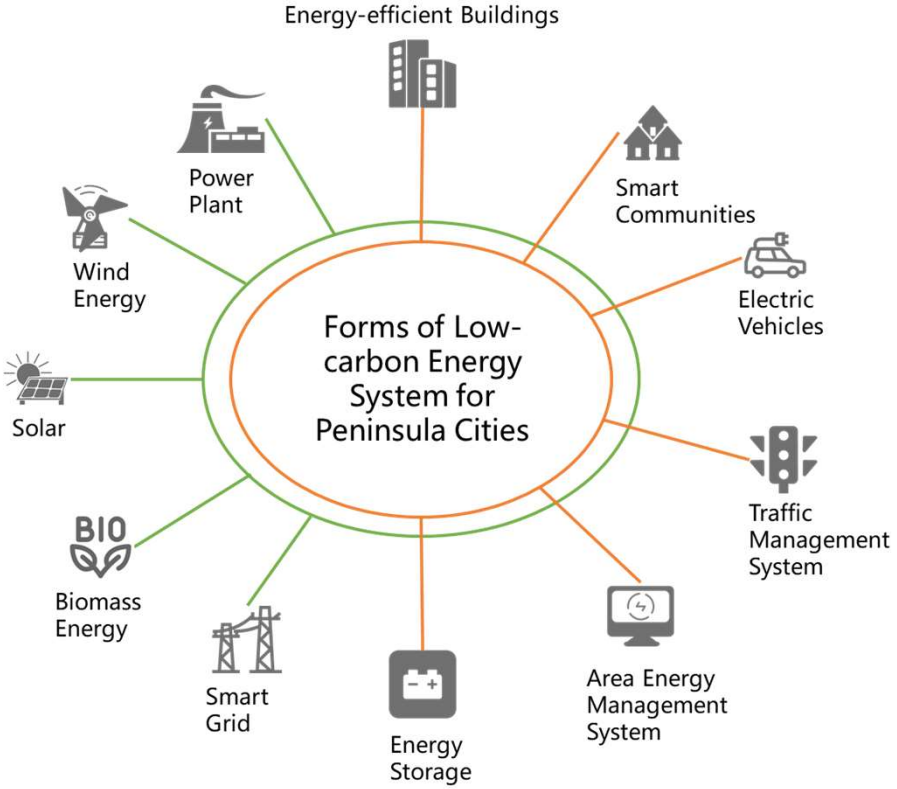
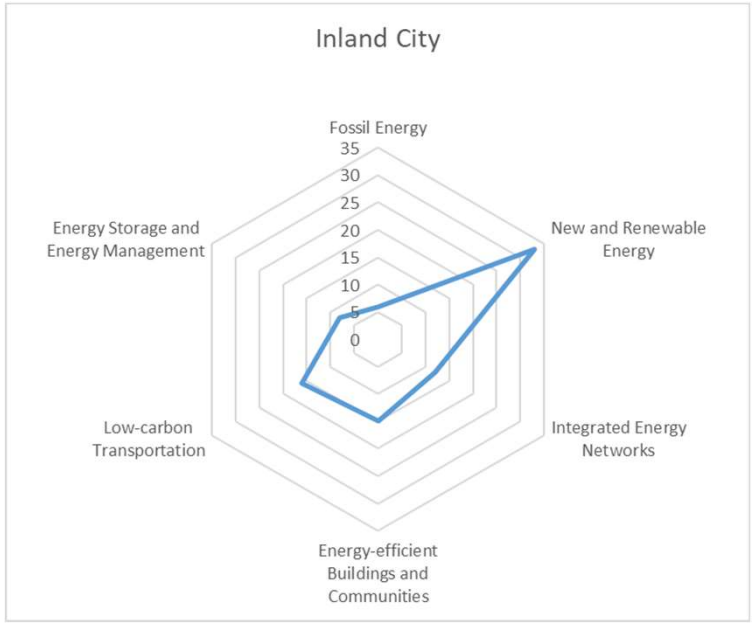
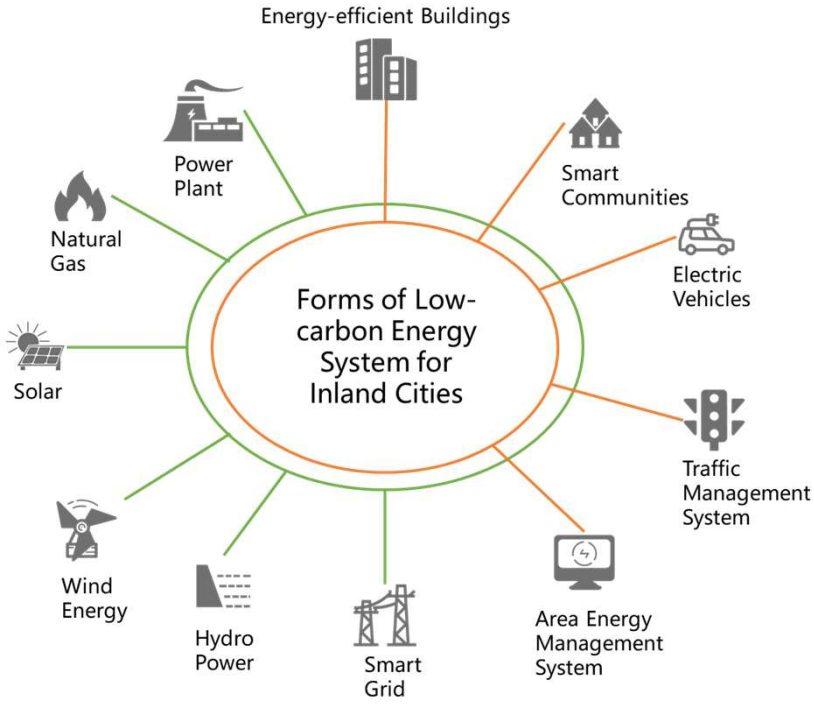




Forms of Low-Carbon Energy System





Research on the role of Urban Planning for Addressing Climate Change and Disasters (EWG 09 2019S)

APEC Integrated Urban Planning Report – Combining Disaster Resilience with Sustainability
(«*APSEC 2020*»)

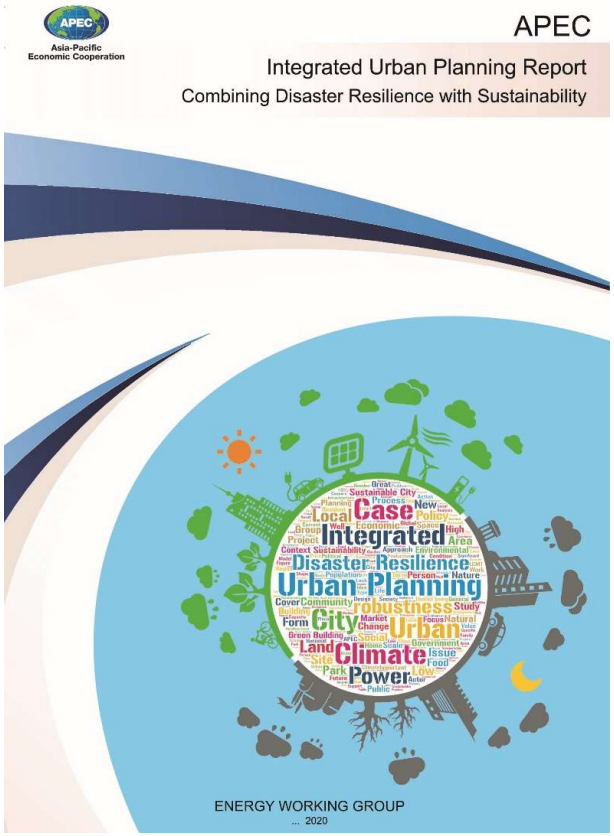
Output of self-funded **project**
EWG 09 2019 S

First draft presented at the 5th Asia-Pacific Energy Sustainable Development Forum September 2019

Originally planned as joint co-operation project with APEC Policy Support Unit PSU, but PSU did not reach consensus to co-operate

Revised draft presented at the 6th Asia-Pacific Energy Sustainable Development Forum, September 2020

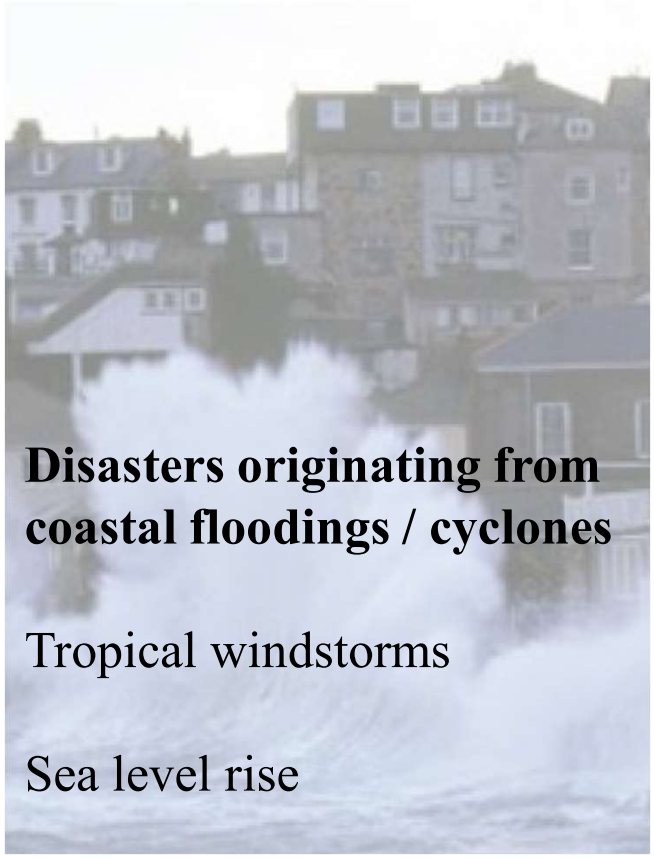
Will soon be submitted to EWG for endorsement



Threats from Climate-Related Disasters

Disasters originating from inland waters

- **Flashfloods: overload of local water drainage**
- **Riverine floods (possibly caused by far upstream rain)**
- **Droughts**
- **Landslides**
- **Specific threats:**
  - **Locust infestation**
  - **Subsidence**
  - **River sedimentation disturbance**



Disasters originating from coastal floodings / cyclones

Tropical windstorms

Sea level rise

Disasters from extreme temperatures

Change of local climate

Destruction of human climate-niches

Wildfires

Deaths due to Disasters in APEC Region 1900 - 2018

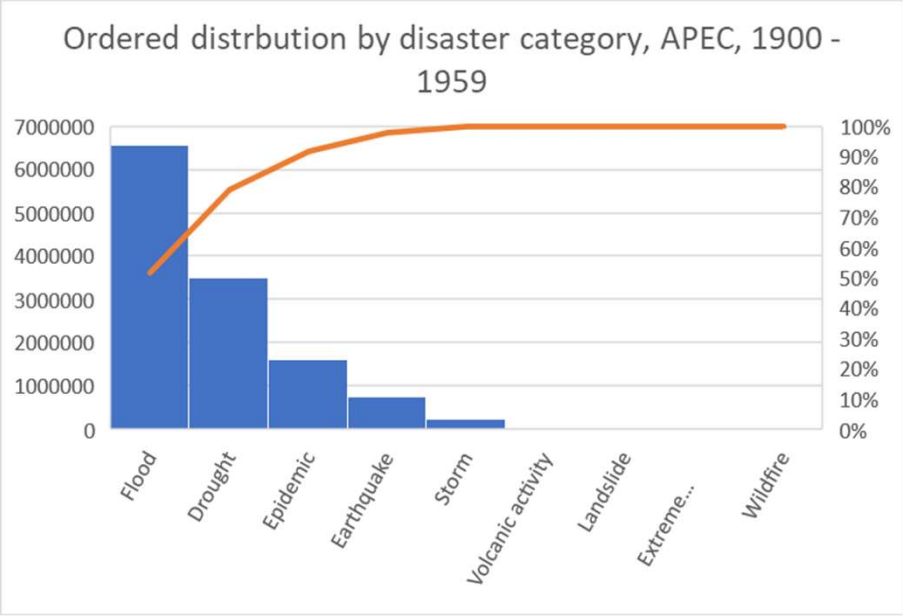
Improved resilience between period 1900 – 1959 and 1960 - 2018

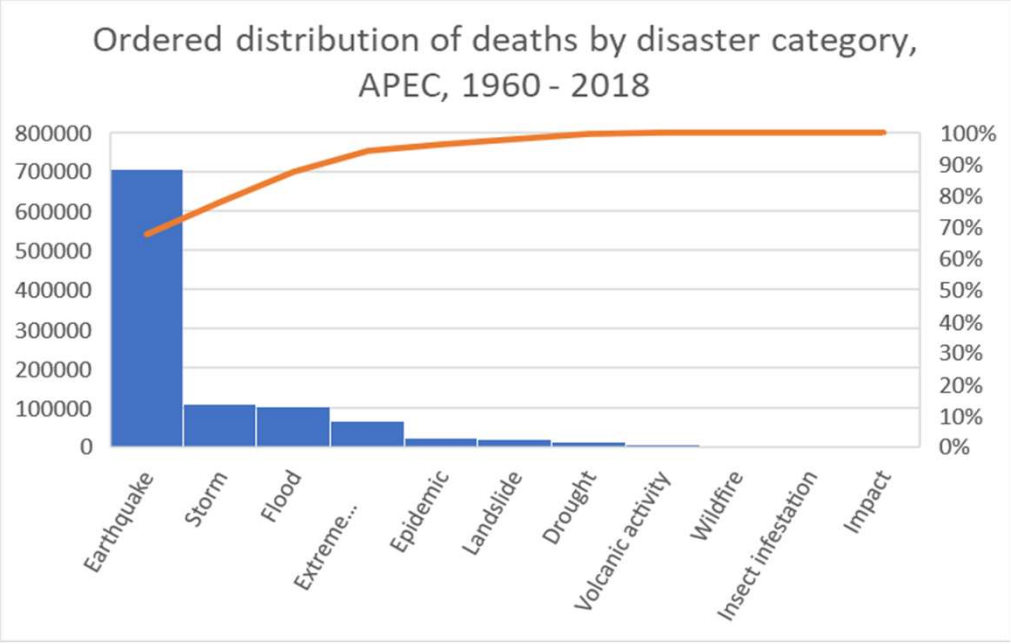
Floods: 65 times less deaths

Droughts: 258 times less deaths

Epidemics (before COVID-19): 73 times less deaths

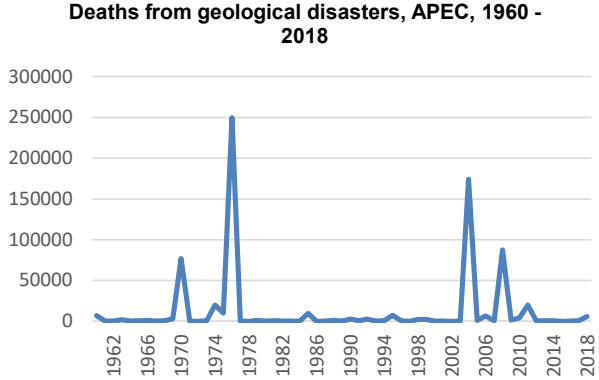
Earthquakes: only 7% less deaths

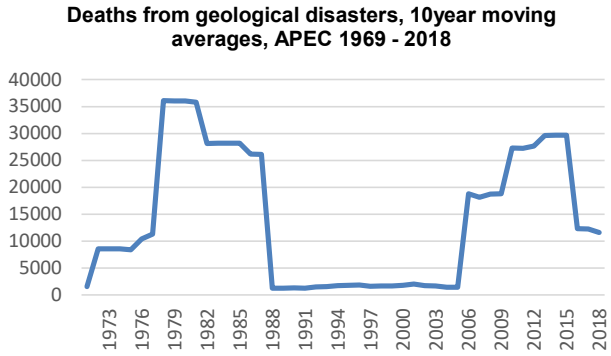




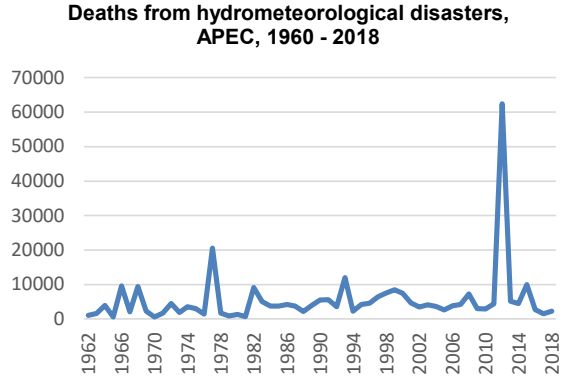
Trends in deaths due to disasters 1960 – 2018 APEC

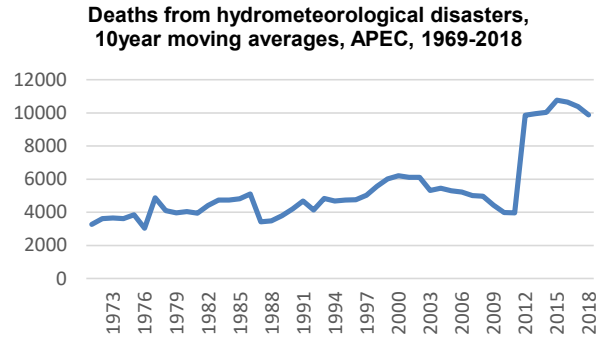
Statistically not measurable decrease





Statistically measurable increase





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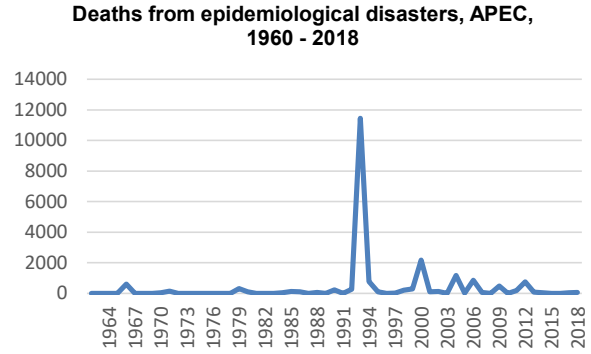
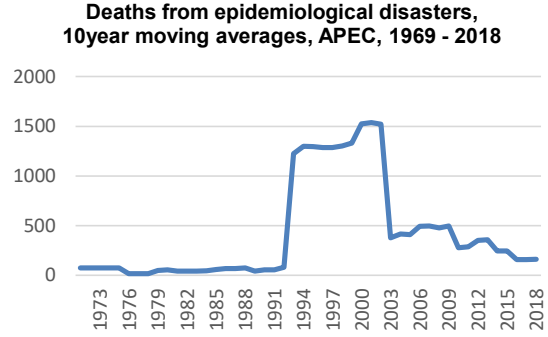
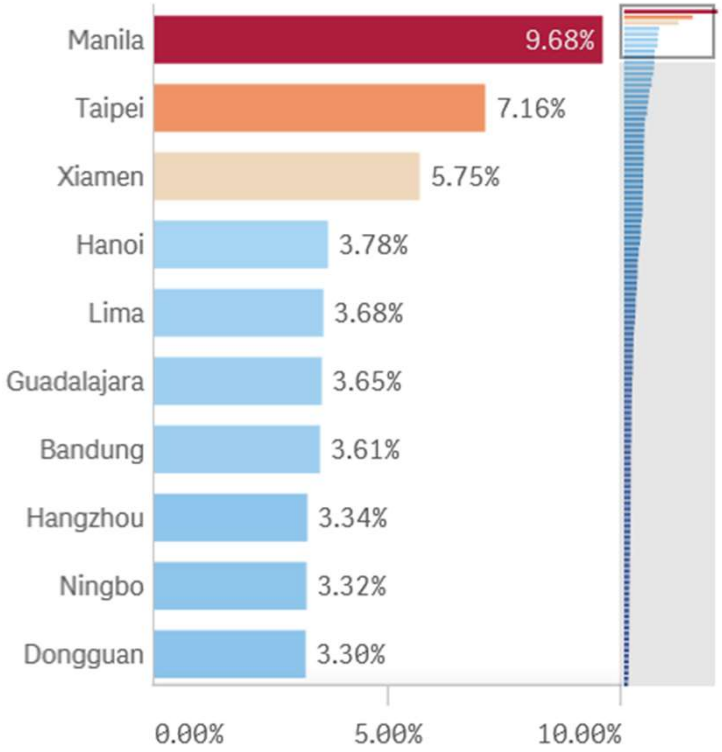




APEC Cities: highest Risk to GDP (except for war-torn cities)



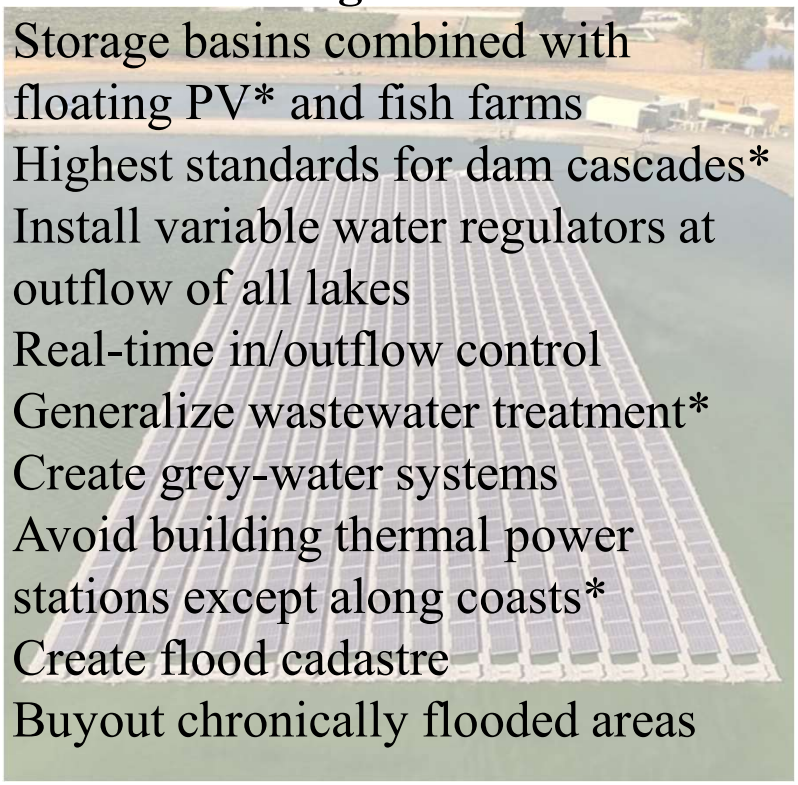
Manila is worldwide the most threatened city that is not war-torn, with 9.68% GDP at risk. Manila is also the most disaster-threatened APEC city

World's most exposed cities (in %GDP) for all 22 threats cumulated are all war-torn:
Kabul 17%,
Tripoli 16%,
Saana 15%,
Baghdad 15%,
Khartoum 13%,
Kinshasa 11%,
Beirut 10%

Bearable risk level (all threats) < 1-2% GDP, e.g. Hong Kong: 0.93% GDP

Examples of Measures mitigating Inland Water Disasters

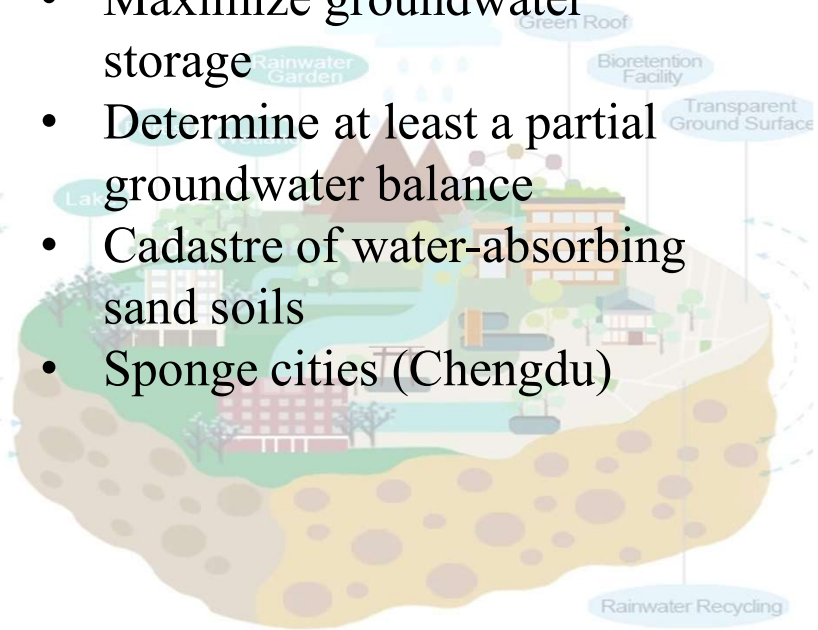
River basin management



- Storage basins combined with floating PV* and fish farms
- Highest standards for dam cascades*
- Install variable water regulators at outflow of all lakes
- Real-time in/outflow control
- Generalize wastewater treatment*
- Create grey-water systems
- Avoid building thermal power stations except along coasts*
- Create flood cadastre
- Buyout chronically flooded areas

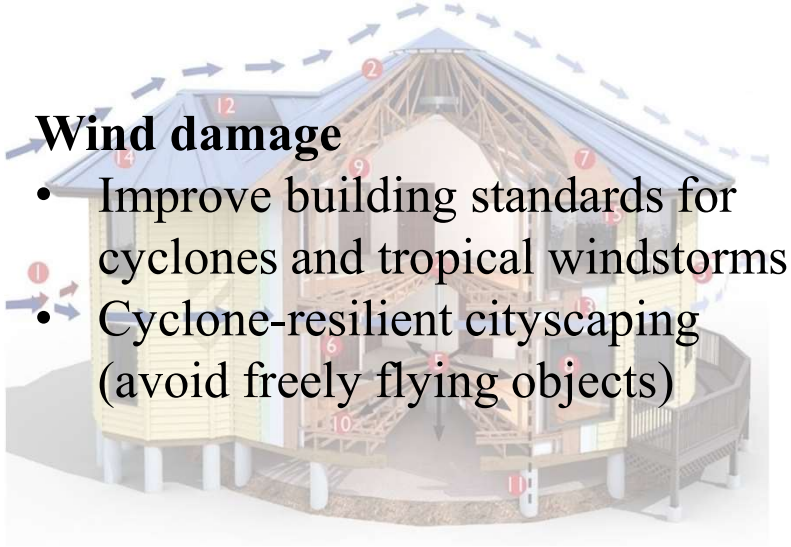
Groundwater management

- Maximize groundwater storage
- Determine at least a partial groundwater balance
- Cadastre of water-absorbing sand soils
- Sponge cities (Chengdu)



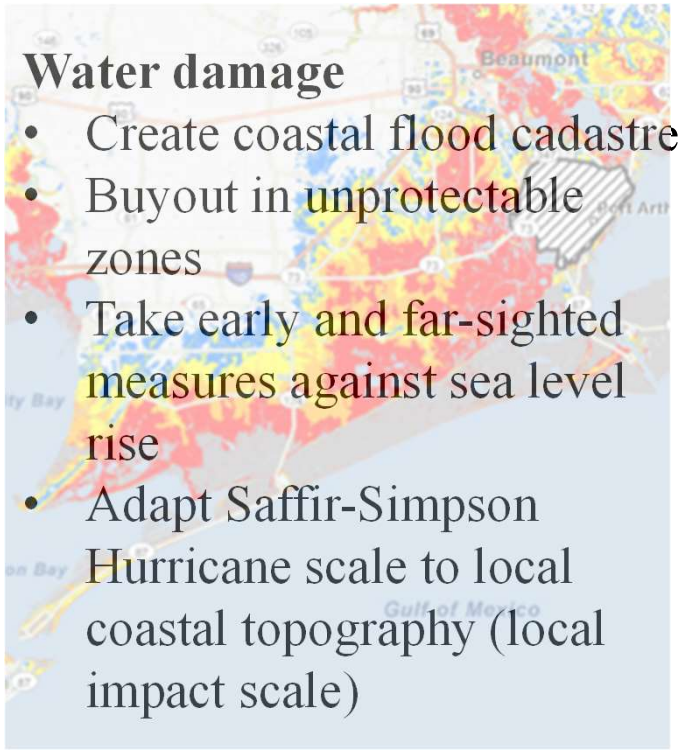
* Synergy with energy system

Examples of Measures mitigating Tropical Windstorms



Wind damage

- Improve building standards for cyclones and tropical windstorms*
- Cyclone-resilient cityscaping (avoid freely flying objects)



Water damage

- Create coastal flood cadastre
- Buyout in unprotectable zones
- Take early and far-sighted measures against sea level rise
- Adapt Saffir-Simpson Hurricane scale to local coastal topography (local impact scale)

* Synergy with energy system

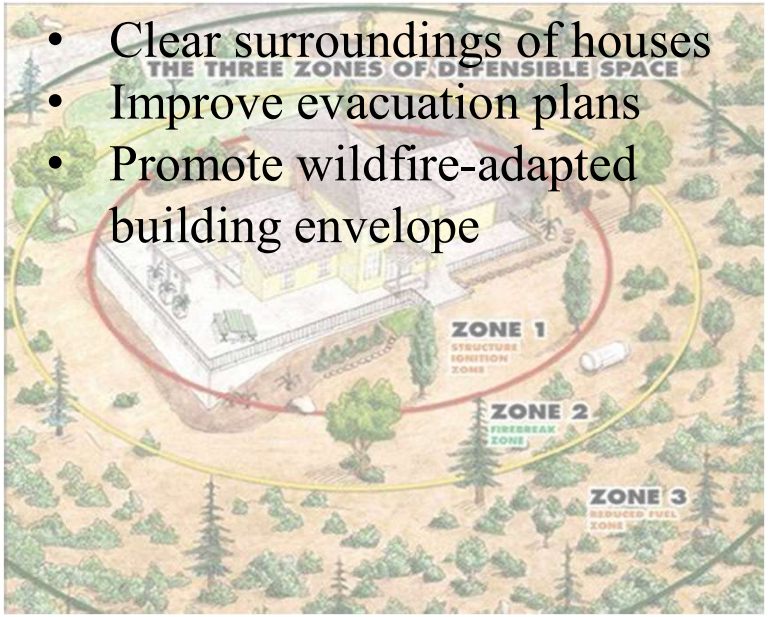
Examples of Measures mitigating Extreme Temperatures

Extreme temperatures

- Generalize passive housing and solar-powered HVAC*
- Generalize use of renewables for space cooling*
- Promote solar-powered district cooling*
- Define cooling as energy product*
- Generalize heat-reflective paint*
- Promote integrated PV-crop cultures*
- Promote PV-cooled greenhouses*

Wildfires

- Clear surroundings of houses
- Improve evacuation plans
- Promote wildfire-adapted building envelope



* Synergy with energy system

Example of Measures against Disasters of Geological Origin

Earthquakes

- East Asian >1000 years old architectural techniques (taishin, seishin)
- Modern approach: base isolation (menshin)
- Regulate risk of artificial earthquakes (e.g. fracking)*
- Existing buildings: combined seismic and energetic exterior insulation*
- Emergency preparedness (skills and drills, resilient communities)

Tsunamis

- All measures are necessary
- Mutliple protections
- Seawall against 150-year events
- Vegetation buffers
- Vertical evacuation
- Early warning systems
- Emergency preparedness (skills and drills, resilient communities)

Volcanic eruptions

- Small eruptions: tourist attractions
- Middle-size eruptions: Avoid construction, water collection and agriculture in danger zones
- Large eruptions: global events (e.g. Tambora 1815)

* Synergy with energy system

Example of Measures against Epidemics – COVID-19

Preventing spread

2002 SARS prevention measures proved largely insufficient for COVID-19

COVID-19 requirements:

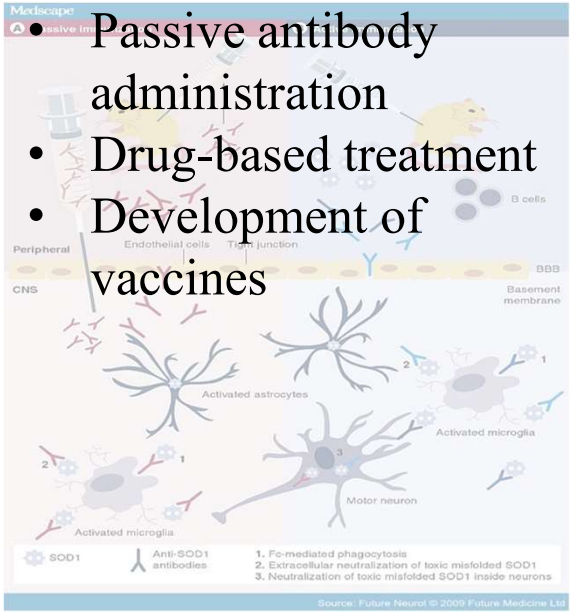
- Efficient contact tracing
- Testing, quarantining
- Physical distancing
- Dedicated hospitals

Buildings and tranport infrastructure*:

- HVAC with UV-C disinfection

Treatment

- Passive antibody administration
- Drug-based treatment
- Development of vaccines

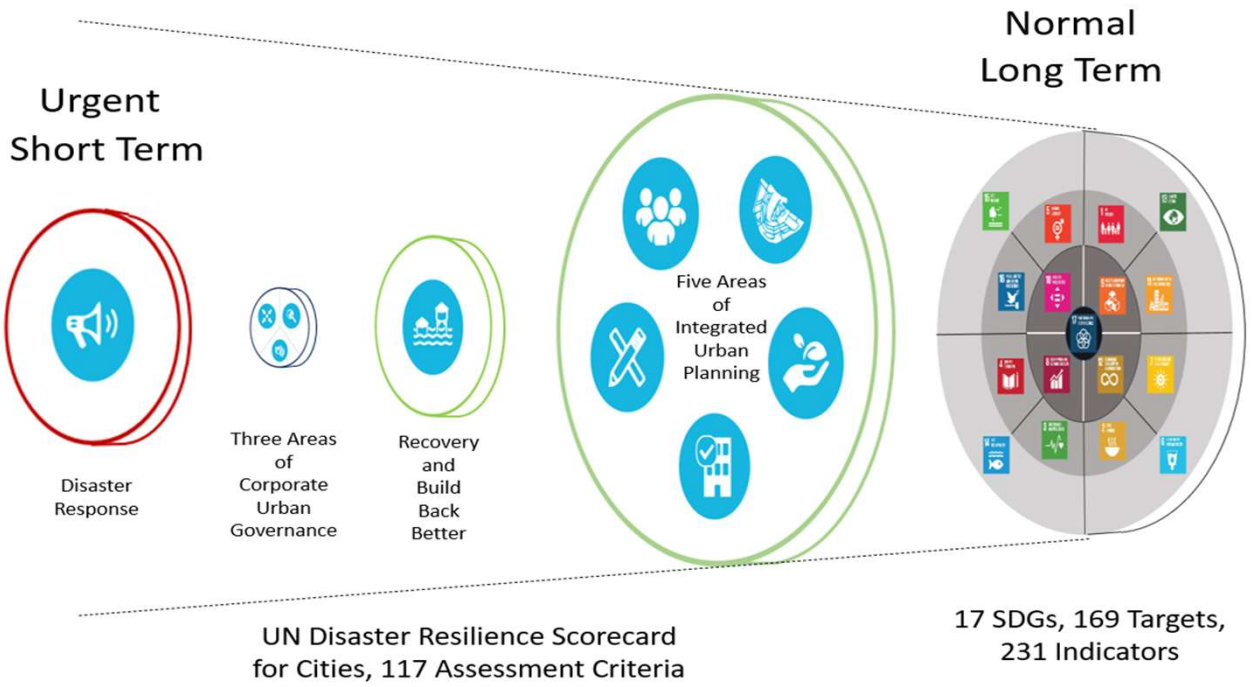


* Synergy with energy system

Favouring positive impact on other sub-systems (economy, schools, IT)

- Continuity of service planning
- Home office
- Distant schooling
- Resilient communities (skills and drills)
- Combine economic stimulus packages with key SDG targets*

Integrating Disaster Resilience with Sustainable Development



Systems-theoretical elements:

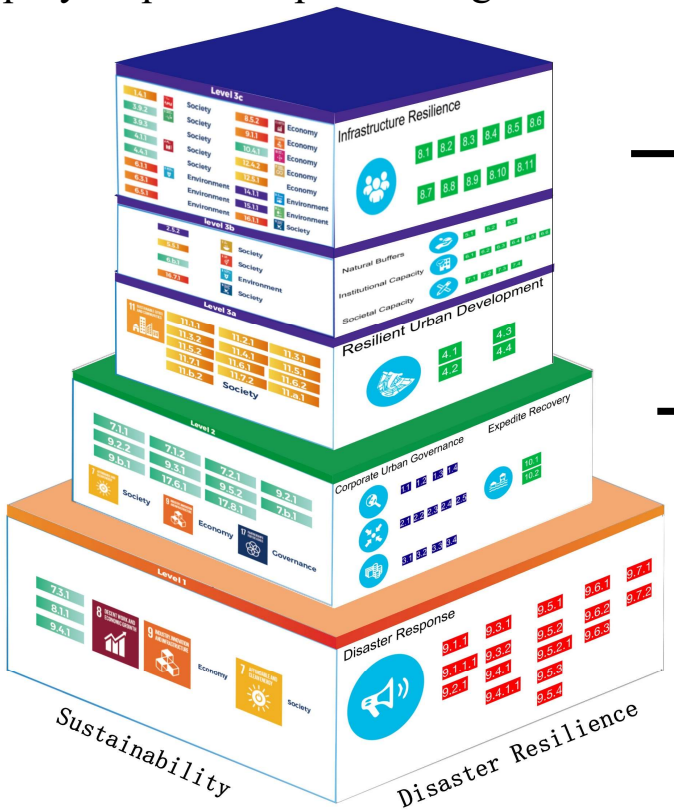
SDGs = objectives or targets

Each target needs at least one instrument to attain it

Disaster Resilience = instruments to attain the targets

Urban SDG Tracker (will be separate APEC Project)

Step-by-step build-up according to Commitment Levels within the Cooperative Network of Sustainable Cities (CNSC)



Commitment level 3: Implementing and evaluating local action plan
Objective: In-depth transformation towards integrated sustainable development and disaster resilience. Data requirement aiming at monitoring equilibrated in-depth development in all major urban areas

Commitment level 2: Local 2050 vision, 2030 targets, elaborating integrated holistic local action plan
Objective: Data requirement aiming at achieving rapid progress, driven by key areas (energy, industrial innovation, IT, urban governance)

Commitment level 1: Improve sustainable development and disaster resilience and showcase results
Objective: Allowing APEC communities of any size to participate in the CNSC city network with little data requirement (population, GDP, energy, CO2, land area, disaster response)

Outline

- Research
  - Research on Forms of Low-Carbon Energy Systems
  - Research on the Role of Urban Planning for Addressing Climate Change and Disasters
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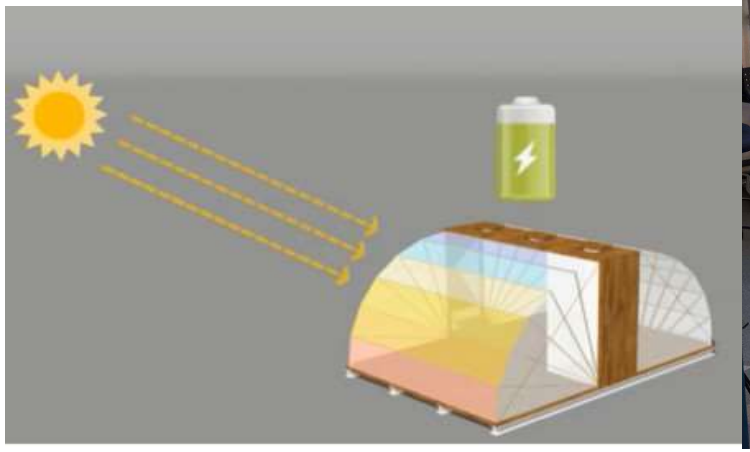
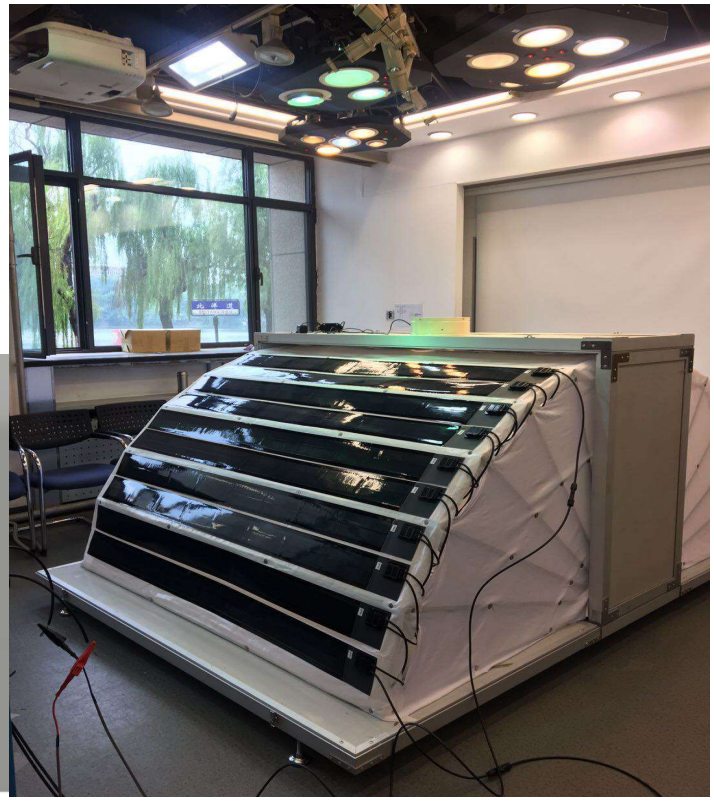
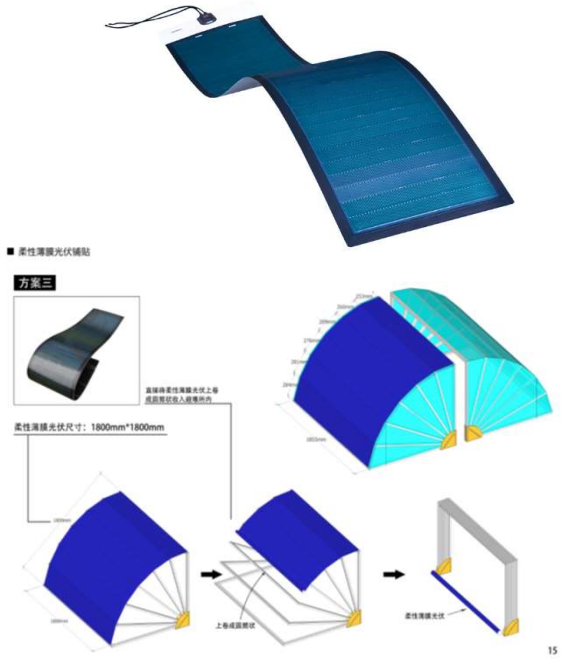
Increase Energy Resilience-APEC Funded Project SPESS

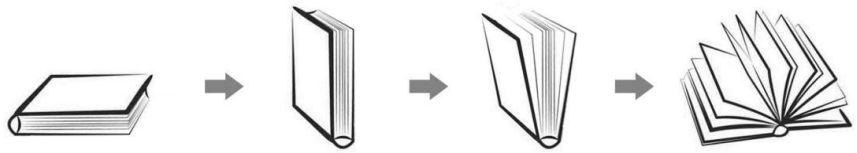
APEC-Funded Project (EWG 22 2015A)
Developing Solar-Powered Emergency Shelter Solutions (SPESS) As an Energy-Resilience Tool for Natural Disaster Relief in APEC Community.





Hanergy MiaSole FLEX CIGS Think-film Solar Module

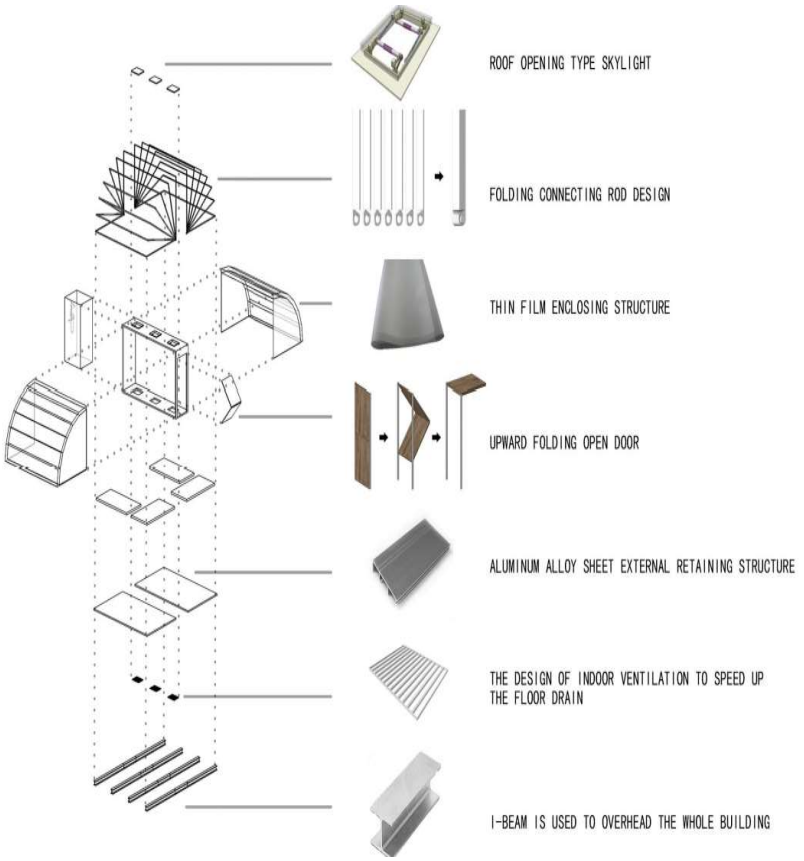




Inspired by the way of opening books. Not only can the convenient transportation, but also can expand and function layout quickly, to ensure that local people have a small home for shelter as soon as possible.

The small building can accommodate 4-6 people which is used for a family or a separate individual. It only meets the requirements of the most basic life.

The big building is mainly used as a temporary public building, it can used as a small reading room, a temporary hospital which can accommodate six hospital beds and an operation room or a complex and surgical ward.

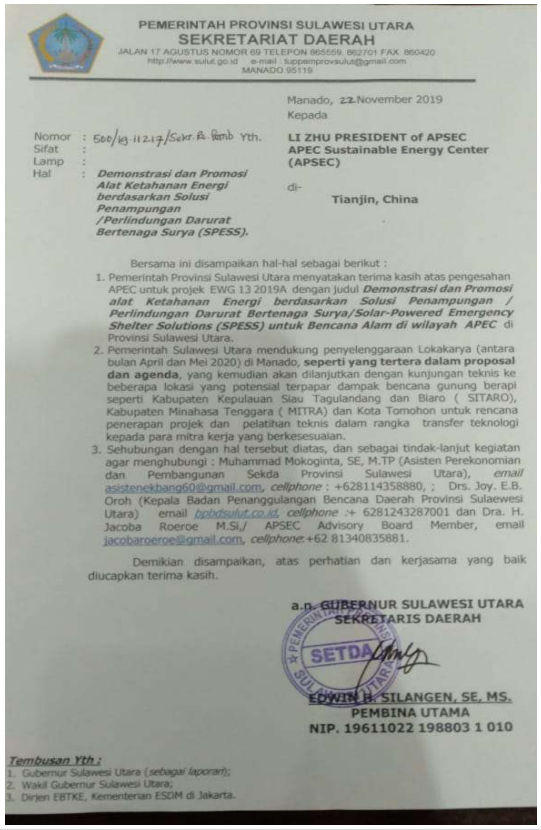


Post Impact and Continued Work of APEC Funded Project SPESS

APSEC was approved a new APEC funded project (SPESS Phase II) — Demonstration and Promotion of Energy Resilience tool based on Solar-Powered Emergency Shelter Solutions (SPESS) for Natural Disaster in APEC .

Main Objective: carry out outcome of EWG 22 2015A—provide technical support, establish workshop and technical training to engage key APEC stakeholders, and establish demonstration project in China and other susceptible economics to natural disasters.

Project Title	Demonstration and Promotion of Energy Resilience Tool based on Solar-Powered Emergency Shelter Solutions (SPESS) for Natural Disasters in APEC	**Project Year**	2019
Project Number	EWG 13 2019A	**Project Session**	Session 2
Project Type	Standard	**Project Status**	Project in Implementation
Co-Sponsoring Economies	Australia; Hong Kong, China; Indonesia; Papua New Guinea; Philippines; Thailand		



PEMERINTAH PROVINSI SULAWESI UTARA
SEKRETARIAT DAERAH
JALAN 17 AGUSTUS NOMOR 69 TELEPON 865559, 862701 FAX. 860420
http://www.sulut.go.id e-mail : suppemprovsulut@gmail.com
MANADO 95119

Manado, 22 November 2019
Kepada

Nomor : 500/13 11217/Sekr. A. Perek Yth.
Sifat :
Lamp :
Hal : *Demonstrasi dan Promosi Alat Ketahanan Energi berdasarkan Solusi Penampungan /Perlindungan Darurat Bertenaga Surya (SPESS).*

LI ZHU PRESIDENT of APSEC
APEC Sustainable Energy Center (APSEC)
di-
Tianjin, China

Bersama ini disampaikan hal-hal sebagai berikut :

1. Pemerintah Provinsi Sulawesi Utara menyatakan terima kasih atas pengesahan APEC untuk projek EWG 13 2019A dengan judul ***Demonstrasi dan Promosi alat Ketahanan Energi berdasarkan Solusi Penampungan / Perlindungan Darurat Bertenaga Surya/Solar-Powered Emergency Shelter Solutions (SPESS) untuk Bencana Alam di wilayah APEC*** di Provinsi Sulawesi Utara.
2. Pemerintah Sulawesi Utara mendukung penyelenggaraan Lokakarya (antara bulan April dan Mei 2020) di Manado, **seperti yang tertera dalam proposal dan agenda**, yang kemudian akan dilanjutkan dengan kunjungan teknis ke beberapa lokasi yang potensial terpapar dampak bencana gunung berapi seperti Kabupaten Kepulauan Siau Tagulandang dan Biaro (SITARO), Kabupaten Minahasa Tenggara (MITRA) dan Kota Tomohon untuk rencana penerapan projek dan pelatihan teknis dalam rangka transfer teknologi kepada para mitra kerja yang berkesesuaian.
3. Sehubungan dengan hal tersebut diatas, dan sebagai tindak-lanjut kegiatan agar menghubungi : Muhammad Mokoginta, SE, M.TP (Asisten Perekonomian dan Pembangunan Sekda Provinsi Sulawesi Utara), *email* asistenekbang60@gmail.com, *cellphone* : +6281143588880, ; Drs. Joy. E.B. Oroh (Kepala Badan Penanggulangan Bencana Daerah Provinsi Sulawesi Utara) email bpbdsulut.co.id, *cellphone* :+ 6281243287001 dan Dra. H. Jacoba Roeroe M.Si,/ APSEC Advisory Board Member, email jacobaroeroe@gmail.com, *cellphone*:+62 81340835881.

Demikian disampaikan, atas perhatian dan kerjasama yang baik diucapkan terima kasih.

a.n. GUBERNUR SULAWESI UTARA
SEKRETARIS DAERAH

SETDA

EDWIN H. SILANGEN, SE, MS.
PEMBINA UTAMA
NIP. 19611022 198803 1 010

Tembusan Yth :
1. Gubernur Sulawesi Utara (*sebagai laporan*);
2. Wakil Gubernur Sulawesi Utara;
3. Dirjen EBTKE, Kementerian ESDM di Jakarta.

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6th Asia-Pacific Energy Sustainable Development Forum, 16 - 18 September 2020 (online / onsite, Tianjin)

Mr. Jyuung-Shiauu Chern, the **Lead Shepherd** of APEC Energy Working Group; Mr. ZHOU Ningyu, the Division Director in Department of International Economic Affairs of **Ministry of Foreign Affairs**; Mrs. Huimin PAN, the Division Director in Department of International Cooperation of **National Energy Administration**; Mr. Wenping HU, the **Vice President of Tianjin University** and nearly 200 representatives from the APEC Energy Working Group (EWG), 14 APEC economies, independent experts and domestic government departments, universities, research institutions and enterprises attended the forum to explore APEC energy sustainable development.

Four parallel sessions held along the 6th Forum:

- 6th APSEC Steering Committee Meeting & 5th Advisory Board Meeting,
- Network of Chinese Participation in APEC Energy Cooperation & Training on APEC ESCI,
- The 5th Workshop on Sustainable Cities
- Workshop on Energy Transition and Scaling-up Renewable Energy

5th Workshop on Sustainable Cities, 17 September 2020

- Co-organized with IRENA
- Themes:
  - (1) Energy Resilience though Urban Renewables
  - (2) Sustainability Indicators and Trackers
- Online event organized as parallel session of the 6th Asia-Pacific Energy Sustainable Development Forum
- Participating speakers from: IRENA, APSEC, China, Hong Kong China, Philippines, AIIB, RAP, RMI, UNESCAP, WRI
- Audience: Australia, China, Hong Kong China, Canada, Indonesia, Malaysia, Philippines, Thailand, United States
- In total 49 participants

THANK YOU!