

Swissnex Regional Report 2021: Towards Carbon Neutrality in APAC

Chapter 2 – Sustainable Living and Social Response

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Hosting almost half of the world's urban population, figure which does not seem to change any time soon, the Asia Pacific (APAC) Region experiences big challenges in its path towards a more sustainable living. Overtime rural areas have been losing their appeal compared to urban centres due to scarce job opportunities and services, contributing to widen income gaps. High population density and weak regulations have been facilitating a continuous reshape of the cities along with lifestyle changes as a function of the incomes growth. Experts have defined this latter as a “dizzying transformation” of traditional cultures, which might limit rather than create opportunity for efficiency. Indeed, while focusing on the economic growth, the risk is high to generate pollution and chaos, which compromises a sustainable urban development and widens the financial gap among the population.

In the last years, the attention of the whole globe moved towards the main contributors to the climate change. Urbanization and economic growth have been generating a chain of challenges that countries, included the ones in the APAC Region, are facing by adopting different strategies. Traffic congestion, air pollution, waste management and urban warming are just few of the issues to be addressed.

In this chapter, the steps adopted by Australia, China, India, Japan, Singapore and South Korea in the path towards a more sustainable living and their social responses will be discussed with special attention to subjects like energy, mobility and waste.

Green standards and efforts in the construction and housing sectors

The depopulation of the rural areas in favour of increasing urbanization caused a rising demand of resources like water and electricity from households, which consistently contributes to urban warming and air pollution along with emission from transportation and factories. Transition to clean energy sources and investments in innovative insulating materials and construction design have been identified as steps to undertake to meet the energy efficiency targets set by the nations.

With 20% of the total national carbon emissions, the building energy consumption is expected to rise to 40% by 2030 in China, currently already leading the rank as the most polluted country. In addition, the lifespan of Chinese buildings is around 30 to 50 years, much shorter than developed countries, which makes the transition to more sustainable construction sector a pressing challenge to be addressed. Between 2005 and 2019 China topped the world with the construction of 1800 buildings according to the Leadership in Energy and Environmental Design – LEED green building certification¹. However, already in 2016 the Chinese Government launched its own green building rating system – the Three Star System – more focused on meeting the requirements for **energy saving and structure optimization** than on answering to the demand in innovation technology and materials of LEED. It also requires materials to be produced within 500 km radius of the construction site, but it does not consider their life cycle and waste generation². China marked bold goals in the transition to green buildings, requiring 50% of all new urban buildings

to match the criteria by 2030. With specific focus on the cooperation for energy efficient buildings, **Switzerland and China signed a Memorandum of Understanding** in 2020, according to which the two countries will exchange technological expertise³. The 13th Five Year Plan does not address energy efficiency for new households only, but the program is extended to schools, community hospitals and public buildings⁴

In the same way **South Korean** government established in 2012 its Green Standard for Energy and Environmental Design (G-SEED), which takes into account **building's environmental sustainability throughout its lifestyle**, from the materials to the ecofriendliness with the surrounding environment. Certified buildings are subjected to some reductions in taxes and environmental improvement charges. Result of mass and uncontrolled construction process after the Korean War, South Korean buildings have also short life and cities undergo continuous reshaping. As for the Chinese 13th Five Year Plan, the Korean Green New Deal covers all buildings without differentiating the types or purposes, but simply considering floor areas greater than 500 m². It is a natural evolution of efforts started in the early years 2000 when just 3 buildings met the requirements, becoming 1000 in 2014⁵. The current Green Remodelling under the Green Deal aims to improve more than 220 thousand housings that are over 15 years old by implementing solar energy panels and high performance insulation systems. Additionally, it plans to install energy-efficient infrastructures in public buildings such as national/

¹ [U.S. Green Building Council Announces Top 10 Countries and Regions for LEED Green Building](#)

² [Comparison of Chinese Green Building Standard with Western Green Building standards](#)

³ [Switzerland and China sign MOU on energy efficiency in buildings](#)

⁴ [How building efficiency partnerships can help China meet its sustainability goals](#)

⁵ Global Green Growth Institute. 2015. Korea's Green Growth Experience: Process, Outcomes and Lessons Learned.

https://www.greengrowthknowledge.org/sites/default/files/downloads/resource/Koreas-Green-Growth-Experience_GGGI.pdf

public kindergartens, museums and libraries⁶.

If China's target is to have 50% green buildings by 2030, the Green Building Masterplan launched in 2009 in Singapore set a higher threshold at 80%.⁷ Singaporean government aims to reduce of 15% energy consumption in apartment buildings (HDB) by integrating smart LED lights and solar energy panels by 2030. The **adoption of efficient appliance models and smart home technologies** meet the Minimum Energy performance Standards (MEPS) and are integral part of the newest HDB towns. However, something which differentiates the Singaporean case from the others is the specific target on data centres. Authorities have estimated that the 10 largest data centres in Singapore consume as much energy annually as 130'000 households.⁸ The Green Data Centre Technology Roadmap found that the sector has the potential to reduce energy use by more than 50% by 2030.⁹ For this reason, the Infocomm Development Authority has implemented initiatives to encourage energy efficiency in the design, operation and management of data centres. Currently, trials are ongoing at the Tropical Data Centre.

Improving energy efficiency in buildings and housing is also in the sights of the federal and state governments in Australia, where households generate 13% of the total emissions. A Low Energy Buildings national plan was launched with the goal to achieve **zero energy and carbon ready buildings**¹⁰. Interestingly, accelerating the transition to a more sustainable housing has been estimated in the equivalent of about 350 million CHF of extra investments in the construction industry by 2030, creation of over 7000 new jobs and save about 400 million CHF of Australians' energy bills¹¹.

Thanks to the **transition to non-fossil fuel electricity generation** – including renewables and nuclear– India reached already -21% of emissions intensity vs. - 33-35% expected to be achieved by 2030. Installation reached already the 38% of the targeted 40%¹² and, considering that electricity produced through this sources counted just for 22% in 2019¹³, this clearly shows the enormous potential for renewable in India. To help India mainstream energy efficient and thermally comfortable building design for both commercial and residential buildings, the **Indo-Swiss Building Energy Efficiency Project** started in 2011 under the Indian Ministry of Power and the Swiss Federal Department of Foreign Affairs. Building codes developed in this bilateral cooperation are now implemented in residential buildings¹⁴. Material efficiency is also under the Indian radar and already achieved with concrete outcomes. Limestone Calcined Clay Cement, LC3¹⁵, developed by a team of Swiss and Cuban researchers, is object of a project funded by the Swiss Agency for Development and Cooperation and the Indian Institutes of Technology in Delhi, Madras and TARA in partnership with 15 cement Indian companies. The cement uses degraded input materials and the production cost can be up to 25% lower, due to savings in energy and material cost. The whole production reduces carbon emissions of 40% than for ordinary cement. Demonstration buildings have been constructed in India, one of them also in the compound of the Embassy of Switzerland in New Delhi.

When speaking about construction materials, Japan decided to embrace its own tradition and move back to wood, material used for temples, shrines and castles since centuries. The revision of the building Standards Act in 2000 approved fireproof

⁶ <https://www.knewdeal.go.kr/front/view/task08.do>

⁷ [Green Building Masterplan](#)

⁸ [IDA Launches First-in-Singapore Green Data Centre Innovation Programme to Explore Green Technologies for Data Centres in a Smart Nation](#)

⁹ [Green Data Centre Technology Roadmap](#)

¹⁰ 'Trajectory for Low Energy Buildings', Council of Australian Governments / Energy Council 01.02.2019 [online](#)

¹¹ 'Growin the market for sustainable homes', CRC Low Carbon Living 16.01.2021 [online](#)

¹² <https://www.nrdc.org/experts/anjali-jaiswal/climate-action-all-eyes-india>

¹³ Central Electricity Authority, All India Electricity Statistics General Review 2020

¹⁴ <https://www.beepindia.org/>

¹⁵ <https://lc3.ch/>

wooden structures, paving the way to erect wooden mid-to-high-rise buildings. Sumitomo Forestry Co. announced its plan to realize a 70-storey, 350-meter mostly wooden skyscraper in Tokyo to mark the company 350th anniversary in 2041¹⁶. In a long term vision, the Company aims to increase use of wood in high-rises to expand carbon fixation and demand for timber, which in turn would lead to forest growth and

further CO₂ absorption. The idea of using trees as a recyclable resource is supported also from experts in academia. Theoretically, if trees can be grown in 50 years, structures can be rebuilt in the same cycle. In a sustainable vision, modular wood sections would be reused in smaller buildings after deconstruction and then turned in biomass fuel such as wood chips would be the ideal.

Preservation of biodiversity, CO₂ and urban warm reduction

The connection between nature and material lifecycle in Japan brings to another aspect of the transition to green constructions, which is the preservation and **integration of the biodiversity in the everyday life**. Rooftop gardening is well established in Tokyo, where people can buy honey made in Ginza, one of the city's most glamorous shopping district¹⁷. The urban bee project Ginpachi harvested 1000 kg of honey in the first half of 2021. An example for the next step is provided by the above mentioned W350 building will have greenery connected from the ground to the top floors through the balconies.

Schools provided the perfect place where combining youth education to sustainability and gardening. In **South Korea the Green and Smart School project implements education technology and includes the efforts to build sustainable eco-friendly school buildings**. Prior the announcement of the Green New Deal, the Rural Development Administration had already launched an initiative called Green School project

in 2018, to invite elementary schools nationwide to cultivate their own gardens in classrooms. It was announced to expand to the next years thanks to positive feedbacks, but Covid-19 pandemic prevented it to happen. However, more specific plans – installation of solar panels and insulation systems – were included in the Green New Deal Task¹⁸.

As another aspect of the green integration in the construction sector, **Singapore considers also increasing greenery along with cool paint on building facades** with the aim of moderating urban warming.¹⁹ For the same reason, more vegetation will be planted along the roads. Additionally, each household will live just a 10-minute walk from a park. Indeed, 200 ha of new nature parks are expected by 2030 and 1000 ha more of green spaces by 2035. Moreover, 1 million more trees will be planted across the island between 2020 and 2030 to provide cleaner air.

¹⁶ https://sfc.jp/english/news/pdf/20180208_e_02.pdf

¹⁷ <https://www.japantimes.co.jp/life/2019/09/21/food/buzzing-ginpachi-rooftop-beekeeping-japans-capital/>

¹⁸ Lee J. and Woo J. 2020. Green New Deal Policy of South Korea: Policy Innovation for a Sustainability Transition. Sustainability. MDPI.

¹⁹ [HDB's Green Towns plan ambitious but doable: Experts](#)

On this last point, India is instead lagging. Indeed, despite being one of the few countries on track with the objectives set in the Paris agreement²⁰, such as addressing emission reduction and increase

non-fossil fuel electricity generation, the country is lagging on increasing forest coverage to achieve carbon sequestration equivalent to 2.5 to 3 billion tons²¹.

Green Mobility

In the mobility sector “electric” seems to be the key word for the APAC Region. However, approaches and social responses are different.

In South Korea the energy consumption associated to the transportation sector increased from 13.5% in the 80s to 19.7% in the first decade of the new millennium²². However, a slight decrease to 16.9% share of final energy consumption has been registered in 2019, which is associated with the high increase of diesel and electricity and decrease in gasoline use in transportation²³. Integral part of the Green New Deal 2020, **stabilization of Green Mobility and Eco-Friendly** vehicles are the priorities for the Korean Government. The goal is to expand the use of electric cars to 1.13 million and of hydrogen powered cars to 20'000 by 2025. Interestingly, the plan does not support only the implementation of sustainable vehicles, but also scrapping worn-out gas fuelled cars or their transition to LPG fuelled vehicles. In addition, as an effort to make the transition stable, the construction of social infrastructures such as EV charging stations, hydrogen generation bases and distribution lines are included in the list of project tasks, accounting for about 20 million CHF and thousand new job opportunities²⁴.

With the same investment of about 20 million CHF,

Singapore is expanding the charging infrastructure with a goal of 60'000, a substantial increase from the 28'000 prior target, and requires all the newly registered cars to be of **cleaner energy models** starting since 2030²⁵.

Differently from South Korea, where cars became a status symbol as a result of the rapid economic growth following the Korean War, owing a passenger car has been on a downward trend for almost two decades in Japan. Although still minimum, car sharing is growing rapidly, especially in the center of Tokyo. Toyota started its own subscription-based service with flexible terms and vehicle choice compared to car lease services. Differently from the above mentioned countries and some of the Europeans²⁶, the transition to electric seems less advanced. The reason arises from a substantial difference in Government incentives not being enough to support interested consumers in the transition. Another interesting information is the decision of Toyota Motor Corp to continue selling **hybrid vehicles rather than go solely** electric like its competitors. The company claims that is taking a realistic approach and, according to a study by London-based PA Knowledge Ltd., Toyota is the only automobile company that is expected to achieve its CO₂ emissions target this year.

²⁰ <https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions/>

²¹ Central Electricity Authority, All India Electricity Statistics General

²² Kamal-Chaoui, L., et al. 2011. The Implementation of the Korean Green Growth Strategy in Urban Areas.

OECD Regional Development Working Papers 2011/02. OECD Publishing. <http://dx.doi.org/10.1787/5kg8bf44lvq-en>

²³ http://www.keei.re.kr/main.nsf/index_en.html?open&p=%2Fweb_keei%2Fen_publish.nsf%2Fby_reviewmonthly%2F17F378896A3F48F3492584F00023B0F5&s=__%3Fopendocument%26menucode%3DES_165%26category%3DKorea%2520Energy%2520Review%2520Monthly

²⁴ <https://www.knewdeal.go.kr/front/view/task10.do>

²⁵ [Singapore to install 60,000 charge points by 2030](https://www.knewdeal.go.kr/front/view/task10.do)

²⁶ <https://www.bloomberg.com/news/articles/2020-06-05/germany-s-recovery-fund-gets-green-hue-with-its-focus-on-climate>

In highly populated areas, smart technologies play a fundamental role in order to control the traffic flow. China and South Korea have implemented a **smart traffic control system**, which monitors traffic information and in case of cars accident facilitate a quick response by suggesting alternative routes directly through mobile applications and sending accident notices to police and hospitals. The Alibaba's project "City Brain" in Hangzhou has been proven to increase the traffic speed of 15%

Despite the appearances due to traffic congestion, public transports are still the preferred choices for commuting. Singapore aims to achieve 75% use of public transport by 2030 from 66% today.²⁷ The Chinese Shenzhen has been the first city in the world to have implemented fully electric urban bus fleet and same transition applies to taxis, for a total

of 6'000 buses and 22'000 electric taxis²⁸. China started promoting New Energy Vehicle (NEV) since 2009 and plan to have 4 million NEVs on the road by 2025. Municipalities heavily invested in advanced charging infrastructures and established a model, which ensures competitive market. Indeed, the governments do not own or operate the stations, but pay directly to the charging service providers. However, it is important to bear in mind that the **most of the electricity in China comes from coal**. The grid does not fully support the sustainable mobility through electric vehicle yet and whole life cycle for electric vehicles still needs to be perfected. This is why the Chinese Government is considering other energy forms for public transportation and 30 hydrogen fuel cell buses rolled out on the roads in June 2020 in Zhengzhou.

Steps towards a more circular economy

Highly populated areas of the world are found also guilty for large amount of waste production. A circular approach in the waste generation and management allows to maximize the value of resources by keeping them in use for as long as possible. **Singapore aims to be a zero waste nation** powered by circular economy, with high rate of recycling. The target is to reduce the amount of waste to landfill per capita per day by 30% by 2030.²⁹ Singapore already closed the water loop by recycling used water to make NEWater and will make a similar strong push towards circularity in waste materials.³⁰

In recent years, the recycling landscape has dramatically changed in the APAC Region³¹. In 2017 Australia produced an estimated 67 million tons of waste, of which 58% was recovered and about 40% sent to the landfill. However, as a consequence of China's ban on waste imports introduced in 2018, the Australian Government announced a National Waste Policy³² and the Federal Parliament passed the Recycling and Waste Reduction Act in December 2020, effectively banning the export of unprocessed waste overseas. This new law aims to transform the economy towards a circular model where

²⁷ [Enhancing Public Transport, Ministry of Transport](#)

²⁸ [This Chinese City Has 16,000 Electric Buses And 22,000 Electric Taxis](#)

²⁹ [Zero Waste Nation](#)

³⁰ [NEWater](#)

³¹ 'The state of Australia's recycling - how did we get into this mess?', WWF 23.06.2021 [online](#)

³² 'National Waste Policy', Department of Agriculture, Water and the Environment 2018 [online](#)

local infrastructure reprocess and re-manufacture recyclables onshore.³³ The context also stimulated research and innovation in recycling technologies. For instance, the University of New South Wales (Sidney) announced the world's first e-waste microfactory, recycling computer parts, mobile phones and printers³⁴. Another example comes from CSIRO, which developed ASPIRE, an online market place that matches businesses with manufacturers, purchasers and recyclers to find new purposes for waste materials. CSIRO also aims to identify opportunities through the whole supply chain to reduce the total waste generated in Australia by 10% per person by 2020 and achieve 80% of resource recovery³⁵.

South Korea deals with large quantities of waste and pollution as side effect of its rapid development into a prosperous country. The country of the “Morning calm” has developed a **sophisticated waste management system** and achieved the second-highest recycling rate in the OECD countries. This is especially true for the large amount of food waste generated by the traditional à volonté Korean side dishes. Recycling rate reached 98% in the last years and food transformed mainly in feeding powders for animals. Despite

this excellent result, recycling is not a solution to the extremely high waste production: South Korea is the largest plastic consumer per capita among the OECD countries. Top-down government led approaches generally speed up implementation of initiatives in South Korea. Nowadays, new hard measurements as well as soft measurements devoted to influence individuals' habits are among the priorities and involves restaurants and coffee places.

Top-down approach is also applied in China where the Municipal Solid Waste (MSW) classification plan was launched in 2017. 46 cities were requested to design and adopt local regulation on waste classification. For instance, Shanghai differentiates waste in recyclable, hazardous, wet and dry. Beijing, instead, consider kitchen waste, recyclable, hazardous and others. The implementation of the plan in 2020 determined a significant daily reduction of waste reaching 46.1% in the capital³⁶.

However, although waste transformation and management is fundamental, waste reduction is key in the transition to a circular model and requires a more fundamental approach of rethinking production and consumption patterns.

More about social response

Government initiatives towards a more sustainable society aim to stimulate a strong social response, which would effectively make the transition possible. To make the most use of them and inform consumers about the potential of renewables/energy saving vs. cost saving, the Bureau of Energy Efficiency in India launched a standards and labelling programme³⁷.

However, from a recent survey the awareness of these programmes is still low – about 40% in the urban and 20% in the rural areas. Thanks to the Government subsidies 90% of Indian homes switched to LED. Progresses on energy efficiency include also 38% of air conditioning and 34% of refrigerators being energy efficient products, but

³³ 'Australia's waste export ban becomes law', University of Technology Sydney 15.12.2020 [online](#)

³⁴ 'World-first e-waste microfactory launched at UNSW', UNSW 04.04.2018 [online](#)

³⁵ 'A circular economy roadmap for plastics, tyres, glass and paper in Australia', CSIRO 2021 [online](#)

³⁶ [A year into Beijing's compulsory household waste-sorting policy](#)

³⁷ <https://beeindia.gov.in/>

only 3% of households own an air conditioner and 35% a refrigerator, while 72% own a television set, but 38% only is energy efficient.

In Japan grassroots initiatives offer an interesting study case. Ueda Citizens Energy, a NPO based in Ueda City, started out as a study group on energy issues, following the Great East Japan Earthquake in 2011. They started installing solar panels on one residential rooftop with investment from individuals, by bringing together a group of people who wanted to take action, but did not know how. Currently the group has installed solar panels in more than 50 locations including public schools, offices and farm land. The group got the attention of investors from all over in Japan and abroad and as for March 2020 they produced approx. 750'000kWh with the equivalent of 496 tons CO2 reduction. Municipalities have also stepped up Konan City solicited investments from citizens and local corporations who receive dividends in the form of coupons to be used in local shops. Attention to sustainability is growing among individual investors in Japan through the offering of so-called ESG funds and bonds that consider non-financial factors such as environment, social and governance principles into investment decisions. The increasing popularity is motivating industry, prompting others in the transportation sector to step on the gas.

In **Australia** there is **growing realisation within**

the private sector that climate change is in fact as much as a financial, than an environmental and social risk, and that transition towards a circular economy is an opportunity³⁸. In 2020, a group of Australian banks and insurers published in collaboration with CSIRO, the national science agency, the first comprehensive climate change reporting framework, a first in Australia³⁹. The resulting guidelines are specific to Australia's geography and provide a scientific framework within which to assess climate-related risks and opportunities in the financial sector⁴⁰. The recently launched Climate League 2030 initiative, comprising 19 of Australia's institutional investors and 1 bank with total equivalent of ca. CHF 640 billion in assets under management, is a ten-year initiative that aims to reduce emissions by 230 million tons a year by 2030⁴¹.

Companies' social responsibility is also another aspect of the transition to a more sustainable living. In India companies have to spend 2% of their profits for activities devoted to it. It is possible for them to invest their profits in areas such as education, poverty, gender equality, environment etc. . A survey involving the top 100 Indian companies by market capital showed that 60% of the profits dedicated to social responsibility was invested in health and education, while environment attracted only 12% of investments between 2014 and 2019.

³⁸ 'Building a more circular Australia', PWC March 2021 [online](#)

³⁹ 'Banks publish disclosure rules for extreme climate risk', AFR 14.09.2020 [online](#)

⁴⁰ Report, Climate Measurement Standards Initiative September 2020 [online](#)

⁴¹ 'New private sector-focused initiative launched to back deeper Australian emissions reductions', Climate League 2030 06.10.2020 [online](#)

⁴² <http://ebook.mca.gov.in/Actpagedisplay.aspx?PAGE=17923>

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