

Low Carbon Development Pathways and Cities in North East-Asia

The East and North-East Asian subregion is an export-oriented industrial powerhouse, and heavily dependent on energy-intensive production and fossil fuel-based energy systems. The subregion has also experienced significant technological and policy lags in adopting greener technologies and practices. This situation resulted in North-East Asia accounting for about 35 percent of global greenhouse gas (GHG) emissions in 2013 while sharing about 25 percent of the global GDP, which indicates a relatively high carbon intensity. In terms of carbon intensity of GDP (kg of CO₂ per 1000 USD GDP), the ratio in China (1.10) remained significantly higher than the world average (0.44), and the gap between the Republic of Korea (0.46) and Japan (0.21) was more than double in 2014. Moreover, most countries have not shown trends of GHG emission reduction.

Overview of Nationally Determined Contributions

| | NDCs Highlights |
|----------|--|
| China | Peak CO ₂ emissions by 2030 at the latest and lower carbon intensity of GDP by 60% to 65% below 2005 levels by 2030 |
| DPRK | 8% below business-as-usual (BAU) by 2030 and additional 32.25% with international support |
| Japan | 26% below 2013 emission levels by 2030 (excluding LULUCF) |
| Mongolia | 14% below BAU by 2030 (excl. LULUCF) |
| ROK | 37% below BAU by 2030 (excl. LULUCF) |
| Russia | 25% to 30% below the 1990 level by 2030 (incl. LULUCF) |

These carbon-intensive economies also bring about other environmental externalities, notably air pollution such as fine particulate matters (PM 2.5), causing immense socio-economic costs. Thus, a key challenge for the subregion is to identify and promote low carbon development pathways that have co-benefits for multiple dimensions, i.e. economy and the environment, and global climate change and domestic/subregional air quality. Low carbon

development pathway (LCDP) has been increasingly recognized as a practical strategy that supports middle and high-income countries to promote low carbon innovation, and for low and middle-income countries, to have better access to modern energy and low carbon technology to meet development needs. This is also emphasized in the Paris Climate Agreement which calls for all Parties to formulate “*long-term low greenhouse gas emission development strategies*” by 2020 in addition to the regular update of nationally determined contributions every five years.

LCDP can be taken in various forms as countries have considerably different development paths. A general approach is to pursue take co-benefits of attaining multiple outcomes by designing policies that simultaneously consider and address the multifaceted dimensions of sustainable development. Such policies and technical measures include the improvement of energy efficiency, the increase in the share of renewable energy, the building of sustainable urban infrastructure, the protection of natural capital to mitigate and adapt to climate change, etc. In this connection, this report looks at specific cases at the city level that support LCDP.

Cities and LCDP: cases of Seoul, Tokyo and Beijing

Cities are service- and energy-intensive consuming 75% of global primary energy, they are therefore ideal testing grounds for low carbon policies including energy policies. Policies experimented in urban centres can drive transformations at a bigger scale such as national- and regional-levels. In this connection, this report briefly looks at the implication of LCDP in urban context by reviewing the cases of Seoul, Tokyo and Beijing.

Driven at various degree by national climate commitment and local needs including reduction of local air pollution, these capital cities have taken different low carbon approaches discussed below. They are also active in international cooperation including through city networks such as all being members of C40, a network of

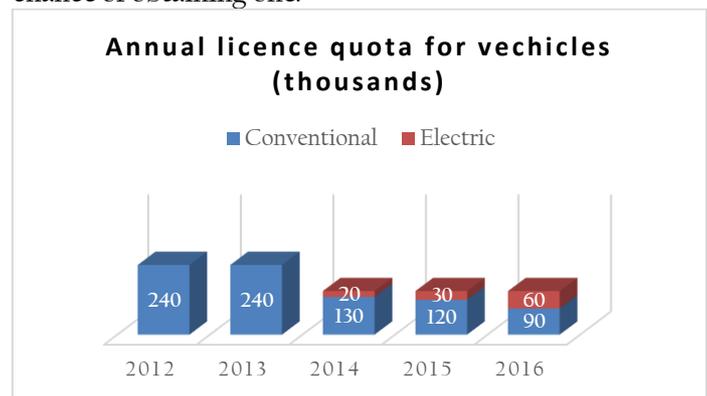
megacities committed to act together on climate mitigations.

Seoul city in 2012 adopted the policy “One Less Nuclear Power Plant (OLNPP)”¹ to raise power self-sufficiency rate from 3% in 2011 to 20% by 2020, as well as saving 2 million TOE of energy by 2014 (equivalent to the amount of energy produced by a nuclear power plant). Seoul OLNPP involves a mix of top-down and bottom-up measures on: (i) local renewable energy supply such as fuel cells and biogas plants; (ii) energy efficiency measures including retrofit projects; (iii) management of energy demand by encourage energy saving through eco-mileage system and providing energy consulting services; and (iv) performance evaluation and monitoring. According to a report by SMG, by end of 2016, 3.6 million TOE was saved by increasing renewable energy production, energy efficiency, etc., which is equivalent to 1.5 nuclear power plant. As a result, SMG gained 1.663 trillion KRW/year (= approx. USD 890 million/year) of economic benefit and reduced 8.19 million tCO₂/year of GHG emission.

Tokyo announced the Tokyo Climate Change Strategy in 2007 to reduce greenhouse gas emissions by 25% by 2020, and 30% by 2030 from 2000 level. To achieve its targets, Tokyo implemented the world’s first mandatory cap and trade programme at city-level on energy-related CO₂ emissions. This Emission Trading System (ETS)² launched in 2010 is an absolute cap set at the facility-level on both direct and in-direct emissions. It covers 40% of the industrial and commercial sector, equivalent to 20% of Tokyo’s CO₂ emissions. Credits are tradable from excess reduction, small and midsize facility, renewable energy etc. The first compliance period from 2010-2014 noted an emissions reduction of about 12 million tonnes of CO₂, over 90% of reduction was met through energy efficiency measures and less than 10% was met through emissions trading. Despite the progress, the total GHG emissions in Tokyo has increased by 6.3% due to changes in energy mix after the Great Tohoku earthquake in 2011. In this connection, the Tokyo Metropolitan Government makes further efforts for saving energy which is integrated into the Basic Environment Plan issued in 2016. The Plan outlines five key strategies including the policy for "smart energy city" which aims to achieve the following targets;

- Energy saving and management: By 2030, reduction of GHG by 30% (2000 as base year)
- Promotion of renewable energy: By 2030, increasing the share of renewable energy to 30%
- Promotion of hydrogen: By 2030, fuel cell vehicle to the order of 200,000

Beijing, on the other hand, has implemented multiple initiatives as part of a national policy and also its own city policy. In 2010, China designated 42 pilot low carbon cities and provinces since 2010 to attain the national emissions reduction goal including Beijing. The scheme is currently in its third phase with an additional 45 designated cities³. Numerous major cities under this scheme have set their peak emissions times and Beijing is expected to reach its peak emissions in 2020. Other than driven by national climate initiatives, Beijing has also made efforts to achieve the 25% reduction target of particulate matter under the Beijing 2013-2017 Clean Air Action Plan, which contributes to CO₂ mitigation. The Plan includes energy restructuring, transportation and industrial improvements etc., the share of energy generated from coal will be reduced to under 10% and coal consumption has already been reduced by 14 million tonnes in the past five years⁴. Renewable energy utilized by Beijing has also doubled from 2010 to 2015, accounting for over 6% of total energy consumption. The Plan also promotes clean energy vehicle by increasing the allocation of new car license quota for EV, and petrol vehicles can only be applied through a public lottery whilst EV licenses can be applied through queuing and with a much higher chance of obtaining one.



(Source: <https://www.chinadialogue.net/article/show/single/en/9418-Electric-vehicles-gain-mainstream-momentum>)

Despite the different drivers and approaches taken by Beijing, Seoul and Tokyo, their impact is far beyond climate mitigation. These low carbon policies, mostly energy-related, are also generating significant socio-economic benefits including health gains in reduced pollution; improved public awareness; and more innovative and cost-effective energy use.

The ENEA Policy Briefs aim at providing a subregional-level review on common challenges and opportunities, and generating forward-looking discussions among key stakeholders. The views and options expressed in the briefs are the author’s own and do not necessarily reflect the official policy of the UN. ESCAP East and North-East Asia Office welcomes proposals from officials and experts for the Briefs. For further information, please contact the Office (escap-sroenea-registry@un.org).

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¹ Seoul Metropolitan Government – One Less Nuclear Power Plant <http://english.seoul.go.kr/policy-information/policy-focus-2017/one-less-nuclear-power-plant/>

² Tokyo Metropolitan Government http://www.kankyo.metro.tokyo.jp/en/climate/cap_and_trade.htm

³ National Development and Reform Committee (NDRC) http://www.ndrc.gov.cn/zcfb/zcfbtz/201701/t20170124_836394.html

⁴ Beijing Energy http://en.expochina2017.org/2017-04/18/content_29253113.htm



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