

Research Project:

Replicable Best Practices for Metropolitan Washington

By Melissa Low and Mai Huong Vu

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Acknowledgements

We owe our gratitude to all those people who have made this report possible and because of whom our YSEALI Professional Fellows Program experience has been one that we will cherish forever.

Our deepest gratitude is to the entire Department of Environmental Programs (DEP) at COG. We are amazingly fortunate to have COG as our hosts, who have given us much freedom to explore on our own, and at the same time guidance on issues and contexts we were not familiar with.

We are thankful to Steve Walz, Jeff King and Maia Davis and others for their time and patience with us. We are especially grateful for the time taken to organize meetings, tours and events, and often taking us to these meetings. Our discussions have helped us to sort out technical details of this research. We are thankful for the encouragement and comments on our presentation slides and draft reports. Any errors that remain are our sole responsibility.

Finally, we appreciate the YSEALI Professional Fellows Program, the U.S. State Department, and International City/County Management Association (ICMA) for their support throughout these 5-weeks.

1. Introduction

About the Fellowship

The [YSEALI Professional Fellows Program](#) is a professional development exchange program for the best and brightest community leaders from ASEAN, working in the fields of civic engagement, NGO management, economic empowerment, governance, legislative process, environmental and natural resources management. The YSEALI Professional Fellows Program provides participants a month-long fellowship at U.S.-based non-profit or other organizations, government offices or legislative bodies. Fellows will work with community leaders to enhance their practical expertise, leadership skills and professional contacts to address issues in their home communities.

The Young Southeast Asian Leaders Initiative (YSEALI) is President Obama's signature program to strengthen leadership development and networking in ASEAN, deepen engagement with young leaders on key regional and global challenges, and strengthen people-to-people ties between the United States and young Southeast Asian leaders. The YSEALI Professional Fellows Program is part of the broader Professional Fellows exchange program.

Research Objectives and Approach

This research project for COG is to find replicable best practices for Metropolitan Washington, with a focus on the Clean Tech Economy, Energy Efficiency, Renewable Energy, Resiliency and Finance as a cross-cutting issue.

This report covers several cities and regions, some of them assigned by COG while others were chosen as unique case studies. For example, Kyoto, Japan and Shenzhen, China were chosen for their respectively for leading efforts in their countries. Having worked on climate change policy in the cities of Da Nang City, Vietnam and Singapore, we chose to include these two cities as case studies. The other cities and regions include the Australian Capital Territory, Wales, and the Province of British Columbia, Canada.

Report Structure

A summary and template for of cities and regions' key targets and initiatives is used in the case studies are presented in Chapter 2.

The conclusion includes a brief analysis of key best practices and initiative and provides recommendations for the consideration of the Metropolitan Washington Council of Governments' Climate, Energy and Environment Policy Committee (CEEPC). The concluding chapter also includes some reflections from the YSEALI Professional Fellows on key takeaways from their research project and time spent at COG.

2. Case Studies

This chapter presents brief case studies of cities and regions, with a view to highlighting best practices and initiatives in climate change action and resilience planning.

Kyoto, Japan

Summary by Mai Huong Vu

Background

Kyoto is a city located in the central part of the island of Honshu, Japan. It has a population close to 1.5 million. Formerly the Imperial capital of Japan for more than one thousand years, it is now the capital city of Kyoto Prefecture located in the Kansai region, as well as a major part of the Kyoto-Osaka-Kobe metropolitan area. For over a thousand years serving as capital of Japan, Kyoto city has developed an important center for politics, economics, culture and arts in Japan. It is home to ancient cultural assets and beautiful natural scenery. Kyoto city is also the namesake of the Kyoto Protocol, international treaty which extends the 1992 United Nations Framework Convention on Climate Change (UNFCCC) that commits State Parties to reduce anthropogenic greenhouse gases emissions. Thus, Kyoto strives to fulfil its responsibilities as the city where the Kyoto Protocol was born.

Japan's Global Warming Law and the Kyoto Protocol Target Achievement Plan ask the 47 prefectural and 1,800 municipal governments to introduce programs to address greenhouse gas emissions. All prefectures and many cities in Japan have formulated local climate change action plans and set their own GHG reduction targets. The participation of citizens and companies in the formulation and checking of these plans is encouraged. In July 2008, 12 cities and towns, including Kyoto, Kitakyushu, Ida, and Toyota, were selected as environmental model cities. Besides these model cities, several other cities and prefectures have also indicated their intentions to set up strategies or a roadmap to go low-carbon by 2050.

In 2010, Kyoto revised all their regulations relating to global warming countermeasures, which were the first regulations in Japan to specialize in global warming countermeasures, setting ambitious goals to reduce the city's total greenhouse gas emissions by 40% by 2030 and 25% by 2020. This Kyoto City Program of Global Warming Countermeasure is their roadmap for achieving this goal.

In fiscal year (FY) 2010, Kyoto City achieved a 15.1% reduction in greenhouse gas emissions, far exceeding the target set in its old code of 10% reduction from 1990 levels. In FY 2011, however, emissions increased from the previous year to 7.57 million tons due to an increase in the CO₂ emission factor caused by a switch from nuclear to thermal power generation. The reduction achieved was only 220,000 tons, or a 2.8% reduction from the base-year total emissions of 7.79 million tons.

Kyoto City participates in the International Council for Local Environmental Initiatives (ICLEI), a council of local governments and municipalities striving for sustainability.



Figure 1 Overview of Kyoto City's Target

Summary of Targets and Initiatives

Policies	Goals	Actions
1. Targets	25% below 1990 levels by 2020 and 40% below 1990 levels by 2030	To adopt necessary measures between 2010 and 2030 Kyoto's prefectural and municipal governments have used local ordinances to claim competences in energy, traffic, and other policy areas in order to reduce their GHGs
2. Buildings	Promoting renewable energy use in public buildings and in residential areas	Creation of installation specification for solar PV/water heating for public buildings Subsidy system of PV Diffusion of PV devices for households
3. Transport	Expanding use of eco-vehicles and promoting hybrid cars Use of biodiesel in land transport	Widening the pedestrian for program "Kyoto, enjoyed by walking" Incentives for installation of charging facilities Collection of used cooking oil for conversion Different taxation structure for biofuels
4. Clean Tech	Reduce emissions through green certification	KES Environmental Management System Standard for small and mid-sized businesses Power generation by biomass (waste incineration)
5. Other	Outreach	Energy saving behavior in business establishment Training for eco-driving City-wide campaign: "Kyoto, enjoyed by walking"

Da Nang City, Vietnam

Summarized by Mai Huong Vu

Da Nang is a rapidly growing transportation, services, and tourism hub in central Vietnam. Other key economic sectors include aquaculture and marine fishing. The city sits on a long piece of low-lying coastline, with the city center resting along the Han River. This city is no stranger to flooding. Typhoons have battered the city, and variable rainfall has caused both drought and flooding. The poor and near-poor households of the city face unstable employment and insufficient access to health care, education, housing, and other services. For years, the city has been developing innovative models to enhance resilience to climate change, including early flood warning systems and improved urban planning. And despite the challenges, Da Nang has become an attractive destination in Vietnam for Foreign Direct Investment. By late November 2013, Da Nang had attracted 279 FDI projects, totaling over 3.31 billion USD.

Da Nang City is the third largest city in Vietnam. As a coastal city, it is annually impacted by 1-2 typhoon and flood events, often experiencing wind speeds around 73-109 mph (12-15 at Beaufort scale). Hurricanes and typhoon casualties and economic losses are of concern to the local government. In 2006, Da Nang city lost 50% GDP by the hurricane Xangsane and overall economic losses since 1998 amount to nearly US\$50 million.

In response, Da Nang City established the Storm and Flood Steering Committee and Climate Change Steering Committee in 1999 and 2011 respectively to further prevent residents, infrastructure and properties from natural disasters and climate change impacts. It also developed a climate change action plan to build the resilient capacity and to reduce the GHG emission.

Da Nang City is one of [100 Resilient Cities](#). By 2030, the city aims to reduce 19% GHG emission below 2010 levels. By 2020, the city will build resilient capacity for more than 20,000 vulnerable single women, elders and veterans and educate all government officers and around 30% residents will be educated on climate change and relevant issues. Da Nang City aims to become a walk-able city by 2030. It is taking steps to retrofit buildings into green and energy efficiency buildings.

Summary of Key Targets and Initiatives

Policies	Goals	Actions
1. Transport	Promote electric taxis	Keeping prices low
2. Energy Efficiency	Increase stove efficiency	Use of biomass in order to increase efficiency to approximately 80%
3. Resilience	Develop room for water by using parks Develop catastrophe insurances for vulnerable communes	'Flooding early warning system' has been used since 2011 to alert residents living along rivers 10 hours in advance to evacuate from flooding events. Use Hydrological Urban Development Simulation Models (HUDSIM) for making decision on urban planning.
4. Outreach	Integrating climate change and natural disaster in school curriculum	Integrating climate change and natural disaster syllabus from primary to high school levels. Climate change as a compulsory credit in colleges and universities.
5. Other	Administrative and legislative	Climate change action plan for Da Nang territory and for sectors, including: Energy, Environment, Agriculture, Water sources, Industry, Transportation and Tourism.

Singapore

Summary by Melissa Low

Singapore is a party to the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. Despite being a non-Annex I Party, much of Singapore's national climate law and policy framework is heavily influenced by the supranational legal order. Furthermore, as a small, low-lying island city state with an area of just 719km² (278 square miles) situated in the equatorial tropics, Singapore is naturally vulnerable to the impacts of climate change.

In recent years, its reliance on imports of energy and water and the challenges of climate change have compelled Singapore to examine its vulnerabilities and adopt practices towards ensuring resilience. To this end, the city-state has set several national targets for 2020 and 2030. A [Sustainable Singapore Blueprint](#) also highlights goals in various sectors. Achieving these targets would involve an in-depth examination and evaluation of its energy consumption patterns in various sectors and the adoption of appropriate mechanisms such as laws and policies to help regulate energy management practices, as well as fiscal tools to steer the behavior of consumers, particularly large corporations.

Singapore has also experienced temperature increases from 26.8°C in 1948 to 27.6°C in 2011. Daily rainfall totals have also risen from 2192mm in 1980 to 2727mm in 2014. Mean sea level has shown an annual increase of 3 mm per year over the last 15 years. Key adaptation areas include sea level rise, water resources and water stress, inland flooding, loss of biodiversity and greenery, public health concerns (vector-borne diseases), urban heat island effect and food and energy security.

In 2011, Government raised minimum level of newly reclaimed land by an additional 1m, to 2.25m above highest recorded tide levels. This means that newly reclaimed land will provide a buffer that will withstand more than the projected 18-inches (46cm) rise in sea levels in the next 100 years. In 2013, Changes to the Code of Practice on Surface Water Drainage doubled the minimum platform levels from 30cm above the highest recorded flood level to 60cm for general developments and residential developments with basements. Special underground facilities and basements of commercial and multi-unit residential developments will also need to have a minimum crest level of 30cm above the minimum platform level, compared to the previous level of at least 15cm.

Several drainage improvement projects are also under way or scheduled at 139 locations in 2015, with 58 already completed since 2011 and 17 more scheduled for 2016. Inland flooding is largely being addressed through infrastructural upgrades and the use of water level sensors, adding or widening of existing canals to divert excess water from increased rainfall and the use of underground detention.

The Resilience Working Group (RWG) under the Inter-Ministerial Committee on Climate Change (IMCCC) is currently studying measures that will address Singapore's physical vulnerabilities to climate change. These will include an evaluation of the Phase 2 Climate Change Study and the Building and Construction Authority's (BCA) Risk Map Study. Updates from these studies will be reviewed by RWG so that they can be incorporated into Singapore's long-term adaptation plans.

Summary of Targets and Initiatives

Policies	Goals	Actions
1. Targets	Conditional GHG emissions reductions by 16% below Business-as-Usual (BAU) levels in 2020; Unconditional pledge of 7 –11% below 2020 BAU	Actions in all sectors of economy
	36% emissions intensity reduction from 2005 levels by 2030	Stabilize its emissions with the aim of peaking around 2030
	35% improvement in energy efficiency from 2005 levels by 2030	Actions in all sectors of economy
2. Renewable Energy	350 MWp of solar power or around 5% of peak electricity demand in 2020 Develop energy storage capacity	33 MWp of solar capacity installed and PUB is studying if solar panels can be installed on reservoirs, waterworks and water reclamation plants and adopting innovative business models such as solar leasing. Since 2013, \$12 million in grants awarded to solar energy research. Established a \$25 million Energy Storage Programme to develop technologies that will enhance the overall stability and resilience of Singapore's power system; Energy Storage System (ESS) Test-bed to be conducted
3. Buildings	80% of all existing and new buildings to be Green Mark certified by 2030	Green Mark Certification Scheme Energy Smart label Public sector taking the lead Building control regulations for energy efficiency Improvement Assistance (EASe) Scheme for energy auditing for buildings

<p>4. Transport</p>	<p>70% of all journeys by public transport by 2030; 70:30 public transport modal shift during peak hour; Improving fuel economy; Promoting green vehicles and fuel efficient driving habits</p> <p>Promoting electric vehicle sharing</p>	<p>Vehicle quotas (Certificate of Entitlements), electronic road pricing, road tax</p> <p>Pedestrianization of some roads (car-free Sundays once a month)</p> <p>Carbon Emissions-based Vehicle Scheme</p> <p>Fuel economy labelling</p> <p>Install 2,000 charging points across the island to boost its electric car-sharing program</p>
<p>5. Clean Tech</p>	<p>Developing city as a Clean Tech Hub</p> <p>Urban Solutions and Sustainability Research Funding</p> <p>Adopting hybrid electricity solutions and allowing offsite power-purchase agreements for renewable energy</p>	<p>Project development and financing capabilities e.g. green bonds, green business trusts and other new business models such as solar leasing.</p> <p>S\$900 million announced in 2016 to developing strong R&D capabilities in area of clean tech</p> <p>E.g. Apple Singapore will power all operations with solar energy generated from over 800 buildings across Singapore</p>
<p>6. Energy Efficiency</p>	<p>Encourage energy efficiency across sectors</p> <p>Establish Green Data Centre Standard</p>	<p>Energy Conservation Act 2013; Energy Manager Scheme; Small & Medium Sized Enterprise Energy Efficiency Grant; Grant for Energy Efficient Technologies</p> <p>Launched First-in-Singapore Green Data Centre Innovation Programme (GDCIP) to Explore Green Technologies for Data Centres in a Smart Nation</p>
<p>7. Other</p>	<p>Waste & Recycling: Zero landfill by 2030</p>	<p>Improve recycling rate from 56% in 2008 to 65% in 2020 and 70% in 2030</p>

Shenzhen, China

Summary by Melissa Low

Introduction

Shenzhen is a major city in the Chinese province of Guangdong. Located immediately north of the Hong Kong Special Administrative Region, Shenzhen holds a sub-provincial administrative status. In the 1980s, the city of Shenzhen experienced an industrial boom and was designated China's first Special Economic Zones (SEZ). Shenzhen was one of the fastest-growing cities in the world during the 1990s and the 2000s. In 2015, Shenzhen has a population of 10,778,900 and a metropolitan area population of over 18 million.

Given the economic and administrative privileges of being a Special Economic Zone and 'specifically designated city', Shenzhen has more autonomy from provincial control in the planning and implementation of low carbon development. As the city is houses service- and trade-oriented industries, it has chosen to pursue a low-emissions development trajectory and its municipal authority have taken to branding itself as an arena for experimentation and innovation. The Chinese government has recognized Shenzhen as one of eight low carbon pilot cities in the country. This was done as part of a low-carbon province and low-carbon city experimental project initiated by Beijing on 18 August 2010. The project covers in five provinces, namely Guangdong, Liaoning, Hubei, Shaanxi and Yunnan, and in eight cities, namely Tianjin, Chongqing, Shenzhen, Xiamen, Hangzhou, Nanchang, Guiyang and Baoding.

The Shenzhen Emissions Trading Scheme (ETS) program will cover some 635 industrial companies from 26 industries. This is the first of seven proposed pilot GHG cap-and-trade schemes in China, which the country has been developing since 2011. The Shenzhen ETS is the smallest of the seven pilot markets, covering around 30 million tonnes of CO₂ each year, around 40 per cent of the city's emissions.

International Cooperation

On 18 June 2013, California Air Resources Board Chairman Mary Nichols and Director of the Shenzhen Development and Reform Commission Xu Anliang signed a memorandum of understanding in Shenzhen that will expand cooperation at the subnational level to tackle global climate change. The cities agreed to work together to share policy design and early experiences from their climate trading programs, in order to build strong, stable and growing markets for clean energy technology and greenhouse gas emission reductions.

Emissions Trading Scheme

In 2010, these 635 industrial companies emitted 31.7 million tons of carbon dioxide and contributed 59 percent of the Industrial Added Value (gross domestic product (GDP) due to industry) and 26 percent of Shenzhen's GDP. Under the ETS program, each of the 635 industrial companies will receive 100 million metric ton CO₂ emission allowance for free over the three years beginning in 2013. If the companies only emit their allotted amount, this would be equal to a 32 percent reduction in terms of GDP emission intensity.

China is committed to reduce its emission intensity by 40 to 45 percent by 2020, and Shenzhen's carbon intensity reduction target during the current Five-Year Plan period (2011-2015) is 21 percent. It is worth noting that the allowances are determined by emissions intensity rather than in absolute terms, meaning the government will review companies' Industrial Added Value on an annual basis and increase or decrease

the absolute emission allowance to maintain a fixed emissions-to-GDP ratio. According to a study by the World Resources Institute, intensity-derived allowances are a novel concept and could hold lessons for other developing countries.

Reporting Guidelines

On 18 May 2015, the Market and Quality Supervision Commission of Shenzhen Municipality released a statement that bus and taxi companies will have to report their carbon emissions from 1 June. The transport sector has a high share of the city's emissions and there have been plans since 2013 to bring transport into the ETS. Details can be found in the Medium- and Long-term plan for Shenzhen low carbon development (2011 -2020) issued in February 2012 by the Shenzhen Development and Reform Commission.

Summary of Targets and Initiatives

Policies	Goal	Actions
1. Targets	21% reduction of carbon intensity by 2015 compared to 2010 levels	
	Share of natural gas, solar PV, biomass and wind energy at least 50% and 60% of the total primary energy use in 2015 and 2020, respectively.	
2. Buildings	Green buildings' share of total new construction	40% and 80% share of new certified green buildings by 2015 and 2020 respectively.
3. Transport	65% share of public transport in modal split by 2020	
	Increase in number of new energy (i.e., electric) cars by 2015	Nationwide sales target of 500,000 new energy vehicles by 2015; ¥60,000 subsidy by Central government and an additional city-level ¥60,000 subsidy.
4. Clean Tech	R & D investment in low carbon technologies	Low carbon service centers to provide technical support for enterprises
5. Other	Emissions Trading Scheme	ETS introduced, covering 635 industrial companies from 26 industries
	Information dissemination	Strengthening international collaboration in terms of scientific research, technology transfer and information sharing and financial resources

Australian Capital Territory (ACT)

Summary by Melissa Low and Mai Huong Vu

Background

Australian Capital Territory (ACT) is the area that bounds Australia's capital city Canberra. The landscape of the ACT falls into a temperate zone climatically and is characterized by fertile farm and grazing lands. Geographically, the region is surrounded by the Great Dividing Range to the east and the foot of the Australian Alps to the west. The Territory has an abundance of nature with over half of the total area preserved as parks and nature reserves.

ACT has four distinct seasons with warm summers and cool winters. Clean air is purified by passing over the Australian Alps and water comes from catchments fed by pure rain and snowmelt. Canberra, the urban centre of the ACT, is a thriving modern city of around 390,000 people.

Compact of Mayors

In April 2015, the ACT joined the Compact of Mayors (CoM), an international commitment by cities around the world to reduce GHG emissions, reduce vulnerability and enhance resilience to climate change in a consistent and complementary manner to national level climate protection efforts. The CoM requires cities to be consistent in their emissions reporting by using the Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories (GPC). The CoM is run in partnership with C40 cities and ICLEI, with reporting undertaken through the Carbon Disclosure Project (CDP).

Adaptation and Resilience

In the ACT, dry weather and hot days are increasing the risk of bushfires and contributing to significant changes to the water cycle. It is predicted that the annual average rainfall will decrease in southern Australia coupled with an increase in droughts (CSIRO/BoM 2014). In general, heavy rainfall should increase with an intensifying water cycle. However, in SE Australia there has been a slight decrease in heavy rainfall over the past several decades consistent with a drying trend. Seasonality of rainfall is likely to shift in the ACR, with less rainfall in the cooler months. Since 1996, rainfall has declined to below average indicating a drying trend for this region. The ACT is developing an ACT Climate Change Adaptation Strategy to help identify priorities for adaptation and coordinate in building resilience. The consultation on the draft ACT Climate Change Adaptation Strategy closed on 3 April 2016 and the final Strategy is expected to be released in 2016.

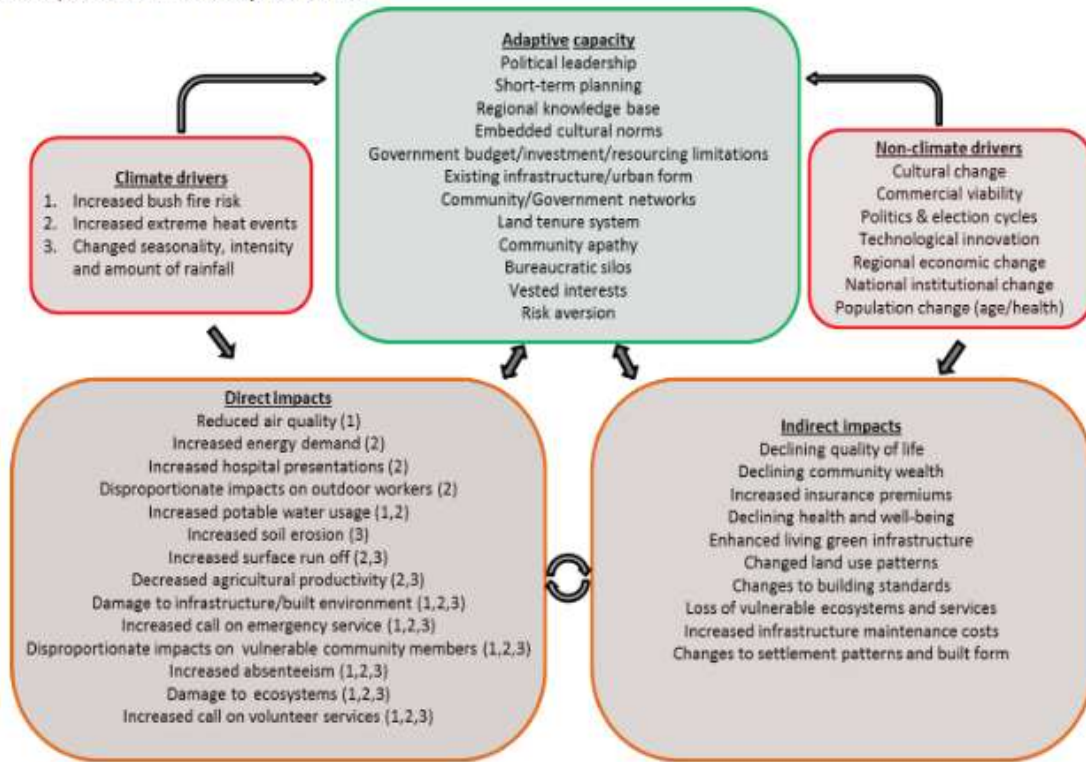
Analysis of climate drivers for each service area

Service area	Climate drivers selected
Community health and well-being	Heat waves and hot days
Disaster and emergency management	Heat waves and hot days Bushfires
Settlements and infrastructure	Heat waves Bushfires Changes in water cycle
Water	Changes in water cycle
Natural resources and ecosystems	Heat waves and hot days
Agriculture	Changes in the water cycles

Adaptive capacity

5 resources types are created, combined and transformed in pursuit of adaptation (human – regional knowledge and skills base, social – social interaction through policy-spanning networks, natural – environmental assets, physical – technology innovation and financial – economic benefits of early adaptation).

Figure 6: Snap shot of vulnerability for the ACT.



Source: ACT Government, 2014

Summary of Targets and Initiatives

Policies	Goals	Actions
1. Targets	40% reduction of 1990 emission levels by 2020; 80% below 1990 levels by 2050; peaking per capita emissions by 2013; or zero net GHG emissions by 2050	
	Renewable energy target of 60% by 2017; 100% by 2020	
	Energy Efficiency	Energy Efficiency Improvement Scheme from 1 January 2013
2. Buildings	Improve building efficiency	Carbon Neutrality Government Fund Energy efficiency investment program across Government of up to \$6 million per year to 2020
		Improving environmental performance of buildings owned by ACT Government
3. Transport	138 kt CO ₂ e reduction goal	Transport for Canberra policy being implemented; the Active Travel Framework released in 2015 and a Low Emission Vehicle Strategy is being developed.
4. Clean Tech	To develop ACT as a hub of clean energy innovation and investment	Knowledge economy jobs in the renewables sector; AUD300 million local investment
5. Other	Environmental grants	2016-17 ACT Environmental grants up to AUD185,000 for suitable environmental projects
	Fostering staff culture for smart energy use	Engaging and empowering ACT Government staff to use energy efficiently in their working environment
	Advisory service	ACTSmart Energy Assist for small and medium sized businesses in the Territory to access a range of grants and financial incentives being offered by the Commonwealth as part of the Clean Energy Future plan
6. Resilience	Develop resilience for ACT	Holistic natural water system for storm water utilization; Nature-based tourism; Climate resilient community spaces; Green Infrastructure strategy

Wales, United Kingdom

Summary by Melissa Low and Mai Huong Vu

Background

Wales is a country in southwest Great Britain known for its rugged coastline, mountainous national parks, distinctive language and Celtic culture. Located on the island of Great Britain, it is bordered by England to the east, the Irish Sea to the north and west, and the Bristol Channel to the south. It had a population in 2011 of 3,063,456 and has a total area of 20,779 km² (8,023 sq mi). Wales has over 1,680 miles (2,700 km) of coastline and is largely mountainous, with its higher peaks in the north and central areas, including Snowdon (Yr Wyddfa), its highest summit. The country lies within the North Temperate Zone and has a changeable, maritime climate.

Wales presents itself as a green country as it boasts many [Blue Flag beaches](#) and its capital, Cardiff, offers more green space per person than most of the other main cities in the UK. Based on some indicators, Wales is also outperforming GB in regard to the implementation of key energy efficiency and fuel poverty measures, and renewable heat and electricity generation installations. The country is home to the second largest offshore wind farm in the world, which is capable of generating enough energy from renewable sources to power the equivalent of approximately 400,000 homes. Gwynt y Môr (English: Sea Wind) is Wales' third fully operational offshore wind farm. Its 160 wind turbines of 150 metres (490 ft) tip height above mean seal level generates 576-megawatt (MW) of offshore wind in North Wales.

Wales has a green growth strategy called [Green Growth Wales: Investing in the Future](#) as well as a [Climate Change Strategy](#). The goals generally are to invest in high quality and sustainable infrastructure in order to make Wales a more attractive place to do business and to broaden and deepen the skills base by encouraging science and innovation and offer business support. Wales also developed a [National Energy Efficiency and Savings Plan](#) to better target energy efficiency investments at the fuel poor, whilst promoting improvements for all households.

Summary of Targets and Initiatives

Policies	Goals	Actions
1. Targets	Emissions reduction of 3% each year from 2011, relative to a baseline of average emissions over 2006-2010 in areas of devolved competence	
	Reduction of 40% of GHG in all sectors by 2020 from 1990 levels	
2. Buildings	For residential, range target against a baseline	All existing buildings at least meet Energy Performance Certificate Standard C, and many are on the way to becoming carbon neutral. All new buildings are constructed to highest standards of energy and water efficiency and for the climate over its design life and to minimize travel needs.
	Carbon neutrality of public buildings by	
3. Transport	Range target against a baseline; Wales Transport Strategy and Regional Transport Plans to implement Sustainable Travel Towns initiative	Enhanced opportunities for walking and cycling, improved public transport and better travel planning; Encouraging all major employers to have Green Travel Plans and for key public sector bodies in Wales to demonstrate best practice in cycling and walking to work
4. Waste	Zero waste nation by 2050; minimum of 1% of municipal waste to be re-used by 2025; minimum recycling rate of 70% across all sectors by 2025; energy recovery to be an option for maximum of 30% of municipal waste by 2025 and set a maximum level of residual household waste per inhabitant of 150kg per year and max level of municipal waste going to landfill of 5%; and the phase out of waste going to landfill from all sectors.	
5. Other	Create sustainable employment; Generate returns for investors to support further initiatives; Launching advisory services; Tool kits	E.g. Resources Efficient Wales, FS4B, Waste and Resources Action Programme (WRAP), etc. E.g. Travel plan toolkit
6. Resilience	Enhancing resilience	Investing £245 million in flood and coastal erosion risk management that protected 99% of risk land and properties during the winter storms of 2013/2014 (preventing £3 billion in damages); Building the Sector adaptation plans

British Columbia, Canada

Summary by Melissa Low and Mai Huong Vu

Background

The Province of British Columbia in Canada has set a goal of net-zero carbon emission for public sector organizations in 2015.

Under the Carbon Neutral Government Regulation in 2008, public sector organizations (government ministries, schools, universities and colleges, hospitals, health authorities and Crown corporations and agencies) measured carbon emissions of every building, vehicle and piece of equipment. In 2014, 131 provincial public sector organizations generated 46,000 tones less GHG emission compared to their baseline year of 2010. The regulation will operate for individuals, business and industry.

The province is the first to become carbon neutral and reduced the net environmental impact of its GHG emissions to zero. From 2010-2014, the Government invested approximately \$53 million into the purchase of emission offsets on behalf of the public sector. There has been leadership in Energy and Environmental Design (LEED).

Summary of Targets and Initiatives

Policies	Goals	Actions
1. Targets	Reduce Provincial CO2e emissions by 33% by 2020 and 80% by 2050 based on 2007 levels	
	At least 93% of electricity generation to be from clean or renewable resources	Clean Energy Act, building the necessary infrastructure
2. Clean Tech	Promoting clean technology	Replace natural gas, diesel with no GHG gases (hydroelectricity, biomass); Convert methane produced in a landfill.
3. Buildings	Increasing building efficiency	Retrofit 103 buildings and upgrade 51 housing sites by replacing boilers and leaky windows, installed solar panels Certified 26 buildings with (Leadership in Energy and Environmental Design) Install a biomass system that burns wood chips and pellets manufactured from waste wood for School district 79

		<p>Lighting: replacing existing lighting fixtures with high efficiency LEDs or energy-efficient fluorescent systems.</p> <p>Heating and cooling system upgrades: replacing existing end-of-life/over-sized boilers, installing heat Direct Digital Control (DDC): introducing or updating automated building controls.</p> <p>Solar: installing solar hot water systems to replace existing domestic hot water systems and using rooftop solar photo voltaic to supplement electricity.</p>
	Carbon Neutral Capital Program	<p>In 2012, allocated CAD \$50 million over 5 years to help schools, hospitals, colleges and universities with projects and initiatives.</p> <p>Between 2008-14, the purchase of carbon offsets has contributed CAD\$372.5 million and 4,438 jobs through 23 offset projects including agriculture, industrial and land-based forestry, oil and gas, waste management and transportation.</p>
	New provincial government facilities should achieve LEED gold certifications	Funding available
4. Transport		
5. Waste		
6. Other	Enhancing capabilities	Build a repository of energy use data to create the collection of emission data and solid foundation for evidence-based decision-making
7. Resilience	Planning for resilience	Incorporating climate change into long-term planning documents: Climate change assessments for key economic sectors identify climate-related risks and actions that can help these sectors prepare for climate change
	Raising awareness	Education messages to the public and vulnerable populations, advice about cooling centres and water stations, or considerations for outdoor events including water availability and schedule changes

3. Conclusion

These case studies researched over four weeks at COG present an overview of some replicable best practices for the consideration of the Metropolitan Washington region. It is hoped that this research might inform CEEPC in its process to develop their 2017 – 2020 Climate Action Plan by the end of 2016.

Reflections from Fellows

Mai Huong Vu

*Climate Change Coordinator, Department of Natural Resources and Environment, Da Nang City
YSEALI Professional Fellow, Spring 2016*

(1) Jurisdiction

In my work as a government officer, I always look for the ways to enhance the jurisdiction in order to develop a good government for Da Nang city. During one month working in COG under the YSEALI professional fellows program, there are some key findings to improve the jurisdiction for Da Nang city:

- Government and public sector must play a leading role: In term of climate change response, energy efficiency, GHG emission reduction and natural disaster adaptation require efforts from different stakeholders, government, public sector, academy, private sector and residents. However, to gain the success, government or public sector must play as pioneer so that the results will be the best practices to replicate for private sectors and residents. For example, once government issues the regulation regarding green or energy efficient buildings or typhoon adaptable ones, the public buildings must be retrofitted first before forcing private sector to comply the regulations.
- Communes must be engaged during building the policies: Any policy that is practical requires the engagement of communes for very beginning so that the government would understand the real impacts, the practical proposes/solutions and could encourage huge sources (man power, budget...) from the communes.
- Academy/Institution and government need strong collaboration to use the scientific research results for making decision. In addition, institution needs to understand the practical demands from the local government so that the research results will be more practical and not too theoretical.

(2) Technical issues

- Visualization on modeling by regular ways. In Da Nang, we use hydrological and hydraulic model to simulate the flooding impacts on GIS maps. It is easy for scientist or technical officers to understand how extreme of the floods, but for the citizens, it is totally difficult to understand the real situations. Therefore, the flooding maps should visualize and compare with regular things, such as: human body, car and house.
- Communicate and build awareness on climate change not only for children but also their parents.
- Combat climate change by the simple and easy way, from single action of individual to thousands actions of communes.

(3) New network and new chances.

- C40 is the new network suitable and valuable for Da Nang city in term of climate change response.
- Sharing and learning information, research results among fellows and organizations are always good ways to understand and improve us.

Melissa Low

*Research Associate, Energy Studies Institute, National University of Singapore, Singapore
YSEALI Professional Fellow, Spring 2016*

We did a number of things during our time at COG. This research stretched our minds to think about ways that metropolitan regions can benefit from replicable best practices from others. Our research was aided by the experienced team and staff at COG, who sat patiently with us to explain governance structures, as well as to organize meetings and tours for us to attend to get a better sense of the region.

As a research associate in Singapore, I have benefited greatly from this exercise particularly in recognizing the importance of stakeholder engagement and seeking buy-in through a robust public participation process. The city-state of Singapore has a relatively 'flat' governance structure compared to many countries, and this research project revealed the benefits of having an entity to bring area leaders and passionate individuals together to address major regional environmental issues i.e. the work of MWCOG.

My time at COG has allowed me to gain a better understanding of U.S. local government's role in addressing environmental sustainability efforts, and best practices for tackling issues such as climate change.

Wilson Ang

*Executive Director, Global Compact Network Singapore (Since April 2016)
Founding President, ECO Singapore, Singapore
YSEALI Professional Fellow, Fall 2015*

My fellowship has given me insight into how civil society organizations work with government representatives and their respective relationships with the private sector. I was given access to several closed-door negotiations among different states, and realized that America is a 'Country of Countries'. I was tasked to do a basic mapping on how to increase the use of clean technology in the Washington DC metro-region to create jobs and economic progress. This project has also allowed me to achieve my aim of developing strategies for green growth in Southeast Asia with the same key outcomes. The short stint has not only provided me with firsthand experience, but also established contacts, opportunities and relationships that will continue to benefit me and my work back in Southeast Asia.

Resources

Australian Capital Territory

- [Enabling Adaptation in the Australian Capital Territory, 2014](#)
- [Climate Change Adaptation and Resilience 2016](#)
- [Energy Efficiency Improvement Scheme, 2013](#)
- [AP2: A new climate change strategy and action plan for the Australian Capital Territory](#)
- [2015 Review of AP2, 2015](#)
- [Carbon Neutral Government Fund](#)
- [Carbon Neutral ACT Government Framework, 2014](#)
- [National Strategy on Energy Efficiency \(NSEE\), 2010](#)
- [ACT Smart](#)
- [2016 Environmental Grants](#)
- [Carbon Neutral Government Framework](#)
- [Solar Auction - Feed-in Tariff reverse auction processes completed for large-scale renewables](#)
- [ACT Smart Schools](#)
- [Renewable Energy Local Investment Framework](#)
- [Renewable Energy Innovation Fund](#)
- [Renewable Energy Skills Centre of Excellence at the Canberra Institute of Technology](#)

British Columbia, Canada

- [Leading by Example: The First Five Years of Carbon Neutral Government in British Columbia - 2010-2014, 2015](#)
- [Economic Analysis of British Columbia's Carbon Offset Projects](#)
- [Carbon Neutral Capital Program](#)
- [Greenhouse Gas Reduction Targets Act](#)
- [Carbon Neutral Government Regulation](#)
- [BC Climate Action Toolkit website](#)
- [Carbon Neutral Corner](#)
- [Carbon Neutral Government Overview](#)

Da Nang City

- Da Nang Climate Change Action Plan by 2020
- Da Nang Resilient Action Plan.
- [Da Nang action plan of respond to climate change and sea level rise](#)
- [Da Nang Low Carbon Society plan](#)
- [Da Nang: Extreme Rainfall, Climate Change, and Flooding](#)
- [Pros and Cons of implementing climate change policy in Vietnam](#)
- [Assessing the vulnerability and impacts of climate change in Da Nang City](#)
- [Building Urban Climate Resilience: Experiences from Da Nang city, Vietnam](#)

Kyoto, Japan

- [A Roadmap towards a Low Carbon Kyoto, 2009](#)
- [International Cooperation through a Strong Partnership between ICLEI and Strategies for Climate Change in Kyoto City](#)
- [Sugiyama, N. and Takeuchi, T., 'Local Policies for Climate Change in Japan', The Journal of Environment Development December 2008 vol. 17 no. 4, p. 424-441.](#)
- [A Roadmap towards a Low Carbon Kyoto, 2009](#)
- [Program of Global Warming Countermeasure <2011~2020> - For an environmentally-friendly city, economy and lifestyle, 2011](#)

Singapore

- [Singapore's 3rd National Communication to the UNFCCC/1st Biennial Update Report](#)
- [Climate Change & Singapore: Challenges. Opportunities, 2012](#)
- [Singapore's National Climate Change Strategy, 2008](#)
- [Building and Construction Authority \(BCA\) Green Mark Scheme](#)
- [Energy Storage Programme](#)
- [Grant for Energy Efficient Technologies \(GREET\)](#)
- [Singapore Green Data Centre Standard](#)
- [Green Data Center Innovation Programme](#)
- [Second National Climate Change Study - Climate Projections to 2100 Science Report, 2015](#)
- [Technology Roadmaps](#)
- [Infographic on the Impacts of Climate Change on Singapore](#)

Wales, United Kingdom

- [Welsh Climate Change Commission](#)
- [Fuel Poverty Strategy](#)
- [The National Energy Efficiency and Savings Plan](#)
- [Climate Change Strategy for Wales](#)
- [Adaptation Delivery Plan](#)
- [Progress on reducing emissions and preparing for climate change in Wales](#)
 - [Technical annex](#)
- [Resource Efficient Wales \(Advisory service\)](#)
- [Non-Energy Intensive Business Package \(Carbon Reduction Commitment Energy Efficiency Scheme\)](#)
- [Energy Intensive Business Package \(Climate Change Agreements\)](#)

Shenzhen, China

- [Medium and Long-term plan for Shenzhen's low carbon development \(2011-2020\), 2012](#)
- [Shenzhen Emissions Trading Scheme](#)
- [Shenzhen: Construction of the Carbon Trading Market in Shenzhen](#)
- [Inside China's Emissions Trading Scheme: First Steps and the Road Ahead](#)

- [Developing low-carbon cities through pilots](#)
- [Climate Change Governance in Chinese Cities, 2014](#)
- [Evaluating China's pilot low carbon city initiative: national goals and local plans, 2013](#)
- [California and Shenzhen, China cooperation on fighting climate change](#)
- [Analysis of the Chinese Market for Building Energy Efficiency, 2014](#)