APPENDIX F

Summary of Thematic Session A: Urban Services

Thematic Session A1: Waste Management

This session was chaired by Mr. Lorenzo Santucci, Economic Affairs Officer, United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). A total of 6 presentations were made:

1. *"Solid Waste Management Balikpapan City 2014"* by Mr. Ketut Astana, Head of Environmental Agency, Balikpapan Environmental Agency
2. *"Workshop on International Cooperation for Waste Management in Capital City of Jakarta, Indonesia"* by Mr. Masanobu Iizuka on behalf of Mr. Hirotaka Yamazaki, Manager, International Cooperation Office for Waste Management, Clean Association of TOKYO 23 (a special purpose municipal government)
3. *"Maximizing Resource Recovery"* by Hon. Mr. Phee Boon Poh, Penang State Executive Councilor (State Minister) For Welfare, Caring Society, Environment, Penang State Government, Malaysia
4. *"Project for Developing a Low Carbon Society through 'Waste to Energy Technology' in Penang, Malaysia"* by Ms. Yohko Maki, Planner, Executive Director, Kawasaki Environment Research Institute, Environment Bureau, City of Kawasaki, Japan
5. *"Solid Waste Management in a Rural District of Danang City"* by Ms. Nguyen Thi Thu Ha, Vice Head of General Affairs, Division of Natural Resources and Environment, Danang, Viet Nam
6. *"JFE's Technologies for MSW Treatment"* by Mr. Jun Ogawa, Group Manager, Sales & Marketing Department, Asia Pacific Division, JFE Engineering Corporation.

Mr. Rizal Effendi, Mayor, Balikpapan presented “Solid Waste Management Balikpapan City 2014".

Balikpapan is a city of approximately 650,000 people growing at a 4.89% annual rate located in East Kalimantan on Borneo. Balikpapan’s solid waste management addresses three types of waste – domestic waste, market/shop waste and street waste which are disposed of at waste banks, compost houses or at final disposal sites. The city is currently implementing a 3 year project with JICA aimed at improving solid waste management practices. Balikpapan generates 126,417 tonnes of solid waste of which 115,266 tonnes is disposed at a 27.1ha sanitary landfill (established in 1997/98), 11,008 tonnes goes to 38 compost houses and 203 tonnes goes to 65 waste banks. There is also a leachate treatment system and gas production facilities. Waste plastic is now being used for handicrafts as well as a building material. Another key area of solid waste management is attempting a cultural shift away from the perception that waste is dirty through educational programmes which include a nursery, producing handicrafts from waste and environmental education. Moreover, recreational facilities such as buggy racing and ziplines have been established at the waste site.

Mr. Masanobu Iizuka on behalf of **Mr. Hirotaka Yamazaki, Manager, International Cooperation Office for Waste Management, Clean Association of TOKYO 23 (a special**

purpose municipal government) presented "Workshop on International Cooperation for Waste Management in Capital City of Jakarta, Indonesia".

Clean Association Tokyo 23 (CAT 23) is responsible for the intermediate waste processing (incineration and pulverization) for all 23 cities which comprise Tokyo Metropolis. Waste collection and transportation, recovery of resources etc. is handled by each of the 23 cities with final disposal being managed by Tokyo Metropolitan Government as consigned by the 23 cities and CAT 23. CAT 23 has now established itself as having technical skills, time-tested knowledge and experience in consensus building through its 19 incineration plants and work with all 23 cities so it is now establishing itself as a consulting service for technical transfer and technical training services in Japan.

CAT 23 is holding a workshop in Jakarta to improve municipal solid waste (MSW) management in Indonesia following a suggestion by the Vice Minister of the Environment Japan (MoEJ) during a visit by the Minister of Environment, Indonesia (MoEI) to a CAT 23 incineration plant. It is held on March 3rd and 4th in Jakarta under the partial contribution of MoEJ and JICA with the aim of building a trustworthy relationship and improving MSW management in Indonesia. Furthermore a study council has been established within CAT 23 to explore international cooperation. Outputs include a basic policy document on international cooperation for waste management and the “Tokyo Model” brochure in 4 languages.

Hon. Mr. Phee Boon Poh, Penang State Executive Councillor (State Minister) For Welfare, Caring Society, Environment, Penang State Government, Malaysia presented "Maximizing Resource Recovery".

Penang has faced a variety of challenges – lack of waste separation at source, mixed waste hindering resource recovery, insufficient diversion points for recyclables and organic waste, people’s mind set and bad practices. This was initially tackled through the creation of source separation by-laws and a waste generator pays principle. All types of waste are covered from domestic waste, organic waste, e-waste to construction and demolition. The waste generator pays principle creates many benefits for local authorities such as cost savings from final disposal along with income from permits and fees with many of the costs being borne by the private sector.

Along with incentives and penalties, key factors for success have been strong political will along with ground champions and public education. This has been shown by Penang’s success stories such as organic waste diversion at high rises where waste was diverted for community composting as well as to organic treatment facilities. Other practices include Zero Waste Communities which have also been established both in high rises and village communities where all waste have been sorted with the aim of reuse and recycling. Environmental education is also important to change mind sets with the establishment of a Green School Award which has increased from 53 schools in 2012 to 84 schools in 2013 along with talks on composting and making soap from oil.

Ms. Yohko Maki, Planner, Executive Director, Kawasaki Environment Research Institute, Environment Bureau, City of Kawasaki, Japan presented "Project for

Developing a Low Carbon Society through 'Waste to Energy Technology' in Penang, Malaysia".

Kawasaki is currently cooperating with Penang on a feasibility study for a waste to energy project under the umbrella of Japan's Joint Credit Mechanism (JCM) programme. Penang is divided into two cities, Penang Island City and Seberang Perai City with a bridge connecting the two. Unfortunately only Seberang Perai City has a sanitary landfill leading to the bridge being used for transferring waste. Through cooperation of both the public and the private sector on the Malaysian and Japanese side it is hoped that the pressure on the infrastructure can be reduced through reducing waste generation.

The project started with study tours by both sides to Malaysia and Japan with an in depth discussion of the issues, the outcome of which was a decision to focus on assistance towards a regulatory framework as well as technological transfer. Following the examination of many options it was decided to propose that the feasibility of a wood-based biomass power generation plant should be further explored in FY2014. It is hoped that in the future further technologies such as waste-to-energy and the processing of fluorescent light RDF can be transferred under this cooperation.

Ms. Nguyen Thi Thu Ha, Vice Head of General Affairs, Division of Natural Resources and Environment, Danang, Viet Nam presented "Solid Waste Management in a Rural District of Danang City".

With a population of 950,000 Danang is one of the 5 largest cities in Viet Nam and is a key economic, transport and cultural hub within central Viet Nam. By 2020 Danang aims to have improved air quality, 25% of wastewater being reused, a recycling rate of 50% as well as 100% of households using clean water. Recent work has been undertaken in Hoa Vang, a rural area of the city which comprises 57.17% of the total area of the city but with a population of only 120,698. Solid waste is 45-50 tonnes per day (with domestic waste comprising 95-98%) with a collection rate of 45-50%. Achievements of the waste management programme in Hoa Vang are an improvement in the collection rate to around 50% of the waste, an increase in the awareness of residents on environmental protection and creating jobs for residents. Weaknesses include the failure to fully apply 3Rs and a lack of involvement of the private sector in waste collection. Reasons for this include a lack of facilities, a lack of suitable policies and a lack of suitable methods. Measures being taken include socialisation on waste collection and implementation of 3Rs as well as research into waste collection and making fertilizer from organic waste.

Mr. Jun Ogawa, Group Manager, Sales & Marketing Department, Asia Pacific Division, JFE Engineering Corporation presented "JFE's Technologies for MSW Treatment".

Currently "Waste to Energy (WTE)" technology plays an important role in the waste management in Japan. Advanced WTE technology brings various useful by-products such as renewable power, steam and recycled materials while significantly reducing the volume of waste. This technology is particularly prevalent in Japan due to a lack of space for landfill. Japan thermally treats 79% of its waste, recycling 19% of waste generated and sending 2% of waste to landfill. This compares to the EU where thermal treatment comprises 22%,

landfill 38% and recycling 40% and the United States where the figures are 12%, 54% and 34% respectively. JFE mainly offers two types of WTE technologies – stalker and gasification, both of which has an abundant track record and long and stable operation record. Utilising those advanced technologies, JFE actively assists in the planning and execution of the waste management projects in the region and presented the case of the cooperation between Danang City, Vietnam and Kawasaki City, Japan. JFE will continue to contribute to the improvement of environment through advanced technology.

Discussion:

Q: What activities will be done to educate the Indonesian public and change behaviour concerning waste separation under the collaboration between Japan and Indonesia as outlined by the presentation by CAT 23?

A: CAT 23 is not really engaged in the creation of methane gas or composting due to the difference in waste composition between Japan and Indonesia. Regarding public education, there are no shortcuts to be had – changing minds is a slow process. In Tokyo efforts have been made for half a century on public education and progress has also been slow in similar activities in cooperation in Malaysia, so this is not a problem unique to Indonesia. In Japan a large amount of public relations materials has been produced, including TV programmes, to launch new systems of waste separation. For example, incineration of waste plastic started five or years with a great deal of money being spent for awareness raising. There is no easy method.

A: In Penang we have focused on the school children as the fastest and cheapest method to changing mind sets. Children are the darlings of the parents so using them is an effective way of altering behaviour within a household.

Q: How can a company such as JFE Engineering ensure public acceptance of having a waste disposal plant within their community?

A: This is more a responsibility for the public sector rather than the private sector. Having said that, there are many benefits for the community. The plant is a waste to energy plant and not only supplies electricity but also supplies waste heat. Moreover the plant does not create problems in the area and is beneficial, so is usually supported.

Thematic Session A2: Water and Sanitation

This session was chaired by Mr. Saengroaj Srisawaskraisorn, Climate Change Adaptation Specialist, USAID and co-chaired by Mr. Joris van Etten, Deputy Program Coordinator, CDIA. A total of 4 presentations were made:

1. *"Water and Sanitation to support ASEAN ESC Model Cities Program Phase 2"* by Mr. Chin Sothun, Vice Chief of Solid Waste and Hazardous Substance Management, Department of Environment Pollution Control, Ministry of Environment, Cambodia
2. *"Demonstration Site for Countermeasures of Waste Water in North Sumatra Province (Policy of Wastewater Treatment Management in North Sumatra)"* by Dr. Ir. Hj. Hidayati, Director, Environmental Protection Agency of North Sumatra, Indonesia
3. *"Banjarmasin City Water and Sanitation"* by Mr. Fajar, BAPPEDA, Kota Banjarmasin
4. *"Environmental Benefits by Water Saving"* by Mr. Motoshi Muraoka, Partner, Senior. Executive Manager, Socio & Eco Strategic. Consulting Sector, NTT Data Institute of Management Consulting

Mr. Chin Sothun, Vice Chief of Solid Waste and Hazardous Substance Management, Department of Environment Pollution Control, Ministry of Environment, Cambodia presented "Water and Sanitation to support ASEAN ESC Model Cities Program Phase 2".

Cambodia has committed itself to ensuring improved access to clean water and sanitation by 2015 under Cambodia's Millennium Development Goals. The proportion of the rural and urban population with access to safe water is aimed to be 50% and 80% respectively with the proportion of the rural and urban population with access to improved sanitation is to be 30% and 74% respectively. The key strategies for achieving this are the promotion of private sector participation, improving public utilities, protecting the poor as well as environmental protection and the promotion of sanitation. Work is on-going in a variety of sanitation projects.

Two cities were highlighted for their practices. Phnom Penh has a combined sewer system but no wastewater treatment plant as yet. There are current efforts to rebuild a pumping station with a capacity of $8m^3$/sec. Siem Reap has been using a DEWATS (decentralised wastewater treatment) system for domestic wastewater and organic industrial wastewater. Moving forward, the main challenges are that sewerage and drainage floods during the raining season; further deterioration is expected through rapid town development; there are inadequate human and financial resources; lagoons in north and south of Phnom Penh are shrinking; efficiency of waste water treatment plants is low.

Dr. Ir. Hj. Hidayati, Director, Environmental Protection Agency of North Sumatra, Indonesia presented "Demonstration Site for Countermeasures of Waste Water in North Sumatra Province (Policy of Wastewater Treatment Management in North Sumatra)".

North Sumatra is a province in northwest Indonesia with a population of 12,985,075. Centralised sewerage only reaches 0.6% in the province as a whole and 3.8% in Medan, the capital of the province. In addition within Medan 36.2% have no treatment at all with 60% of the population relying on septic tanks. Nevertheless, sanitation coverage is higher than the national average. North Sumatra has joined the JCM programme in the hopes of improving

sanitation issues. In order to be involved North Sumatra undertook a GHG inventory to see potential emissions savings. Once complete, it was determined that Johkasou, a technology similar to a sceptic tank but smaller and with a lower GHG emission impact, could be used. Although technology transfer is helpful, other issues such as improvement of access to services, an increased role for the community and the development of institutions as well as policies and regulations are key factors for success.

North Sumatra has made strong efforts to manage solid waste and wastewater through conducting a baseline assessment and is determining the emission factor of domestic waste water through a national pilot project which is expected to be used for GHG calculations of the wastewater sector. Installation of Johkasou in North Sumatra Province is a new step for domestic wastewater management in North Sumatra. However licenses, certification and establishment of standards are necessary for Johkasou installation and, considering the necessary number of Johkasou in North Sumatra, financial support schemes from the North Sumatra government are to be considered. The JCM project is a way of supporting the Johkasou project in North Sumatra.

Mr. Fajar, BAPPEDA, Kota Banjarmasin presented "Banjarmasin City Water and Sanitation".

Banjarmasin City is located in South Kalimantan in Borneo with a population of 720,000. Due to being surrounded by a system of rivers and canals, the city is essentially an island with 84% of the total area being within 400 metres of a waterway. However, the city is also below sea level which leads to water becoming brackish and salty in the dry season due to sea water intrusion.

Banjarmasin has many difficulties related to water with (i) slums being built on the water; (ii) rivers contaminated by industrial pollution; (iii) urban waste and destruction of the river ecology; (iv) a lack of potable water; (iv) 11 rivers being lost in the last 5 years due to sediment and build-up of waste; (v) flooding during the rainy season; (vi) a damaged river ecology. In terms of the water supply, the city is divided into 4 zones and has 3 water treatment plants. Difficulties include freshwater supply; production capacity; system reliability; rate of water loss; and weak customer service.

Despite these difficulties there have been successes as well. From 2000 – 2012 coverage increased from 58% to 97.91%; service is now 24 hours a day; water losses have been reduced from 33.18% to 26.19% and a profit is now being made. This has led to Banjarmasin been acknowledged nationally for its efforts. Nevertheless, problems still remain with wastewater, with challenges including a lack of citizen awareness, lack of knowledge concerning septic tanks and a lack of law enforcement.

Mr. Motoshi Muraoka, Partner, Senior. Executive Manager, Socio & Eco Strategic. Consulting Sector, NTT Data Institute of Management Consulting presented "Environmental Benefits by Water Saving".

Domestic water savings can greatly reduce CO^2 emissions due to a reduction in energy being consumed through pumping as well as water and sewerage treatment. Moreover, costs can also be saved due to lower energy use and therefore bills. This can lead to a

reduction in the need for water and sewerage treatment facilities as the same number of facilities would be able to cover more households. TOTO has been involved in 3 activities on water saving in ASEAN – (i) quantifying CO2 reduction with data being collected in Surabaya and Johor Bahru; (ii) proposing water saving standards to Viet Nam; and (iii) holding a "Minimal Infrastructure Committee" in ASEAN to study the effects of water saving in ASEAN.

Quantification was done through a preliminary survey conducted by TOTO, NTT, Kitakyushu City and Pusdakota (an NGO in Surabaya). This led to a field survey including household survey, discussion with public officials and water infrastructure visit. Following this the precise figures were calculated using TOTO technology as a guide. It was discovered that 900,608 tCO2/year could be reduced through introducing water saving showers in Indonesia and 9,743 tCO2/year could be reduced through the introduction of water saving toilets in Surabaya. A similar activity was also undertaken at a large hotel in Viet Nam. Furthermore the Minimal Infrastructure Committee in FY2013 shows that "Minimal Infrastructure" could contribute to water-resources preservation and CO2 reductions in ASEAN countries by water-saving technologies. TOTO and NTT DATA IOMC are planning to establish a committee aiming for the optimization of water saving infrastructure in FY2014, targeting the realization of large scale JCM in Indonesia.

Discussion:

Q: All the speakers spoke about how problems were magnified by a large population. This being the case, why did the speakers not address issues such as family planning? If there is a link between population quantity and quality of life, should this not be further explored?

A: In Sumatra Province, we are dealing with the wastewater matter in a technical way but public education is also a key to the work. Education can bridge the gap between excess population and quality of life.

A: In Balikpapan there is an education programme at five schools concerning water, particularly concerning the correct disposal of wastewater. There is also collaboration with the family planning office. This is all under the umbrella of trying to improve services to the public.

Q: Phnom Penh is a very successful example of water supply within Asia. However I noted that in the presentation you spoke about both greater involvement of the private sector whilst also talking about ensure equity and access to the poor. How do you ensure both when the poor may not be able to afford private services?

A: The answer to this depends on the geography and the level of urbanisation in Phnom Penh as well as issues concerning the urban poor and how to increase private sector investment in the clean water. Currently the price of water is broadly seen as acceptable. The main issue is one of capacity in the face of the increasing population. We are seeing increasing flooding in Phnom Penh during the rainy season which we are receiving assistance from JICA for. On-site treatment by the private sector is another method, so that facilities such as factories have their own on-site methods. We are also receiving assistance from NGOs for community based solutions.

Thematic Session A3: Resiliency

This session was chaired by Mr. Saengroaj Srisawaskraisorn, Climate Change Adaptation Specialist, USAID and co-chaired by Mr. Joris van Etten, Deputy Program Coordinator, CDIA. A total of 5 presentations were made:

1. *"Resilience Overview"* by Mr. Saengroaj Srisawaskraisorn, Adaptation Specialist, Regional Development Mission for Asia, USAID
2. *"Building Climate Resilient Cities"* by Mr. Saengroaj Srisawaskraisorn, Adaptation Specialist, Regional Development Mission for Asia, USAID
3. *"Linking Resilience Planning to Infrastructure Financing"* by Mr. Joris van Etten, Deputy Program Coordinator, Cities Development Mission for Asia (CDIA)
4. *"Urban Regeneration Plan Through Environmental Strategies in Busan"* by Prof. Woo Shin Koo, Department of Urban Architecture, Pusan National University
5. *"Urban Climate Change Resilience in Semarang - Indonesia"* by Mr. Wicaksono Gunawan, Secretary, Semarang Environmental Board, Semarang

Mr. Saengroaj Srisawaskraisorn, Adaptation Specialist, Regional Development Mission for Asia, USAID presented "Resilience Overview".

This presentation was a brief summary of the meaning of resilience to provide an overview for the session. The Oxford Dictionary defines resilience as “The ability of a substance or object to spring back into shape; elasticity. The capacity to recover quickly from difficulties; toughness.” UNISDR (United Nations Office for Disaster Risk Reduction) states it is “The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions” whereas USAID defines it as the “Ability of people, households, communities, countries and systems to mitigate, adapt to and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth”

Mr. Saengroaj Srisawaskraisorn, Adaptation Specialist, Regional Development Mission for Asia, USAID presented "Building Climate Resilient Cities".

USAID has four climate resilient projects as follows:

M-BRACE works in Thailand and Viet Nam. Its key finding has been the need to build from the ground up through creating a climate resilience framework and process through shared learning dialogues. What has made M-BRACE different to other programmes is its focus on being local government led with engagement with multiple departments and stakeholders as well as national government experts.

US–ASEAN CityLinks Pilot Partnership has implemented a Climate Leadership Academy for eight cities in ASEAN to examine the core issues of restoring urban systems, elevating social equity and aligning financial investment through citizen engagement, the use of climate data, strategic planning for climate adaptation, restoring ecosystem services and cross-sector working groups. Following the Climate Leadership Academy individual city

progress on action plans was followed up with the next steps being the selection of ASEAN cities and technical exchanges between ASEAN and US cities during 2014.

ADAPT Asia-Pacific is a project preparation facility providing capacity building, knowledge sharing, technical assistance, twinning partnerships and an annual forum.

Climate Change Project Preparation and Financing in Urban India is working in Bhubaneswar, Mysore and Shimla with Rockefeller, CDIA and ICLEI.

Urban Climate Change Resilience Trust Fund is in the pipeline and aims to prioritize approximately 25 medium-size cities for direct support in adapting to the impacts of climate change through city wide and targeted investments, leveraging private sector investment in climate resilient infrastructures targeting 6 countries.

The main lesson learnt is that the interaction between systems (inclusive dialogues, balanced and integrated approaches, best use of scientific data and tools), governance (coordination across agencies and actors, actionable and well-founded strategies, linkage finance) and humans (networking, innovation, champions) is vital. The most important areas for attention are regional scale up and flexibility/resilience.

Mr. Joris van Etten, Deputy Program Coordinator, Cities Development Mission for Asia (CDIA) presented "Linking Resilience Planning to Infrastructure Financing".

It is estimated that Asia's urban infrastructure investment requires USD100 billion per year with current funding being at USD40 billion (20% private, 10% ODA, 70% public sector), creating a USD60 billion gap. CDIA aims to support cities by setting priorities, making projects bankable and linking projects to financing. About 80 pre-feasibility studies (PFS) have or are being conducted in 53 cities with an expected infrastructure value of USD7.3 billion. Sectors include energy efficiency (5 PFS), urban transport (21), flood and drain management (15), urban renewal (10), wastewater management (9), solid waste management (10), water supply (7), slum upgrading (3). There are numerous options for financing actions including international (ODA, climate finance, carbon markets); national (national budgets, climate financing); local (local funding sources such as taxes) and private sector involvement as well as capital markets.

CDIA has recently become involved in the Urban Climate Change Resilience Partnership which will focus on Bangladesh, India, Indonesia, Pakistan, Philippines, Viet Nam. Highlighted interventions included Pakse, Lao PDR which has received USD439,000 with sector interventions leading to investment values of USD25.3 million in drainage, flood protection and sanitation, USD1.8 million in solid waste management and USD6.2 million in green infrastructure which was linked to the ADB Pakse Urban Environmental Improvement Project. Another highlight is Semarang which received USD220,000 to address technical issues relating to flooding, investigate how to address social issues and how to finance projects. Financing was through the central government, public-private partnership and ADB Green Cities Programme.

Prof. Woo Shin Koo, Department of Urban Architecture, Pusan National University presented "Urban Regeneration Plan through Environmental Strategies in Busan".

Korean cities face a post-industrial age of declining and ageing population alongside decaying commercial vitality. The area of Seo-gu in Busan was initially an area for refugees during the Korean War which was then followed by an influx of low-income workers. This housing area is on a steep slope and since the 1990s has seen deindustrialisation and depopulation leading to deterioration of housing stock along with previous issues of a lack of parking and traffic roads.

The master plan for Seo-gu to create a model city runs from 2011 – 2022, encompassing 33,357 people and financing of USD145 million. There are five categories under an eco-friendly banner – public facilities, residential area, infrastructure, port area and activity programmes. Public facilities will be upgraded with a variety of green technologies including solar, insulation and green roofs. Residential areas will have a network of green roofs and conversion of empty houses to community gardens and parks. Infrastructure will be improved through greening of outdoor stairways and LED lighting in urban areas. The port area will be improved by installing solar panels on a refrigerated warehouse. Activity programmes will train local residents as green leaders with green practice culture promotion, green evaluation and monitoring and green agreement guidelines. Pilot projects include the promotion of model houses which use passive heating, rainwater recycling and renewable energy. Housing is to be rented to low-income families with urban farms supplying vegetables to local restaurants. There are also pilot community activities providing urban agricultural training programmes to local people and encouraging foreign people from multicultural families to participate in the community business.

Mr. Wicaksono Gunawan, Secretary, Semarang Environmental Board, Semarang presented "Urban Climate Change Resilience in Semarang - Indonesia".

Semarang is a city of 1.5 million people located in Central Java. Coastal erosion and increased flooding due to a shorter but fiercer rainy season has brought the issue of climate change into focus. Semarang has joined ACCCRN and has undergone three different activities – shared learning dialogues; sector studies and pilot projects; and a city resilience strategy. Two shared learning dialogues took place in August 2009 and January 2010 respectively involving municipal agencies, private sector, universities, NGOs and other stakeholders. This resulted in (i) an agreement on the top four climate hazards; (ii) a commitment to establish a city team on adaptation; (iii) contribution to studies on vulnerability assessments, (iv) community based assessments, (v) governance and institutional analysis; (vi) the development of pilot projects.

From 2011 – 2016 the city will build capacity; integrate the city's vulnerability assessment and city resilience study into the medium term development plan and organise a rainwater harvesting project. A flood early warning system along with the creation of a dam and a sea wall will also be implemented. In recognition of its work Semarang has been named one of the 100 Resilient Cities by Rockefeller. Lessons learned from Semarang include the importance of engaging all actors, political will, leadership and the implementation of city resiliency strategy. The city needs support in mainstreaming climate change into all development sectors, develop networking, to access funding from national government or international donor sources, use corporate social responsibility as a funding source and elaborate local wisdom.

Discussion: No questions were asked.