



The Delhi Metro cluster of CDM projects – a lighthouse case of integrating transport and renewable energy projects in a megacity

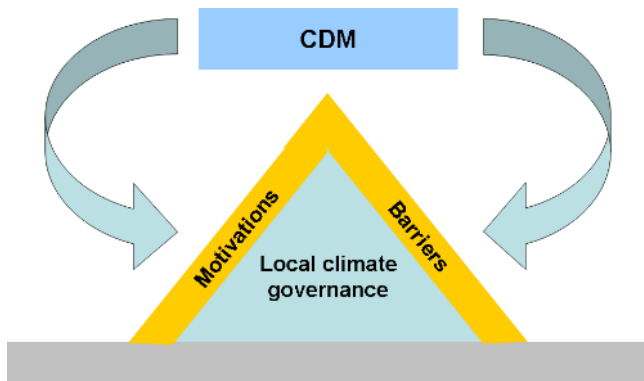
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CDM EB side-event: The role of CDM in decarbonizing cities and its co-benefits, 2 December 2019

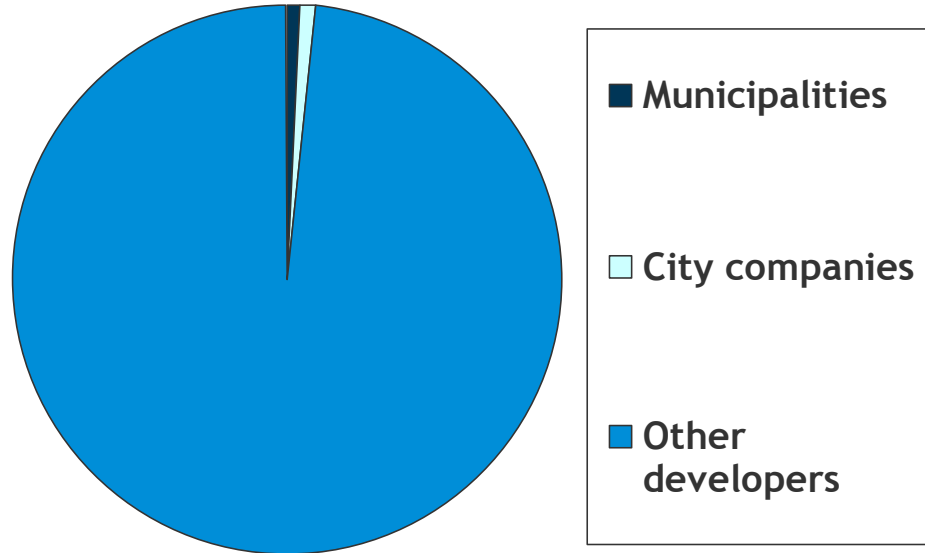
Agenda

- The share of urban activities in the CDM
- Challenges for urban CDM activities
- Delhi Metro: a frontrunner in urban transport infrastructure in India..
- ... and in harnessing the CDM for its low-carbon activities in various parts of its operations
- Outlook for urban activities under Article 6
- Conclusions



Municipalities in the CDM – almost absent

- **Projects from municipalities make up less than 1% of registered CDM projects**
- **Projects from “city companies” in China cover about 1%**



Challenges for municipalities to engage in CDM

- **Upfront investments** cannot be covered from scarce **municipal budget**
- **Weak institutional capacity** and lack of **skilled specialist staff**
 - Lack of competitiveness against CDM consultants
- **More costly** and **difficult to mobilize** mitigation compared to electricity generation or industry
 - Many stakeholders to be engaged
- **Short- term perspective** of municipal government due to electoral cycles
 - Frequent changes in project design, long delays



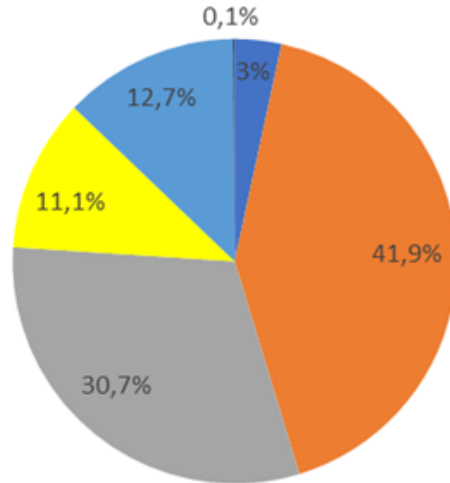
CDM in cities: key project types and performance

- ~**22%** of CDM projects relate to **urban** activities

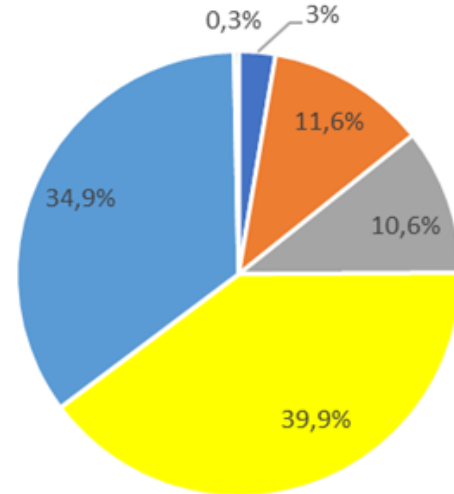
Source: Perspectives
and ICLEI 2019

■ Urban Transport
■ Waste
■ Water and Wastewater
■ Local Energy Supply
■ Private Buildings
■ Public Infrastructure

Single Projects per Subsector



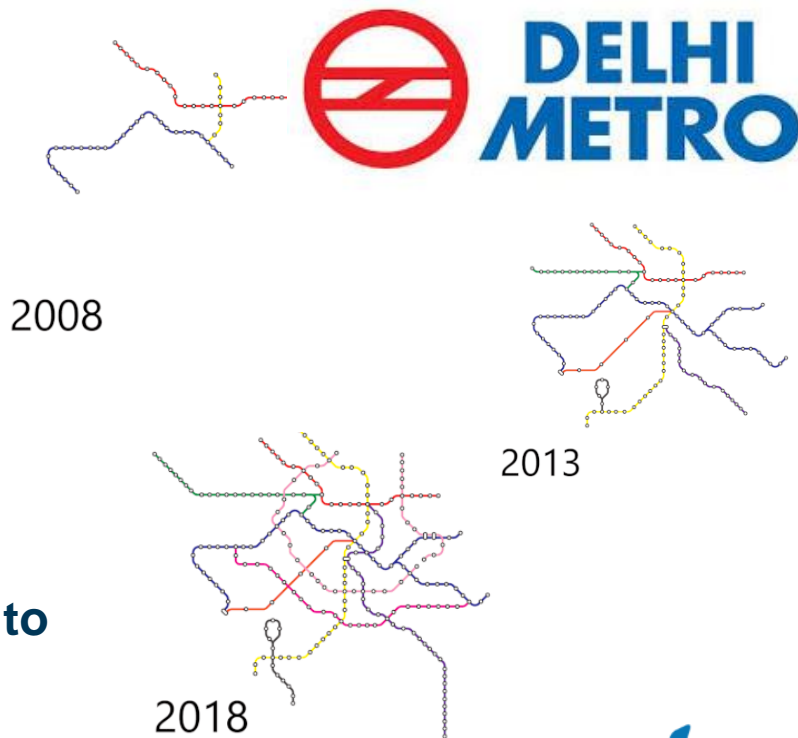
PoA per Subsector



- ~**21%** of these projects have achieved **issuance**
- **Issuance performance** ranges from **35%** (energy) to **69%** (waste); transport is at **61%**

Delhi Metro – an unexpected success story

- **1998: Construction start**
- **2002: First line opened**
- **2006: 65 km line length, 0.5 million passengers per day**
- **2011: 190 km line length, 1.7 million passengers per day**
- **2019: 357 km line length, 2.3 million passengers per day**
 - Decline from 2.8 million in 2016 due to strong fare hikes
- **2024: 461 km length envisaged**

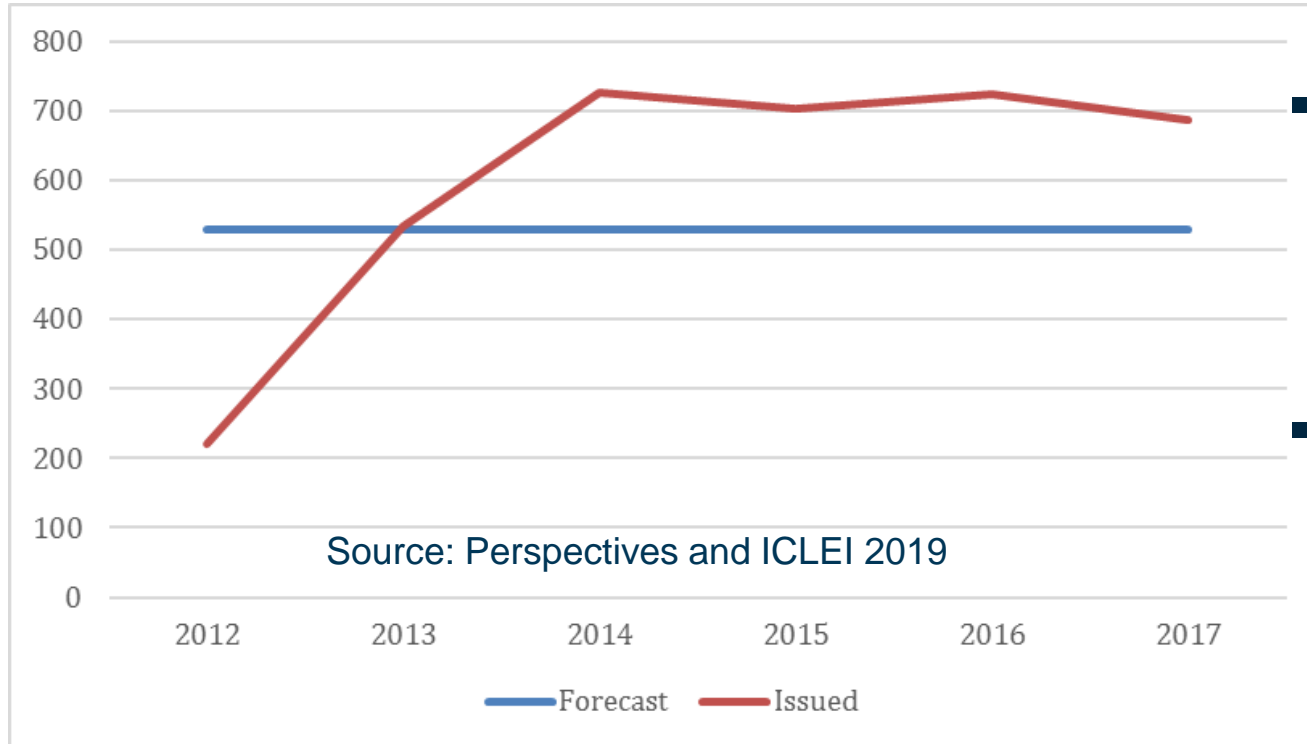


Delhi Metro – an unusual CDM cluster with high performance

- **2007: Installation of low GHG emitting rolling stock in metro system, UNFCCC # 1351**
 - **Energy efficiency:** regenerative braking systems of metro carriages
 - 43.5 kCERs per year estimated, issuance performance **115%**
- **2011: Metro Delhi, India, UNFCCC # 4463**
 - **Transport:** modal shift from cars to metro
 - 520 kCERs per year estimated, issuance performance **135%**
- **2014: MRTS PoA UNFCCC # 9863, CPA 001**
 - **Transport:** modal shift from cars to metro
 - 640 kCERs per year estimated, no issuance to date
- **2017: DMRC Solar PV Project, PoA UNFCCC # 6161, CPA 002**
 - **Renewable energy:** 15 MW photovoltaics
 - 18.5 kCERs per year estimated, monitoring report but no issuance

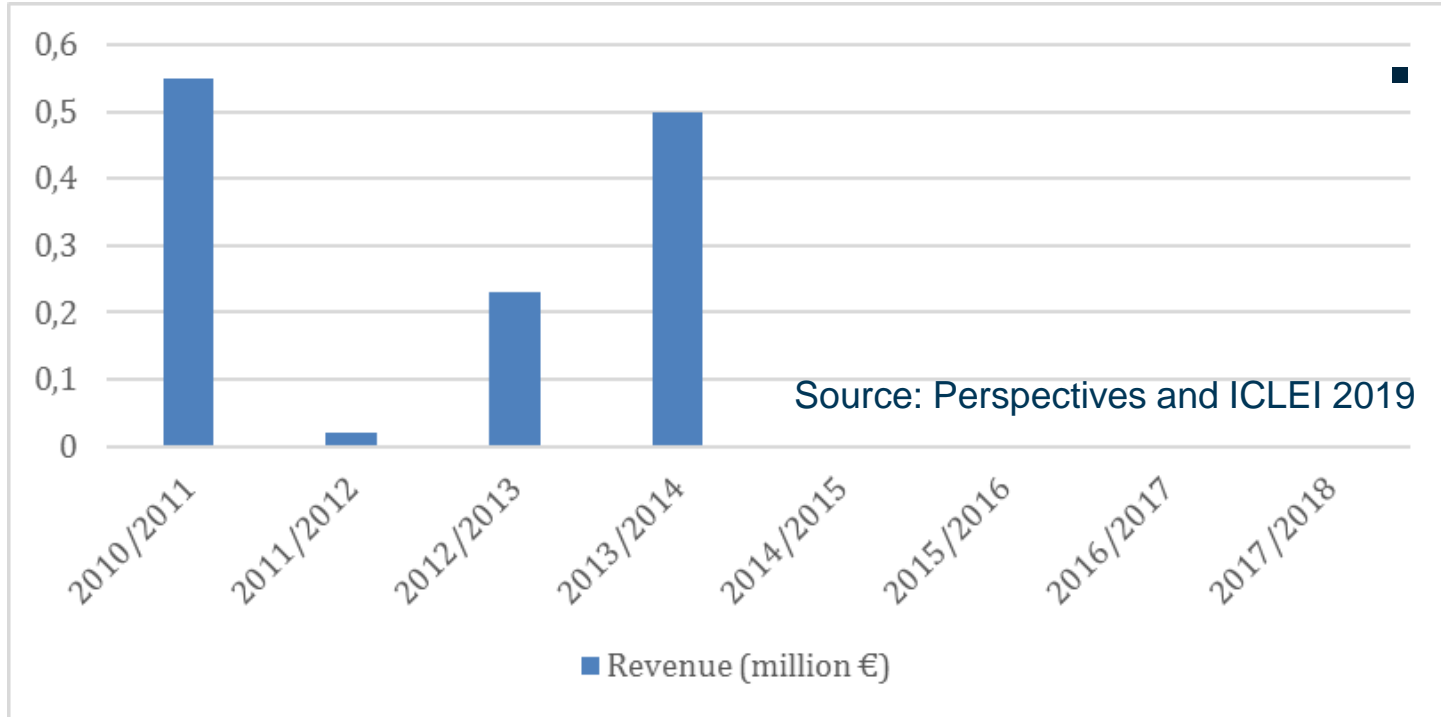
Delhi Metro – performance increase over time

- **Issuance performance Metro Delhi, India, UNFCCC # 4463**



- **Issuance was continued into the doldrums of the CDM market**
- **Delhi Metro still offers CERs on the free market**

Delhi Metro – Revenues from CER sales

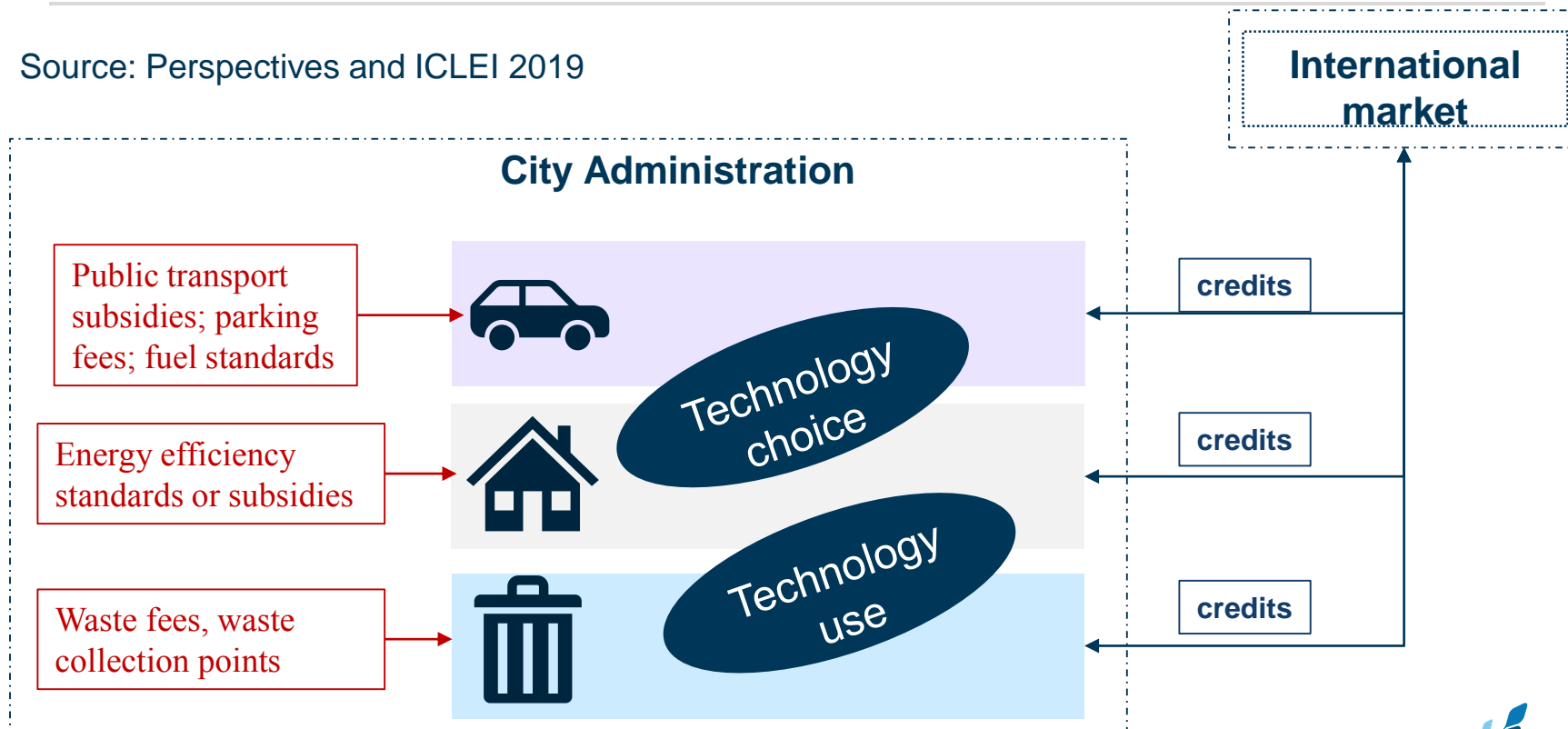


■ **But in terms of actual sales, Delhi Metro was unable to sell in the difficult market period**

Data source: Delhi Metro Rail Company: Annual reports (various years)

Sector-based approach for cities under Article 6

Source: Perspectives and ICLEI 2019



Baseline approach illustrated for the transport sector

■ Standardized parameter

- Captures both **technological choice** and **use**
- **tCO₂-eq per pkm** for passengers/tkm for freight
- Combine with **pkm/tkm per inhabitant** and year which reflects behavioral change

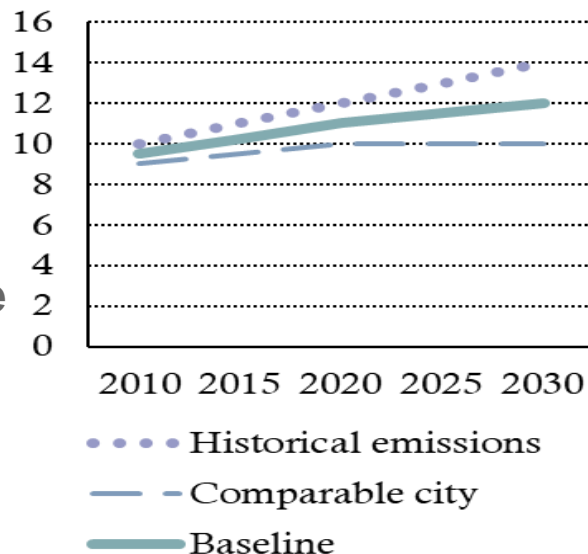
■ Extrapolation of historical trends

- Past 10 years

■ Comparable city

- Similar population density, per capita income, and geographic situation

Source: Perspectives and ICLEI 2019



Conclusions

- **Municipalities found it very difficult to participate in the CDM**
- **Activities located in cities fared slightly better but were generally underperforming**
- **The example of Delhi Metro shows that innovative and well organized urban infrastructure providers were able to use the CDM and perform highly**
 - **Still, they could not escape the CDM market crisis**
- **For the international market mechanisms under Article 6, a sector-based approach with strongly standardized parameters should be applied for cities**
 - **Upscaled crediting alleviates barriers**



Thank you!

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