



Unlocking potential of the local energy efficiency implementation



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COPENHAGEN CENTRE
ON ENERGY EFFICIENCY
SE4ALL EE HUB

Energy Efficiency on Local Level

15 June 2018

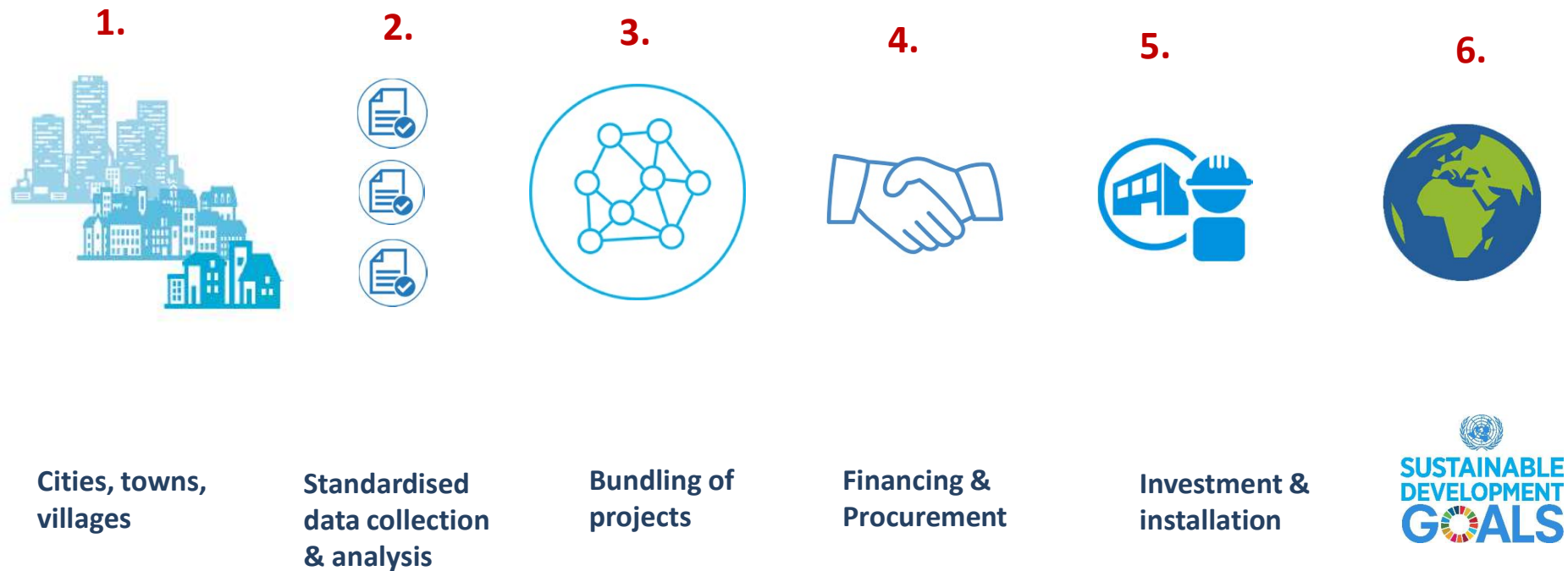
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The Copenhagen Centre on Energy Efficiency

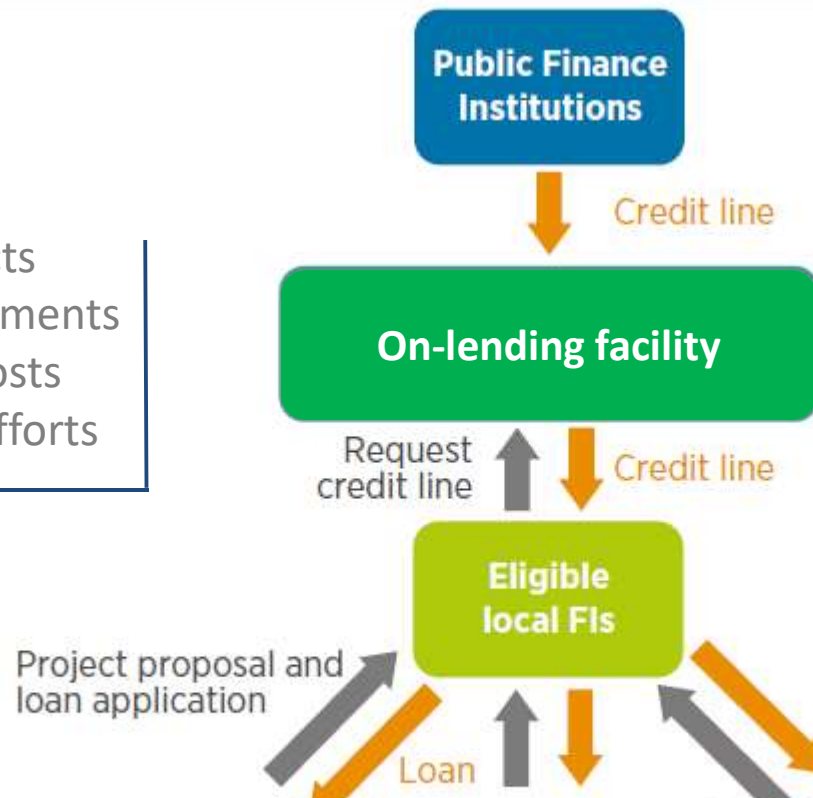


Our Model: Standardisation, Upscaling and Replication



Typical project financing path

Fragmented projects
Small size of investments
High transaction costs
Replication of TA efforts



PROJECTS BUNDLING

Structure to bring together several relatively small-scale energy efficiency projects or activities, to form a single thematic portfolio (i.e. 'bundle') above a certain investment threshold, which can be procured, administered and financed under the same structural framework

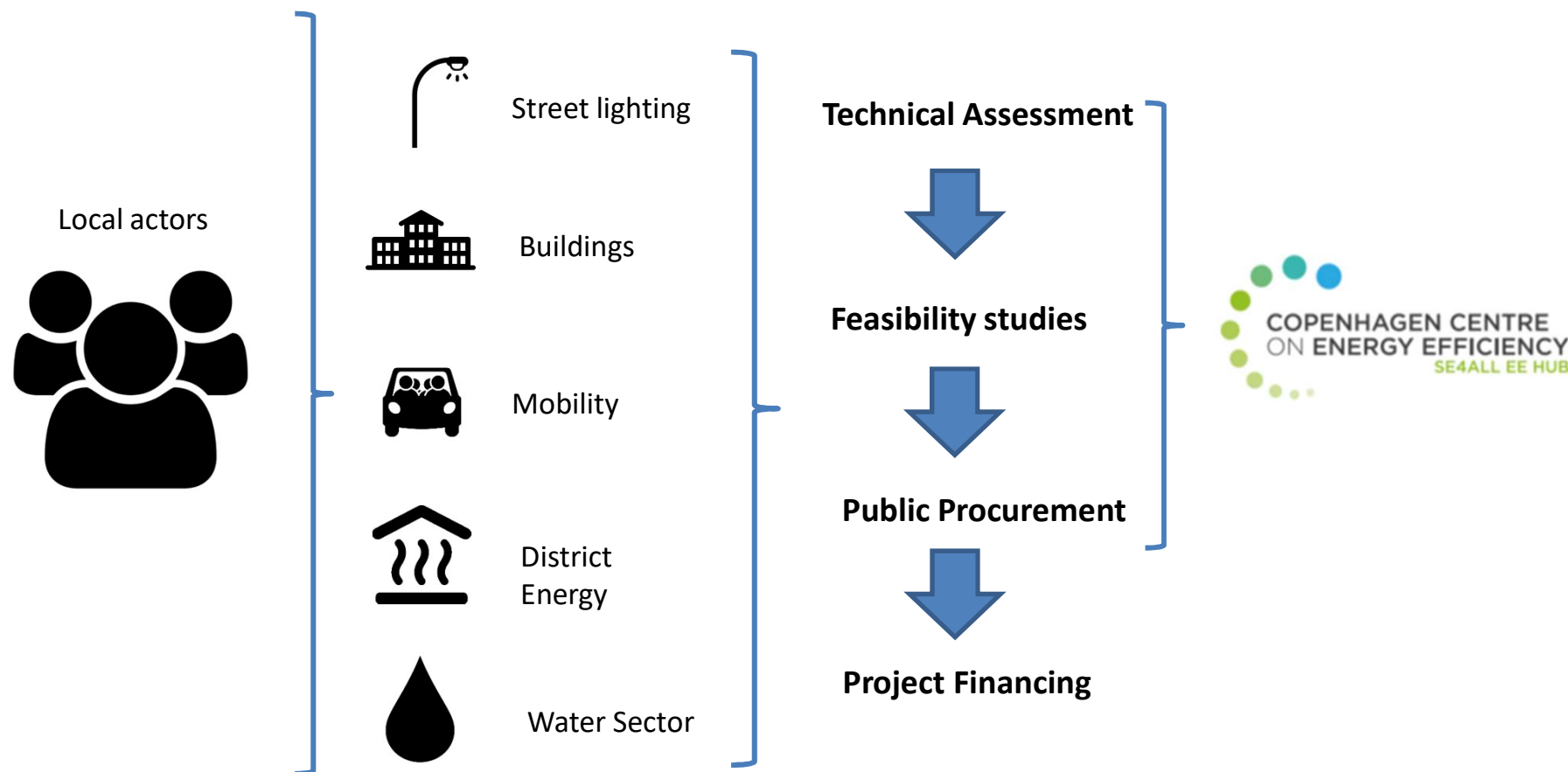
Need for implementation at the scale


Energy Efficiency Aggregation Facility

Aim: to provide streamlined, structured and aggregated expertise on technical, financial, legal aspects related to energy efficiency investment project development



Aggregation mechanism



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- A map of the Astrakhan Oblast region in Russia, showing its location along the Volga River and the Caspian Sea. The map includes labels for various cities and towns in Russian and English, such as Chompot, Ashuluk, Jenotajewka, Selitrennoye, Narimanov, Akkol, Krasnyy Yar, Safonovka, Utery, Astrakhan, Kamyzak, Liman, Yandyki, Dzhalykovo, Lagan, and Ulan-Khol. It also shows the borders of neighboring countries like Norway, Tunisia, Algeria, Morocco, Mali, Niger, Sudan, Yemen, Oman, Myanmar (Burma), and Thailand. A blue semi-transparent box is overlaid on the map, containing a list of facts about the city and region.
- The city lies on two banks of the Volga River, close to where it discharges into the Caspian Sea at an altitude of 28 meters
 - **City population:** 520,000 people
 - **Oblast population:** 1 mln. people
 - **Climate:** temperate continental "Aralian" semi-arid climate with cold winters and hot summers



OCTOBER 2017

ENERGY EFFICIENCY BRIEF

Astrakhan, Russia

INTRODUCTION

Astrakhan is a Russian city located on the Caspian lowlands close to the Volga River delta, 1534 km southeast of Moscow. It is the oldest economic and cultural centre of the Lower Volga and Caspian regions and is often referred to as 'South Venice' and 'the Caspian capital'.

The population of Astrakhan city is 531,000 (as of 2016). The climate is continental arid, with an average temperature of -10°C in the winter and +25°C in the summer.

The City of Astrakhan is the largest city of the Astrakhan region (or 'oblast'), which includes 11 rural districts, 442 villages and settlements, and 6 cities with an overall population of 1,018,000 (as of 2016). The region occupies an area of 49,024 km², which is 0.3% of the area of Russia. Its gross regional product (GRP) in 2015 was RUB 304 billion (EUR 6.2 billion) compared to RUB 289 billion (EUR 5.9 billion) in 2014.

Russia has acknowledged energy efficiency as an important direction for its policy development. In 2008, an economy-wide target was set to reduce energy intensity by 40% by 2020 in relation to 2007. The target is supported by Federal Law 261 on Energy Savings and Energy Efficiency (2009) and the State Program on Energy Efficiency (2014). In 2014 and 2015, Astrakhan region and city respectively developed a Regional Program and a Municipal Programs, which outline indicators and measures for energy efficiency across different sectors in order to achieve the national target.

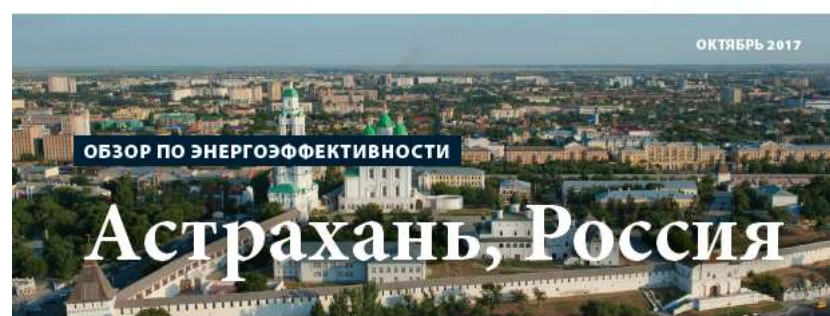
A number of existing barriers in Astrakhan might impede implementation of these measures without efficient policy development, including:

- Significant depreciation of energy consuming equipment;
- Scattered settlements and socially significant sites;
- Limited ability of end-users to understand opportunities of energy efficiency;
- Limited budgetary capacity and lack of effective market infrastructure for the provision of energy services; and
- Lack of experts in the field of energy efficiency.



ASTRAKHAN CITY INITIATIVES AND PARTNERSHIPS

- In 2017, Astrakhan was included in the list of cities under the UN Environment District Energy in Cities Initiative
- In 2018, Astrakhan joined the sustainable city development and eco-energy town initiative of the Clean Energy Ministerial, which supports transition of cities towards sustainable development through energy efficiency improvement, clean energy technologies and behavioral change
- In 2019, the city's energy policy was approved with the aim to continuously improve energy efficiency and reduce energy consumption in the city of Astrakhan by 15% until 2020, to introduce energy management systems in accordance with ISO 50001 in all municipal institutions and support the introduction of such systems at industrial facilities and house management companies serving residential multifamily buildings
- In 2015, City Administration and UNIDO's Center for International Industrial Cooperation in the Russian Federation made an agreement for the development and implementation of the Energy and Resource Saving Program on the basis of ISO 50001 in the city



ОКТАБРЬ 2017

ОБЗОР ПО ЭНЕРГОЭФФЕКТИВНОСТИ

Астрахань, Россия

ВВЕДЕНИЕ

Астрахань - это город в России, расположенный на каспийской низменности, недалеко от дельты Волги, в 1534 км к юго-востоку от Москвы. Это старейший экономический и культурный центр Нижней Волги и Приволжского региона, который часто называют «Южной Венецией» и «Каспийской столицей».

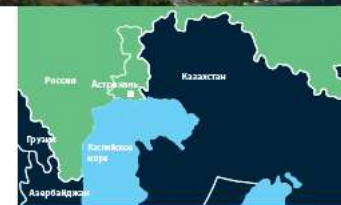
Население города Астрахани составляет 531 000 человек (по состоянию на 2016 год). Климат континентальный, со средней температурой -10°C зимой и + 25°C летом.

Астрахань - крупнейший город Астраханской области, в состав которой входят 11 сельских районов, 442 деревни и поселения и 6 городов с общей численностью населения 1 018 000 человек (по состоянию на 2016 год). Область занимает площадь в 49 024 км², что составляет 0,3% от площади территории России. Валовой региональный продукт (ВРП) области в 2015 году составил 304 млрд. руб. (6,2 млрд. евро) по сравнению с 289 млрд. руб. (5,9 млрд. евро) в 2014 году.

Россия признала энергоэффективность важным направлением развития политики. В 2008 году была поставлена задача об уменьшении энергоёмкости на 40% к 2020 году по сравнению с 2007 годом. Эта цель была закреплена Федеральным законом № 261 «Об энергосбережении и энергоэффективности» (2009) и Государственной программой энергоэффективности (2014). В 2014 и 2015 годах Астраханская область и город Астрахань, соответственно, разработали Региональную и Муниципальную программы, в которых описываются показатели и меры по повышению энергоэффективности в различных секторах для достижения национальной цели.

Ряд существующих барьеров в Астрахани может помешать реализации этих мер без разработки эффективной политики, включая:

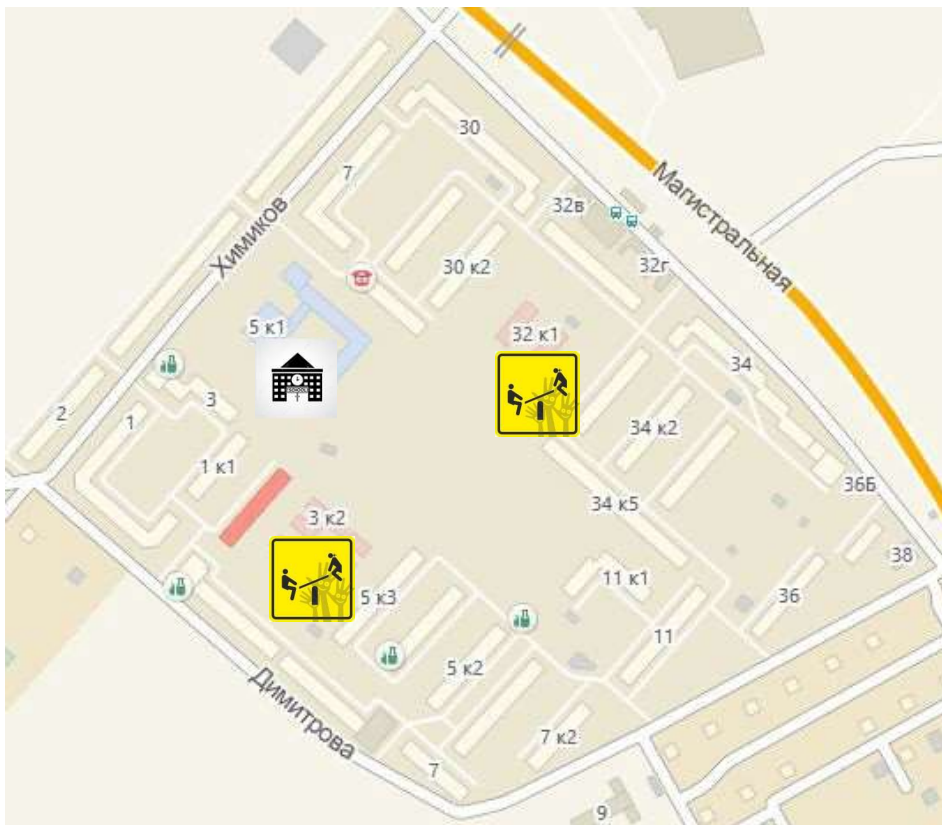
- Значительная амортизация энергопотребляющего оборудования;
- Рассеянные поселения и социально значимые объекты;
- Недостаточное понимание конечными пользователями возможностей энергоэффективности;
- Ограниченные бюджетные возможности и отсутствие эффективной рыночной инфраструктуры для предоставления энергетических услуг;
- Недостаток экспертов в области энергоэффективности.



ИНИЦИАТИВЫ И ПАРТНЕРСТВА г. АСТРАХАНЬ

- В 2017 году г.Астрахань был включен в список городов под эгидой инициативы ЮНЕП «Централизованные энергосистемы»
- В 2016 году г.Астрахань присоединился к инициативе «Устойчивое городское развитие и энергетические города». Министрского уровня по чистой энергетике, которая поддерживает переход городов к устойчивому развитию посредством повышения энергоэффективности, распространения экологических технологий и изменения поведения потребителей
- В 2016 году была утверждена энергетическая политика города с целью повысить энергоэффективность и сократить потребление энергии в Астрахани на 15% до 2020 года, внедрить системы энергоменеджмента в соответствии с ИСО 50001 во всех муниципальных учреждениях, а также поддержать внедрение таких систем на промышленных объектах и в управляющих компаниях, обслуживающих жилые многоквартирные дома
- В 2015 году Администрация города и Центр международного промышленного сотрудничества ЮНИДО в Российской Федерации заключили соглашение о разработке и реализации Программы энерго- и ресурсосбережения на основе ИСО 50001

Model project



Residential buildings

- 28 five-storey houses
- 2 nine-storey houses

Population

- 6 294 people
- 2 310 apartments

Public buildings

- 1 school
- 2 kindergartens

Commercial buildings

- 4 stores

Energy use

- Hot water - 2489 Gcal/year
- Heating - 9570 Gcal/year
- Total - 12059 Gcal/year
- Cooling is needed from May to October

Microdistrict №6 is a part of «Trusovskij Severnyj» district, situated in the north-west part of the left Volga bank's part of Astrakhan City. It is the district with the fastest growth rate of the newly constructed floor area by 2029 (2 396 thousand m²)

Challenges in the district

- Quality and quantity of the supplied heat does not meet comfort needs of the residents
- Further utilisation of district heating networks may lead to accidents and emergency situations
- Inefficient building envelopes, many buildings require capital repairs
- Lack of data on energy use, no energy meters, no opportunity to control energy use in apartments
- Barriers for financing through energy performance contracting and ESCOs
- Lack of locally available technical solutions and expertise
- Lack of awareness about EE and its benefits among the residents



Energy efficiency must be part of capital repairs
Economic parameters varies significantly for different measures
Separate financing of measures for capital repairs and energy efficiency

Estimated investments for buildings retrofit measures (EUR)

Measures	1	2	3	4	TOTAL
	Comprehensive school No. 35	Kindergarten No. 111 'Luchik'	Apartment building at Magistralnaya St., 34, building 2	Apartment building at Khimikov St., 3	
Installation of heating substations without upgrading hot water supply contour		11 357			11 357
Upgrading hot water supply contour (in addition to installation of heating substations)	10 295	9 379	10 295		29 969
Installation of manual balancing valves into the heating systems		3 555			3 555
Replacement of staircase windows in multifamily buildings			8 952		8 952
Replacement of windows in public buildings	6 125	25 020			31 146
Total for Capital Repair Programme	16 421	49 312	19 247	-	84 980
Installation of heating substations without upgrading hot water contour	12 777	-	11 357	11 243	35 378
Installation of manual balancing valves into the heating systems	5 039	-	3 276	2 394	10 708
Insulation of heat piping in basements	2 657	-	-	1 897	4 554
Total for Energy Service	20 474	-	14 633	15 534	50 641
TOTAL	36 894	49 312	33 880	15 534	135 620

Bundling EE in existing public buildings

Aggregation of Buildings:

1. Buildings in Municipality A
2. Buildings in Municipality B
3. Buildings in Municipality C
4. Buildings in Municipality D
5. Buildings in Municipality E
6. Buildings in Municipality F
7. Buildings in Municipality G
8. Buildings in Municipality H
9. Buildings in Municipality I
10. Buildings in Municipality J

n Municipalities  ~ x million inhabitants



Interactive depositary for
bundles development



Typical public buildings:
schools, & sports centres, hospitals, etc..

On-going work:

- Data collection for technical assessment is in progress
- Active engagement with local CoM offices
- High potential for replication across typical buildings
- Current countries for replication in the UNECE region:
Belarus, Georgia, Armenia



On-going work on EE street lighting

Aggregation of Municipalities

1. Municipality A
2. Municipality B
3. Municipality C
4. Municipality D
5. Municipality E
6. Municipality F
7. Municipality G
8. Municipality H
9. Municipality I
10. Municipality J



10 X Municipalities



1. Forecast savings & Bundling

2. Project development



3. Financing



4. Public procurement



5. Implementation

On-going work in Argentina:

- Technical assessment for the bundle is completed
- 41 municipalities
- Light fixtures to replace: 268.778
- Approximate total investment: 135 Million US \$



THANK YOU!



Knowledge Management System

The Copenhagen Centre's Knowledge Management System (KMS) engages stakeholders in energy efficiency initiatives through knowledge sharing and outreach. The KMS provides users with access to selected information, reports, publications, and databases on energy efficiency. The KMS is linked to many other energy efficiency initiatives.

<http://kms.energyefficiencycentre.org/>



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