

Terms of Reference

Improving energy efficiency in buildings and district energy systems of the City of Astrakhan, Russia

1. Background

In 2015, a global agreement on the 2030 Agenda for Sustainable Development, with its 17 Sustainable Development Goals (SDGs), was adopted alongside with adoption of the Paris Agreement on Climate Change.

Sustainable Development Goals directly support the realisation of the Paris Agreement particularly SDG 7, which set a universal goal for energy development, focusing on ensuring access to affordable, reliable, sustainable and modern energy for all.

According to the Sustainable for All Global Tracking Framework 2017, Russia is considered as one of the priority countries for improving energy efficiency and reducing economy-wide energy intensity. Russia has acknowledged energy efficiency as important direction of 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 the Federal Law 261 on Energy Savings and Energy Efficiency (2009) and the Government Program on Energy Efficiency (2014), which also sets sectoral targets for energy efficiency improvements.

In support of the national policy on energy efficiency, the City of Astrakhan adopted its Municipal Program on Energy Savings and Improvement of Energy Efficiency (2015), which covers indicators and measure for energy efficiency improvement with a focus on the municipal and housing sectors.

With the vision to improve the quality of life and reduce its environmental impact, Astrakhan has initiated a project 'Sustainable City - Astrakhan', which includes the following six components: (1) effective municipal management, (2) energy savings and energy efficiency, (3) human capital development, (4) models for interactions with society, (5) waste management system and (6) higher standards of living.

1.1 *The Copenhagen Centre on Energy Efficiency*

The Copenhagen Centre on Energy Efficiency (Hereinafter referred to as "Copenhagen Centre") is a research and advisory institution dedicated to accelerating the uptake of energy efficiency policies, programmes and actions globally. The Copenhagen Centre serves as the Energy Efficiency Hub of the Sustainable Energy for All (SEforALL) Initiative. The Centre's prime responsibility is to support SEforALL's objective of doubling the global rate of energy efficiency improvement by 2030.

The Copenhagen Centre was established as a joint activity of the Danish Government, the United Nations Environment Programme (UNEP) and the Technical University of Denmark (DTU), and is dedicated to accelerating the uptake of energy efficiency policies and programmes at a global scale. The Copenhagen Centre is institutionally part of the UNEP-DTU Partnership (UDP).



UNEP DTU Partnership
DTU Management Engineering
Technical University of Denmark – DTU
UN City, Marmorvej 51
DK-2100 Copenhagen Ø, Denmark

Phone +45 4533 5250
Fax
unep@dtu.dk
www.unepdtu.org

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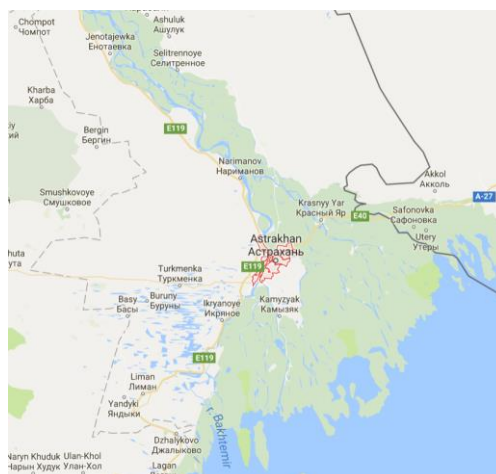
1.2 *The District Energy in Cities Initiative*

The Copenhagen Centre is supporting the District Energy in Cities Initiative, as one of the SEforALL accelerators. The District Energy in Cities Initiative is a multi-stakeholder partnership coordinated by UN Environment, with financial support from DANIDA, the Global Environment Facility, and the Government of Italy. As one of six accelerators of the Sustainable Energy of All (SEforAll) Energy Efficiency Accelerator Platform, launched at the Climate Summit in September 2014, the Initiative is supporting market transformation efforts to shift the heating and cooling sector to energy efficient and renewable energy solutions. The Initiative aims to double the rate of energy efficiency improvements for heating and cooling in buildings by 2030, helping countries meet their climate and sustainable development targets. The Initiative supports local and national governments build local know-how and implement enabling policies that will accelerate investment in modern – low-carbon and climate resilient – district energy systems. UN Environment is currently providing technical support to fifteen cities in eight countries including Bosnia and Herzegovina, Chile, China, India, Malaysia, Morocco, Serbia and now Russia.

1.3 *The City of Astrakhan*

The City of Astrakhan is the largest city of Astrakhan oblast, which includes 11 rural districts, 442 villages and settlements and 6 cities. Astrakhan Region is located in the southeast of the European part of Russia, in the Caspian lowlands in the lower part of the river Volga.

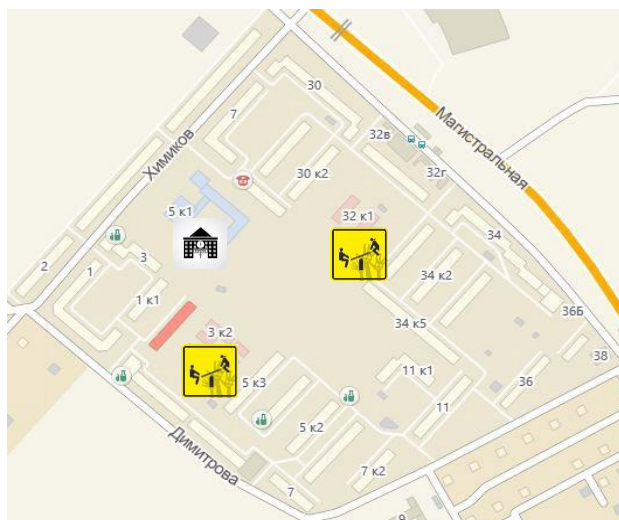
Population of Astrakhan City is 531 thousand people (as of 2016), which represents more than a half of population of Astrakhan oblast (1,018 thousand people as of 2016). Astrakhan is characterized by the temperate continental "Aralian" semi-arid climate with cold winters and hot summers, with maximum temperatures exceeding 33°C and minimum temperatures dropping below -5°C. Such ambient conditions require both space heating (between October and April) and cooling (between May and September) for ensuring thermal comfort. The city also has on average more than 200 days of sunshine per year, which offers a significant potential for utilisation of solar energy.



1.4 Microdistrict 6

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). Population of the microdistrict is 6294 people residing in 2310 apartments. Within the microdistrict there are 28 residential buildings: 26 five-storey houses and 2 nine-storey houses; 1 school, 2 kindergartens and 4 stores.

Residents of Microdistrict 6 use approximately 2489 Gcal/year for hot water, 9570 Gcal/year for space heating, amounting to 12059 Gcal/year in total.



2. Assignment

The Copenhagen Centre expressed its intention to support the City of Astrakhan in the field of improving the city's energy efficiency, which was stipulated in the Letter of Intent signed by both Parties in December 2016.

During a stakeholder consultation in February 2017 the City of Astrakhan together with the Copenhagen Centre identified Microdistrict 6, as a site for the pilot project under this collaboration with the vision for replication. Two main direction of work have been agreed upon for Microdistrict 6: (1) improvement of energy efficiency in district energy systems and networks, (2) improvement of energy efficiency in buildings.

Under the first direction, the Copenhagen Centre is collaborating with UN Environment's District Energy in Cities Initiative and is deploying an expert team to conduct the assessment of the district energy systems and networks of the Microdistrict 6, as well as to develop the potential technical solutions for energy efficiency improvements applicable for the local context.

The Copenhagen Centre is, therefore, seeking a consultant to accomplish the assignment under the second direction outlined above.

The purpose of the assignment is to assess the current state of energy efficiency in buildings in Microdistrict 6 and elaborate a range of technical solutions for improvement based on international best practices, local context, experiences from other projects in Russia and CIS and the principle of cost-effectiveness. The developed solutions for energy efficiency improvements in buildings should be in line with the solutions selected for district energy systems upgrade and should benefit from a synergetic effect of enhancements in both of these areas. The proposed solutions should be compatible with and fed directly into preparation of a procurement process and linked to potential models for financing the implementation of the project. As part of the assignment, the consultant should elaborate the recommended financial structure of the project and recommended means of procurement for the selected measures, which shall include identifying potential service providers, manufacturers and local experts, as well as suggesting sources of funding and commercial issues for consideration, taking into account the local context.

The results of the work should be presented in the form of a brief report describing the project design, proposed measures, project financial structure and the procurement process, which will be delivered to the City Administration at the end of the assignment and presented at a final workshop.

The tentative structure of the assignment and the timeline is expected to be the following:

Assignment component	Duration in working days	Period
Preparation of the detailed work plan by the consultant	2	August 2017
Technical assessment in Astrakhan (including a field trip to the city), including: <ul style="list-style-type: none"> Express energy audits of selected buildings in Microdistrict 6 Options analysis and needs assessment for smart grid connection for Microdistrict 6 	20 5	August - September 2017
Development of the conceptual project design and practical recommendations for energy efficiency improvements of buildings and heat supply (to be conducted in collaboration with other experts on district energy systems) in the Microdistrict 6	10	September 2017
Development of the financial structure of the project	10	September 2017
Identification of and report on potential implementation and investment partners	5	October 2017
Assistance in setting up the procurement process for the implementation of the project in the Microdistrict 6	15	November 2017
Preparation of the final report to be submitted to the city Administration	10	November - December 2017
Final project workshop in Astrakhan	2	December 2017
In total	79	August – December 2017

3. Requirements

The consultant should fulfil the following requirements:

- 1) At least 10 years of work experience in development and implementation of energy efficiency projects in the building sector in Russia and CIS region
- 2) Expertise in conducting energy audits and energy assessments in buildings
- 3) Experience in development and implementation of smart energy management systems in buildings
- 4) In-depth knowledge of Russian context in relation to energy efficiency improvements in buildings, namely: related regulatory framework, barriers, key stakeholders, cost-effective technologies, sources of finance, commercial and legal issues, manufacturers, etc.
- 5) In-depth knowledge of international best-practices on energy efficiency improvements in buildings, including technical solutions, policy instruments, project structures and financing models, as well as understanding of their applicability for the Russian context
- 6) Well-established expert and collaboration network at the national and local levels in Russia and CIS to provide the opportunity for potential replication of the project
- 7) Advanced communication skills, both oral and written, proven by the track record of presentations and publications
- 8) Professional project management skills, proven by the track record of successfully implemented projects
- 9) High level of professionalism in technical work, stakeholder relationships and dissemination of the results
- 10) Fluency in English and Russian

4. Application

Quote with the outline of qualifications and relevant expertise, breakdown of activities and associated costs (indicating separately costs for staff, travel, materials, etc.) to be submitted to Ksenia Petrichenko at ksepe@dtu.dk by August 4.