

C40 CITY SOLUTIONS PLATFORM

Addis Ababa:

**Piloting Electric Buses in the City's
Bus Rapid Transit System**



Organized By:



Addis Ababa City Administration is the challenge owner led by the Addis Ababa City Transport Bureau.



Addis Ababa Transport Bureau, which is part of the City Administration, focuses its efforts on creating sustainable urban transport system, and ascertaining road traffic safety while ameliorating the current challenges



C40 is a network of 96 of world-leading cities committed to taking bold climate action. C40 supports cities to collaborate effectively, share knowledge and drive meaningful, measurable and sustainable action to tackle the climate crisis.



C40 City Solutions Platform facilitates early-stage public-private collaboration to co-create and accelerate the implementation of innovative solutions to cities' urgent climate challenges, driven by a neutral platform.

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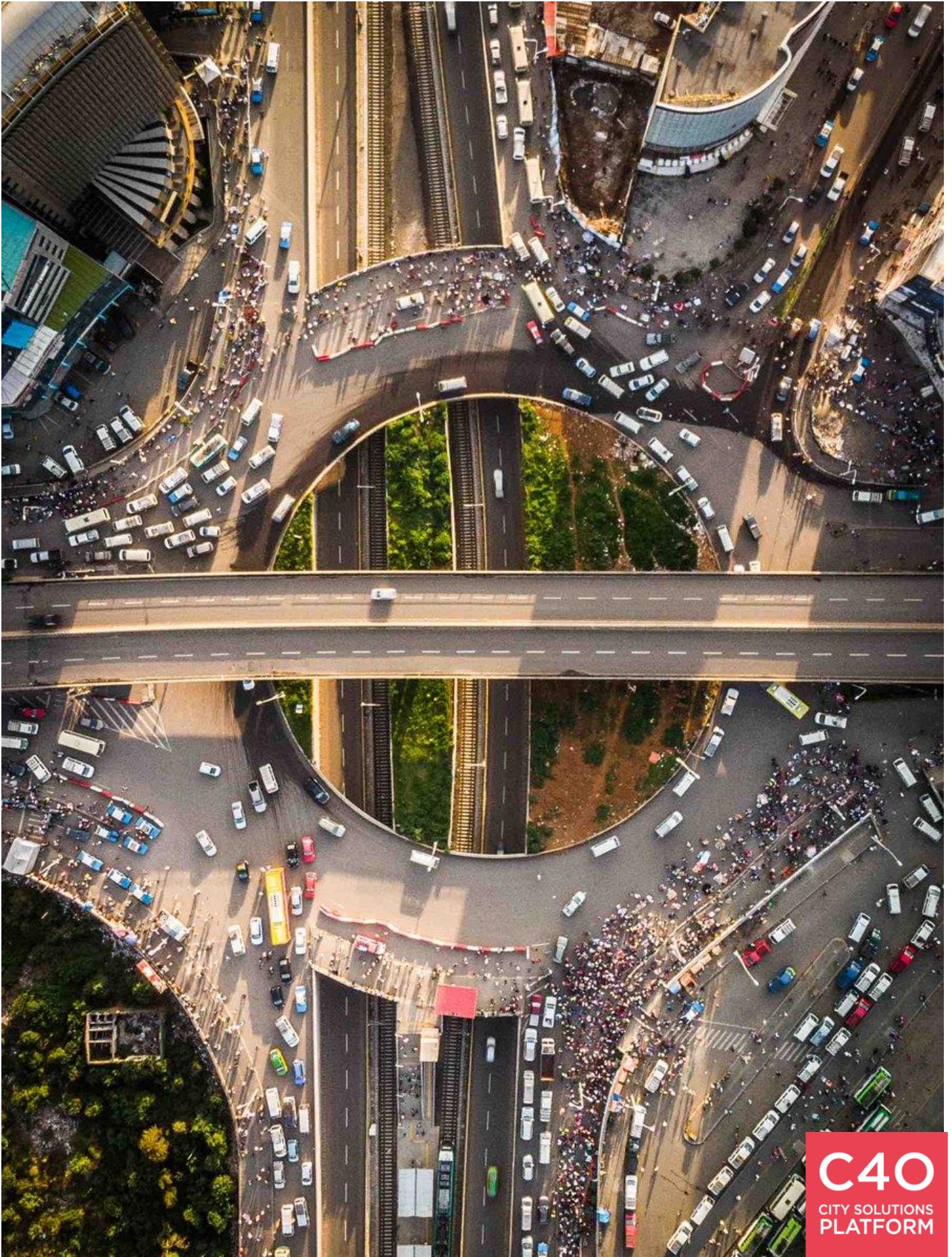
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Document purpose

C40 Cities and the City of Addis Ababa are releasing a call to action to climate solution providers to understand how a battery-electric bus pilot can be implemented on a Bus Rapid Transit (BRT) corridor in the City. This document is for prospective solution providers from the public, private, academic and NGO sectors to understand the context and objectives surrounding this climate crisis challenge from the City of Addis Ababa, and how they can get involved via the C40 City Solutions Platform programme. Solution providers should read through this document carefully and take the opportunity to provide expert insight and pose questions to the city by responding to challenge scoping questions by the 8th of October, through the [online Scoping Survey](#). The responses will be useful for the CSP team and the City to prepare the solution provider co-creation workshop scheduled for the 10th and 11th of November 2020. More information on page 13.

The City of Addis Ababa's Challenge: Piloting Electric Buses in the City's Bus Rapid Transit System

Background

Addis Ababa is rapidly urbanizing doubling in size every decade since the 1980s. Despite the City's relatively low motorization rate; rapid economic growth has led to increasing rates of vehicle registrations. Today, transport comprises 68% of the City's total emissions the major share of which is from on-road transport. The vehicle fleet in Addis Ababa is characterized by old and inefficient vehicles. Public transport includes public buses and privately-owned minibuses which are predominantly powered by unregulated diesel engines. For urban residents, air pollution is one of the top causes of death with diesel exhaust constituting a large share of air toxins. In 2017, the transport sector was responsible for 60% of PM2.5 non background concentration.

The demand for affordable and modern mass transit services has increased faster than the City can provide it. In turn, mounting gridlock is creating safety and health risks, producing more greenhouse gas emissions and impeding economic development. In response to these challenges, Ethiopia has turned its attention to shifting its capital towards sustainable mass transit solutions. Part of this is investing in light rail transit (LRT), bus rapid transit (BRT) systems and other mass transport services. The development of 2 BRT corridors is already underway with a total of 15 planned BRT corridors as stated in the current Addis Ababa city master plan 2017-2027(link to article).The two LRT corridors cover about 34.25 km in both directions, i.e. from North to South and East to West.

As buses have yet to be tendered or procured for the BRT systems, the introduction of zero emission buses, such as battery-electric buses, on defined BRT corridors or other alternate routes provide an excellent opportunity for Addis Ababa to avoid locking-in local and global emissions from diesel fueled buses for the next 20 + years. Having zero tailpipe emissions, battery-electric buses not only reduce global greenhouse gases from transportation sector,

but also have huge local air quality and health benefits. The C40 Benefits team have conducted a benefits analysis of introducing BRT lines into Addis Ababa and identified significant results in terms of reduction in premature deaths; increase in life expectancy; reduction in hospital admissions for cardiovascular and respiratory diseases and healthcare costs saved. Despite being more investment heavy, e-buses can attain lower total cost of ownership over their lifespans due to large operational and maintenance savings and can be introduced to the city's fleet through innovative business models with third-party providers and investors without increasing the system total cost.

Project Scope

The challenge is to build a consortium of relevant stakeholders to develop solutions for the introduction of battery-electric buses for Addis Ababa's BRT in order to curb growing greenhouse gas emissions, air pollution and public health risks.

The challenge will center around three pivotal questions:

1. How to deploy and design a small-scale electric bus pilot, including the needed charging infrastructure and any necessary accessories, to raise awareness and gain confidence in the technology and test its performance on the BRT corridors, or other alternate routes, under construction?
2. How to evaluate which BRT corridors (out of the 15 planned) are most suited for the sustainable operation of an electric bus and what technical and finance elements are needed to make a widespread roll-out of e-buses in the system viable over the long-term?
3. How to engage the community and relevant stakeholders in the electric bus project, and sustain their involvement?

An array of different private and public stakeholders must coordinate efforts to develop a pilot and test a battery- electric bus. These include but is not limited to:

- Bus manufacturers, battery assemblers and charging infrastructure suppliers;
- Energy suppliers;
- Investors and financiers (development agencies, multilaterals, national development financiers, commercial banks);
- Technology providers;
- Addis Ababa City Administration transport and environmental agencies;
- Ethiopia National transport, environmental ministries and other federal government organizations;
- Academic institutions
- Bus transport service operators, among others.

The participation and cooperation among different stakeholders and partners are necessary for an effective electric bus pilot. Other cities sharing similar challenges within the African region, such as Dar es Salaam, Kigali, Nairobi, and South African cities, will be involved to

broaden the scope of stakeholders, facilitate knowledge sharing and scale-up electric bus deployment in the region.

The CSP co-creation methodology provides the critical first step in convening all of the 'actors around the table' to initiate discussions; co-creating solutions in line with local and regional operating requirements and barriers and spurring public interest & momentum to procure and deploy battery-electric buses in Addis Ababa.

This project is in line with the objectives of [Ethiopia's Climate Resilience Green Strategy](#), which aims to reduce sizable emissions from the transport sector and improve cities' capacity to adapt and become more resilient to the climate crisis. The project will also help ensure Addis Ababa is on a pathway to reach the Paris Climate Agreement.

Through the C40 City Solutions Platform, Addis Ababa will collaborate with "solution providers", from the private, public, academic and NGO sectors, to develop scalable and tangible ideas and solutions. The CSP Challenge is phase 2 of a larger in-depth workplan provided by C40 Cities to support Addis Ababa in procuring and deploying electric buses.

The in-depth assistance will include the following C40 led programme of support for the city:

- **Phase 1: An extensive benefits analysis on e-buses in Addis Ababa to ensure political buy in.** The C40 Research team have undertaken cutting-edge research to assess and develop a tool on the air quality, health and economic benefits of climate action- working with 30 cities to date. The [report on climate, air quality and health benefits](#) is available online. The tool can help cities assess the impact of policies to better design, set target and communicate the impacts of climate actions to citizens and stakeholders to get more political buy-in. The Research team will support Addis Ababa in assessing the health impact of the City's public transport system (BRT and others) through guidance and help during the data collection.
- **Phase 2: CSP Challenge to convene a favourable ecosystem of stakeholders & generate initial ideas**
This phase includes the use of an [online collaboration platform](#) where solution providers can sign-up for and a co-creation workshop on the 10th and 11th of November 2020. This challenge scoping document is focused on Phase 2.
- **Phase 3: Prepare a structured e-bus pilot through technical assistance:**
Support the city conduct a detailed city and location-specific study on the selection of e-bus technology and charging infrastructure that is needed to develop a successful pilot on e-bus deployment on a proposed BRT corridor or alternative route. This pilot will work to make the case for the widespread roll-out of battery-electric buses in the city.
- **Phase 4: Share and learn with other African experiences:** Facilitate knowledge-sharing across the region through the participation of Addis Ababa city officials at regional meetings with peers from other African cities through C40's Financing Sustainable Cities Initiative (FSCI) and USAID Urban Links Africa Programme.

Project Objectives/criteria for success

The overall criteria of success is to develop defined steps forward to obtain further political buy-in and attract private sector investment, to design and develop a pilot electric bus project for Addis Ababa's BRT system.

To reach this a number of objectives must be met:

- To develop an understanding of the electric mobility landscape and create an enabling environment for an electric bus system in Addis Ababa;
- To develop innovative, feasible and scalable solutions for the introduction of electric buses in Addis Ababa;
- To enhance awareness about regulatory frameworks/ tariff structures for importing or producing electric buses into Ethiopia;
- To improve meaningful and sustained private, public and civil society engagement in electric mobility in Addis Ababa/ East Africa;
- To facilitate and mobilize resources and technologies to deploy an electric bus system in Addis Ababa;
- To assist Addis Ababa in the development of their Climate Action Plan goal of reducing emissions from the transport sector.

Project KPIs (Key Performance Indicators)

The evaluation KPI's of the success of the project are as follows:

- A transparent and clear idea of the different local, regional and international stakeholders (automotive and component industries, utilities, battery and charging manufacturers, energy suppliers, investors, banks, SMEs etc.) on electric mobility;
- A clear understanding of the feasibility of procuring and deploying a pilot of 1-15 electric buses on a specific BRT corridor or alternate route in Addis Ababa;
- Demonstration that e-buses Total Cost of Ownership (TOC) can be lower or similar to diesel buses.
- Secure commitment from at least 1 electric bus manufacturer to bring pilot units by 2021;
- Obtain further political buy-in;
- A clear understanding from the community side (civilians' perspective) on electric mobility benefits;
- The deployment of small-scale electric bus and connected charging infrastructure as a pilot project in Addis Ababa.

Design Parameters

For the ideas to be a success, they must follow these design parameters:

- The solutions must be economically, technically feasible and sustainable for the specific Addis Ababa context;
- The solution must be scalable to other cities with similar contexts and also other bus based city public transport systems in Addis Ababa.
- The solution must take into account the reality of COVID-19 and its impact on Addis Ababa;
- The solution must attract private investment;
- The solution should be financially sustainable and should not depend solely on funding from government;
- The solution must support Addis Ababa to reduce CO2 emissions from its transport sector and improve air quality in line with the City's climate ambitions
- The solution needs to consider long run performance considering Total Cost of Ownership
- The solution should be easily maintainable, and the city should not be responsible for the disposal of batteries or chargers deployed at the end of their lifecycle;
- The solution must not be isolated, but must be connected to and support the scalability towards other bus based public transport in the future, as they are part of the mass transit systems the City is focusing on;
- The solutions should promote horizontal collaboration (public / private / manufacturers etc.);
- The solutions must promote international, national and regional collaboration;
- The process should be highly inclusive for all of the potential end-users (vulnerable groups, children etc.);
- Short, medium and long-term public benefits should be described (eg. CO2 storage, impact on air quality benefits, etc.).

About the City Solutions Platform

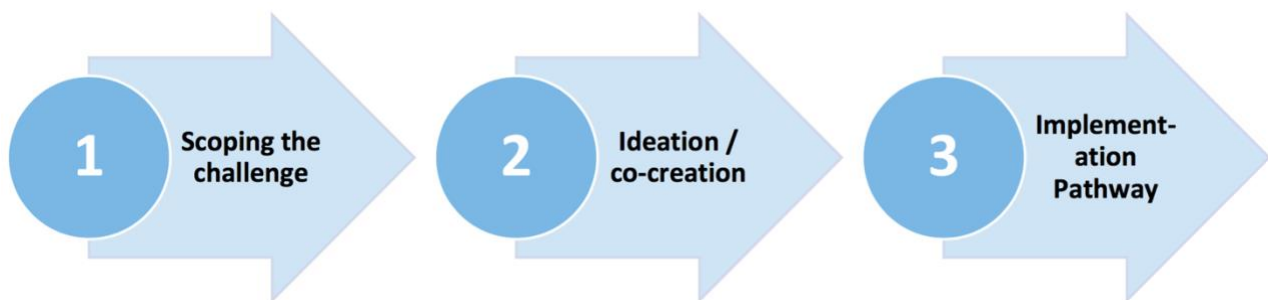
The [C40 City Solutions Platform](#) (CSP) is a not for profit programme which enables cities and the private sector (and other solution providers) to engage through an unbiased, neutral and non-commercial platform to co-create innovative methodologies, technologies, and new business methods. The CSP is funded by the Danish philanthropic association Realdania.

The CSP introduces solution providers to:

- Decision makers in 90+ cities (C40 Network) with concrete needs for climate solutions;
- An ecosystem of local and international start-ups, knowledge institutions and established companies;
- An unbiased and [non-commercial platform](#) where technology and solutions can be discussed with relevant representatives from cities in the C40 network;
- Create durable and innovative climate solutions with the potential to be scaled to the rest of the C40 network.

City Solutions Platform Process

The CSP is a tailored process aimed at supporting the cities' pre-procurement processes. As a solution provider you have the opportunity to be part of the process, providing inputs and guidance for investable solutions that the city with the climate challenge could potentially implement and/or procure. The process revolves around the expert input and guidance from the solution providers together with the city. The process is a 3-step approach, potentially resulting in an investment / partnership / procurement by the city. The 3 steps are:



1) Scoping of the Challenge

The challenge is presented to a wide audience through online promotion and (usually) a webinar. During the webinar solution providers have the opportunity to ask their initial questions to and comment on the city's vision and KPIs. Usually, this is the first point of engagement between the city and solution providers/private sector and the first step to build a common understanding of the city climate challenge and create trust between the various stakeholders, including the various CSP partners identified to support the city challenge.

Following the webinar, solution providers have the opportunity to give input to what is needed to solve the challenge, who are the key stakeholders, and to provide guidance in terms of different perspectives to be considered. This scoping is conducted through a challenge scoping document (this document), with an [online scoping survey](#) to be filled out by interested solution providers. This document and the survey responses will be used to help frame the workshop through pre-procurement market insight and provisionally group the solution providers in terms of their interest, thus ensuring all participants drive value from the workshop.

2) Ideation/Co-Creation

The co-creation phase focuses on a two/three-day virtual workshop. During the workshop solution providers will engage directly with decision makers and representatives for the city, building on the common understanding of the challenge, the barriers to implementation, and what needs to be done in order for successful solutions to be developed. The aim of the co-creation workshop is for multi-sector groups to co-develop a number of potential and feasible solution ideas to the city challenge in a non-commercial environment, to be pitched to a panel of senior city stakeholders.

3) Implementation Pathway

The final part of the City Solutions Platform process aims at developing an implementation pathway. C40 and its partner organization CLEAN, in close collaboration with inputs from solution providers via the workshop and programme partners, will support the city, where possible and required, to determine the critical path to potential implementation of a solution(s) e.g. through procurement. Based on the input and guidance from solution providers during the workshop and led by the city, the implementation opportunities and next steps will be communicated to interested parties.

Terms and Conditions

To participate in the CSP process as a solution provider, you will:

- Understand the complexity of sustainable urban development, have expertise in the challenge sector, and support the future-proofing of cities through innovative and tangible climate solutions;
- Embrace open standards of communication and collaborate/co-create with other solution providers on the CSP in a non-commercial environment;
- Collaborate with the CSP team to deliver an outcome that can be implemented within the city;
- Cover your own costs of attendance to all CSP activity including travel to, and accommodation during, CSP workshops (attendance to physical and online workshops is free);
- Help to assess the social, environmental, and economic benefits from any climate solutions developed.

The information you provide us will be used to facilitate your participation in the CSP Programme. This will include sharing your contact information with C40 Cities' partner organization, CLEAN. For more information about C40 uses your information, please review our [Privacy Statement](#). CLEAN will abide by the C40 Privacy Statement for activities relating to the CSP Programme.

Disclaimer:

This work was carried out with the aid of a grant from the Ministry of Foreign Affairs of the Netherlands and the International Development Research Centre (IDRC), Canada, as part of the Climate and Development Knowledge Network (CDKN) Programme. The views expressed herein do not necessarily represent those of the Ministry of Foreign Affairs of the Netherlands, or of the International Development Research Centre (IDRC) or its Board of Governors, or of the entities managing CDKN.

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Additional Information about Addis Ababa’s Challenge

Please note, further news about the challenge and additional resources will be posted on:

The official CSP website: <https://c40citysolutionsplatform.org/>

The online collaboration platform (account required for access): <https://c40csp.solved.fi/login>

Existing projects in Addis Ababa:

- BRT B2
- BRT B6

Case study:

- [Addis Ababa BRT Climate, air quality and health benefits](#)

Key Dates

Deadline to respond to scoping survey	8 th of October 2020
CSP Introduction webinar	TBC
CSP Online co-creation workshop	10 th and 11 th of November 2020 (two half days, times TBC)

Scoping Survey

This survey should be filled in by solution providers to provide expert insights to the scope of this challenge. Feedback on this challenge scoping document is highly valued and will be very useful during the preparations of the virtual workshop. Please note, the [scoping survey is available online](#).

Are there aspects of the challenge, currently defined, that you think need particular attention? Why?
Are there crucial aspects of the challenge that are currently not covered by the scope and design parameters? Please clarify e.g. how could these aspects be included?

Is there additional information that would be important in order for you to respond adequately to the challenge and effectively participate in the co-creation process?
Is the challenge and the scope feasible, given the timeframe and budget? If not, what would need to be addressed to make it feasible?
What current developments (solutions, trends etc.), in the context of the challenge, are important to be aware of when developing a solution?
What kind of solution providers (skills and competencies) do you envision are needed (apart from yourself) to solve the challenge?
What local stakeholders would you like to see engaged in the co-creation process?
Any additional input?