

GREATER LONDON AUTHORITY

REQUEST FOR MAYORAL DECISION – MD2332

Title: E-FLEX (Real-world Energy Flexibility through Electric Vehicle Energy Trading)

Executive Summary:

The Greater London Authority, in partnership with Cisco International Limited, Cenex, E-Car Club Ltd, Nuvve Ltd, Imperial College London and Transport for London has been successful in its grant funding proposal to Innovate UK (part of UK Research and Innovation) for Innovation in vehicle-to-grid (V2G) systems: real-world demonstrators.

E-FLEX will create a scale demonstration of a functioning V2G market. The project will look at how V2G technology, electric vehicles (EV) and energy services can be used by fleet owners and operators to cut energy bills and reduce energy use. It will also aim to: financially reward electric vehicle charging flexibility (e.g. lower or shift electricity use to another time of the day), provide demand response services to local and national electricity grid operators (e.g. to better match the demand for power with the supply at times of critical need, i.e. peak times of the day) and contribute to a smarter, cleaner energy system for London.

This project contributes to delivering a number of Mayoral aims and objectives:

- For London to be a zero-emission city with clean transport and clean energy;
- To develop clean and smart, integrated energy systems utilising local and renewable energy resources;
- To investigate the potential for demonstrators where Londoners can help manage London's energy demand;
- To undertake demonstration projects to improve London's energy systems.

Decision:

That the Mayor approves:

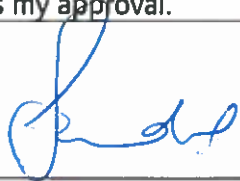
1. receipt of a conditional grant income of up to £373,209 from Innovate UK, to be claimed on proof of expenditure; and
2. expenditure of up to £373,209 from 2018 to 2021 to pay for both a full-time project manager and electric vehicle charging infrastructure (including the conversion of £199,999 of revenue grant income to capital grant funding for charging infrastructure).

Mayor of London

I confirm that I do not have any disclosable pecuniary interests in the proposed decision, and take the decision in compliance with the Code of Conduct for elected Members of the Authority.

The above request has my approval.

Signature:



Date:

26/7/17

PART I - NON-CONFIDENTIAL FACTS AND ADVICE TO THE MAYOR

Decision required – supporting report

1. Introduction and background

- 1.1 The Mayor wants London to be zero carbon emission by 2050. To help achieve this aim the London Environment Strategy has set the policy objective to develop clean and smart, integrated energy systems utilising local and renewable energy resources. This objective will, in part, be delivered by demonstration proposals which improve London's energy systems and investigate the potential for Londoners to help manage London's energy demand.
- 1.2 Working with The Office for Low Emission Vehicles (OLEV) and Innovate UK, the Department for Business, Energy and Industrial Strategy (BEIS) are providing funding of £20 million for innovative projects that develop future vehicle-to-grid (V2G) products, services and knowledge. The V2G demonstrator trials must happen in real-world environments at scale. Projects in this competition should last up to 3 years. They should range from total project costs of £1.5 million to £7 million. Projects must be collaborative and business-led. For larger projects, they expect to see participants from across the value chain, such as energy companies, vehicle manufacturers, hardware manufacturers, service providers, local authorities and other infrastructure providers.
- 1.3 Electric vehicles offer the opportunity of flexible mobile energy storage & supply. V2G is a system where plug-in electric vehicles, such as battery electric cars (BEV) and plug-in hybrids (PHEV), return electricity to the power grid (with consent from their users) or reduce their vehicle charging rate to better match the demand for power with the supply. This is usually in return for a financial reward or other benefit.
- 1.4 Cisco and its project partners including the GLA, have been awarded an Innovate UK grant worth £3,664,687. The GLA's grant is £373,209. The project partners will use the grant to complete a real-world demonstrator of a V2G system by January 2021. This will identify the potential for Demand Side Response (incentivising and enabling energy consumers to lower or shift their electricity use at peak times by using smart energy technologies, payments and tariffs) in electric vehicle fleets. The project will address the challenge of how to create a market mechanism that allows these rewards and benefits to be realised exploring business cases for EV and grid operators and energy users.
- 1.5 E-FLEX is a project being undertaken in partnership with Cisco International Limited, Cenex, E-Car Club Ltd, Nuvve Ltd, Imperial College London and Transport for London. The project partners will:
 - Design use case requirements and technical/business model designs for trailing V2G.
 - Secure fleet sign-up (circa 200 vehicles).
 - Install and prepare charging Infrastructure for vehicle to grid.
 - Design the V2G market trial.
 - Build the market models and software that allows V2G demand side response.
 - Test schedule flexible energy trading (fixed time of day).
 - Test dynamic flexible energy trading (responding to price signals at unknown time of day).
 - Complete impact assessment.
 - Complete dissemination of project impacts, commercial exploitation of business models & support open market innovation in V2G applications.
- 1.6 The GLA will be responsible for:
 - Identification and recruitment of public sector and commercial fleet owners and operators that could participate in the demonstration project;

- Grant funding (subject to additional decision forms) fleet owners and operators to purchase V2G electric vehicle charging infrastructure up to the value of £199,999 from the grant income received;
- Providing Mayor of London policy insights, advice and ensuring the project delivers London Environment Strategy and Mayor's Transport Strategy policies and objectives; and
- Support dissemination of the project results/impact and commercial exploitation of the business models developed.

1.7 The GLA's funding of £373,209 will be used to cover the revenue cost of a full-time project manager (grade 9, fixed term contract, from August 2018 – January 2021) and grant funding of the capital cost for electric vehicle charging infrastructure (circa 70 charging stations).

1.8 Cisco International is the accountable body to Innovate UK. All obligations in the consortium agreement will be managed through the project governance arrangements stated in the consortium agreement.

2. Objectives and expected outcomes

Outcomes

2.1 The project will contribute to:

- Delivering a zero carbon London by 2050 with smart flexible energy systems;
- Cutting electric vehicle owners' and operators' electricity bills and reduce their energy use;
- Financially rewarding fleets who use energy in more flexible ways; and
- Allowing electricity grid operators (National Grid and UK Power Networks) to better manage their networks by using flexible ways to manage demand at times of critical need (i.e. peak times of energy use).

Objectives

- Identify and detail with key stakeholders, potential services and products that the end-to-end V2G market could demonstrate (use-cases). This will form the basis of the market demonstrator requirements to be trialled.
- Develop and refine a marketplace trial design in response to fleet owner/operator consultations.
- Prepare the fleet and facilities (charging infrastructure, V2G software) that will demonstrate the new marketplace design.
- Install and prepare charging Infrastructure for vehicle to grid.
- Creating models and mechanisms upon which the marketplace trial (and business case) can be built.
- Develop the technical specification, system build and testing that underpins the operation of the market.
- Bring together the essential elements to perform a scheduled flexible energy trading demonstration by using a fixed price to lower or shift electricity use to another time of the day using V2G charging and electric vehicles.

- Assessment of the impact of the new market design and enhanced business case for V2G.
- Identify future commercial opportunities, promote the project and generate interest in extended demonstration and market applications, supporting scale up and roll out across London.

3. Equality comments

- 3.1 The GLA will ensure that (as part of its on-going legal responsibility to have due regard to the need to promote equality, in everything it does, including its decision-making), barriers are removed that may prevent those with protected characteristics benefiting from the project. The project will require the partners to identify those protected groups who could benefit, determine whether barriers exist and measures to remove those barriers. The partners will estimate the numbers involved for each relevant characteristic.
- 3.2 The GLA Environment Unit commissioned an Integrated Impact Assessment (IIA) on the draft London Environment Strategy. This evaluated the social, economic, environmental, health, community safety and equality consequences of the strategy's proposed policies to ensure they are fully considered and addressed. A post-adoption statement showing how the IIA influenced the final strategy and Equality Impact Assessment (EqIA) report has been published.

4. Other considerations

4.1 Key risks

Category	Description	Impact	Probability	Impact	Risk Index	Owner	Treatment	Mitigation
Technical	Lack of technology interoperability between hardware charging types & backend systems	This would prevent market demonstrator as participants breakout into isolated tech-specific trials. Project fails to demonstrate open market concept.	2	3	6	Nuvve	Contingency	Option to undertake technical interoperability work if necessary
Benefits	Too few fleets sign-up to participate in the demonstrator.	Sub-scale demonstrator, cannot demonstrate full whole-system benefits, limits demonstrable Return on Investment (RoI), and prevents full commercialisation.	3	5	15	Cenex GLA	Contingency	Cenex and GLA (supported by all partners) will use their network of fleet owners (including GLA Group and EV Taskforce) to sign up fleets throughout prestart and phase 1 of the project. Consortium will track new V2G-vehicle models as they come to Market – increasing the size of potential fleets.
Commercial	Commercial benefits unrealised/revenues too low.	Low RoI for future V2G opportunities for fleets, limiting commercialisation options.	3	3	9	Imperial	Reduce	Market design must capture all the possible benefits, including those from on going

								electricity market reform.
Management	Multi-partner project leading to poor coordination, delivery, timescales & grant claims missed	Slow delivery, delays and overruns.	3	2	6	Cisco	Reduce	Weekly & monthly calls/meetings. Escalation paths available for timely issue redress. Project management methods tailored to ensure delivery, combining Waterfall & Agile methodologies.
Environment	Adoption rates insufficient to reduce emissions when extrapolated.	Project fails to demonstrate decarbonisation impact.	2	3	6	Cenex GLA	Reduce	Market design will ensure that shifting and reduction of energy demand is when carbon grid intensity is high.

- 4.2 The Mayor wants London to be zero carbon by 2050. To help achieve this aim the London Environment Strategy has set the policy objective to develop clean and smart, integrated energy systems utilising local and renewable energy resources. This objective will, in part, be delivered by demonstration proposals, such as this, which improve London's energy systems and investigate the potential for Londoners to help manage London's energy demand.

5. Financial comments

- 5.1 Mayoral approval is sought for the acceptance and expenditure of the conditional grant offer of £373,209. The grant will be from Innovate UK to fund the GLA's role and responsibilities in the E-FLEX project. The GLA will be paid by Innovate UK through grant claims process after actual expenditure has been incurred.

- 5.2 The expected spend profile of this grant is detailed in the table below

Financial year (Start August 2018 to January 2021)	Revenue £ (staff costs)	Capital £	Expenses £	Total £
2018/19	44,056	199,999	2,128	246,183
2019/20	66,084	0	3,192	69,276
2020/21	55,070	0	2,680	57,750
	165,210	199,99	8,000	373,209

- 5.3 As the table above shows approximately £200,000 in 2018/19 is expected to be capital grant paid by the GLA to fleet operators/owners (recruited once the project has started) for the purchase of V2G charging infrastructure. The income will be claimed by the GLA from Innovate UK on delivery of agreed work detailed in the project plan.
- 5.4 A capital grant funding agreement will be prepared by the GLA with input from TfL Legal and TfL Procurement. The funding agreement will be modelled on similar agreements used by GLA Environment, ensuring that liabilities, financial and controls management is appropriately handled.

6. Legal comments

6.1 The foregoing sections of this report indicate that:

6.1.1 The decisions requested of the Mayor fall within the GLA's general powers to do such things considered to further or which are facilitative of, conducive or incidental to the promotion of the improvement of the environment in Greater London; and

6.1.2 In formulating the proposals in respect of which a decision is sought officers have complied with the GLA's related statutory duties to:

- (a) Pay due regard to the principle that there should be equality of opportunity for all people;
- (b) Consider how the proposals will promote the improvement of health of persons, health inequalities between persons and to contribute towards the achievement of sustainable development in the United Kingdom; and
- (c) Consult with appropriate bodies.

6.2 In taking the decisions requested, the Mayor must have due regard to the Public Sector Equality Duty; namely the need to eliminate discrimination, harassment, victimisation and any other conduct prohibited by the Equality Act 2010, and to advance equality of opportunity and foster good relations between persons who share a relevant protected characteristic (race, disability, gender, age, sexual orientation, religion or belief, pregnancy and maternity and gender reassignment) and persons who do not (section 149 of the Equality Act 2010). To this end, the Mayor should have particular regard to section 3 (above) of this report.

6.2.1 Officers have indicated that the contribution to the fleet operators/owners for charging infrastructure amounts to the provision of grant funding and not payment for services. Officers must ensure that:

- (a) the funding is distributed fairly, transparently in accordance with the GLA's equalities duties and in a manner which affords value for money in accordance with the GLA's Contracts and Funding Code;
- (b) appropriate funding agreements are put in place between and executed by the GLA and fleet operators/owners before any commitment to fund;
- (c) the GLA's use of the Innovate UK funding and its arrangements for the same is fully compliant with the conditions applicable to that funding.

6.3 To the extent that any of the funding is to be used for staffing costs, for example of the full-time project manager noted at section 1.7 above officers must ensure that they comply with all GLA HR policies and protocols (including HoPS approvals if applicable) in this regard.

7. Planned delivery approach and next steps

Activity	Timeline
Expected Delivery Start Date (date of Grant Offer Letter received by Cisco from innovate UK)	1 August 2018
Expected public announcement (based on other Innovate UK projects)	September 2018
Develop trial design & fleet sign-up	January 2019
Design use case requirements & reference designs	February 2019

Design the market trial	April 2019
Build the marketplace	May 2019
Install and make ready charging infrastructure for vehicle to grid.	October 2019
Schedule flexible energy trading	December 2019
Test dynamic flexible energy trading (responding to price signals at unknown time of day)	October 2020
Complete project impact assessment.	December 2020
Complete dissemination of project results, commercial exploitation of business models & support market open innovation	December 2020
Delivery End Date	January 2021
Final evaluation start and finish	January 2021 February 2021
Project Closure	February 2021

Appendices and supporting papers:

Appendix 1 – Collaboration Agreement

Public access to information

Information in this form (Part 1) is subject to the Freedom of Information Act 2000 (FOI Act) and will be made available on the GLA website within one working day of approval.

If immediate publication risks compromising the implementation of the decision (for example, to complete a procurement process), it can be deferred until a specific date. Deferral periods should be kept to the shortest length strictly necessary. **Note:** This form (Part 1) will either be published within one working day after approval or on the defer date.

Part 1 Deferral:

Is the publication of Part 1 of this approval to be deferred? NO

If YES, for what reason:

Until what date: (a date is required if deferring)

Part 2 Confidentiality: Only the facts or advice considered to be exempt from disclosure under the FOI Act should be in the separate Part 2 form, together with the legal rationale for non-publication.

Is there a part 2 form – NO

ORIGINATING OFFICER DECLARATION:

Drafting officer to
confirm the
following (✓)

Drafting officer:

Daniel Barrett has drafted this report in accordance with GLA procedures and confirms the following:

✓

Sponsoring Director:

Lucy Owen has reviewed the request and is satisfied it is correct and consistent with the Mayor's plans and priorities.

✓

Mayoral Adviser:

Shirley Rodrigues has been consulted about the proposal and agrees the recommendations.

✓

Advice:

The Finance and Legal teams have commented on this proposal.

✓

Corporate Investment Board

This decision was agreed by the Corporate Investment Board on the 23 July 2018.

EXECUTIVE DIRECTOR, RESOURCES:

I confirm that financial and legal implications have been appropriately considered in the preparation of this report.

Signature

M. D. Ellis

Date

23.7.18

CHIEF OF STAFF:

I am satisfied that this is an appropriate request to be submitted to the Mayor

Signature

D. Bellamy

Date

23/7/2018.