ECOFLEX

With the support of the Energy Transition Fund
Project Handbook

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Abstract for dissemination (PU)

This document includes instructions to ensure project implementation, communication, monitoring and reporting for all partners.

Contents

1. The Project

Energy prices are at historically high levels because the marginal power needed for balancing the grid depends mainly on gas-fired power plants. Thanks to increasing volumes of renewable power generation society will be less depending on electricity generated from natural gas. However, the natural mismatch between supply and demand of renewable energy needs to be balanced as well without gas-fired power plants. The ECOFLEX-project, where nine Belgian partners collaborate, aims to unlock the potential of electric cars and energy communities to balance the grid in a climate neutral way. This industrial R&D project has started on the first of November 2022 and will run for three years.

Objectives

01. Development of intelligent Energy Management algorithms which can determine optimal setpoints for various controllable assets taking into account the behavioural uncertainty and variety of customer and community requirements.

The integration of an increasing variety of assets needs the development of complex algorithms taking decisions on very short timeframe, taking into account transient behaviours, since different technologies may have essentially different response times. In addition, in order to optimize the operation of a site for securing supply of energy and offering flexibility, different forecasting techniques need to be combined, encompassing the identification of potential flexibility needs of the reserve markets on long term, prediction of the flexibility potential of the energy community, and the prediction of potential participation in flexibility markets with the inclusion of economic forecasting. In addition, short term forecasters that can operate real-time and include possible ranges of operation and their probability of occurrence, instead of a discrete value, are needed and designed. Finally EMS's to participate directly in flexibility markets will be developed. These algorithms should ensure security of operation, conservation of comfort standards and should notify costumers/users of the proposed actions to provide flexibility. Smart charging (especially with V2G) is a complex problem with conflicting objectives between actors in the system (e.g. driver needs Vs. grid constraints). Especially for the purpose of smart charging as energy service, where the unpredictability of individual vehicle's behaviors with individual needs linked to the specific environments (public, business, home), and a distributed nature of relatively low capacities per individual vehicle, require large number of vehicles to be managed in a coordinated way. Given the above, the ECOFLEX

project focusses its investigation and developments on Energy Management solutions for E-mobility (car parking's) and on SME-zones.

02. Determine value propositions which will convince consumers to engage their asset(s) in flexibility services of the energy market.

In an energy community several participants collectively invest in energy resources to cover their energy needs or decide to collaborate by exchanging energy in order to produce and consume locally, with a minimum of pollution. In general SME sites with complementary assets offer high advantages since this facilitates exchange of energy locally, and in addition a wide variety of assets and technologies will guarantee the highest degree of flexibility that a community can offer towards the grid. Although companies may have the resources to invest in flexible assets and renewable energy production, the financial advantage of participating in an energy community is often doubted, due to the increased complexity and hence costs that such a participation may entail. In addition for electric vehicles, public smart charging and V2G show early signs of absence of user acceptance and a lack of a clear business case. Although early research has shown users have a positive attitude towards the concept of smart charging, it also reflects a gap in their willingness to participate in such schemes without (and sometimes even with) a clear financial incentive. This project aims to support the generation of revenues through aggregation of flexibility, and hence bring a clear value proposition to the end user.

03. Investigation of new market models (in contrast to the current central design of/and access rules) for the energy (flexibility) market and definition of the roles of stakeholders

This objective is set to help:

- Identifying the key legal issues to be addressed to define (i) the role, rights and obligations of the new market player 'energy management service providers', and (ii) their relationship with existing market players involved in valorizing flexibility of final customers.
- Examining the necessity of introducing the energy management service providers by presenting the key elements of the relevant cost-benefit analysis.
- Identifying whether there are alternative solutions to create the new service layer which specifically addresses relevant technical and IT issues of valorization of final customers' flexibility.

04. Demonstration of a user-centered and interoperable ecosystem with a level playing field for companies to enter a profitable supply chain for Flexibility Services

The fourth objective of ECOFLEX is to research and demonstrate in three sites how to access and leverage the potential flexibility of large-scale e-mobility and distributed multi-energy resources in renewable energy communities in SME-zones, in order to operate and create Virtual Power Plants and contribute to balancing the electric grid and strengthen the security of the energy supply in a cost-effective and sustainable way. This entails that such systems should include in a simple way different technologies and assets. Since, It is only through the integration of a maximal variety of assets that a critical mass can be created and that reserve/capacity markets organised by the TSO are rendered accessible to flexibility assets located in the distribution grid, and that a feasible business case can be created. In addition it is this large variety of these (complementary) assets that enables balancing the grid on local level in a versatile manner. The energy and flexibility management of such VPPs however needs innovative tools and technologies to be developed and tested in a real-life system. These tools entail advanced forecasting algorithms for local production and consumption, with a realistic assessment of uncertainty. In addition, a safe and secure EMS that allows to connect to a wide variety of assets and technologies, and including an energy ledger needs to be deployed and assessed. Finally, such a collaborative system needs to be operationally assessed with the involvement of all stakeholders on a system, including an aggregator that brings the VPP in the energy market.

2. Governance structure

ECOFLEX Project is funded by ETF (FOD Economy) Belgium; the work undertaken is in the context of a direct contract, that specifies all obligations.

The Executive Board (EB) is made up of all Work Package Leaders. They meet once a month to monitor the progress and discuss potential issues.

The Project Coordinator (PC), VUB, is in charge of the monitoring of the project and also for the communication with the funding authority. The PC gathers all results and deliverables and organises the report towards the funding authority on a yearly basis.

Each partner is in charge of implementing specific tasks, according to the description of work (contract) and for developing the deliverables for which they are in charge of, always according to the contract.

TWEED, the Communication Manager (CM), is in charge of developing and maintaining the project website, in cooperation with all partners. In addition, they are in charge of the project newsletters. All partners are required to provide content to the CM.

3. Quality Management

Review of Project Deliverables: procedure, timing, etc

Partners are responsible for the development and preparation of the deliverables according to the contract. The PC is responsible to ensure that all deliverables will go through a quality review process and will be submitted on time, as defined in the contract.

The procedure that will be followed to ensure on time submission according to quality criteria is:

Step 1: Partner in charge of deliverable sends the first consolidated version to the Work package Leader and Coordinator 3 weeks before contractual submission date

Step 2: The Work Package Leader sends the deliverable to the respective reviewers (2 reviewers per deliverable, need to be defined in excel file)

Step 3: The reviewers have 5 working days to complete the review of the document and send the document back to the Work Package Leader and Coordinator.

Step 4: The Work Package Leader integrates changes, corrections and comments into a second consolidated version. This version will be sent back to the Partner responsible.

Step 5: The Partner responsible has 5 working days to integrate suggestions and respond to comments made by the reviewers. This final version is sent to the Work package Leader and the Coordinator.

Step 6: The Coordinator has 5 working days to review and finalize the document (format, cross references etc).

Step 7: The final, reviewed version is submitted by the Coordinator to FOD.

List of reviewers to complete

Templates

Templates will be created and will be made available to all Partners through Sharepoint. Can be found HERE.

(word doc/ deliverable and report, agenda etc), powerpoint

4. Risk management

A Risk log will be kept by the Coordinator; it will be updated in every Steering Committee meeting (every six months) with all potential risks and mitigation plans.

The risks can be of technical nature, management nature or other (e.g. force majeure). Each risk will be introduced and presented by a Task leader, with the support of the Work Package Leader, who will also be in charge of monitoring the risk.

Each risk must introduce likelihood, severity, mitigation plan, owner, follow up.

Available Risk Log Template on Sharepoint

5. Reporting

The reporting takes place on a yearly basis: reporting periods run from November to October each year. Then, in November the technical and financial report is prepared, which is to be presented and justified in a meeting with the funding authority. The PC will organize the reporting.

6. Internal communication

Project repository

A common project repository has been created and access has been given to the Partners: Sharepoint.

Contact lists

A project contact list is in place and will be kept up to date by the coordinator. Each Partner is in charge of providing updates. It can be found on Sharepoint.

More contact lists will be developed to facilitate communication, according to needs.