



e-harbours

WP 3.7 Application of Smart Energy Networks

Organisational and Legislative Analysis

Summary results of showcase “Search for flexibility provided by electric boats in Amsterdam”



Author(s) : Erik Regterschot & Pieterneel Bakker
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1 Introduction

Smart energy networks are intelligent and flexible solutions which combine flexible energy consumption, local generation of (renewable) energy and energy storage on different levels. In any smart energy network, the presence of both technical/economical and organisational/legislative conditions is crucial.

The e-harbours report 3.5 focuses on the *technical and economical aspects* of smart energy solutions. The scope of WP3.5 is the translation of the 6 universal business cases (e-harbours report WP3.4) on the level of every showcase. It gives an overview of the potential for the exploitation within the existing local (national) rules and regulations.

This e-harbours report 3.7 focuses on the *organizational and legislative aspects* of smart energy solutions. A long list of general barriers has already been composed (deliverable 3.3). This report 3.7 addresses the analysis on a local level, and gives an overview of barriers which hamper the exploitation of smart energy systems, and suggestions to improve this situation.

1.1 Description case study

The Amsterdam canal boats are number 1 tourist attraction in the Netherlands (over 3 million visitors a year). Given the large scale of boating, approximately 250 boats for commercial use (canal cruise boats and rental boats) and 14.000 small leisure boats (owned by citizens of Amsterdam) the transfer to electric boating could contribute to the air quality in Amsterdam and to flexibility of energy use (smart grids) on the long run. The Amsterdam canal boats could potentially be an interesting energy buffer, consuming the energy during low demand hours or when local renewables are in excess. We investigated the flexibility that electric boats in Amsterdam could provide.

1.2 The strategy/approach

(See also 3.5)

Consulting stakeholders and literature study

The strategy/approach was to combine theory from reports by Waterrecreatie advies and TNO (Centre for Applied Scientific Research) with input from interviews with a boating company, an aggregator and an association for electric boating, Vereniging Electrisch Varen Nederland". (<http://www.ev-nl.nl/>).

We interviewed a company in the field of electric boating, Greenjoy and an "aggregator", a commercial party which is authorized to trade on the wholesale market on behalf of a pool of customers. This in order to find out whether companies are interested in the smart grid concept, what the theoretical potential of flexibility is in technical and economical terms (3.5) and what the possible organisational and legislative implications are.

We also studied documents. First a policy document of the Water authority of Amsterdam ("Nota Varen in Amsterdam") in which emission- targets for boats are formulated for the coming years. This in order to estimate the coming developments in electric boating. We also got information about the current state of electric canal cruising and the consequences for business operations from two investigations (conducted by interviewing the branch), completed by Waterrecreatie Advies and TNO.

Assumptions

- 1) In order to become part of the wholesale market we assumed a virtual cluster of boats located on different locations in the Netherlands.
- 2) Second assumption is that the cluster may be considered as one legal entity which is responsible and accountable on behalf of the total fleet of boats or the participating fleet owners. This entity could be one company or an association representing the cluster. Keep in mind that the tax tariffs for users >10000 are significantly lower.
- 3) We also assume that the wind turbines are regarded as part of the legal entity i.e. part of private network. Under the present circumstances in the Netherlands this is not accepted. For the calculations we implemented a smart charging scenario optimising the best financial gains.

1.3 Scope of the e-harbours showcase “Search for flexibility provided by electric boats in Amsterdam”

(See also 3.5)

The Amsterdam canal boats could potentially be an interesting energy buffer, consuming the energy during low demand hours or when local renewables are in excess. The scope of this showcase is to estimate the potential of flexibility provided by electric boats in Amsterdam if all boats become electric (3.5) and the organisational and legislative implications (this document).

2 SUMMARY RESULTS

2.1.1 Introduction

We investigated cases on “local” and cluster level. “Local” means: exploiting the business cases for a small fleet of boats at one geographical location using one grid connection. A cluster level means: a so called virtual power plant of more boats on more than one geographical location.

2.1.2 Investigation results

Local level:

At local level (Greenjoy) there do not seem to be organisational aspects that hamper introduction of smart grid concepts. However, the storage capacity of a single boat/battery is too low to be sufficient for exploiting the flexibility. The advantage is that only one authority is responsible for the operation of the boats, and one distributor. Greenjoy has developed an ICT infrastructure which, on a hardware level, is capable to meet almost all functions of a SG. Each boat contains a local computer and is equipped with communication facilities (gps, gprs) to enable remote monitoring and potentially also remote control. The ICT application is fully internet/web based and enables customers to log in and make a reservation and schedule the use of a boat at a certain time, day of the week and location. The ICT infrastructure is potentially ready for remote control functions, like setting the SoC set point of the charger of the boat (thus not yet implemented). We may conclude that the ICT infrastructure of Greenjoy enables a smart grid network, cluster of electric boats or any electricity user (and/or sources). Thus the concept of virtual power plant.

Cluster level

Clustering more boats within a company, and/or clustering more electric boat companies requires coordination.

1. Electricity distribution level: are the distributors willing to cooperate to form a virtual power plant and exchange flexibility between customers?
2. Privacy/security level: who operates the ICT infrastructure and is responsible? What about the protection against the insight of the electricity usage of each company?
3. ICT infrastructure: it requires some form of standardisation on communicating with the central broker.

Possible solution within the scope of the Netherlands is to cooperate with aggregator companies like Anode or Powerhouse, which could facilitate the smart grid functions and issues as mentioned above.

2.1.3 Conclusions

Organisational

As long as there is only one authority/organiser and one electricity provider involved, this application can easily being transferred to other municipalities. However, we have to deal with a lot of stakeholders, with conflicting interests (competitors) and operating from on different locations.

Legislative

- 1) The fleet of boats needs to be considered as a virtual power plant, present legislation regards every connection-point (or charging location) as a separate connection, not part of one “legal entity”
- 2) Integration of wind turbines or solar panels requires a private net, which is not admitted within the present legislation

3 Overall conclusions

3.1 Summary of the individual results

See 2.1.3

3.2 General Overall Conclusions and recommendations

See 2.1.3

4 Lessons learned

4.1 Organisational issues

See 2.1.3

4.2 Legislative issues

See 2.1.3

4.3 Ideas for further investigation

Investigate legislative options for associations in order to unite companies to organise a cluster.

5 References

- [1] Minutes meeting Greenjoy, 26 August 2013
- [2] Meeting with Powerhouse, 3 October 2013
- [3] Report Waterrecreatie Advies, “rondvaart en recreatievaart in Amsterdam”, 1 November 2012
- [4] Report Waterrecreatie Advies, “Elektrisch varen in de Amsterdamse Rondvaart”, 4 September 2013
- [5] Presentation TNO (Centre for Applied Scientific Research), “Schone aandrijving voor de Amsterdamse rondvaart”, 9 September 2013
- [6] Waternet (Water Authority Amsterdam), “Nota Varen in Amsterdam 2.0”, September 2013