Hanzehogeschool Groningen
University of Applied Sciences

Assignment student EnTranCe Energy Transition Community

Graduation projects SolarMiles

SUSTAINABLE MOBILITY: ELECTRIC VEHICLES – SOLAR PV - SMART CHARGING – CAR SHARING

Suitable for students of: *Multiple choices are possible*

O MBO
O BuitenWerkPlaats Built Environment (2nd yr, 1 block, 2nd yr, 4 block)
O Vastgoedlab V&M (3rd yr)
X Bachelor graduation assignment (4th yr)
O Bachelor internship (limited possibility in daily guidance)
O Research assignment in curriculum year…….
X Honours research assignment
X Master thesis

Study Program: Toegepaste Psychologie, Human Technology, Communicatie/Communication, International Business and Management, Civil Engineering and possibly others

Period: Februari – Juni 2018

Language: Dutch, English

Client: Solar Miles - Kathelijne Bouw

Internal client: Steven de Boer

Background (facts, situation sketch and parent/organization goals)

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About SolarMiles

SolarMiles is about charging electric shared vehicles with locally produced solar energy. The goal of the project is to design solutions for sustainable mobility in local communities. With more and more electricity produced with solar PV, the grid will increasingly experience imbalances. Peaks can be lowered by charging the batteries of electric cars. In SolarMiles, new concepts are developed for optimizing the match between the production of solar energy and car charging in such a way that the electricity grid will experience the lowest possible peak load during the day. To realize that, the vehicles should be charged when electricity from solar PV is abundant and/or the existing local electricity demand is low.

To gain insight in the potential of solar charging with electric shared cars, mobility data is collected and the impact of charging behavior on the electricity grid is modelled. To this end, the SparkCity model, an agent-based model with spatial dimensions, is used (see http://nklnederland.nl/projecten/onze-lopende-projecten/simulatiemodel-sparkcity/). Based on the outcome of the model, service concept are designed that stimulate users of electric cars to charge the batteries of those cars with solar energy as much as possible.

We are looking for students who are interested in working on the model as well as on scenarios and concepts for sustainable mobility services. No prior knowledge of energy and/or mobility is required. We offer a week-long course 'Basics of Energy' to all of our graduation students to get started on your energy assignment!

Problem (description of the undesirable situation)

Research assignments (5)

1. **Electrical engineering and/or ICT**: Detailed modelling of the load on electricity cables and transformer (sub)station in the Sparkcity model is needed to be able to study the impact of charging behavior on the grid. The assignment requires some programming as well as a thorough analysis of grid effects.

2. **Marketing & Communication:** Service concepts for sustainable mobility should encourage people to use mobility in an alternative way: electric cars instead of gasoline cars, shared cars instead of personal cars, smart solar charging instead of nighttime charging etc. How can we motivate people to make use of sustainable mobility services offered in local communities?

3. **Applied psychology:** To establish smart charging we need to motivate people to change their charging behavior. We would like to use insights from other projects and scientific literature to gain insight on how to change behavior. Price incentives that should increase demand response for example, have shown fairly small effects. What are other good ways to influence behavior into smart charging?

4. **International Business and Management:** Service concepts for sustainable mobility require a good connection between the business model of the car sharing service, the desired behavioral change regarding smart charging and the physical infrastructure (cars,

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solar panels, charging stations). Scenarios will be developed for the sustainable mobility concept. How can we design a service that is easy for people to charge electric shared cars with solar energy as much as possible? Think of combining solar charging with a work space instead of a house, using public charging while grocery shopping instead of home charging, etc. This assignment requires good analytical skills and creative thinking.

5. **Civil engineering and/or ICT:** Infrastructure is an important aspect of sustainable mobility. Charging infrastructure needs to be developed. But what kind of charging stations need to be placed and on what location? Where should shared cars be placed and how many of them are needed? What is the difference between shared cars and personal cars? Using mobility data, the infrastructure, consisting of charging stations, parking spots and solar PV locations, infrastructure will be designed for our local communities.

Other backgrounds: If you're interested in the project, but didn't find a fitting assignment here, please contact us to discuss the possibilities for you!

Objective (description of the desired situation)

New concepts for optimizing the match between the production of solar energy and car charging in such a way that the electricity grid will experience the lowest possible peak load during the day.

Result deliverable/product (what is ready if the project is finished) with list of part results

A design of a service concept stimulates users of electric cars to charge the batteries of those cars with solar energy as much as possible

Competence level

3

Connected to Change Agency ETC

Multiple choices are possible

O Sustainable Building
X Sustainable Mobility
X Local Communities

Interested or further information

You will be working in the context change agency Sustainable Mobility on EnTranCe. You will be working in a multidisciplinairy team. For detailed information on this assignment contact Steven de Boer (EnTranCe), s.de.boer@pl.hanze.nl, 06-24572781

How to respond to the vacancy

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Send a motivation letter and CV to EnTranCe, Energy Transition Community, etc@org.hanze.nl
Attn. Mrs. Jacqueline Joosse, Office Manager EnTranCe. Note: If the job does not fit directly with your specific interest, please visit our website to discuss other possibilities.

Website: http://en-tran-ce.org/for-students/assignments/