
# Smartphone application in phonegap

## M2C's Electric Vehicle Smart Charger

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# 1. Introduction

- Project goal and motivation
- Project summary & overview - the "red thread"
- Project results (brief summary)
- Dissertation Layout

# 2. Background

This is due beginning of march!

- Introduce problem area / give relevant background info
- Introduction - Explain WHY you are doing this study
- Information - Background / your study in the wider context
- Similar work (projects, systems etc.)
- Summary - for this chapter

Most industrialized countries are trying to increase the generation of clean and renewable energy where one of the more used energy source are wind power. While wind power has the benefit of being clean the draw back is the non constant supply of wind. This poses a problem for companies such as ESB Networks and Eirgrid.

ESB Networks and Eirgrid are responsible for the coordination and distribution of electricity within the Irish electrical grid. To allow more wind generated electricity on the grid the winds variability has to be considered and managed so as to maintain adequate system frequency control. Common strategies to cope with this are to reserve generation capacity during periods of low wind also know as spinning reserve. Spinning reserve means that there are other sources of energy, often idle, connected to the grid that can replace, on short notice, the expected energy output of the wind farm in the case of no or little wind. While the use of spinning reserve is a solution it costs money to have facilities only to deal with this issue. Another approach is to dynamically change the load on the grid to match the wind generation capacity.

As electrical vehicles are becoming more common and gain a bigger share of the market of vehicles they also increase the load on the network. If ESB Networks could control and redirect energy demanding devices like electric vehicles to use the electric grid during a time when the wind is abundant it would ease the load during the more critical times of the day. To force this kind of remote control on the equipment might feel as an intrusion of privacy by the user and are likely not a solution.

“A system could be developed whereby the chargers could use a statistical model to switch on/off based on the frequency of the supply. A statistical model element is required to prevent clusters of chargers switching in/out in a localised area at the same time, putting strain on the local LV (lowvoltage) network. Such a model would require extensive testing, and while it would provide a solution, the ESB would have no visibility or direct control of the ‘switchable load’.”

-Background from M2C

M2C are Ireland's leading manufacturer of electric vehicle chargers.

"The M2C charger can be used as a domestic or commercial charger. The charger is capable of relaying charging data via a range of communication modules such as WiFi, Ethernet and GSM." [http://www.m2c.ie/products/]


*Illustration 1: M2C electric vehicle charger*

| Description | Rated Current (Ampere) | Voltage | Socket type | Phase |
|---|---|---|---|---|
| Residential | 16 | 220/240 | 2 | 1 |
| Commercial | 16/32 | | | 1/3 |
| Portable | 8/10 | | | 1 |

*Table 1: M2C charger specification*

**Features**

The charger can communicate through WiFi, Ethernet or GSM.

Equipped with a timer to allow the user benefit from the cheapest possible rate of electricity when charging.

Protection against water ingress.

Various safety measures against voltage and tampering with the connections

[http://www.m2c.ie/products/]

To allow user interaction with the charger M2C decided that a smart-phone application would be ideal to meet the requirements. The purpose of the application is to visualize to the user various statistics like power usage, car charge rate and to customize the settings of the charger. Settings such as to set at what time the vehicle should be fully charged. The last feature is particularly important as it will determine if the charger can vary the charge rate while the vehicle is attached. As was mentioned earlier, the increase in electric vehicles puts an extra load on the grid. If the vehicle can be charged anytime during the given time period that would allow the ESB network to ease the load during the most critical time.

To let ESB know when the user is planing to use the vehicle the charger has to be connected to the home network, which has also has to be connected to the internet. The charger can then communicate with the ESB mainframe computer which in turn schedules an appropriate time to charge the vehicle.

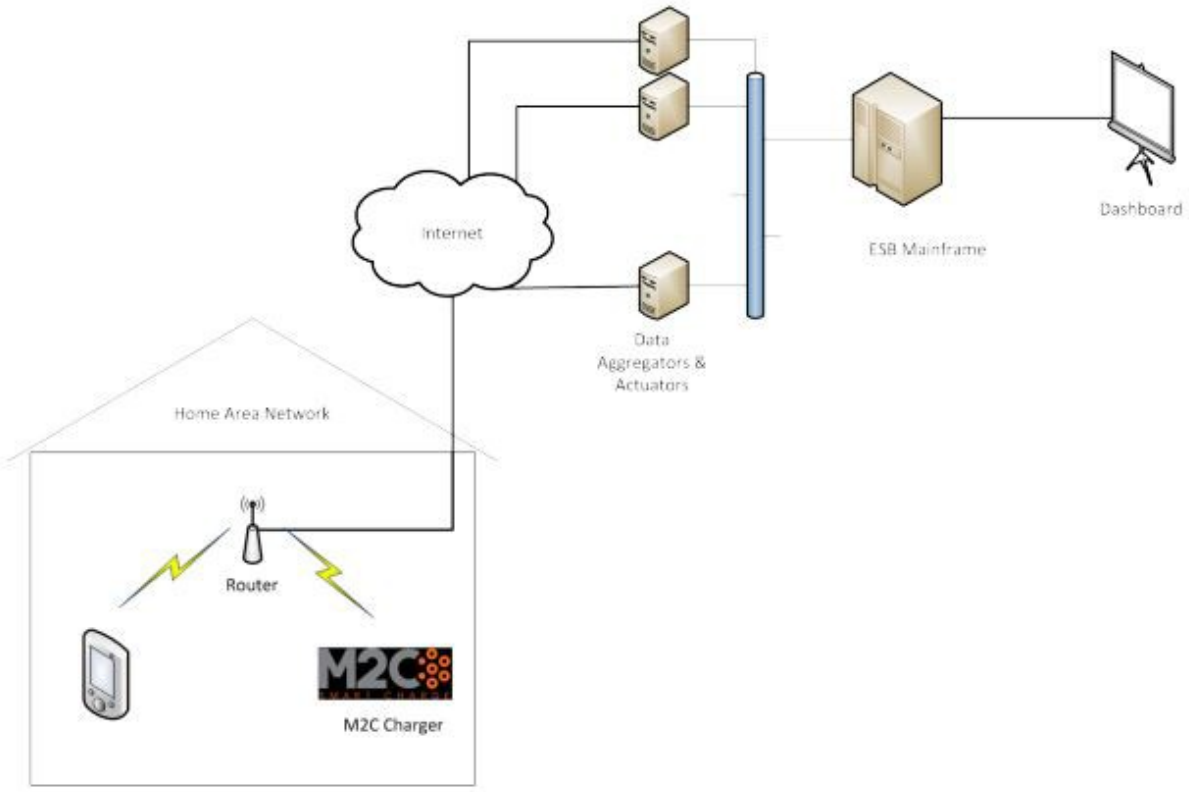


*Illustration 2: Load control architecture*

### *The application*

I was going to write about the application here but I think I will put that in the design instead.

## 3. Project Design and Implementation

- **Design** - Present your project design in general
- Information - Give details here (possibly several sub-sections)
- **Implementation** - Present your project implemetion in general
- Information - Give details here (possibly several sub-sections)
- Summary - for this chapter

## 4. Results / Evaluation

- Introduction - Summarise your main results
- Give details of the results
- Best presentation? (text, tables, diagrams?)
- Implementation Evaluation - your results against your expectations
- Summary - for this chapter

## 5. Conclusion

- Conclusion
- Project Evaluation
- Problems - How would you do this the next time?
- Future work

## References

## Appendices