**The Electric Vehicle Charging Station System (EVCSS)**

You are part of a small startup company with 11 full time employees:

* The Founder
* HR/Accounting
* 2 System/IT staffers
* 7 Software Engineers

Your company has won the contract to implement the EVCSS project for Chargers-R-US; a company that builds and installs EV charging stations. The EVCSS is focused on the installation and operation of charging stations in apartment building parking garages. The EVCSS will consist of a system management dashboard for the apartment building staff and a consumer application for the tenants and guests.

Each apartment unit will have 0-N charging stations assigned to the unit. These charging stations will available **exclusively** to the unit.

Each charging station has a physical "locking" mechanism; the exact mechanism will be determined by Chargers-R-Us. Your software system must interface with the physical charging stations to control access and provide virtual “keyless” access the system for the users. Also, the charging stations have an embedded operating system for updates and maintenance. The internal system must be interfaced with your management dashboard.

Charging fees will be billed on a recurring basis and are in addition to the unit rental fees, which is managed by a different system with which your system must interoperate. This is a key aspect to implementing a successful system. For instance, termination of a lease must trigger termination of charging station privileges for all the stations associated with the unit on the date the lease terminates and the generation of a final bill.

Charging stations will have multiple billing policy options, which are configurable by the apartment complex staff. Options that must be implemented include:

* bill by the KWH used
* bill by type of charging connection
* bill by the speed of charging
* bill by the time of day the charging occurred

These are not mutually exclusive options, and staff must be able to vary the policy by both apartment unit and charging station. Additional options will be added once the system is in operation, so you must account for this system growth.

The apartment management staff need a management dashboard with the following capabilities:

* manage all the charging stations from the dashboard
* define the billing policies per station and unit as explained above
* allocate charging stations
* maintain a waiting list for charging stations
* set limits on the maximum number of charging stations per unit
* lock charging stations for non-payment of bills
* access the internal charging station operating system
* manage the tenant accounts

Again, this is only the initial set of features. As part of the development process your team will be expected to build on this set of features in collaboration with Chargers-R-Us.

The apartment tenants also need a mobile application, with the following capabilities:

* display information and status of assigned charging stations
* display past and projected bills, as well as payments
* display the locations of assigned and available charging stations on a map of the apartment parking garage
* request/release charging stations
* configure charging station billing options (to control costs)
* pay charging station bills, by credit card or bank draft
* report service issues with assigned charging stations

Some number of charging stations will be reserved for "on-demand" usage and will not be associated with any specific unit. These charging stations will still be managed via the same management dashboard as assigned charging stations. However, these charging stations will require the use of a credit card to "unlock" access and the ability to set special "on-demand" rates. These charging stations will not be available to tenants.

The managvement system must also interface with the local electricity and grid providers. In particular, the management system needs access to rate and peak usage information; especially in areas and times where demand pricing is in effect. The system must be able to shut down the entire set of charging stations in the event of a "rolling" black out request or other emergency.

The client wants a web-based application for the management dashboard and a mobile application for the tenants. Ideally this would be a single application that adapts based on the type of user and device. Your company will need to make a recommendation in this regard as part of the design process.

The client is leaning towards a modern, cloud-based hosting architecture; but does not know all the issues related to this approach. Again, your company will need to make a recommendation in this regard.

Finally, the client has big plans for this project. While the initial plan is to roll out the system to a small set of local apartment complexes, the ultimate goal is to sell the system nationwide and possibly even globally. This will impact your technology, implementation, and deployment strategies.

While this initial contract is fixed fee, the client intends to retain your company on a permanent basis for enhancements and support. The client is open to new ideas and enhancements to the basic project, as well as additional capabilities not previously identified. The client is expecting your company to refine this project specification into a formal set of requirements and provide a cost estimate for the work. The client is expecting to participate in all aspects of the design and implementation process.