Smart/Intelligent Grid Development and Deployment in Thailand (Smart Thai)

Smart Thai Corporate Exchange: Electric Vehicle (EV) Ecosystems

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EV Ecosystems Corporate Exchange Program
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Electric vehicles charging market environment

- The success of Electric Vehicles highly depends on the availability of a convenient and future-proven EV charging infrastructure.

- Worldwide there have been many regional pilot projects driven by major incumbent players or innovative start-ups.

- Governmental fundings and the chance to participate as an early-bird in the massive growth of EVs make the market highly attractive.

Orga Systems‘ end2end solution to monetize EV charging and value-added services enables the future – already today!
Electric vehicle charging infrastructure value chain

Illustration based on Ernst & Young paper – “Beyond the plug - Finding value in the electric vehicle charging ecosystem”
Policy Makers in Europe Identified EV's As Important Enabler to Meet CO2 Emission Goals in 2020

Policy makers in Europe identified Electric Vehicles (EV's) as important enablers to meet CO2 emission goals in 2020.

- (Local) Governments identified Electric Vehicles as important enablers to meet ambitious climate goals: cities/regions drive first pilots
- Governments created subsidies to become market pusher in EV mobility
- Automotive industry is investing heavily in Electric Vehicles e.g. Renault, Nissan
- Utilities participate in pilot projects
- New Alliances built and pilot projects started to obtain knowledge and experience

EV target numbers in 2020:
- Ireland: 230,000
- Netherlands: 200,000
- Germany: 1,000,000

1. Potential reduction CO2 emission approx. 10% of total CO2 emission globally
2. 20% reduction of CO2 in 2020, 80% in 2050
Opportunities In A New Value Chain

The adaptation of EV changes traditional value chains. Opportunities might be localized outside traditional activities of companies in multiple Business Models.

Potential Business Models
- Provide home charging services
- Provide public charging services
- Partner with others to provide charging services, e.g. petrol stations, retail, fleets stores, parking facilities
- Offering vehicle to grid services
- Offering different kind of Charge Modes

Potential Revenue models
- Charging fees to cover costs of load balancing and other control systems (potential premium for e.g. boost charging)
- Taking out fees for providing vehicle to grid service, i.e. enabling customer to sell electricity back to the grid from the vehicle battery

Electricity Sales
- Sell electricity to vehicle owner
- Provide payment solution service, potentially partnering with technology providers
- Partner with others to provide electricity
- Partner with others to provide cards and payment services

- Price per kWh for charging, (premium for boost charging)
- Price per km travelled
- Fee for providing payment solution (petrol station or to electricity retail company)
- Vehicle to grid electricity at potentially lower prices than from electricity providers
Variables On Determining Country Business Potential

Determining the business potential for countries is complex due to the many variables. Local government engagement, country specifics and the presence of competitors highly influence the market attractiveness.

European context
- Subsidiary
- Ambitions
- Emission targets
- Open market requirement

Central government
- Subsidiary and funding
- Ambitions (environmental)
- Emission targets
- Open market view

Local government
- Subsidiary
- Ambitions
- Safety
- Environment
- Owner of public space

Partnership
- Interest of potential partners
- Private infrastructures

Customer segments
- Customer requirements
- EV acceptance
- Benefits/Business Case

Cost charging infra
- Allocation of costs
- Public installation

Country specifics
- Number of players in eco system
- Sectors represented in eco system
- Power balance in eco system
- Applicable regulations
  - metering, reselling of electricity
  - Infrastructure monopoly

Competitors
- Presence
- New entrants in eco system
Although there are other viable transportation options, PHEVs are likely to be a large part of our society’s future. It is difficult, perhaps impossible at the moment, to predict how many PHEVs will be in use by when, but it is clear that eventually they will be in use to a significant degree, and that this amount will have a noticeable, perhaps profound impact on utility systems, with the potential, in high market penetrations, to almost double peak demand in residential areas. Expansion of a utility T&D system’s capacity to handle PHEV’s without restriction as to amount of load and time of charging (i.e., without demand control), is in almost all cases going to be prohibitively expensive, requiring roughly a doubling of the distribution system’s capabilities and a doubling or even quadrupling, in some cases, of the utility’s capital investment in its local delivery system. This scenario would also lead to poor system utilization on a daily and annual basis.
By contrast, various scenarios involving demand control, from rather simple brute force time or day charging systems, to “smart” and flexible real-time pricing systems that optimize consumer convenience and balance utility and end user cost, have total price tags that are still rather daunting, but in all cases far less than just building to handle uncontrolled loads. All such scenarios lead to improved utilization of system and generation facilities, and the more advanced systems appear to also offer valuable additional customer convenience and satisfaction benefits.
Thus, one can conclude that every utility will “handle” PHEVs through use of some sort of advanced control, monitoring, and demand limiting/customer communication system. As options and needs vary so will there be a wide variety of systems employed.
Some T&D system reinforcement will still be needed regardless of the control, but nothing like that required without a control system in place. Perhaps the one planning detail that utilities should keep in mind is, the best type of automation and control system to meet these needs is one that is scalable and targetable on a very local (feeder branch or smaller area) basis and that has a relatively low initial cost as compared to total system cost. Such systems can be implemented in proportion to PHEV deployment rate and thus have little financial risk due to uncertainties in the eventual amount of buyers and/or their locations or the rate of market acceptance of PHEVs. Systems that have a high initial or “base system cost” but then provide 100% coverage of the customer base, do not fit needs nearly as well and create a much greater financial risk, unless they address other needs and benefits.
Thank you!