V2G Strategies

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V2G Strategies

- 1. Core questions
- 2. Methodology
- 3. Impact Parameter
- 4. Main Outcomes
1. Core questions

- Consequence of penetration of electric vehicles for the energy system in Austria (Technical and economical effects)
  - Which technical, economic and ecological parameters enable a rising market penetration of e-mobility?
  - What is the influence of different market penetration and charging strategy scenarios on electricity grids (focus on medium and low voltage grids) and the energy system?
  - How can innovative business models be designed to optimize the system integration and the roles of market participants implementing Grid to Vehicle (G2V) and Vehicle to Grid (V2G) concepts?
  - Which strategic decisions are to be met by policy makers, principals and market participants to enable a successful market and system integration of affordable e-mobility in Austria?
2. Methodology

2.1 Concepts

V2G-concept

G2V-concept

Vehicle 2 Grid – STRATEGIES
Analysis regions
2. Methodology

2.2 Overall approach for analysis within the project

- Policies and other encouragement for developing new technology
- Historical penetration of light vehicles
- Technology data
- Energy prices

Penetration of electric drive vehicles:
- Dispersed vehicles
- Fleet

Simulation Tool

Data preparation of grid properties and capacity

DG/RES scenarios

Cost benefit analysis of business models

Results

Scenario guidance for market actors

Action plan with strategies for policy makers and regulation authorities
2. Methodology

2.3 Penetration of Electric Vehicles

- Input Data (Basic)
  - Historical Penetration of light Vehicles
  - Cost of electric-drive Vehicles
  - Technology Data
  - Energy Prices

- Simulation
  - Market Penetration
  - Dynamic Interactions & Constraints

- Feedback Loop from WP5

- Intermediate Results

- Outcome

- Inputs for Scenarios
  - Policies and other encouragement for developing of new technology
  - Constraints & Settings
2. Methodology

2.4 Charging and discharging strategies

**Impact parameter**
- Properties of the power grids e.g. grid capacity
- Driving patterns
- Charging Infrastructure
- Properties of the Battery
2. Methodology

2.5 Business models and the Stakeholders
2. Methodology

2.5 Business models and the Stakeholders

Possible interactions between the stakeholder due to a high penetration of electric vehicles
2. Methodology

2.6 Ancillary Services

- Emergency load curtailment for G2V for both concepts (G2V and V2G)
- Balancing energy (appropriate for V2G concept)
  - Primary Regulation
  - Secondary Regulation
  - Tertiary Regulation (Balancing Energy Market)
2. Methodology

2.7 Balancing Energy

- Balance Group coordinator (Provide an offer platform for providers)
- Generate merit order curves
- Provider (Produce or Consume) offers between 50 MW and 50 MW
- Are the technical requirements reliable?
- Forwarding to BGM
- If necessary, the power will be called
3. Impact parameter

- Driving patterns
- Merit order curve for the demand
- Charging infrastructure
- Properties of Battery
- Kinds of Vehicles
  - Plug-In Hybrid Electric Vehicle
  - Extended Range Electric Vehicle
  - Battery Electric Vehicle
- Properties of the grid and the grid capacity
  - Rural area
  - Urban areas
  - With different consumer groups (e.g. Salzburg City)
3. Impact parameter
3. Main outcomes

- Scenarios for developing of electric vehicles in one urban and three rural areas
- Charging and discharging strategies in conjunction with driving patterns, grid properties and charging infrastructure
- Impact of e-mobility of the power grid (medium and low voltage) based on detailed load flow
- Cost benefits analysis of different business models according to increase in efficiency
- Development of an Action plan for market participants (action needed for realization of G2V and V2G concepts)
- Two press conferences and international workshops for presentation and discussion the outcomes
Feedback

Discussion

Question

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