VGI Working Group Two, Subgroup A

Illustrative Use Case Process

Applying the Joint IOU VGI Valuation Methodology

September 20, 2019

As part of the greater Vehicle Grid Integration initiative, a subgroup of the VGI Working Group Two met to conduct a collaborative trial of the Joint IOU Value Methodology to help members understand how it works.

This memorandum summarizes and illustrates the subgroup’s trial application of the process using a suggested use case submitted by Enel X’s Marc Monbouquette to more deeply understand and produce feedback regarding the viability of a VGI application framed under the process. Collaboration on this trial and assessment included inputs from the following subgroup participants:

- Dean Taylor, CalETC
- John Holmes, American Honda Motor Company
- Marc Monbouquette, Enel X
- Anne Smart, ChargePoint
- John Wheeler, Fermata Energy
- Karim Farhat, PG&E
- Jordan Smith, SCE
- Taylor Marvin, SDG&E

This exercise was suggested during a subgroup meeting held on September 13, 2019, wherein some participants volunteered for a breakout session, which was then scheduled for an hour on September 16, with a follow-on half-hour session the next day. The group discussed the various options under the six-step framework and agreed on the following classifications, steps, and ratings.
Step 1: Define A VGI Framework

The subgroup used the Joint IOU proposed valuation framework:

![VGI Valuation Framework](image)

Value Creation: Benefits & Costs
- Values (i.e. benefits and costs) along these VGI dimensions may be additive

Value Enablement: Business Models
- Values are not additive. Each dimension can be perceived as an enabler
- If not fully unlocked, it can be inefficiency that prevents realizing the full value of VGI: increase costs, reduce benefits, or both

Step 2: Identify Hypothetical VGI Use-Cases

**Suggested Trial Concept:** *Load building with mid-day workplace charging to support GHG throughput and participate in CAISO market services*

**Sector**
Commercial Workplace

**Application**
- Use-case #1 – Wholesale - Day-Ahead Energy
- Use-case #2 – Wholesale - Real-Time Energy (SUGGESTED, NOT COMPLETED)
- Use-case #3 – Wholesale - Renewable Integration (SUGGESTED, NOT COMPLETED)

**Approach**
Active – Load Shift Service, Dispatching

**Type**
V1G

**Resource Alignment**
Fragmented, Aligned

**Technology**
Light Duty, Level 2 AC Charging, OEM Aggregator
Summary portfolio of the three distinct use-cases:

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Use-case #1</th>
<th>Use-case #2</th>
<th>Use-case #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Commercial – Workplace</td>
<td>Commercial – Workplace</td>
<td>Commercial – Workplace</td>
</tr>
<tr>
<td>Application</td>
<td>Wholesale - Day-Ahead Energy</td>
<td>Wholesale - Real-Time Energy</td>
<td>Wholesale - Renewable Integration</td>
</tr>
<tr>
<td>Type</td>
<td>V1G</td>
<td>V1G</td>
<td>V1G</td>
</tr>
<tr>
<td>Approach</td>
<td>Active</td>
<td>Active</td>
<td>Active</td>
</tr>
<tr>
<td>Resource Alignment</td>
<td>Fragmented, Aligned</td>
<td>Fragmented, Aligned</td>
<td>Fragmented, Aligned</td>
</tr>
<tr>
<td>Technology</td>
<td>Light Duty, Level 2 AC Charging, OEM Aggregator</td>
<td>Light Duty, Level 2 AC Charging, OEM Aggregator</td>
<td>Light Duty, Level 2 AC Charging, OEM Aggregator</td>
</tr>
</tbody>
</table>

Due to limited time, the group proceeded with only Use-case #1

**Step 3: Screen Out Impractical VGI Use-Cases**

**Use Case #1 - Wholesale Energy Day Ahead**

*Agreed upon Timeframe for screening is “now”: 2019-2022*

**Screen 1 – Technological feasibility**

Screen 1 – This use-case passed, because, fundamentally, it has been implemented as part of CA IOU demonstrations, including in the BMW ChargeFoward pilot

**Screen 2 – Market Rules**

Screens 2a and 2b – This use-case passed both screens a and b because load shift was addressed in a recent Working Group, and the participants believe that tangible market services will be developed around load flexibility, within the “now” timeframe.

**Screen 3 – Customer preferences**

Screen 3a –This use-case passes without risk of compromising customer mobility needs, due to prior success, demonstrated in PG&E/BMW ChargeForward project and similarly under SCE’s Charge Ready Pilot

Screen 3b – This use-case passes without risk of significantly low customer adoption / participation, since the use-case is likely familiar and attractive to participants. Site owner permitted to opt-out, participant may elect to engage.
Screen 4 – Data Information

Screen 4a – Are data needs for this use case publicly available? Agreed answer: likely yes, due to Avoided Cost Calculator, knowledge of Day Ahead Market Prices. Therefore, the use-case passes.

Screen 4b – Do data needs and inputs for this use case available at all? Agreed answer: Yes. Therefore, the use-case passes, concluding Step 3.

Observation:

May be clearer to “flip” the order of Screens 4a and 4b.

Step 4: Quantify Each VGI Use-Case’s Potential Benefits and Costs

Benefits:

Inputs for Sector:

(1) Reference: Likely AVAILABLE – There exists some form of reference charging profile, which refers to “unmanaged charging”. There is a known load profile over 24 hours, representative of location/application. Here, the capacity is determined by the capacity availability (EVSE type and count).

(2) Plug-in schedule: Likely AVAILABLE – presumed known profile schedule and availability, indicating when the EV is connected and available to interact with the grid.

Inputs for Application:

(3) An economic signal (e.g. price of service) to maximize or minimize charge/discharge over time. In this case it may be wholesale price from CAISO or other aggregator source.

Inputs for Type:

(4) V1G

(5) Battery characteristics or constraints – Likely AVAILABLE. Examples of assumptions include:
   - Battery capacity: 50 kWh
   - Minimum state of charge: 30%

(6) EV-EVSE characteristics/constraints (e.g. energy demand for mobility needs, level of charging, etc.) – Likely AVAILABLE. Examples of assumptions include:
   - Mobility energy need: 10 kWh/day
   - Maximum charge rate: 10 kW
**Costs:**

**Administrative Costs**
Includes any of the following quantifiable costs:
- Design and development
- Operations and maintenance
- Marketing and sales
- IT and Cybersecurity
- Evaluation, measurement, and verification
- Reporting

**Capital Costs**
Includes any of the following costs:
- Equipment (hardware)
- IT (software)
- Backhaul services

**Discussion**
The accounting in the cost buckets is clear, but need to have a discussion on what is “incremental for VGI”, and what is base and already used for TE more broadly.

**Step 5: Rank VGI Use-Cases by Practical Net Benefits**
Criterion 1: Ranking based on net-benefit → ??? With respect to other use-cases
Criterion 2: Ranking based on “implementability” → Consensus score: 3

**Discussion:**
Might be more constructive to use term “telematics” to refer to communications in this example, not OVGIP, since that was a particular implementation.

**Observation:**
Reaching consensus on the scoring on Criterion 2 might be time-consuming, so might need some support from Gridworks on that to streamline the process.
Step 6: Make Recommendations on Policy, Market, or Technology in Order to Realize and/or Improve the VGI Use-Cases’ Value

- Working with CAISO to help materialize load flexibility as an actual market-based service
- Having a discussion around the exact compensation architecture for customers
- Broadening the technology specs to include telematics more broadly, without specific focus on the example of OVGIP

Summary of Subgroup Inputs to Working Group

Discussion:
Perhaps recommendations can also include identifying gaps?

Final thoughts:
General agreement on the value of the exercise in helping participants understand how the method works and gaining comfort with using it to proceed on the next phase of VGIWG.