Software & the Microgrid

Microgrids and Nonutility Strategies for Fleet Electrification

Russell Schmidt, Director of Digital Products

InCharge Energy

www.inchargeus.com

InCharge Energy

- Turnkey fleet charging solutions:
  - Design
  - Manufacture
  - Sell
  - Install
  - Warranty
  - Service
  - Networking
  - InControl
- Majority owned by ABB

InControl

- Charger management system
- Built for fleets
- Developed in-house
- Easy to live with
  - Cloud-based
  - Web application
  - Free OTA updates
- Built-in energy management
- Comprehensive API

Beginning your electrification journey in 2023

How do we stitch this all together?

- Distributed energy resources (DER)
- EV Chargers
- Facilities
- Interact with the grid
- Finance
- Vendor management

Options to stitch it all together:

1. You don’t.

2. Single software/hardware suite

3. Use APIs to have different vendors communicate

The Simplicity of Not Integrating

- If your microgrid is small, you can attempt manual interventions
  - Shut off chargers when running off battery
  - Juggle a few screens once in a while
- Rely on component alerts to trigger your response
- Leverage individual automation options from components

> The best code is no code at all.
>
> - Jeff Atwood

CASE STUDY

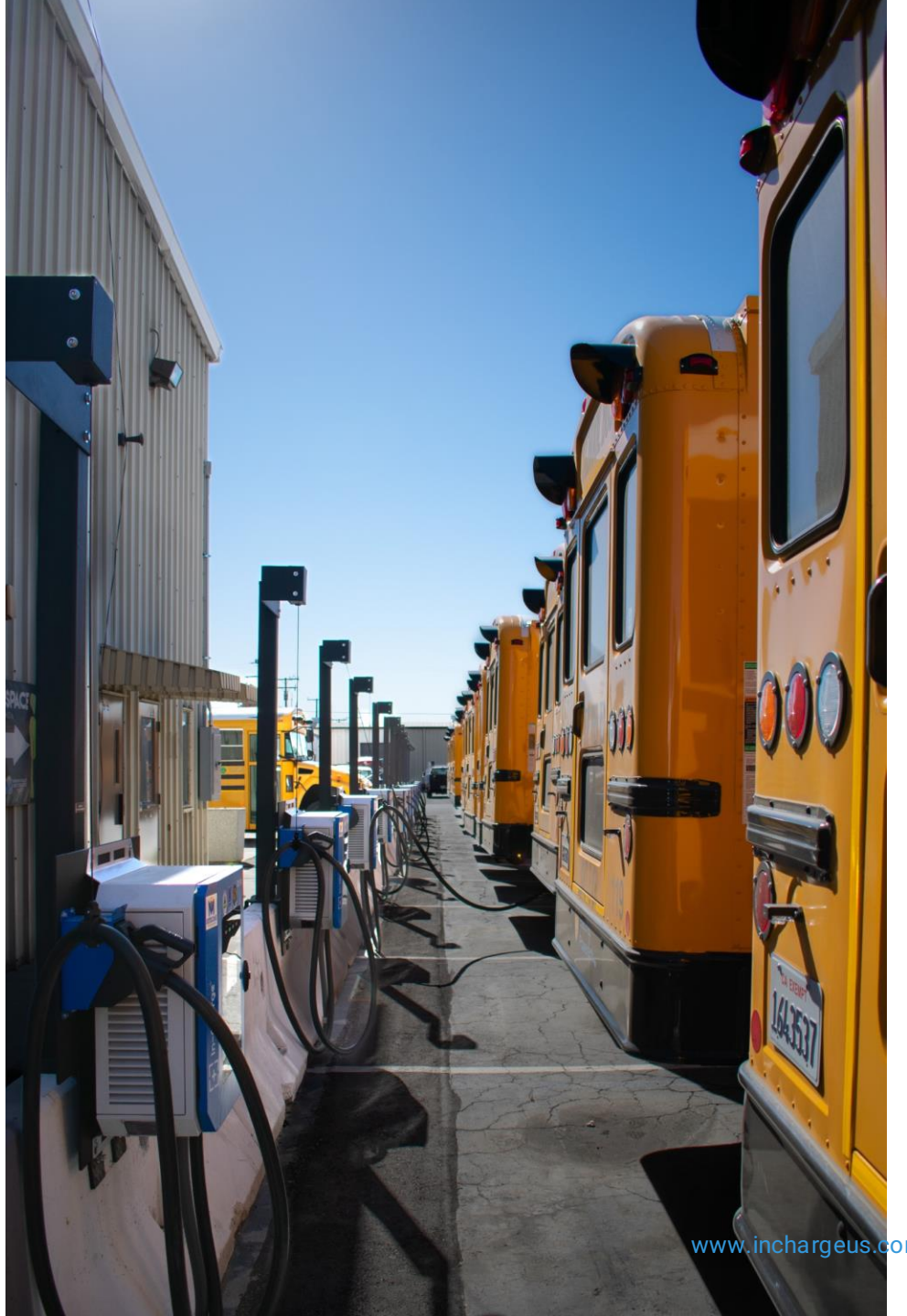
Moreno Valley Unified School District

- Constraints
  - 1.5MW Solar but 500kW usable for charging
  - 4-9pm Peak
  - 38 electric school buses with 200+ kWh batteries
  - 38 30kW DC chargers
  - EV charging represented the biggest source of demand
- Tooling
  - Smart meters
  - Smart Charging software
    - Power Limits
    - Scheduled charging
  - No active energy management system

CASE STUDY OUTCOME

Moreno Valley Unified School District

- Charger management software aligns behavior with microgrid
  - Automatically charge buses a few at a time to avoid demand chargers
  - Automatically start sessions after off-peak tariffs start
  - Relax restrictions mid-day when PV output high
- Requirements
  - Monthly interval reporting to utility via software, smart meters
  - Charger software Amp limit to avoid throwing a breaker
  - Charger software kW limit to avoid demand charges



Benefits of Software Integration

24/7 monitoring

Faster, automatic reactions

Sophisticated, dynamic responses

Unified reporting

The Great (software) Debate

Single vendor

Multi-vendor

The Great (software) Debate

Single vendor

- One neck to choke
- Single pane of glass

Risks

- ‘Jack of all trades, master of none’ shallow feature set
- White-labeled components are superficially integrated
- Single point of systemic failure

Multi-vendor

- Best-in-class solutions
- Deep integration to hardware components

Risks

- Compatibility issues
- Finger pointing
- Vendor management

Software Resiliency

On Premise

- Survive a sustained internet outage
- Immune from mobile network issues

Risks

- Single point of failure
- Server closet upkeep
- Higher capital costs

Multi-vendor

- Ignore local network failure
- No local software updates
- No server closet rat nest
- Distributed internet connections

Risks

- Vulnerable to sustained network outages

Paying for it all

- Inflation Reduction Act: 30% Tax Credit through 2032
- Incentives
- NEVI - $5B
- Federal Discretionary Grant Program - $2.5B
- Bipartisan Infrastructure Law: school bus, port electrification
- Utility programs: Make-Ready, Charge Ready
- FTA: funding for school and transit buses 80-90% of cost
- Carbon Credits such as LCFS

Charging as a Service (CaaS)

Treat your microgrid & charging partners as your utility

- Minimal to no upfront capital
- Hedge electricity costs with a fixed multi-year commitment
- Reliability - Guaranteed availability to de-risk charging operations
- Outsourcing charging and energy expertise allows you to focus on your core business
- Speed to market to meet upcoming regulatory requirements
- Reliability – Guaranteed availability to de-risk operations

Software's Role in Microgrid Financing

- Reporting Strings Attached – Software can fulfill reporting requirements from granting agencies: utilities, governments, etc.
- Custom software integration can be an expensive game to play –ideally your partners have an API so they can easily communicate
- Software with Smart Charging can manage your charging to mitigate peak charges and demand charges, or charging when renewables are unavailable
- Grid communication & Demand Response

Thank you!

- Russell Schmidt

russell.schmidt@inchargeus.com

https://www.linkedin.com/in/russellschmidt