Bus and Truck Charging Interface

Presenter: Mark Kosowski, EPRI

CARB Workshop

February 8, 2016

Bus and Truck Charging Interface Group

- Meetings occur about 4 times per year
- Lots of Interest from
  - Utilities,
  - Bus Manufacturers,
  - Transit Authorities,
  - Charger Manufacturers, and
  - Laboratories
- There is a need to standardize bus charging prior to building an infrastructure
- Discussion points are standardizing and understanding the utility and bus interfaces

Current Participants

OEMs (12)	Utilities (11)	Transit Authorities (4)	Charger Manufacturers (7)	Organizations (8)
BYD	Alabama Power	APTA	ABB	CalStart
BAE Systems	APS	Chicago	Clipper Creek	CARB
Complete Coach	Centerpoint	New York City	Eaton	CTE
Ebus	Exelon	LA County	EVO Charge	EEI
Foothill Transit	Hydro-Quebec		Siemens	EPRI
Gillig	PG&E		Toshiba	REMA
New Flyer	SCE		Wave	SAE
OLEV	SDG&E			UL
Opbrid	SMUD			
Proterra	SRP			
Transpower	TVA			
Volvo- Nova Bus				

Currently, there more than 100 participants on the roster

Bus Charging Interface Group
Next Meeting

When

Tuesday, March 29, 2016 12:30 pm to 5:00 pm

Where

Salt River Project's PERA Club

1 E Continental DR, Tempe, Arizona 85281, USA

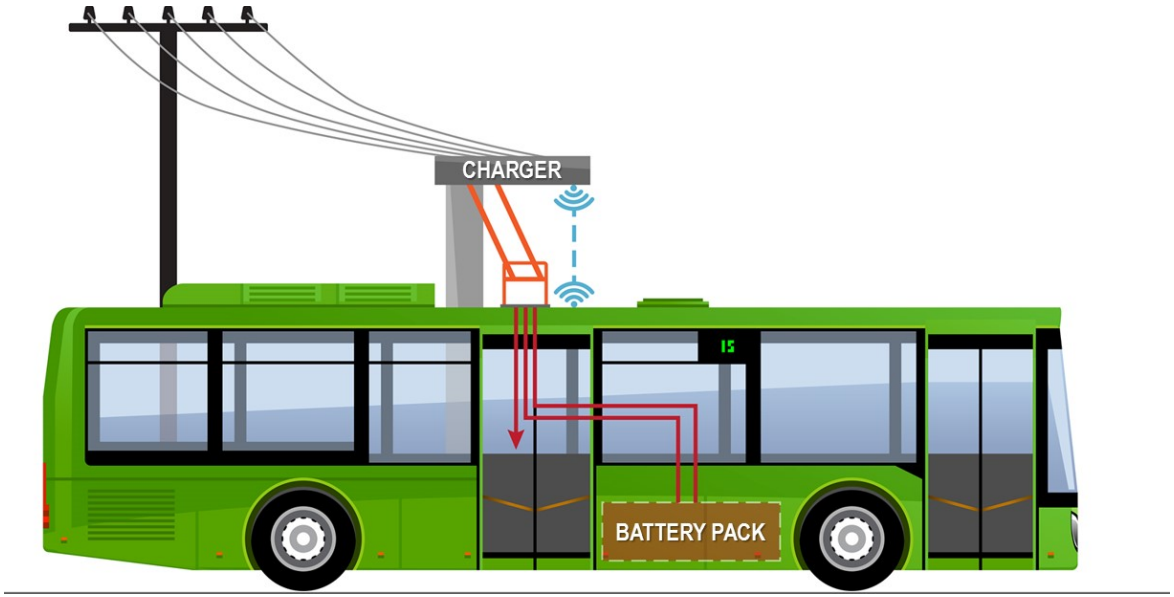
Please let me know if you are interested

Bus and Truck Charging Interface Group

- At least three charging interfacing standards have emerged
  - Manual connection at high power- SAE J-1772
    - An existing document that will make provisions for the higher power needs of the busses
  - Wireless connection at high power- SAE J-3068
    - A developing document that will make provisions for the higher power needs of the busses
  - Overhead connection at high power- SAE J-3105
    - New document which started late last year

Overhead Charging Document

- Overhead connection at high power- SAE J-3105
  - Document wants to standardize the interface between the Overhead infrastructure and the bus
  - Committee meets twice a month



Power Levels

Power Configurations

Connection Points

Communications

Safety

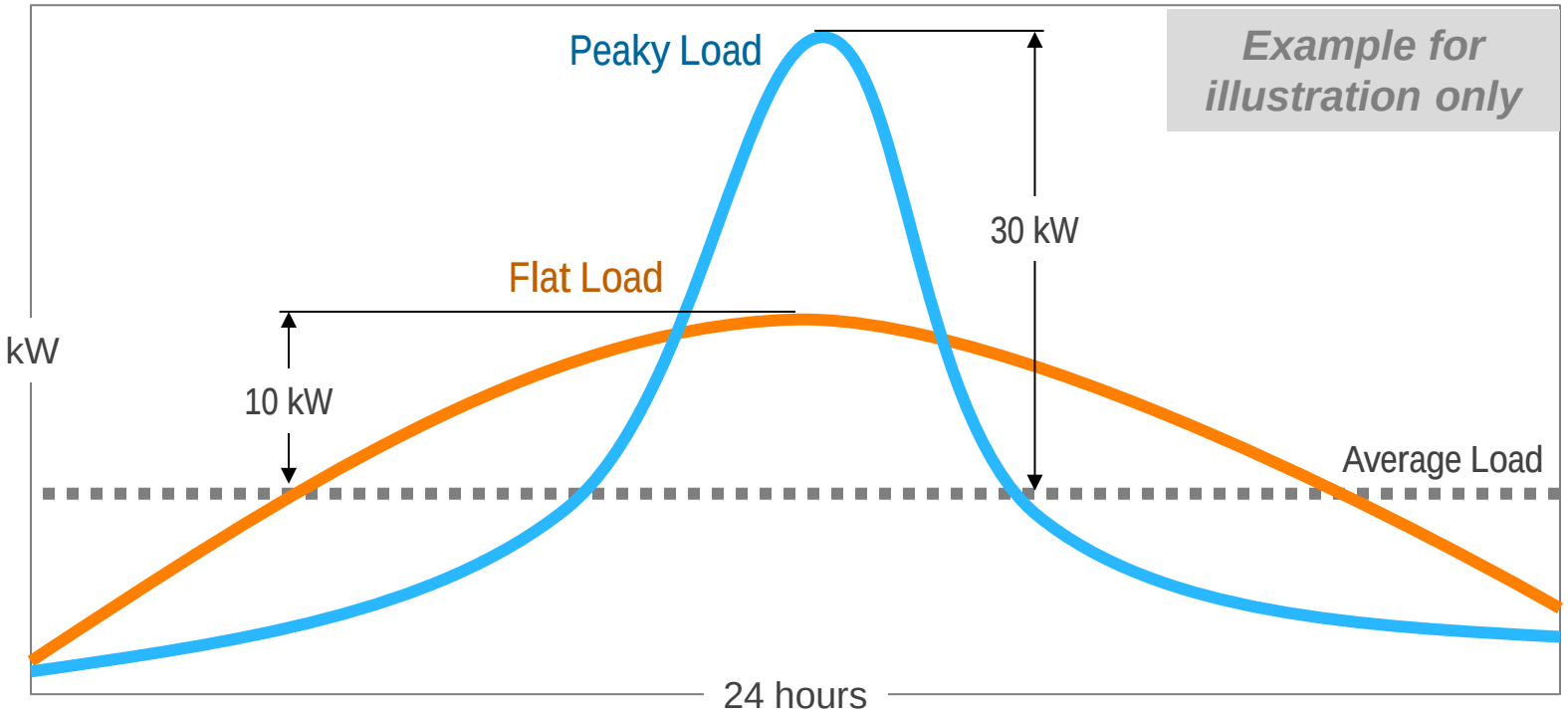
Alignment Protocol

Demand Charges

Energy Storage Used to Reduce Demand Charges

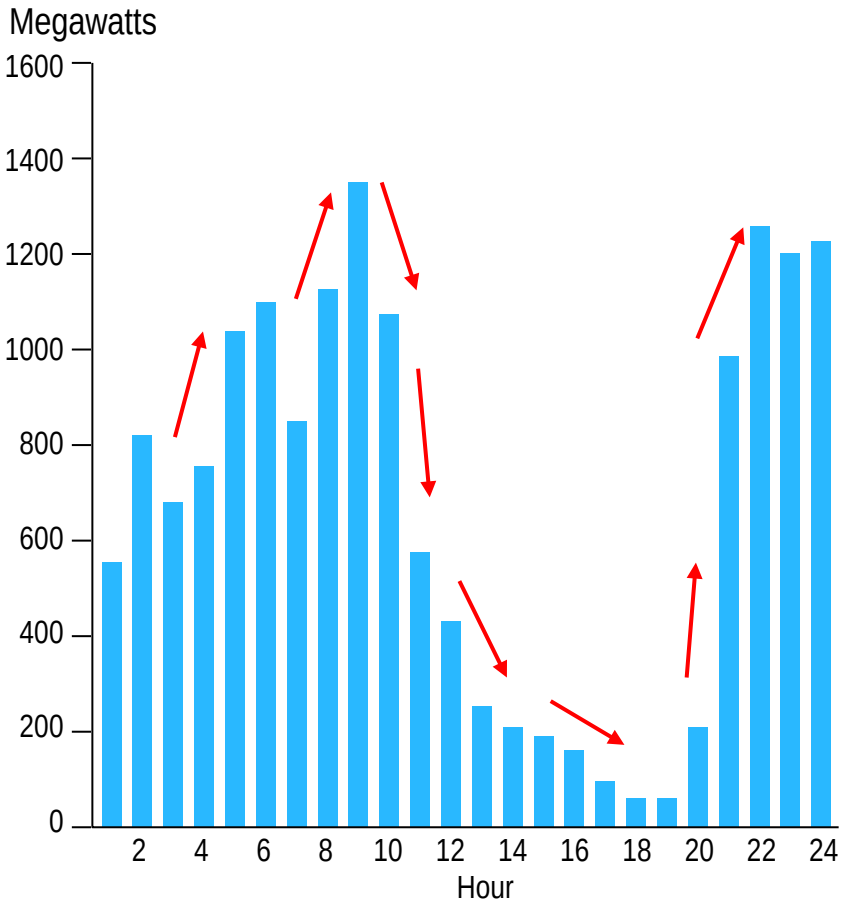
What if demand charges were the only way to pay for storage?

FLAT LOAD	PEAKY LOAD
Savings: 10kW x $10/kW x 12 months = $1,200/year	Savings: 30kW x $10/kW x 12 months = $3,600/year
Cost: 12h x 5kW x $500/kWh = $30,000	Cost: 4h x 15kW x $500/kWh = $30,000
Simple Payback: 25 years	**Simple Payback: 8.33 years**



Assume $10/kW demand charge and storage at $500/kWh

Storage Application for Wind Integration



- Need for system regulation (up and down) increases with the amount of wind generation
- This application does not need storage to be collocated with the wind farm
- The duration of storage needed for “wind+storage” as a viable “Firm Capacity” resource makes it impractical in the foreseeable future

Increased system regulation (up and down) need with market rules that enables storage as a flexibility resource will drive near- to mid-term application

Contact Information

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