Energy Efficiency Policy Workshop 2019

Developing Strategies for EVs: Case Study from the Philippines

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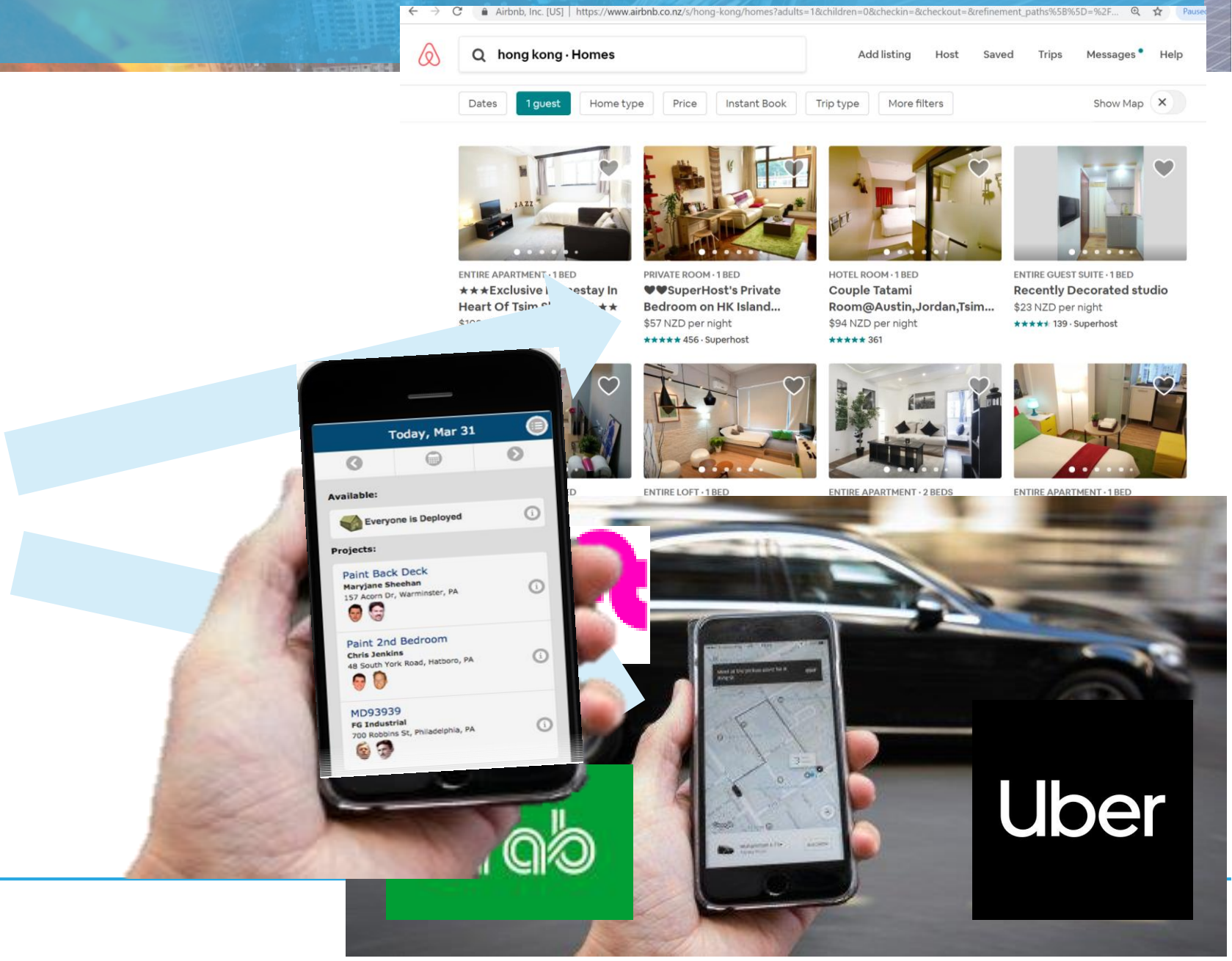
APERC
Asia Pacific Energy Research Centre

APEC
Asia-Pacific Economic Cooperation

Cheap electronics + cheap communications + cheap data + time =



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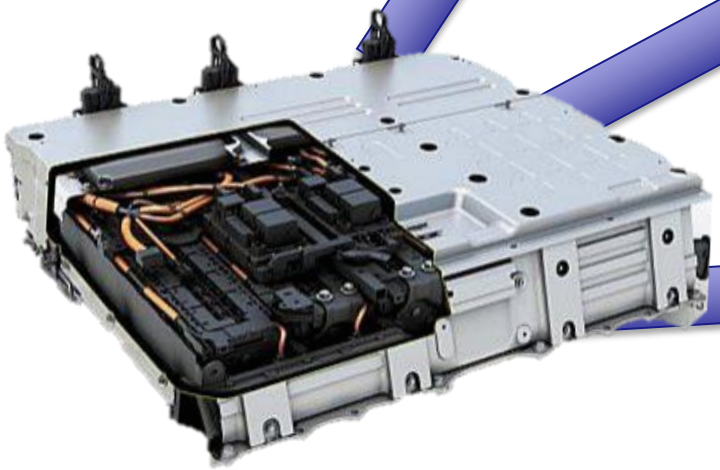
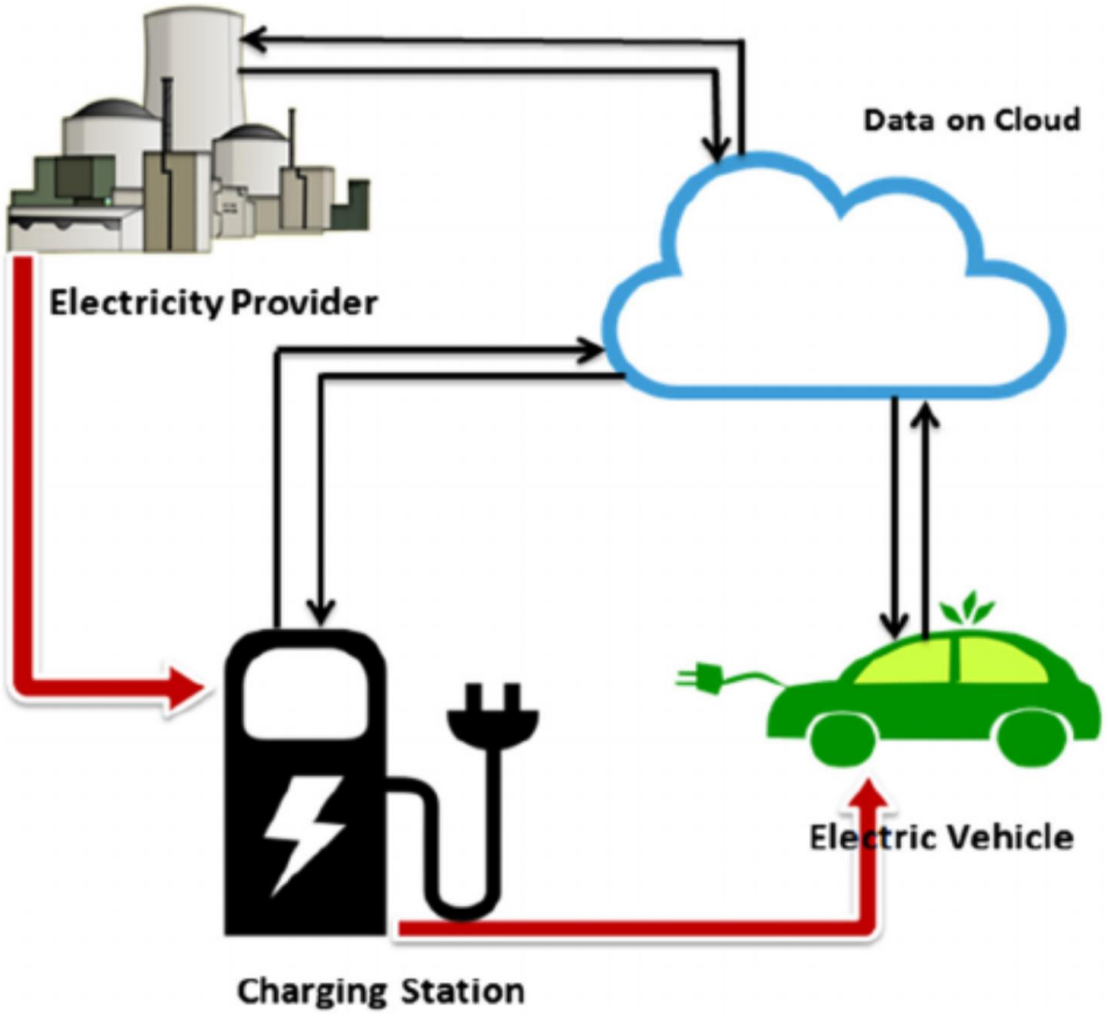
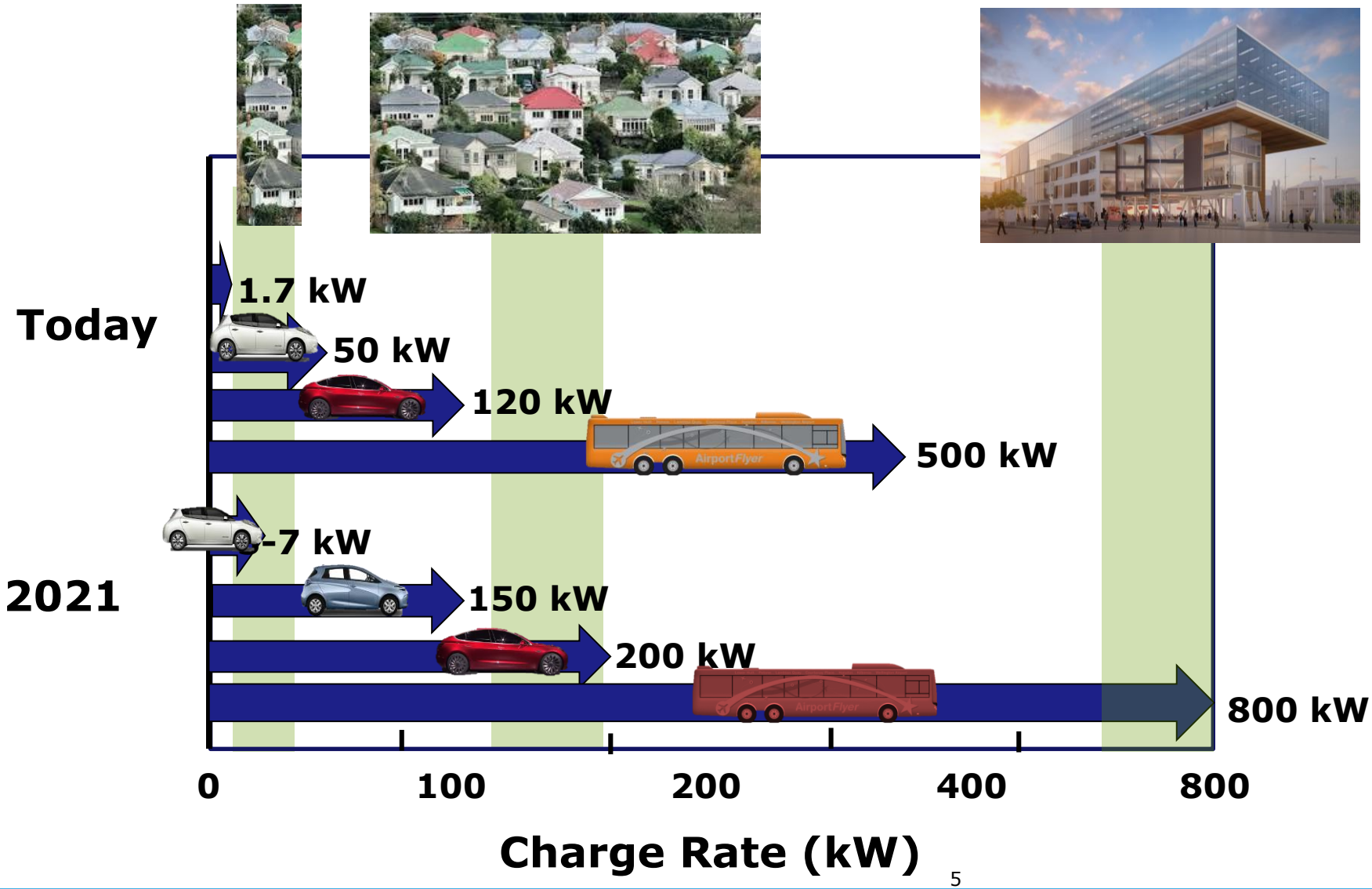
Advances in batteries ….

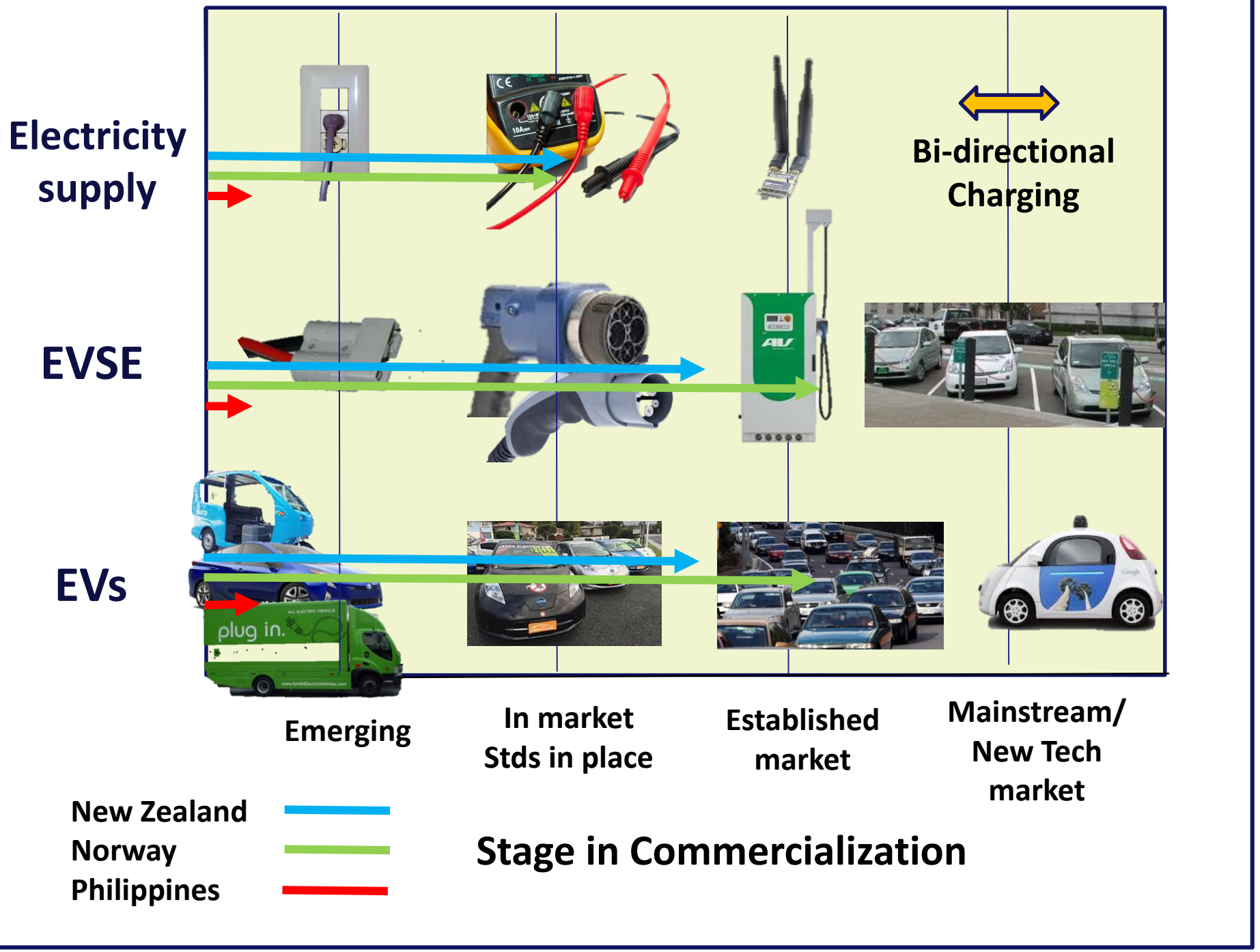


Also changing in the electricity supply sector …



Charging requirements changing …



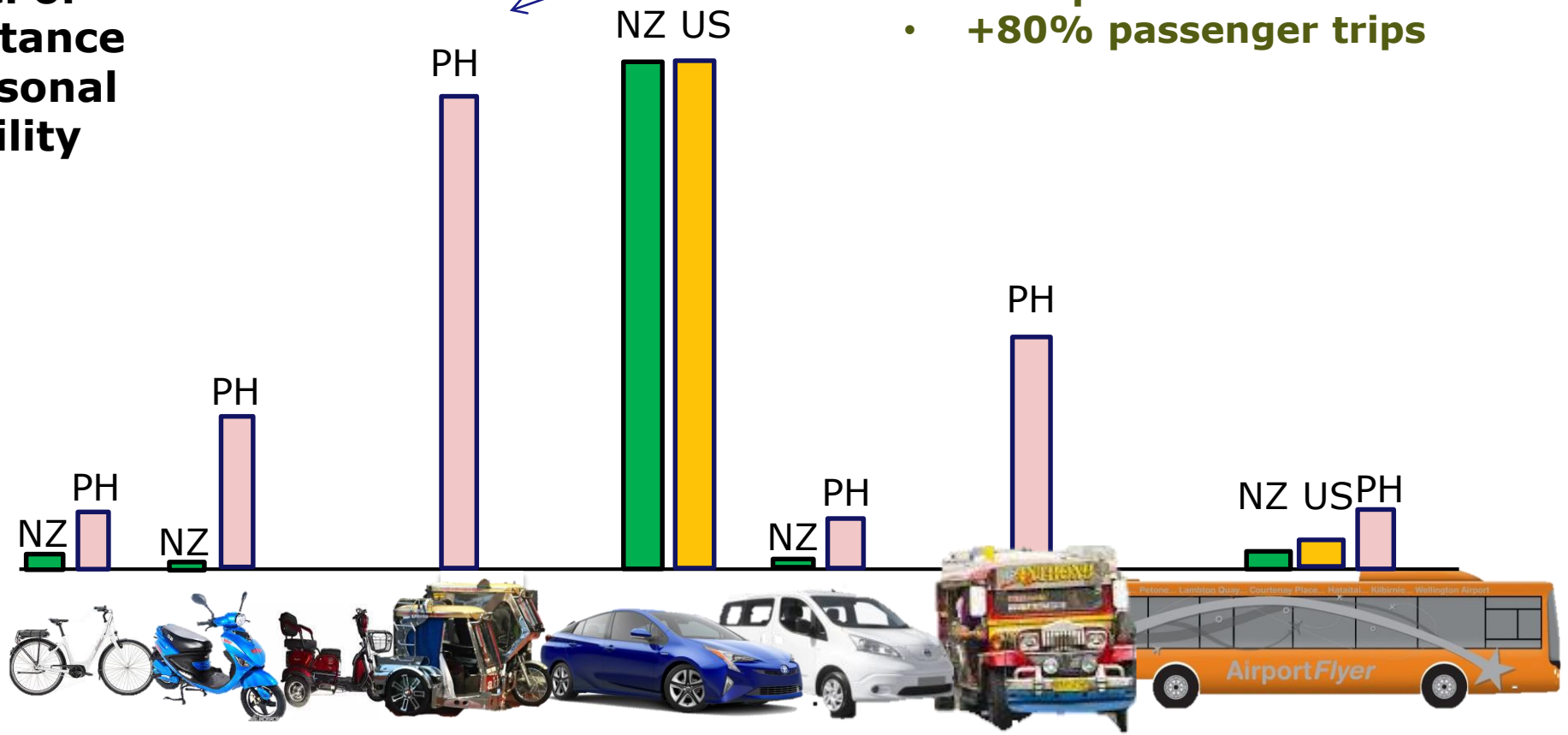

Electricity supply
EVSE
EVs
Bi-directional Charging
plug in.
Emerging
In market Stds in place
Established market
Mainstream/ New Tech market
New Zealand
Norway
Philippines
Stage in Commercialization

What Vehicles are Important to Your Economy?

Very important for many Asian countries:

- **First and last mile public transport.**
- **+80% passenger trips**

Level of importance to personal mobility



Philippines Department of Energy E-Trike Project

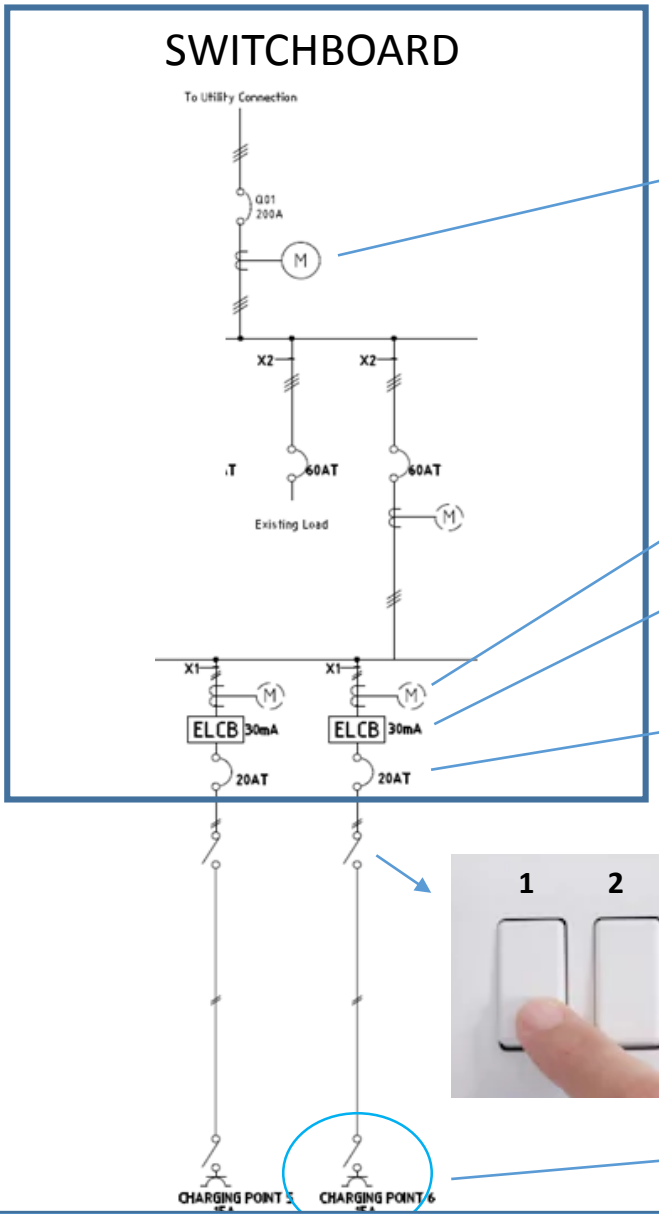
Why e-trikes?

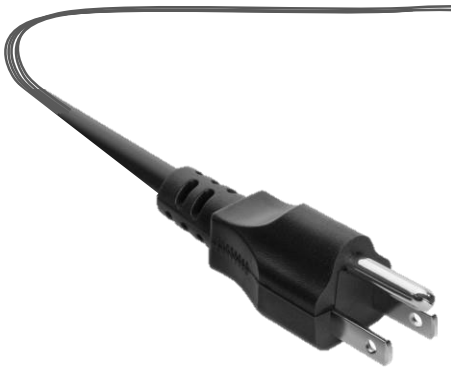
- E-trikes offer a relatively low cost EV entry option (due to small battery size).
- Expect short project development timeframes.
- Can be supported by simple charging options.
- → Project aim: provide an EV base from which to begin a modernization of the fleet as a whole.

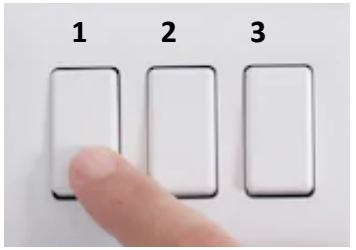
DOE E-trike Project Summary

- Asian Development Bank loan and grant.
- 3000 e-trikes to be deployed by May 2019.
- E-trikes manufactured in Philippines.
- Design applicable to many Asian countries.

- Automotive-grade Li-ion batteries … and supply chain.
- Targeting (first-mile, last-mile) public passenger transport (and removal of two-stroke tricycles).
- Deployed through Local Government Units (who are responsible for setting up charging stations where at-home charging is not sufficient).
- Has stimulated private sector uptake of e-trikes.







Supported by many forms of guidelines

Lessons Learned

- EV technology was largely unknown at the start of the project:
  - Difficult to "sell" project to the industry without a base of EV-related awareness and no mechanism to demonstrate apart from project itself.
  - … in particular, uncertainty of battery life (and cost to replace) was a significant barrier to uptake.
  - Government had an important role in initiating the market.
- Once initiated, private sector is more capable of deployment/is able to move faster.
  - → look for mechanisms that encourage and support private sector.
  - Private sector also pushes boundaries ($$$ to be made) … care required by government to allow this to happen without compromising safety or introducing other unwanted outcomes.
- Care required to minimize behaviour change required.

Time in Life Cycle	Electric Vehicles	Charging Infrastructure	Electricity to the Plug/Charger
Design	Standards, tech development, meeting market. Micro, LEVs, HEVs	Charging and related hardware and IT, NZ Inc. plan, compatibility. Connectors: Micro, LEVs, HEVs	NZ Inc. electricity supply system, planning. Looking at hard demand management tools
Build	Capacity, market demand by vehicle class	Capacity, demand by different type	Gen Co.s/Line Co.s
Supply	Availability, meeting demand, shipping, import, certification	Avail	n Co.s/Lines Co.s, general information on
Purchase (and resell)	Awareness/inf experi		n/network upgrade, ation type switching … any and NZ Inc. plans
Installation			Gen Co.s/Lines Co.s
In-service opera		ring	Monitoring
Genera		Access/restrictions, signage, availability, NZ Inc map.	Awareness, controls (pricing and other).
Charg	anding of, options, costs, best practice	Understanding of, connectivity, time of charge, billing.	Connectivity, management time/rate of charging, billing
Servicing/ maintenance	Understanding of, industry capability and capacity, industry training	WoF, certification, industry training.	Gen Co.s/Lines Co.s
Breakdown	Guidelines/best practice	Response, industry training, map.	Gen Co.s/Lines Co.s
Accident	1st response, repair, fleet re-entry	1st response, repair, re-cert.	Gen Co.s/Lines Co.s
Retirement	Decision to, reuse of battery/electrics through scrap/recycle .	Decision to, re-use/upgrade through scrap	Gen Co.s/Lines Co.s

Require Industry-Wide Coordinated Approach

APEC Electric Vehicle RoadMap History

- **2014:** APEC Trade and Foreign Ministers endorsed APEC Actions for promotion of EVs.
- **2015:** APEC EV Roadmap developed by Automotive Dialogue, Energy Working Group and Transportation Working Groups.
- **2016-2018** delivery of Roadmap Workshops
- **Identified areas for further work:**
  - Recycling (including protocols for re-use and re-manufacture of batteries)
  - Cybersecurity (hacking prevention)
  - Personal data (including autonomous vehicle routing info, driver info)
  - Emergency response (protocols/manuals, ability to convey help required)
  - Interoperability and related standards (high power, wireless, building/grid integration)
  - Standards for other EV types (2- and 3-wheel, emerging user models)
  - … and harmonisation of these standards ….

Example: First Response

Summary Position of First Response

- **Two-step approach to managing risks:**
  - **Identify the risk**
  - **Manage the risk**
- **EVs introduces new battery types (and makeup is changing).**
  - **→ different response required, for fire and (water) emersion.**
- **Introduces high voltages:**
  - **→ Need to carefully identify cables if cutting (LV) to isolate.**
  - **→ Poor/no use of high voltage colour coding in 2- and 3-wheelers!**
  - **→ A minimum requirement?**
- **Several guidelines available (e.g., US: National Fire Protection Association (NFPA), but poor dissemination).**

Battery Fire Quiz

Q. What method is recommended to respond to a fire of an electric vehicle?

a) Dry powder or CO_2 (i.e., electrical fire extinguishers).

b) Water.

c) Get out the marshmallows and watch.

Battery Fire Quiz

Answer:

b) Water based fire extinguishing agents best.

- **Suppress and cool.**
- **Chance of re-ignition …… days later**
- **Remove vehicle to safe location.**

- **Gas extinguishing agents and dry powder extinguishing agents are ineffective**

Why do we have standards?

Safety

- Minimum performance
- Compatibility
- Security
- …

The New Zealand Herald

BUSINESS

Electric scooter giant Lime recalled scooters amid fears that some could catch on fire

4 minutes to read

31 Oct, 2018 12:45pm

And standards need to keep up with new tech

Challenges to EV Commercialization

- Cost of developing technologies
  - Low return on investment and limited R&D $$$
  - Batteries can be half the cost of EV and development critical
- Now a focus on adequacy of infrastructure
  - Significant scale will affect the grid at all levels (generation, transmission and distribution) → critical for industries to collaborate.
  - Significant scale requires interoperability.
- Regulatory environment
  - Still significant cost difference between EV and ICE.
  - Constant updating making standardization difficult.
  - Regulatory predictability and transparency are key.

Thank You

http://aperc.ieej.or.jp/

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