

Electric Vehicle Charging Ecosystem

Opportunities to explore in Indonesia

Yatin Premchand

Managing Director, Global Advisory,
Asia Pacific



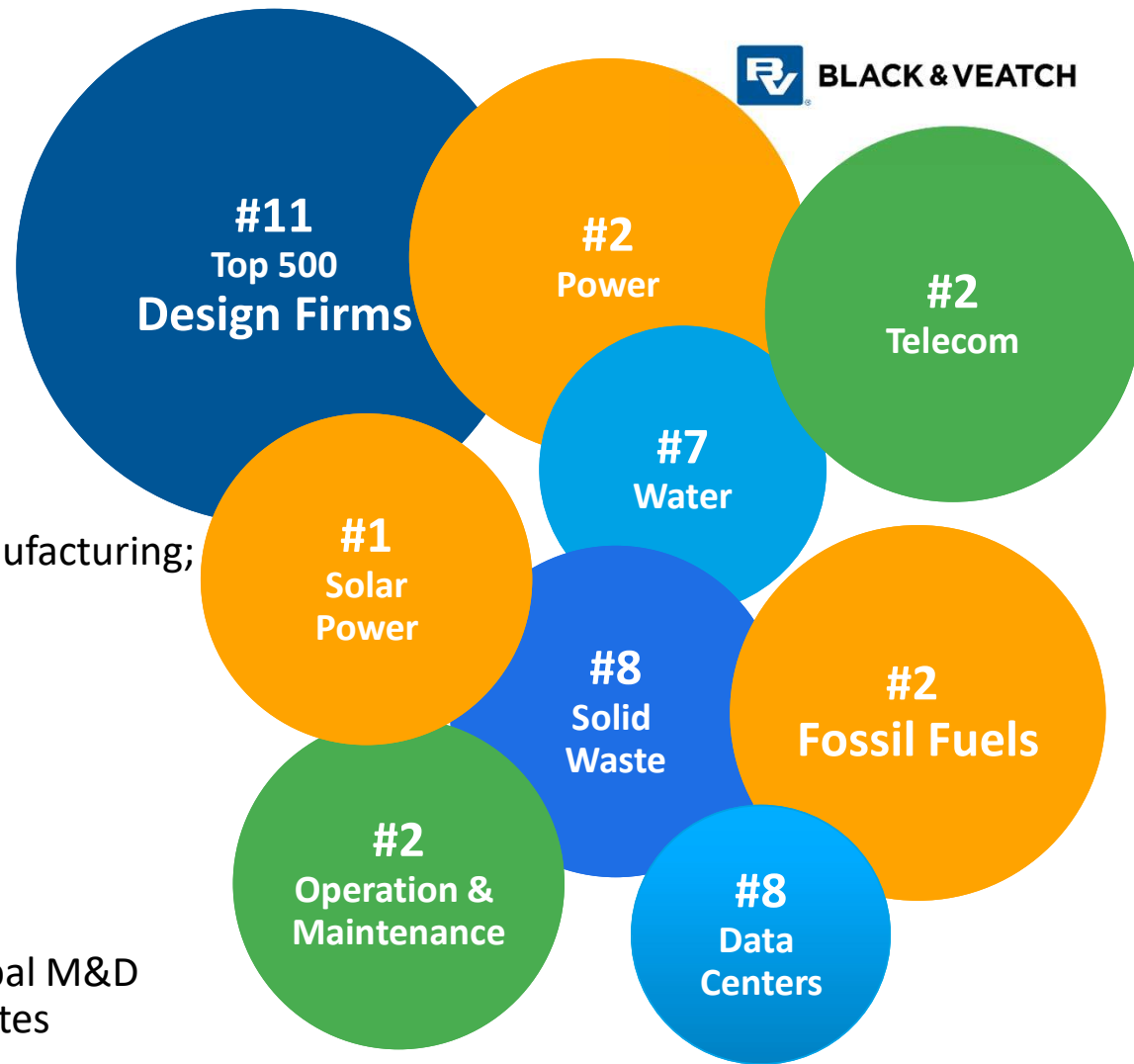
Today's Black & Veatch

- 9,200+ professionals in 120+ offices
- HQ in USA; 50+ years across Asia
- Projects in 100+ countries on six continents
- \$3.3 billion in 2021 revenue
- Sectors
 - Commercial; Governments; Industrial & Manufacturing; Mining; Gas, Fuels, & Chemicals; Power; Telecommunications; Transportation; Water



The brain-within-the-brain

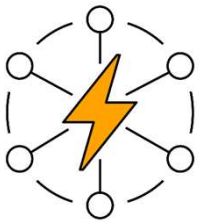
- 50+ M&D operations experts
- 1,000+ Engineering SMEs
- 24/7 cloud-based solution global M&D centers in India and United States



Current Engineering News-Record rankings.

A major transformation is occurring in transportation

Driving down costs, increasing utilization while decreasing emissions



Electric

Cost Savings



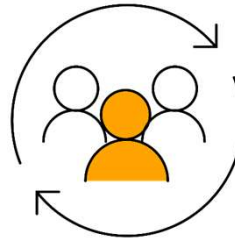
Connected

Improve Decision Making



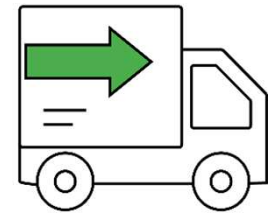
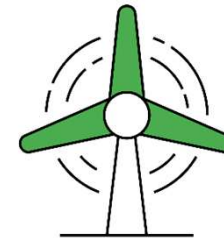
Autonomous

Cost Savings & Improved Safety



Shared

Increase Capacity Utilization

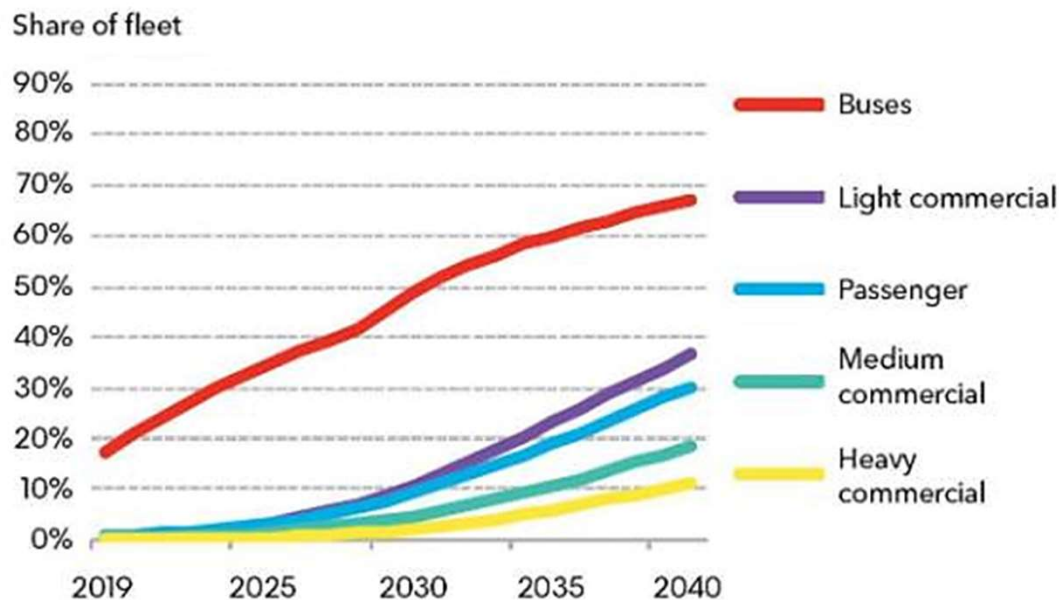


Sustainability

Renewable Energy & Clean Transportation

Global EV Adoption Forecast

EV share of global vehicle fleet by segment



Source: BloombergNEF. Note: Commercial vehicle adoption figures include the main markets of China, Europe, and the U.S.

2040 BNEF Projection

500 million passenger EVs total

- 57% of new sales

40 million commercial EVs total

- 56% of light-duty new sales
- 31% of medium-duty new sales

Projected massive need for charging infrastructure; will Indonesia follow the same pattern?

EV Adoption Still At An Early Stage in ‘Rest of Asia’

Market Drivers:

- Battery pack prices
- Vehicle availability
- New apps & technologies
- Maintenance & fuel costs
- Incentives
- Infrastructure availability

“Rest of Asia” Forecast* by 2023 - *excludes China, India and Japan*

- US\$365 charging infrastructure spend annual spend
- 122,000 charging points
 - 107,000 “residential” charging points

But by 2030:

- 612,000 charging points
- 42,000 medium/truck charging points
- 35,000 public charging points
- 517,000 residential charging points

**Data from Wood MacKenzie, Global EV Infrastructure Report*

Alternative commercial models will start to emerge second half of this decade;
how can developers in Indonesia start planning now and seize market share

What is happening in Indonesia?

- 2003: Indonesia become net importer of Oil – demand from transport
- As World's top producer of Nickel (plus abundance of cobalt, zinc and manganese), Indonesia is eyeing to become global hub for battery manufacturer

Targets:

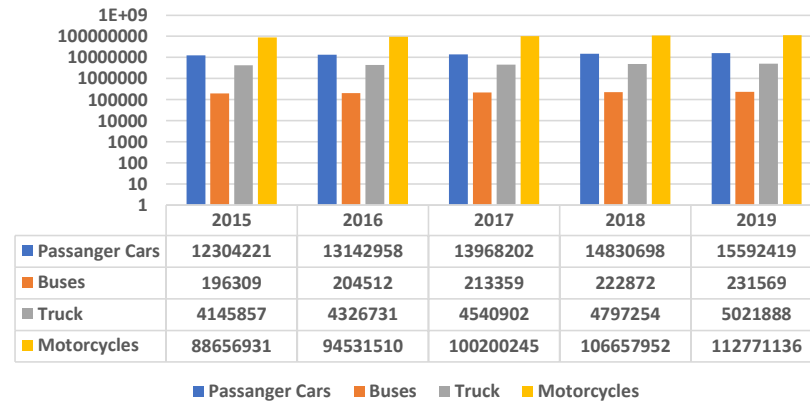
- Internal combustion engine vehicle sales to be banned by 2040
- Alternative vehicles target of 20% of all vehicles produced by 2025
- Target: 80% localization by 2029, boosting local battery and vehicle manufacturing

Other:

- Planning for ambitious project of 195 GWh battery factory, of which 70% will be used for nascent domestic EV market and 30% will be exported.
- Tax rate for BEV is 0%, PHEV will see increased tax rate from 0% to 5%. These tax rates only apply for locally manufactured vehicles.
- Green Bond issued by Indonesia's largest private bank P.T Bank.

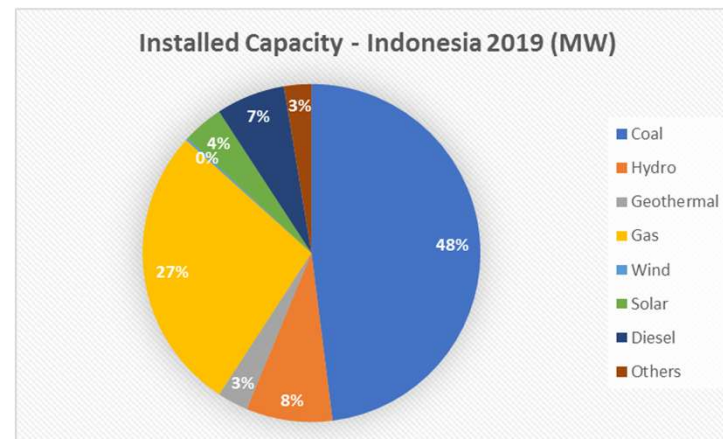
*Data compiled in mid 2021

Total Vehicle Sales



Source: www.bps.go.id

Installed Capacity - Indonesia 2019 (MW)



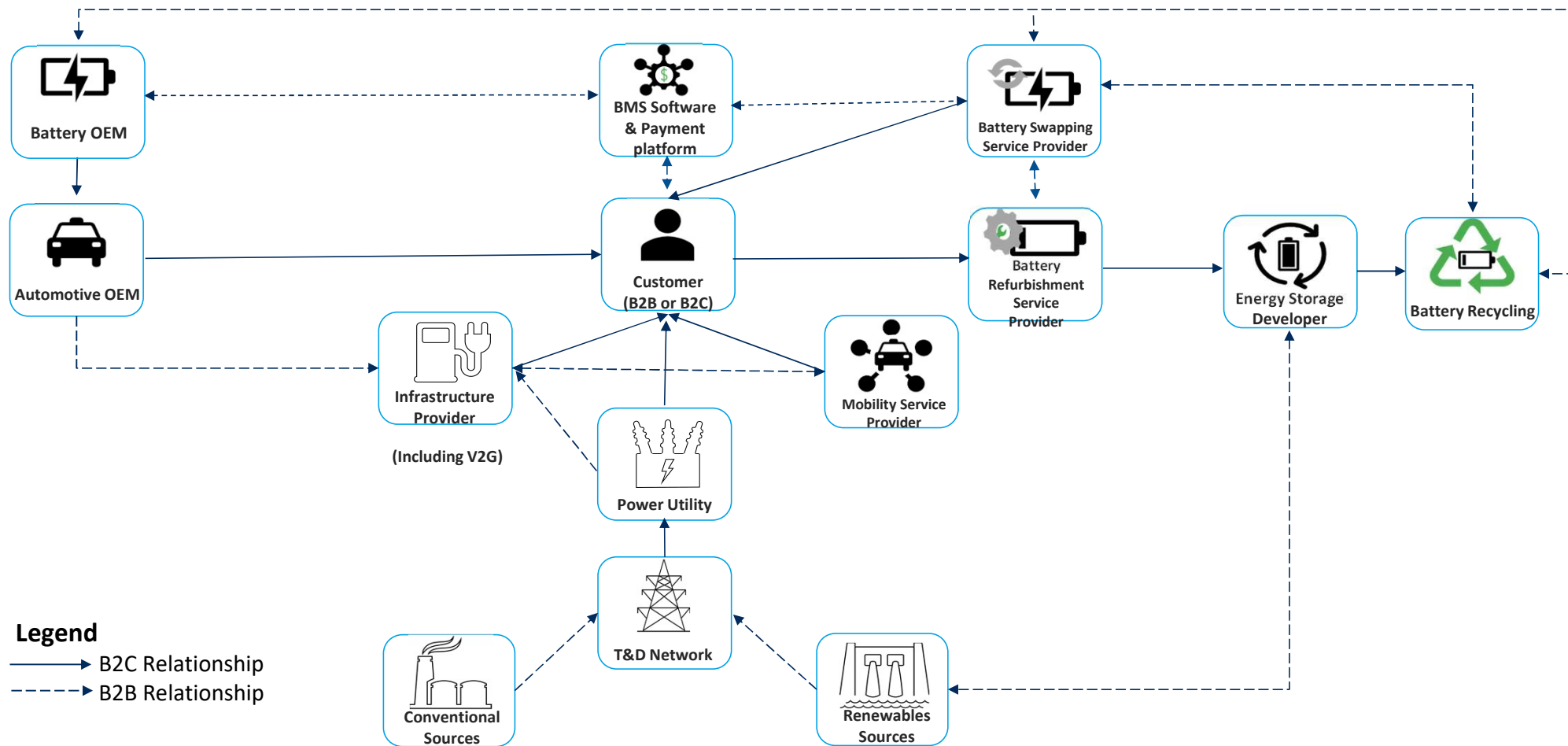
Number of EV stations*

Approx. 36 locations

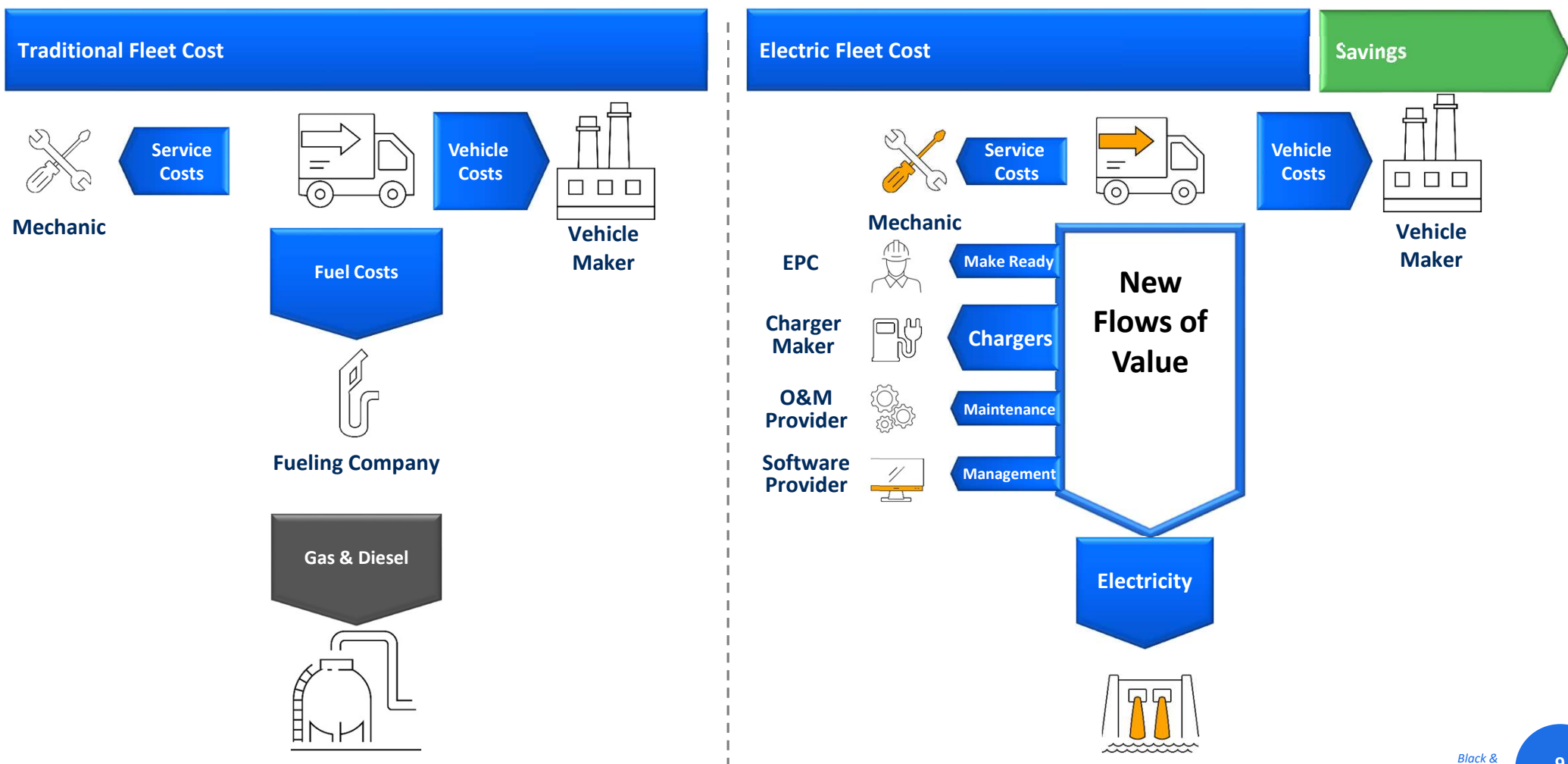
62 Charing units

Approx 9 battery swapping stations

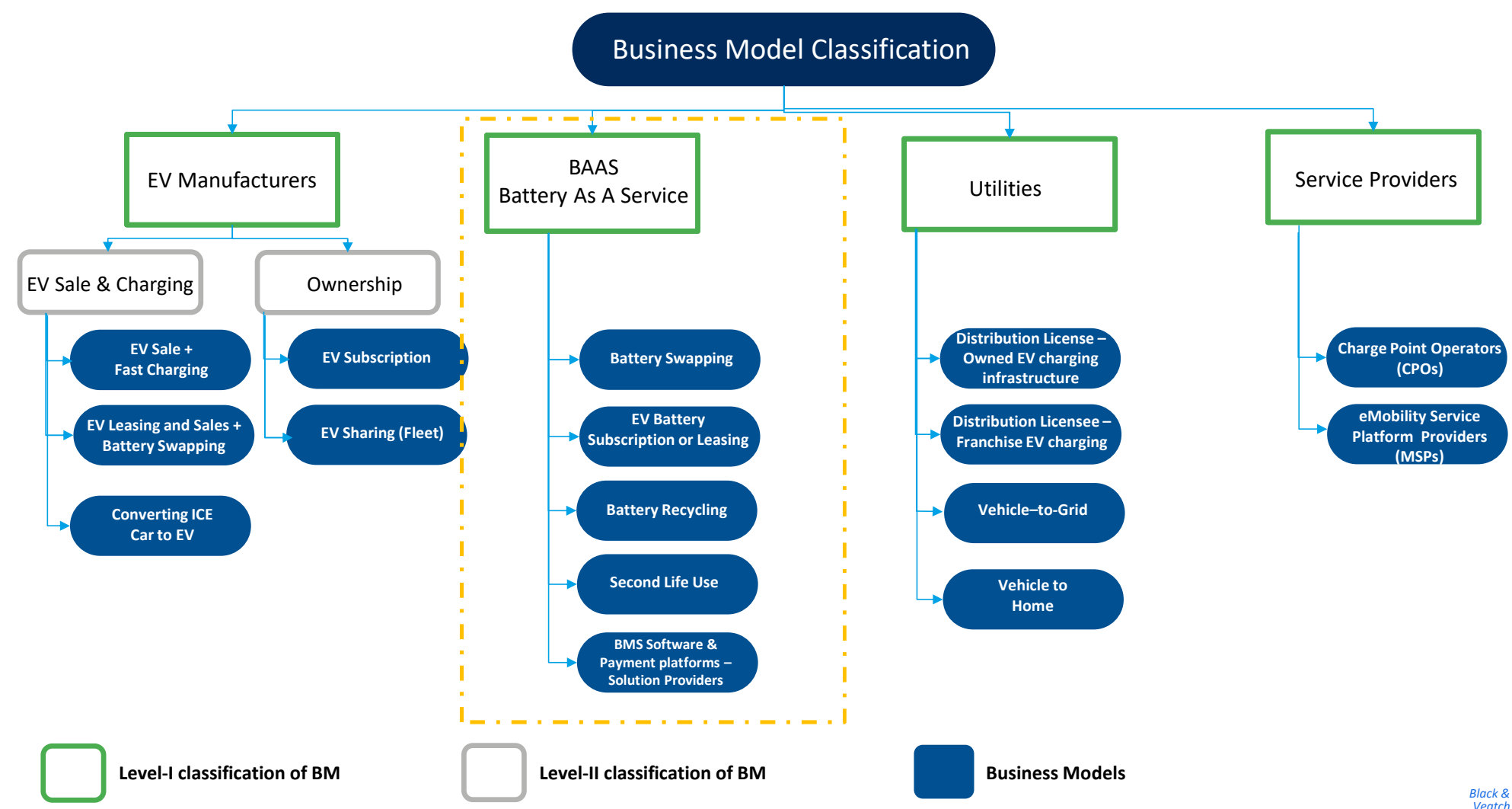
Emerging EV Business Value Chain



New Flows of Value



Classification of EV Business Models



Business Model (continued.)

Current

- EV Sale + Fast Charging
- EV Subscription
- EV Leasing and Sales + Battery Swapping
- Battery Swapping
- Converting ICE Car to EV
- Charge Point Operators (CPOs)
- Distribution License – Owned EV infrastructure
- eMobility Service Providers (MSPs)
- Distribution Licensee – Franchise EV charging

Upcoming

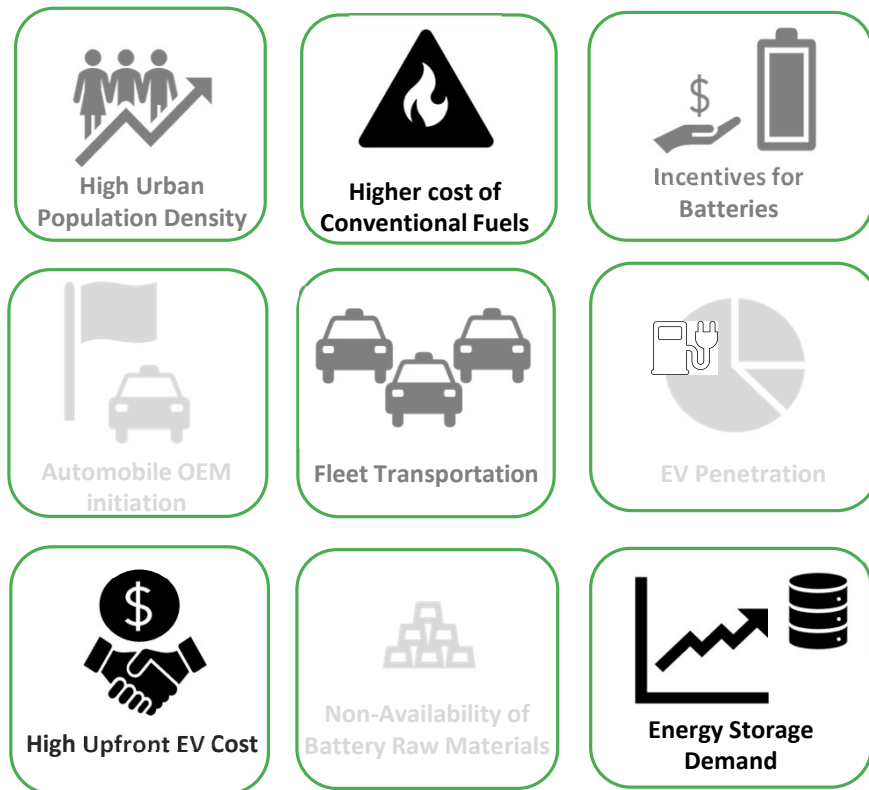
- EV Sharing (Fleet)
- Second Life Use
- EV Battery Subscription or Leasing
- Battery Recycling
- BMS Software & Payment platforms – Solution Providers

Futuristic

- Vehicle-to-Grid
- Vehicle-to-Home
- Grid Modernization & Services

Indonesia – Business Model Opportunities

Business Model Drivers



■ Strong ■ Moderate ■ Low

• Promising: Battery Swapping Model

- High urban density in Java Island (Jakarta specifically)
- B2B consumers like e-trikes, fleet operation (2W, 3W & 4W), food delivery and last mile delivery business in this area

Other models:

• Battery Recycling

- As per PR 55/2019 on the Acceleration of Battery Electric Vehicle Program and Environmental Protection, Indonesia government plans to incentive and regulate battery industry

• EV/Battery Subscription:

- Lack of OEM initiation
- Customer's expectation of hassle free EV maintenance will give boost to EV/Battery subscription model.

• BM4: Battery Second Life

- Medium term: across archipelago, may be demand from greater DERs which utilize variable renewable energy as generation technology

• Battery Management System

- Current low penetration of Es means low market potential; revisit

• Fleet Based Grid Services, Distributed Storage, and Energy Arbitrage

- Grid Mod, Ancillary Services, and Energy Market Development(s)

How to electrify commercial fleets in 'Rest of Asia'?

1. Donor funded project with South East Asian conglomerate
2. Analyzing fleet electrification business cases and its implementation
3. Exploring electrification of three key areas:
 - Electrifying cement trucks to reduce GHG and PM2.5 emissions
 - Third-party owned logistics fleets that serve company
 - Third-party owned taxi fleets
4. Engaging development finance companies for further funding
5. Technology sourcing and project development



Useful Black & Veatch Resources

- [Electric Vehicle E-Book](#)
- [Transportation](#)

Black & Veatch: Decarbonizing Transportation

High-Powered Charging



Hydrogen Refueling



Renewable Energy



Battery Energy Storage

- 9,200+ professionals in 120+ offices
- HQ in USA; 50+ years across Asia
- \$3.3 billion in 2021 revenue
- Market potential assessment, strategy, feasibility, planning, design, engineering, permitting & constructing EV charging and H2 fueling at scale
- Renewables, energy storage integration and resilient microgrids
- Extensive industry & utility relationships

1,500+

EV Charging Sites
Deployed

100+
MW

Transit & Fleet
Charging
Engaged

150+

Behind-the-
Meter Battery
Installations

25,000
MW

Solar Capacity
Installed
*Black &
Veatch*

Building a World of Difference.®

Mr. Yatin Premchand

Managing Director

Global Advisory, Black & Veatch

M : +65 9147 9575 | **E** : PremchandY@bv.com

LinkedIn | [Black & Veatch Global Advisory](#) | [Connect with me on LinkedIn.](#)