

Transition to Electric Cars: Importance of Charging Information

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01 Electric Vehicles (EVs) emerges as a Solution

KONA Electric Vehicle



43.00~46.50 million won
 400km
 204PS/150kW
 40.3kg·m/395N·m
 1,570,000won

Purchase price
 Driving distance
 Max. output
 Max. torque
 Fuel cost/year*

18.95~24.25 million won
 640km
 177PS/5,500Rpm
 27.0Kgm
 160,000won

KONA Gasoline Vehicle



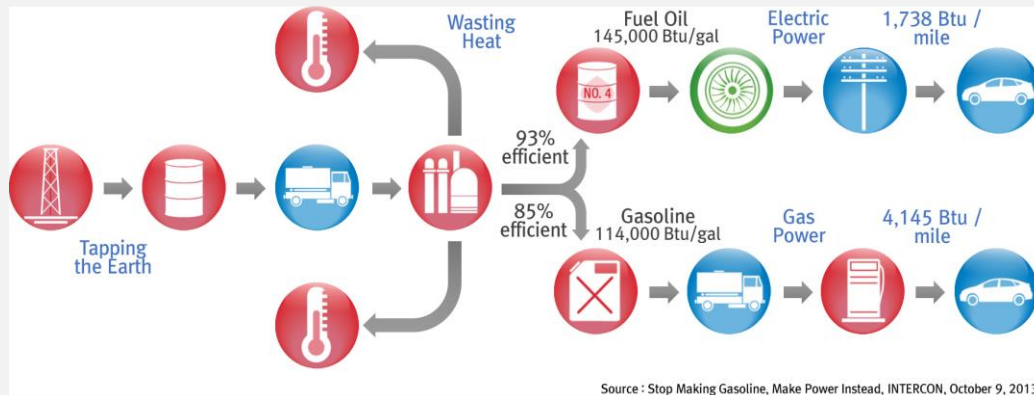
*Annual driving distance: 13,724km/year , Ref: Ministry of Environment (ev.or.kr/portal/chargerfee?pMENUST_ID=21629)

Positives

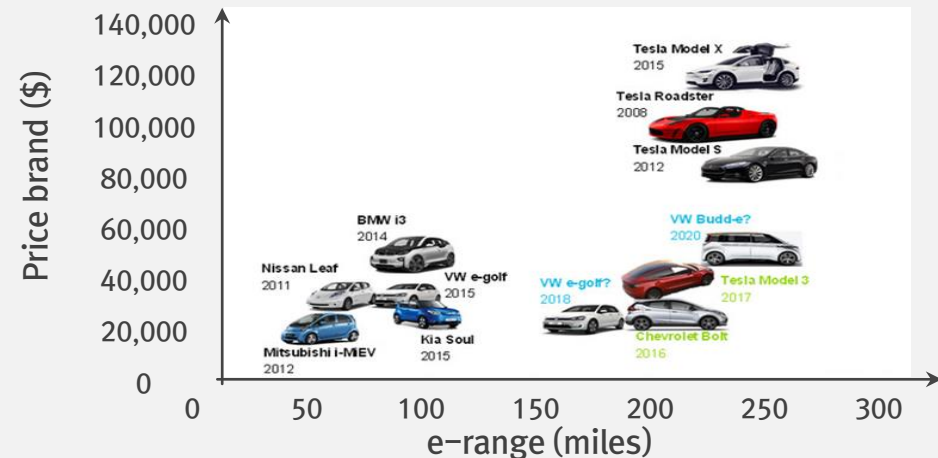
Environment, Cheaper operation cost,
 Less maintenance, Driving comfort

Negatives

Short range, Recharging inconvenience, High cost



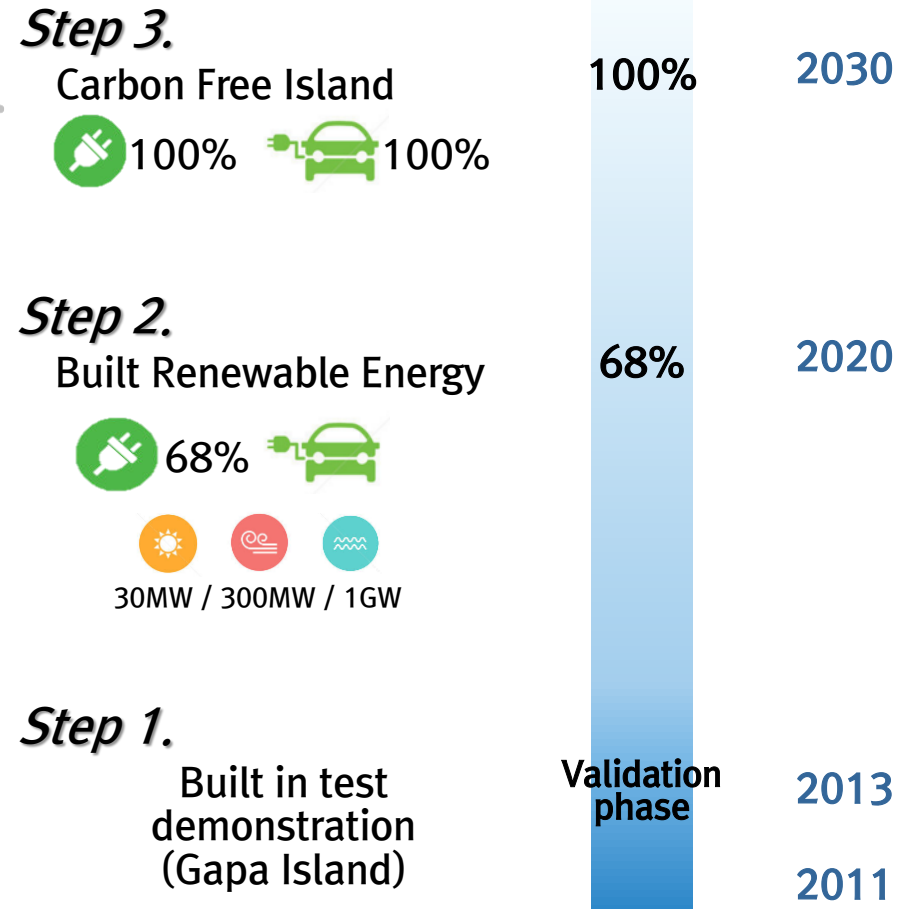
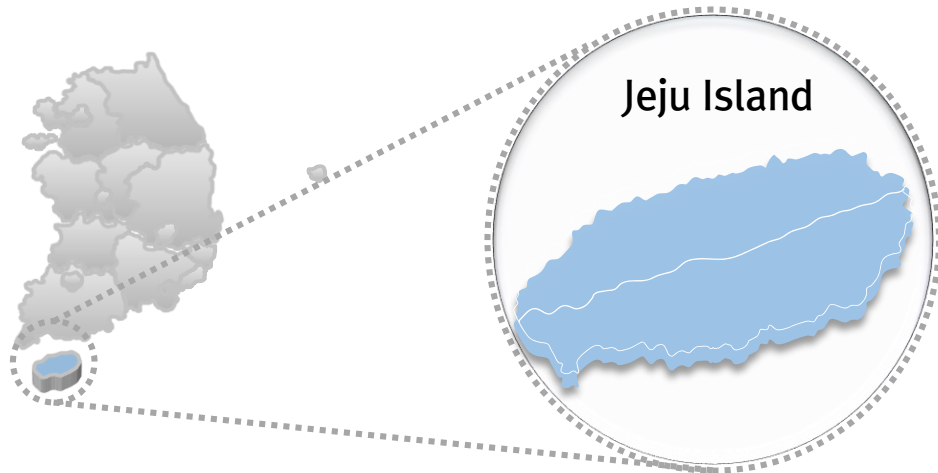
Source : Stop Making Gasoline, Make Power Instead, INTERCON, October 9, 2013



Source : Bloomberg, NEW ENERGY FINANCE

02 Jeju Island as a Living Lab

Carbon Free Island Jeju by 2030



Source : www.sdistory.com

03 Incentives for EVs in Jeju island

Incentives for EV owners (On Jeju Island as of 2015)

	Division	Description	Incentive for EV	Incentive Provider
Tax incentives	Individual consumption tax (a)	· 5% of vehicle factory price	Max. 2 million KRW reduction	National government
	Education tax (b)	· 30% of (a)	Max. 0.6 million KRW reduction	National government
	Acquisition tax	· 7% of [vehicle factory price + (a) + (b)]	Max. 1.4 million KRW reduction	National government
	Public bond	· 9~20% of [vehicle factory price + (a) + (b)]	Max. 0.2 million KRW reduction	National government
	Annual vehicle tax (c)	· 80~200 KRW/cc	Credit of 10 million KRW	National government
	Annual education tax	· 30% of (c)	Charged 3 million KRW**	National government
Other incentives	Public parking lot fee	· 5 thousand~10 thousand KRW per day	Exempt	Local government
	In-home charger installation fee	· Supports for EV wall charger installation cost	Max. 6 million KRW reduction	National and Local government
	EV purchase subsidy	· Supports up to 50% of the price difference between EVs and ICEVs	Max. 22 million KRW reduction	National and Local government
	Battery warranty	· Battery warranty period varies by automobile company	Max. 14 million km	Automobile company
	Refueling /Charge cost	· A different rate is charged depending on the charging time and season of the year (e.g., light load in summer: 57.6 KRW/kwh, maximum load in winter: 190.8 KRW/kwh)	EV rate system	National government

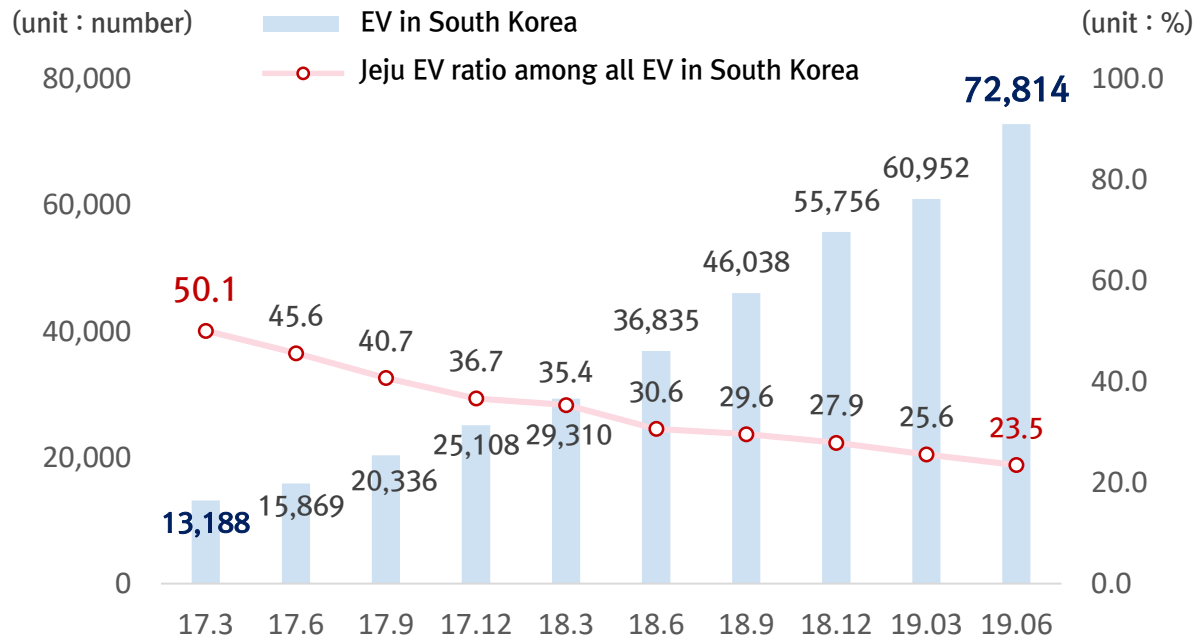
* 1.1 thousand Korean won (KRW) is equivalent for 1 US dollar in 2017

** The same amount of tax is charged regardless of the vehicle type

04 Promotion of Electric Vehicles

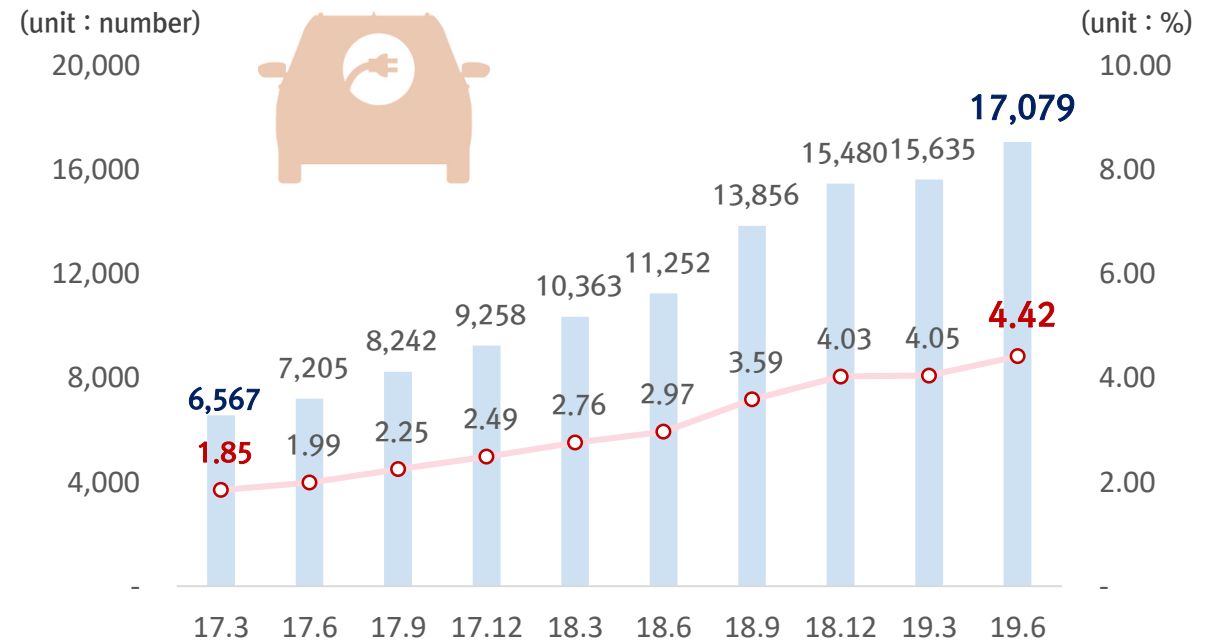
● Increasing market share of EVs

Electric Vehicles in South Korea



Source : MOLIT Statistics

Electric Vehicles in Jeju Island



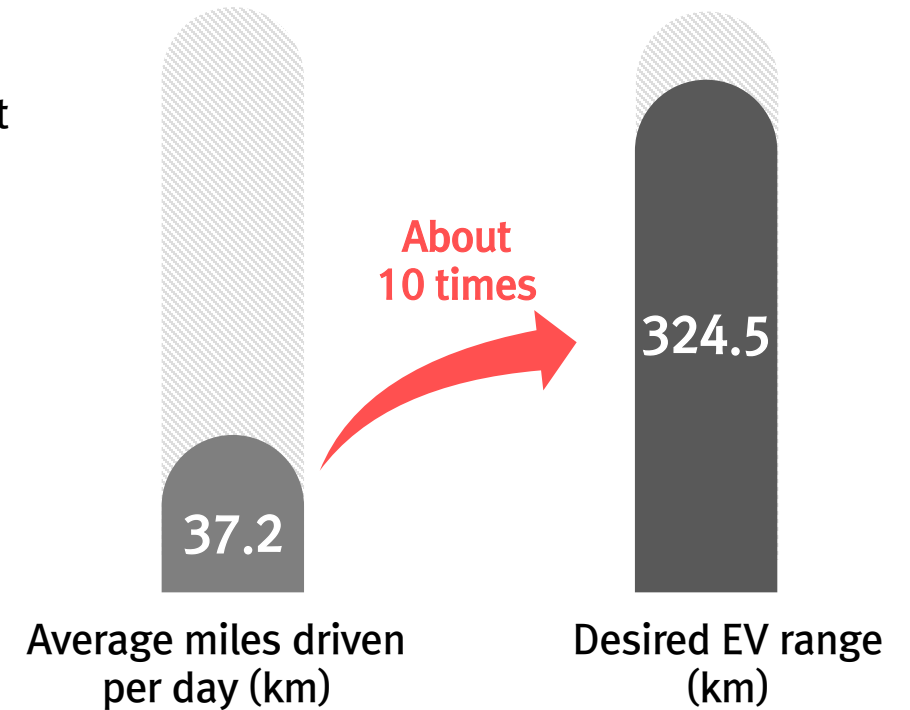
Source : Jeju EV Monthly Report

05 Range Anxiety Still Exists

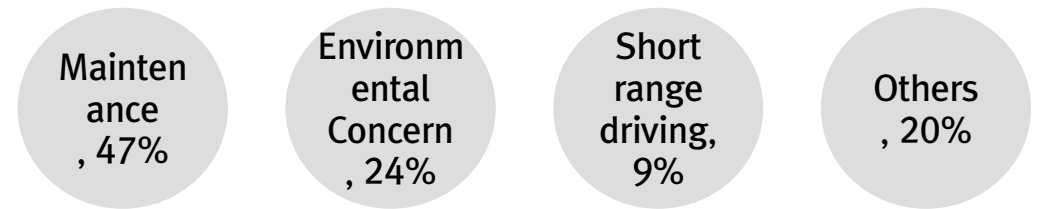
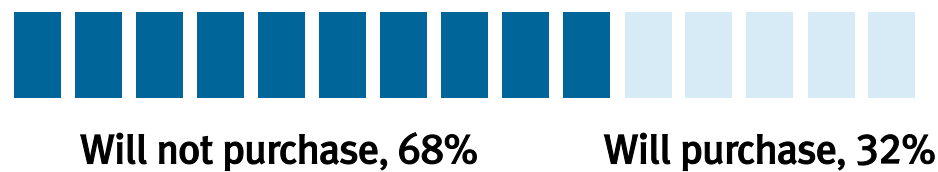
● Range Anxiety

Worry on the part of a person driving an EV that the battery will run out of power before the destination or a suitable charging point is reached

Distance/range (km)	Average miles driven per day (%)	Desired EV range (%)
Less than 40km	70.1	1.1
41 – 80km	21.9	1.1
81 – 120km	5.8	9.7
120km over	2.2	88.1



- Willingness to purchase an electric vehicle when its range is below the expectation

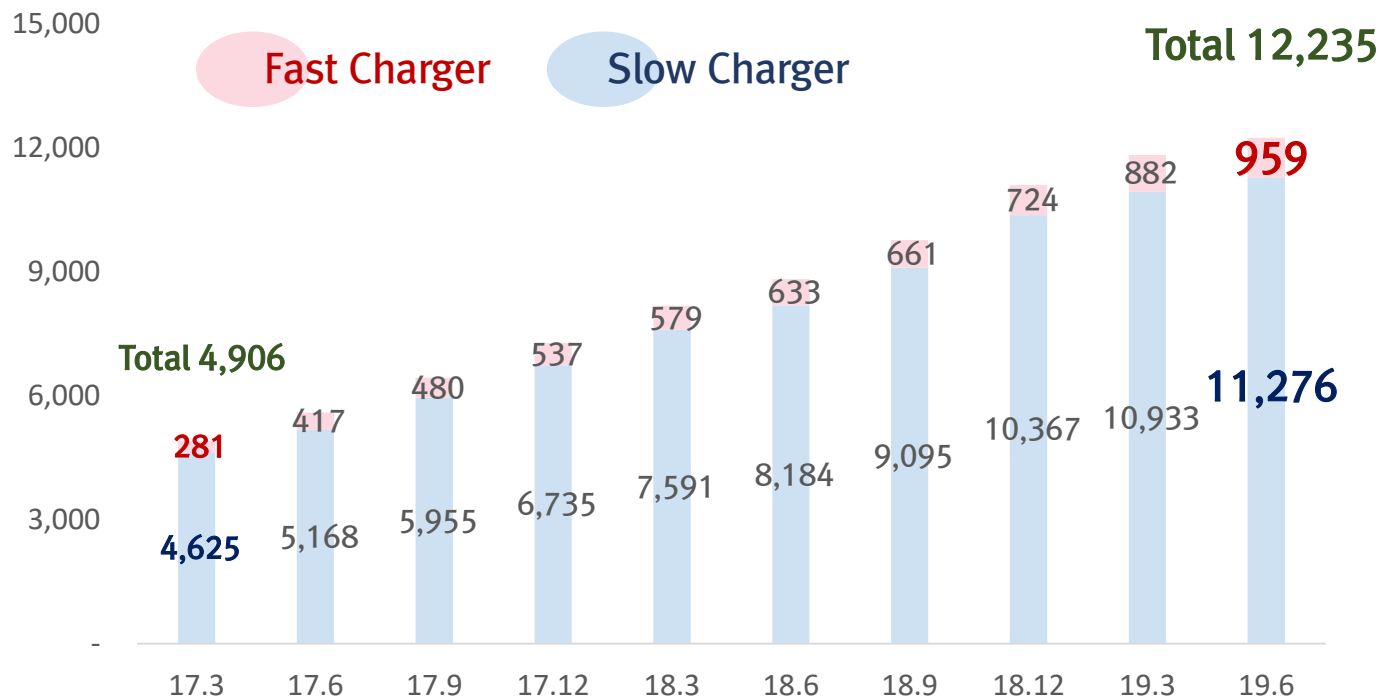


06 Users Complain Charging Inconvenience

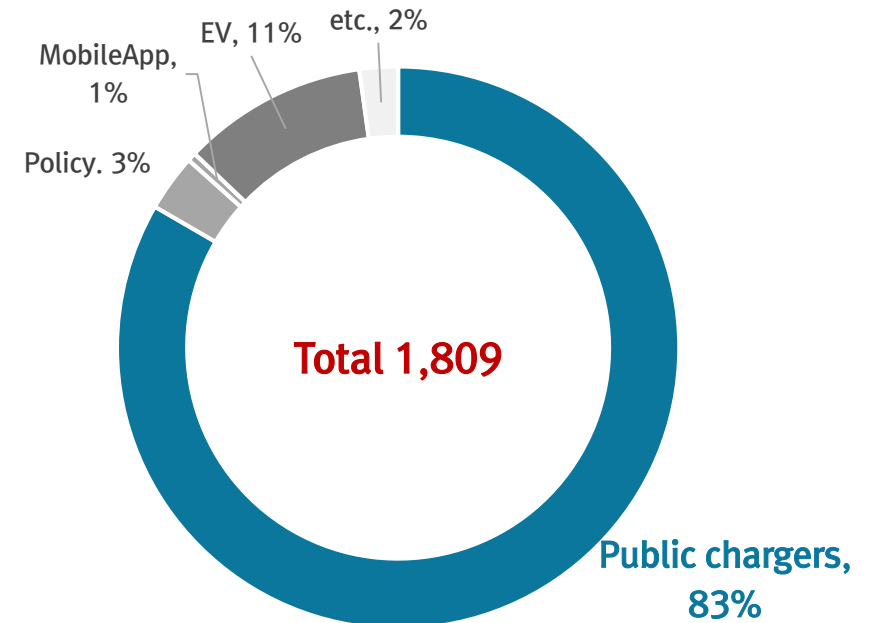
● 1.39 vehicles per charger in Jeju island (6.6 chargers/km²) but...

EV users still complain about charging (83% of total complaints)

EV Charger Status (unit : machine)



2019. 06 EV Call Center Status (unit: case)



Source : Jeju EV Monthly Report

07 User Satisfaction Shows...

● Charging Time

- is the greatest negative factor when people purchase EVs.
- EV customers are willing to pay about 400 USD for every 1 minute saving during their ownership.

- Source: Kwon, Y., Son, S., & Jang, K. (2018). Evaluation of incentive policies for electric vehicles: An experimental study on Jeju Island. *Transportation Research Part A: Policy and Practice*, 116, 404–412

● Charging Satisfaction

- is a key factor to re-purchase or recommendation
- If EV owners satisfy their charging experiences, their overall satisfaction about EVs also enhances.

- Source: Kwon, Y., Son, S., & Jang, K. (2020). User satisfaction with battery electric vehicles in South Korea. *Transportation Research Part D: Transport and Environment*, 82



Why are EV users dissatisfied with charging?

08 What We Have Learned...

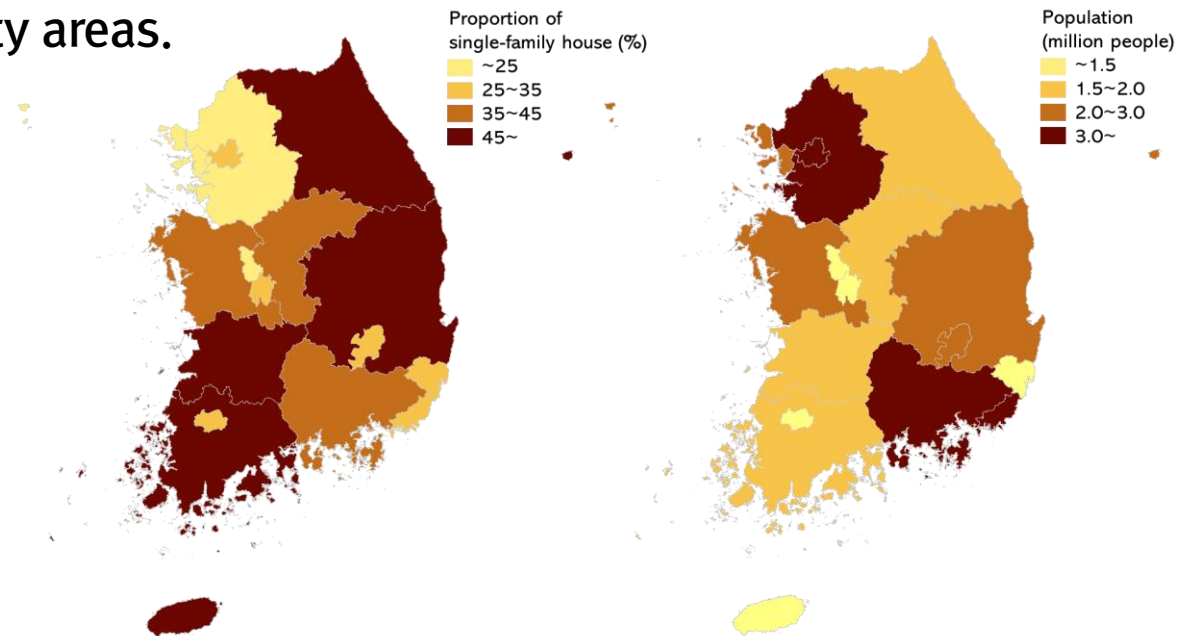
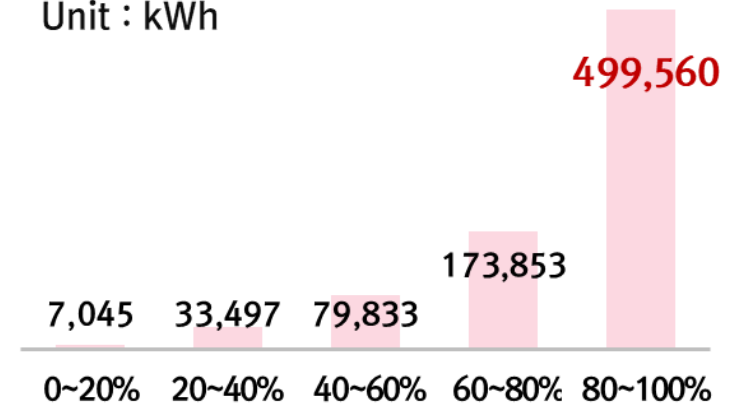
● Concentrated Charging Demand

- 20% of public charging stations supply 63% of charging demand.
- Queues for charging often form.

● Installing private chargers is more difficult in city areas.

- Fewer single-family housing in urban areas.

Unit : kWh



09 What We Have Learned...

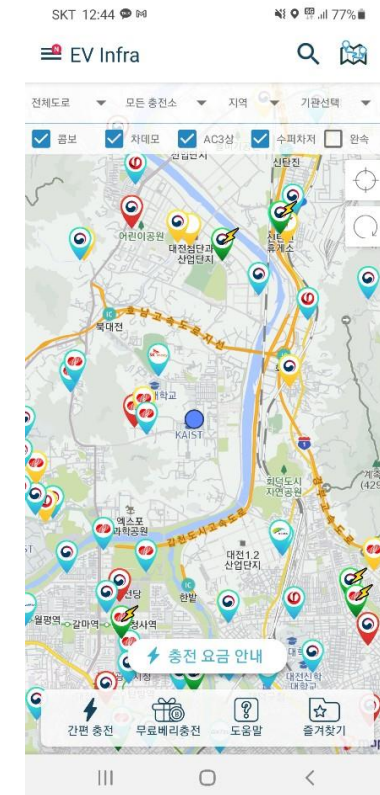
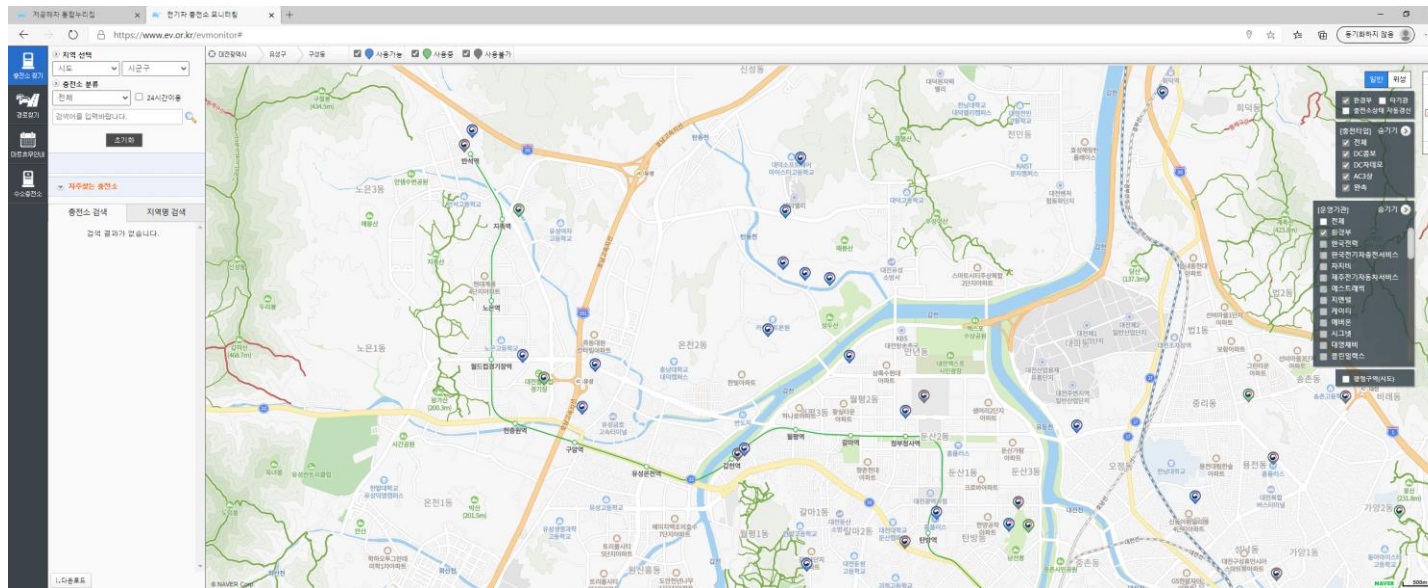
● Need for Better Use of (Slow) Private Chargers

- Many private chargers were distributed but a single vehicle can use

→ Policy to share the use of private EV chargers.

● Better Information on Charging Availability is Essential

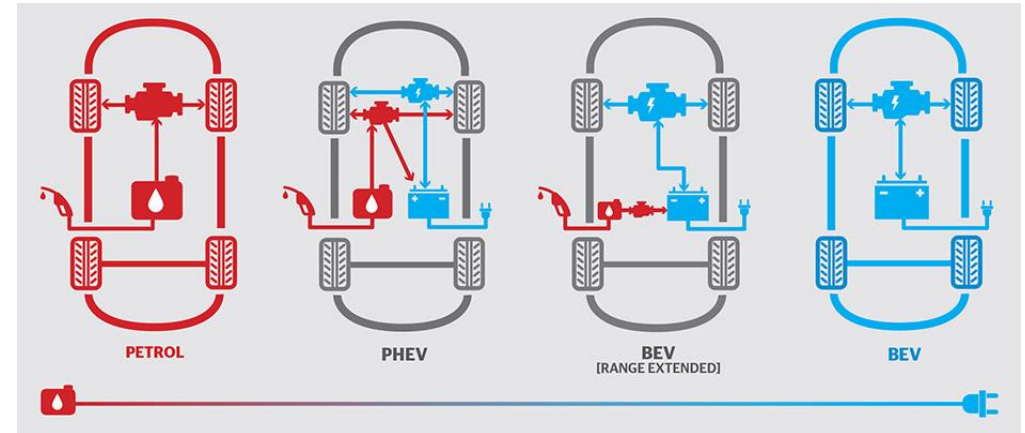
- A large portion of complaints are about the location and availability of chargers.



10 What We Have Learned...

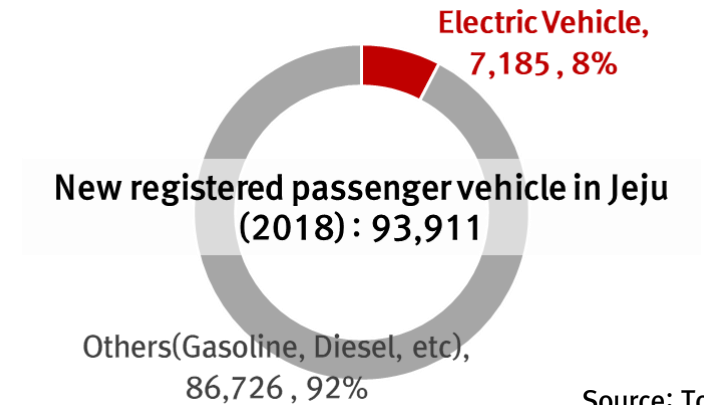
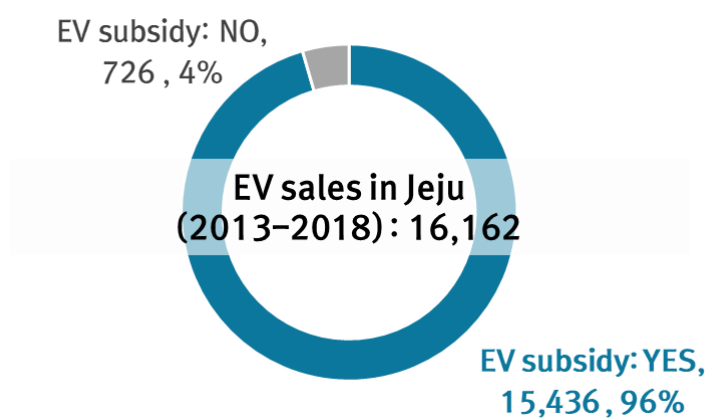
● Diversify Electrification Strategy

- Substitute 20% of ICEVs for EVs = Hybridize 20% of Powertrain
- Hybrid EVs may be a realistic solution for now.



Source: <https://www.consumer.org.nz/articles/a-guide-to-electric-vehicles>

● Transition to Clean(er) Cars is Sluggish → Need Diversification.



Source: Total Registered Motor Vehicles, MOLIT

Thank you

