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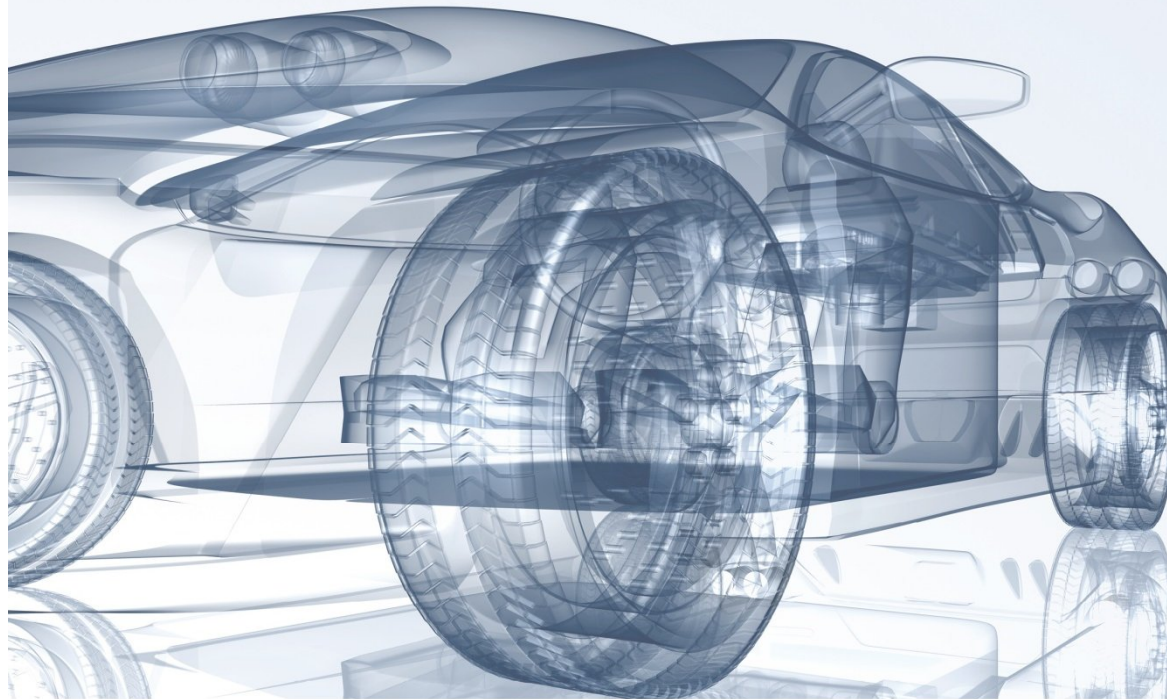
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A Booming Development of Electric Scooters in Taiwan

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Outline



- Why –Taiwan Needs Electric Scooters
- The Status of Electric Scooters in Taiwan
- Why- Taiwan Needs Public E-Scooter Sharing
- Energy Supply Methods for E-Scooter Sharing
- Public E-Scooter Sharing in Taipei City
- A New Concept of Energy Supply for Public E-Scooter Sharing
- Conclusion

Why –Taiwan needs Electric Scooters



- 15 million gasoline-engine motorcycles
- Driving range of all usage is under 17 km/day
- Well-developed Lithium-ion battery technology

Analysis of light motorcycles usage		
Main usage	%	Daily driving range (km/day)
Commute	50%	14.7
Shopping	16.9%	6.2
Business	8.9%	13.1
picking up	8.8%	7.4
Go to school	7.4%	16.1
Others	8%	13.3



The Status of Electric Scooters in Taiwan



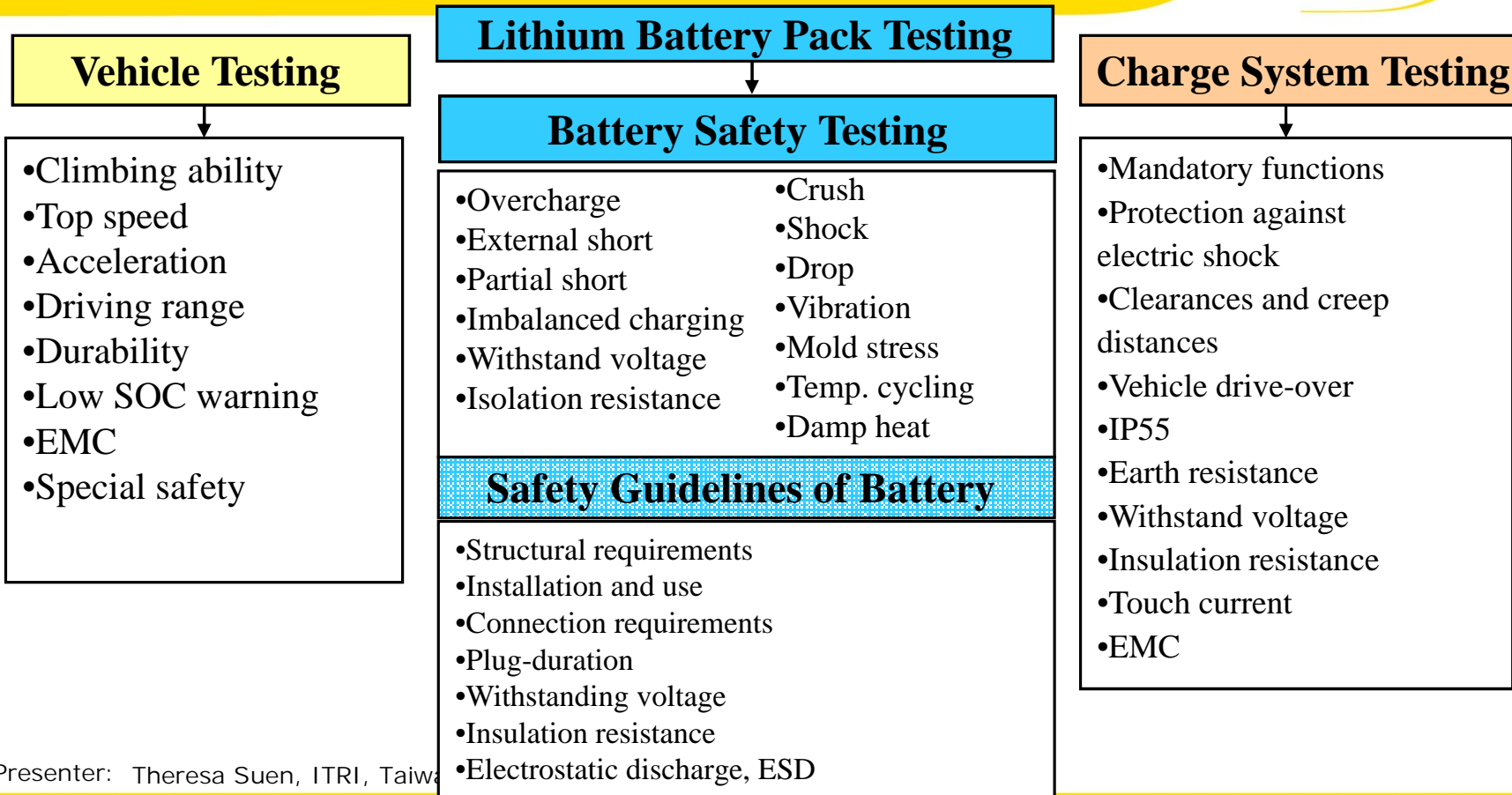
- Taiwan Electric Scooter Standard (TES)
- Subsidization Policy
- TES Certified Manufacturers and Vehicle models
- Sales Profile
- Business Models-B to C
- Business Models-B to B

Taiwan Electric Scooter Standard (TES)



Test Items	Methods	Criteria category (Heavy / Light / Small light)	
Vehicle	Climbing ability	CNS15819-1	Over 10kph on 30% slope / 18% slope/ 12% slope
	Top speed	CNS15819-2	Over 75kph/ 45kph/ 25kph
	Acceleration	CNS15819-3	0~100 meters, shall be less than 9 sec./0~100 meters, shall be less than 12 sec./ 0~50 meters, shall be less than 9 sec.
	Driving range	CNS15819-4	Over 75km/30km/30km of driving range under specific driving pattern
	Durability	CNS15819-5	Accumulate mileage over 3,500km/ 3,500km/ 2,300km without Class A Fault during the test
	Low SOC warning	CNS15819-6	Remaining mileage not less than 2km or the declared value after warning of low state of charge.
	EMC	CNS15819-7	With reference to CNS15819-7
	Special safety	CNS15820-1 CNS15820-2 CNS15820-3	With reference to CNS15820-1 & CNS15820-2 & CNS15820-3
Lithium-ion battery	Safety guidelines	CNS15424-1 CNS15424-2	With reference to CNS15424-1 for detachable battery,CNS15425-2 for fixed battery
	Safety	CNS15387	With reference to CNS15387
	Weight		The weight of each detachable test battery shall not exceed 10kg.
Charging system	CNS15425-1 CNS15425-2	With reference to CNS1542-1 & CNS15425-2	

Testing of Taiwan Electric Scooter Standard (TES)



Subsidization Policy



Subjects: qualified manufacturers, electric scooters, and energy supply facilities.

Objects: citizen and enterprises

Categories	Subsidy	Extra subsidy for offshore islands use	Extra subsidy for domestic battery
Heavy E-scooter	US\$330	US\$530	US\$70
Light E-scooter	US\$330	US\$530	US\$70
Small light E- scooter	US\$230	US\$230	US\$70
Energy facilities	49% of cost, maximum US\$10,000/case		

TES Certified 9 Brands and 51 Vehicle Models



9 of Small Light E-scooter



32 of Light E-scooter



10 of Heavy E-scooter



TES Vehicle Sales Profile

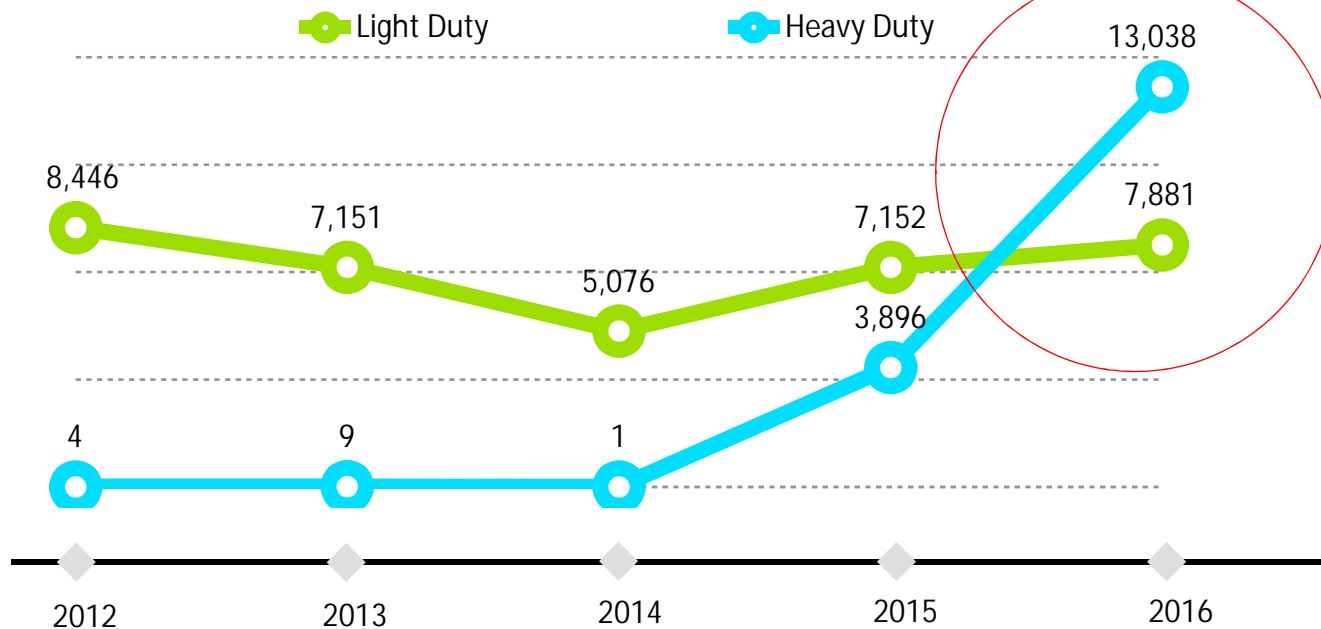


Presenter: Theresa Suen, ITRI, Taiwan

Gogoro



- July 2015, the first Smartscooter and battery swapping system infrastructure were launched
- 110km driving range; 90km/h max speed
- May 2017, the generation 2 of Smartscooter was launched
- Up to Sep. 2017, Light duty sale 3,781 (19%); Heavy duty sale 16,137 (81%)



Business Models-B to C Gogoro



- Buy an e-scooter and rent batteries from Gororo
- Pay subscription every month to swap batteries
- Batteries data upload to control center



E-scooter



Swapping Station

Business Models-B to B



Tourists renting business in offshore islands



Parking Patrol



Parcel delivery



Postal delivery



Food delivery

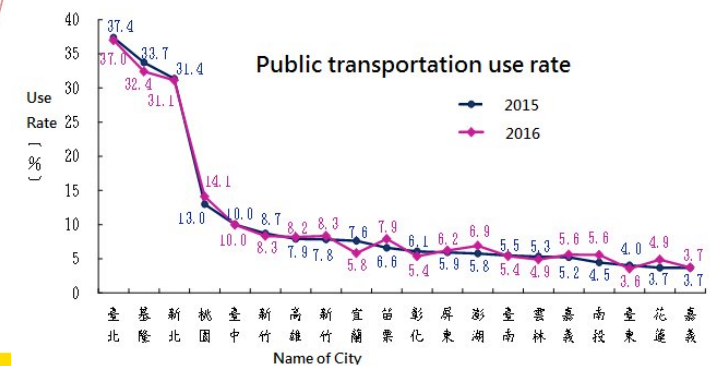
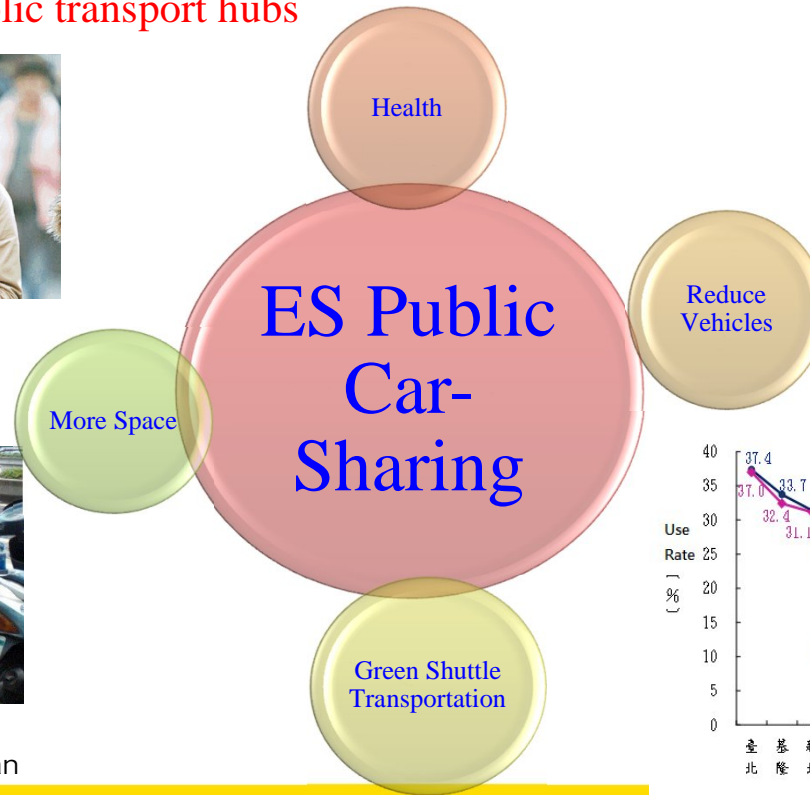


Environment Patrol

Why- Taiwan Needs Public E-Scooter Sharing



- Reduce air pollution
- Decrease traffic jam
- Shuttle transportation to public transport hubs



Presenter: Theresa Suen, ITRI, Taiwan

Energy Supply Methods for E-Scooter Sharing



- Plug the charging wire into vehicle by users after return



- Swap a full-charged battery by users before a ride



- Find the vehicle and exchange a full-charged battery by staff

Public E-Scooter sharing in Taipei City

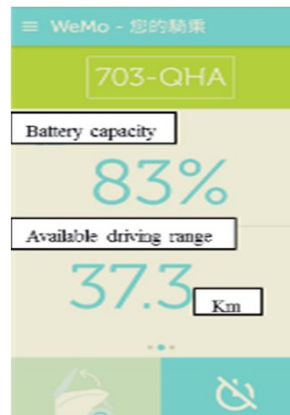


No fixed parking stations, exchange a full-charged battery by staff -WeMo

Use App service



Battery capacity and driving range show on the App



Spend time to find vehicles and exchange batteries in crowded space



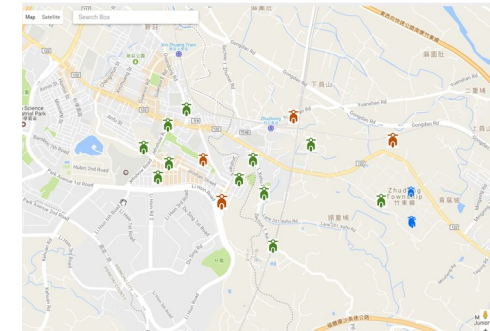
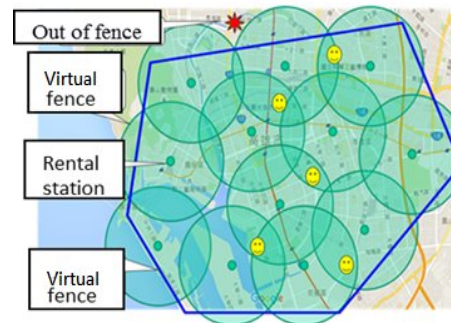
- 0.80 USD rental rate in the first 10 minutes, 0.08 USD per minute for additional drive time.
- This model is convenient for consumers overall
- Unregulated parking arrangement and parking violation fines are two big issues

A New Concept of Energy Supply for Public E-Scooter Sharing

Automatically clamping and charging -SwaGo



Virtual fence technology



- Charge any brand E-scooter as long as equipped with the same size of front wheel.

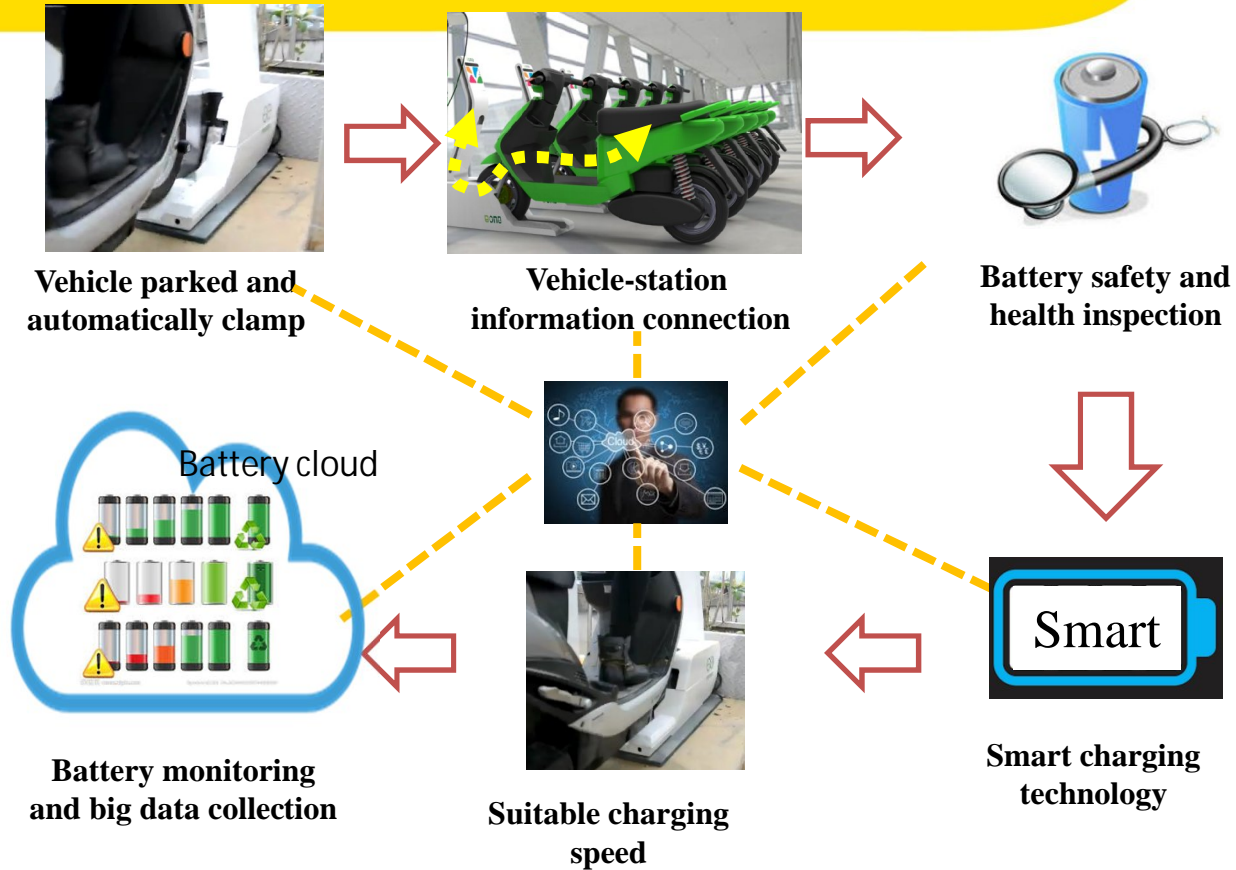
- Charging stations make cities neat and clean.

Monitor each battery and vehicle's status



The SwaGo is also available for B to C and B to B models.





Conclusion



- Monitoring by TES, the e-scooter has become a reliable and safe vehicle in Taiwan.
- The infrastructures of battery swapping and fast charging stations can satisfy shorter driving range of E-scooter.
- Automatically charging station of public e-scooter sharing model can reduce the number of vehicles and make cities neat and clean.

Conclusion



- A common charging standard for the electric scooter is under drafting
- A common swapping battery standard is also under drafting
- We do believe that the e-scooter industry in Taiwan will flourish in the future due to the strong cooperation between the enterprise and Taiwanese Government.

Thanks for your attention

