Enabling Battery Swapping* under FAME-II scheme

Chetan Maini and Ashok Jhunjhunwala

* Presentation limited to electric 2-wheeler / 3-wheeler and 4-wheeler

What is Battery Swapping?

- Electric vehicle purchased by customer without battery
  - Lower cost for customer: would get FAME to move faster
- An Energy Operator (EO) provides charged battery to the customer on demand at multiple outlets
  - Customer returns (nearly) discharged battery to EO and swaps in with a charged battery at one of these outlets
    - Customer pays for the energy used
  - EO charges discharged battery (typically using bulk chargers) and keeps it ready for next customer
    - No battery is married to one vehicle
      - Model similar to LPG gas cylinder

Advantages of Battery Swapping

- EV is purchased without battery (the costliest part of EV)
  - Customer makes no investment for battery, but pays as he / she uses it
  - Energy in battery is now purchased like energy in petrol
- Battery size used is small
  - Since customer can swap battery in 5 minutes and do not have to wait for charging, small batteries are ok
    - Smaller battery weight can make vehicle more energy-efficient
- Battery is used more
  - A customer may use vehicle only 30 kms in a day; but as battery is swapped and used by multiple vehicles, usage may be much higher (say 60 kms a day)
  - More efficient use of battery (an expensive resource with imported cells)
    - as battery is used more, life gets over quicker: tomorrow's battery less expensive and uses less material
      - battery costs fall because material used (higher Wh/kg cells) in them gets less over time

Subsidy-Proposal: Battery-swapping in FAME-II

- OEM to manufacture vehicle-models compatible with certain swappable batteries
  - will get the vehicle and the battery type approved as per prescribed / standard test procedure at the testing agency recognized by the MoRTH

- Registered EOs can purchase these type-approved swappable batteries and get demand-incentives as per FAME-II scheme
  - subsidy for two-wheeler batteries to count against two-wheeler subsidy
    - Similarly three-wheeler swappable batteries against three-wheeler subsidy
  - subsidy to be passed to the end-user in the form of reduced swapping-fees (charges per kWh for using battery)

Monitor any misuse of subsidised batteries

- Enable subsidised battery-usage strictly for EVs
  - EO must share with DHI (on its web portal) the usage of swappable batteries for 3 years
    - Usage information: Vehicle type, Battery ID, City, Vehicle Identity and km travelled for every swap
    - PISC to regularly audit the usage (using AI tools) to find any mis-use of battery
      - Can also check is vehicle was purchased without battery
    - Subsidised battery to be regularly used in EVs and at least 25000 kms in three years: else penalty
- Minimum Range Criteria in FAME-notification should be appropriately modified