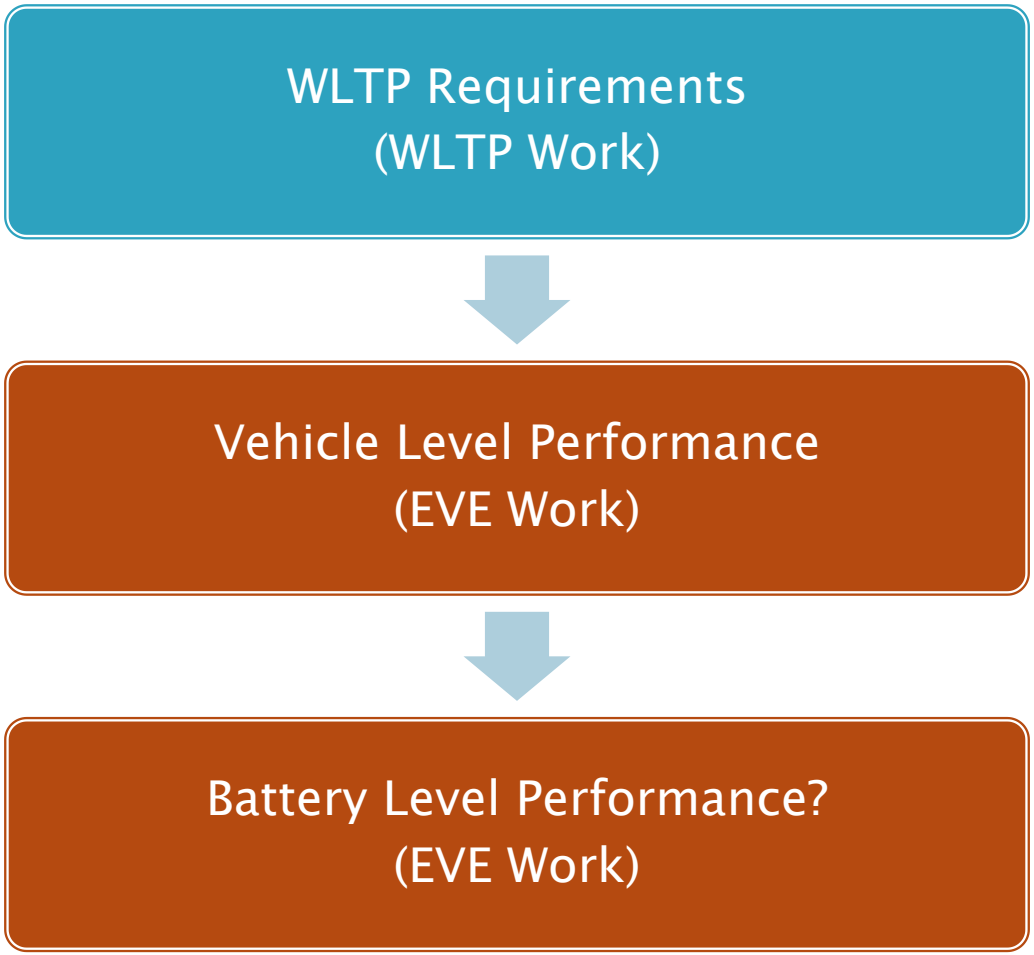
Potential Primary Durability Work Items for EVE Phase B

EVE Secretariat

Hierarchy of data requirements



Key information needs for EV durability

Vehicle Architecture	Criteria Pollutants	CO_2 / Energy Consumption	Range
HEV	???	???	X
PHEV	???	???	???
PEV	X	???	???

Key information needs for EV durability (U.S. as an example)

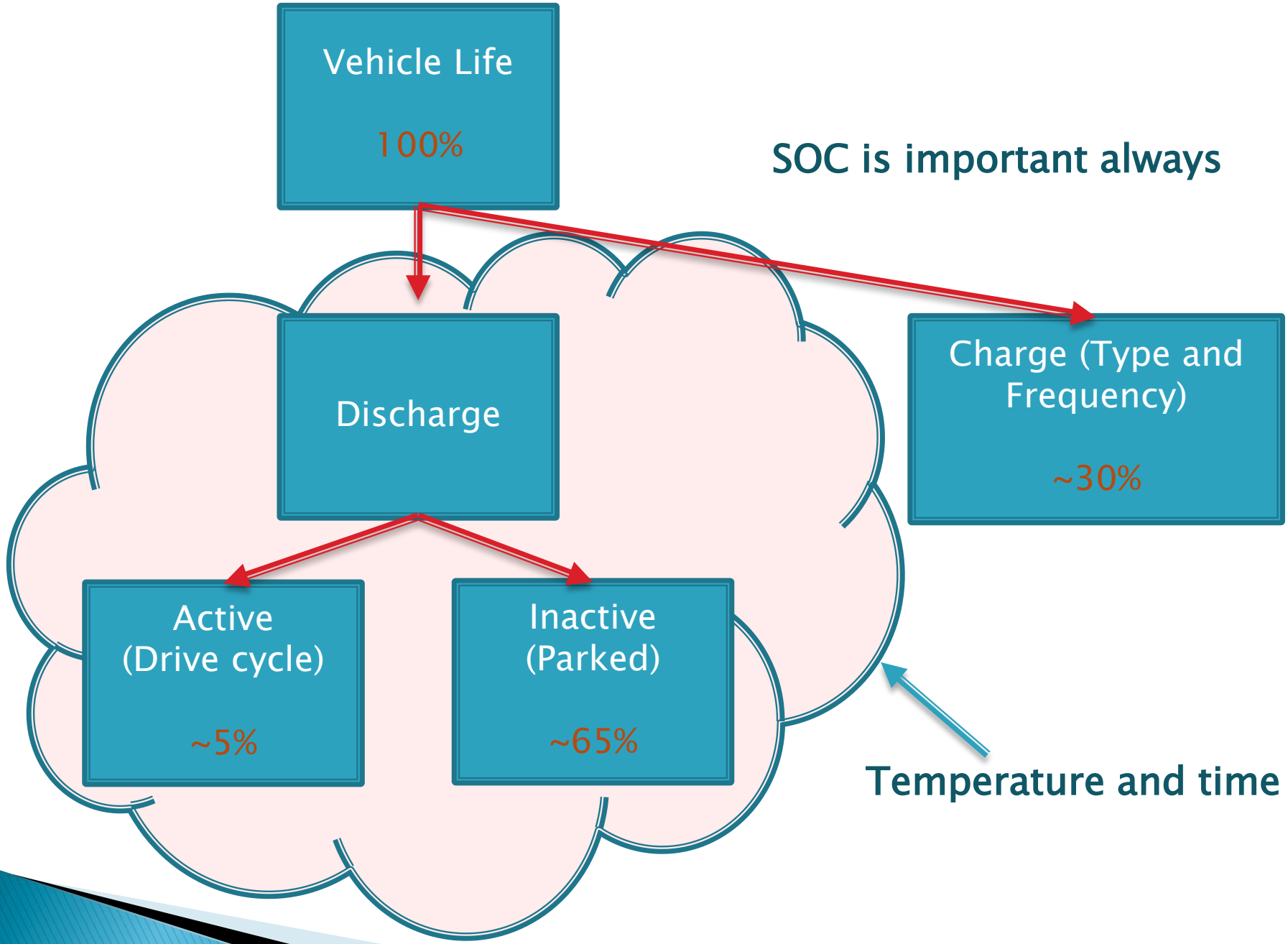
Vehicle Architecture	Criteria Pollutants	CO_2 / Energy Consumption	Range
HEV	@ 150,000 miles or 10 years, vehicle must meet std	+10% from cert value @ 125,000 miles or 10 years	X
PHEV	@ 150,000 miles or 10 years, vehicle must meet std	+10% from cert value @ 125,000 miles or 10 years	X
PEV	X	X	X

Factors affecting durability

- Discharge experience
- Charge experience
- State-of-charge (SOC)
- Battery temperature exposure
- Time (calendar ageing)

Factors affecting durability

- Discharge experience
  - Duty cycle choice? WLTC?
- Charge experience
  - Charge rates? Frequency?
- State-of-charge (SOC)
  - SOC during operation? SOC during inactivity?
- Battery temperature exposure
  - Temp during operation? Inactivity? Role of management system?
- Time (calendar ageing)
  - Vary with other parameters?


Vehicle Life
100%
SOC is important always
Discharge
Charge (Type and Frequency)
~30%
Active (Drive cycle)
~5%
Inactive (Parked)
~65%
Temperature and time

Key information needs for EV durability

Factor	Goal?	Data?	Source/Worker
Discharge experience	Representative driving activity/cycle	- Have data for conventional vehicles, is it appropriate for EV? - xEV driving data by region	- WLTP define drive/discharge profile/cycle - Impact of inactive time?
Charge experience	Impact of charging type & frequency	- Type and frequency of charging	EVE to investigate with support from manufacturers
State-of-charge (SOC)	- Impact of SOC during 3 life stage - Frequency of operation at various SOC levels?	SOC during - Charging - Operation - Inactivity	EVE to investigate with support from manufacturers

Key information needs for EV durability

Factor	Goal?	Data?	Data Source
Battery temperature exposure	Impact of temp during 3 life stages	- Temp during charging, operation & inactivity - Role of BMS - Temp data by region/country	EVE to investigate - Manufacturers provide BMS data/parameters - Contracting parties provide temp data
Time (calendar ageing)	- Impact of time - Agreement on % in slide 7	- calendar ageing - Info on degradation over time	EVE to investigate with support from manufacturers

Questions???