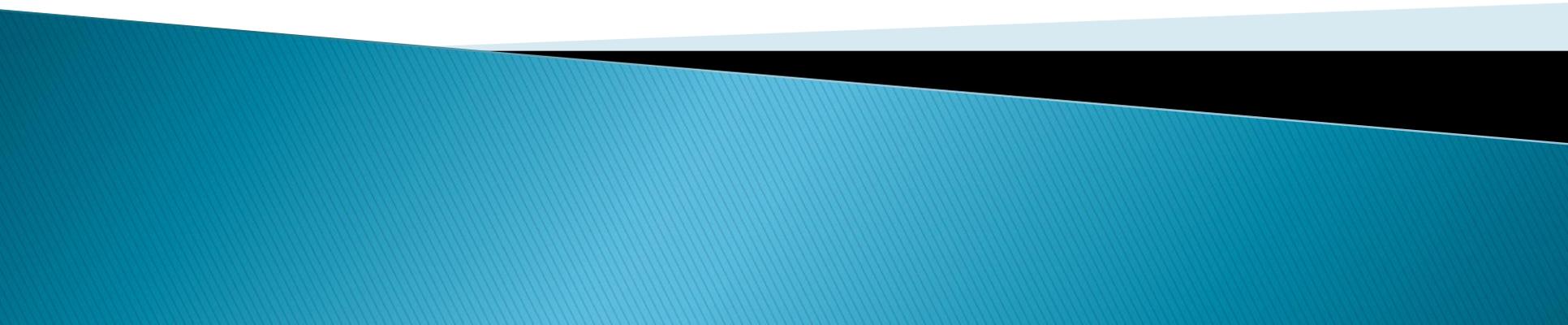
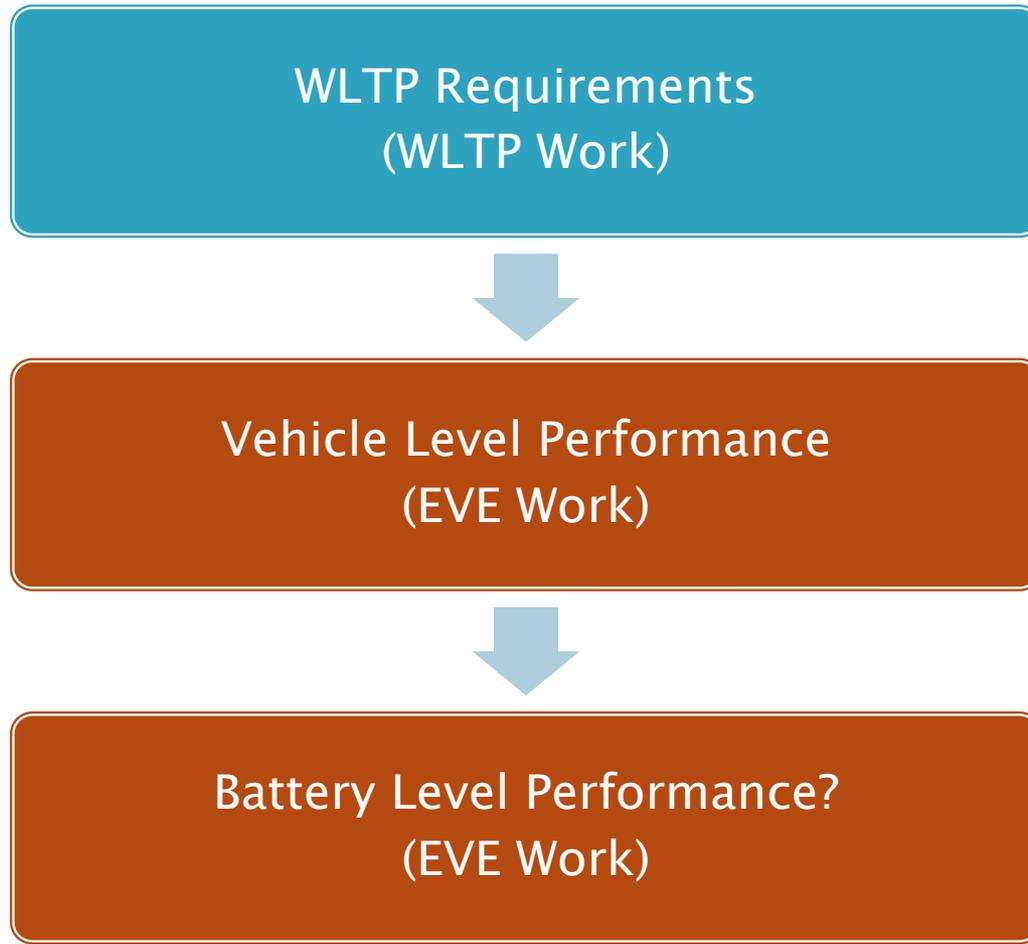


Potential Primary Durability Work Items for EVE Phase B

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

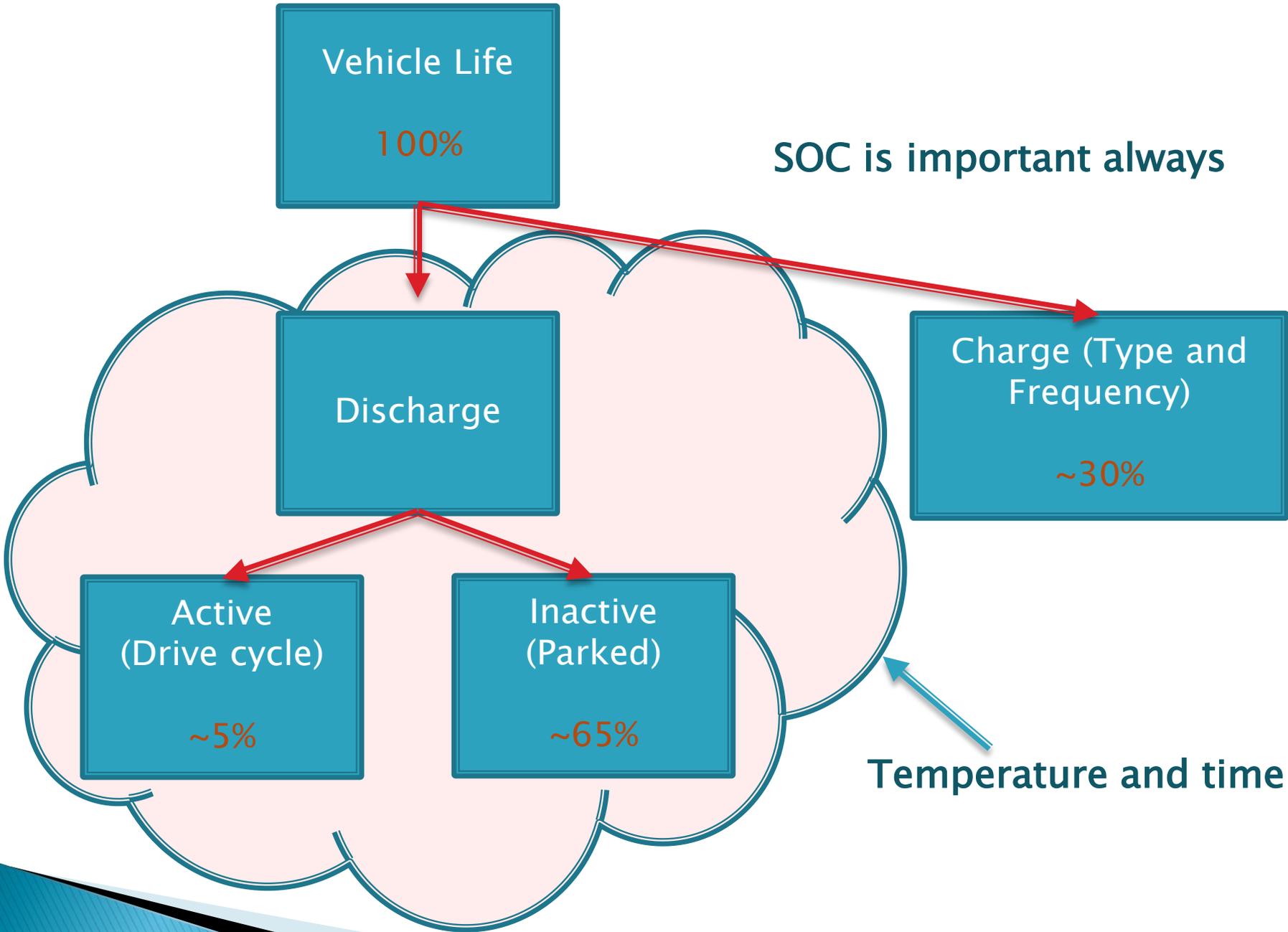
Discharge

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	<ul style="list-style-type: none"> – Have data for conventional vehicles, is it appropriate for EV? – xEV driving data by region 	<ul style="list-style-type: none"> – WLTP define drive/discharge profile/cycle – Impact of inactive time?
Charge experience	Impact of charging type & frequency	<ul style="list-style-type: none"> – Type and frequency of charging 	EVE to investigate with support from manufacturers
State-of-charge (SOC)	<ul style="list-style-type: none"> – Impact of SOC during 3 life stage – Frequency of operation at various SOC levels? 	SOC during <ul style="list-style-type: none"> – 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	<ul style="list-style-type: none">– Temp during charging, operation & inactivity– Role of BMS– Temp data by region/country	EVE to investigate <ul style="list-style-type: none">– Manufacturers provide BMS data/parameters– Contracting parties provide temp data
Time (calendar ageing)	<ul style="list-style-type: none">– Impact of time– Agreement on % in slide 7	<ul style="list-style-type: none">– calendar ageing– Info on degradation over time	EVE to investigate with support from manufacturers

Questions???

