



Project Alpha Phase II

2024-03-22
Redacted



Agenda

- Programme Update
- Vehicle & Motor Selection Alignment Discussion
- E-Motor Landscape Update
- Commercial Strategy
- Next Steps



Programme Update


- Tesla Secured
- Test Facility Shortlisted & Available
- Storage & Workshops Available





Predictions

Which vehicles & real-world use cases benefit most from multi-motor?

#	Prediction
1	MOST vehicles will benefit
2	High-performance vehicles will benefit more <i>(e.g. high-speed)</i>
3	 REDACTED
4	



Prediction 1:

MOST vehicles will benefit

Rationale:

- vehicles are designed for compromised applications
- single motors must deliver performance across entire operational envelope
- multiple motors can pull overall efficiency towards normal use

Reality: Most vehicles DID show a real benefit

REDACTED DATA



Prediction 2:

High-performance vehicles will benefit more (e.g. high-speed)

Rationale:

- The nominal efficiency is further from the actual use case

Reality: Higher performance vehicles DID show higher benefit

REDACTED DATA



Prediction 3:

REDACTED



Prediction 4:

REDACTED



Conclusion 1:

Benefits Extend Beyond Passenger Vehicles to Commercial Vans & Trucks

Conclusion 2:

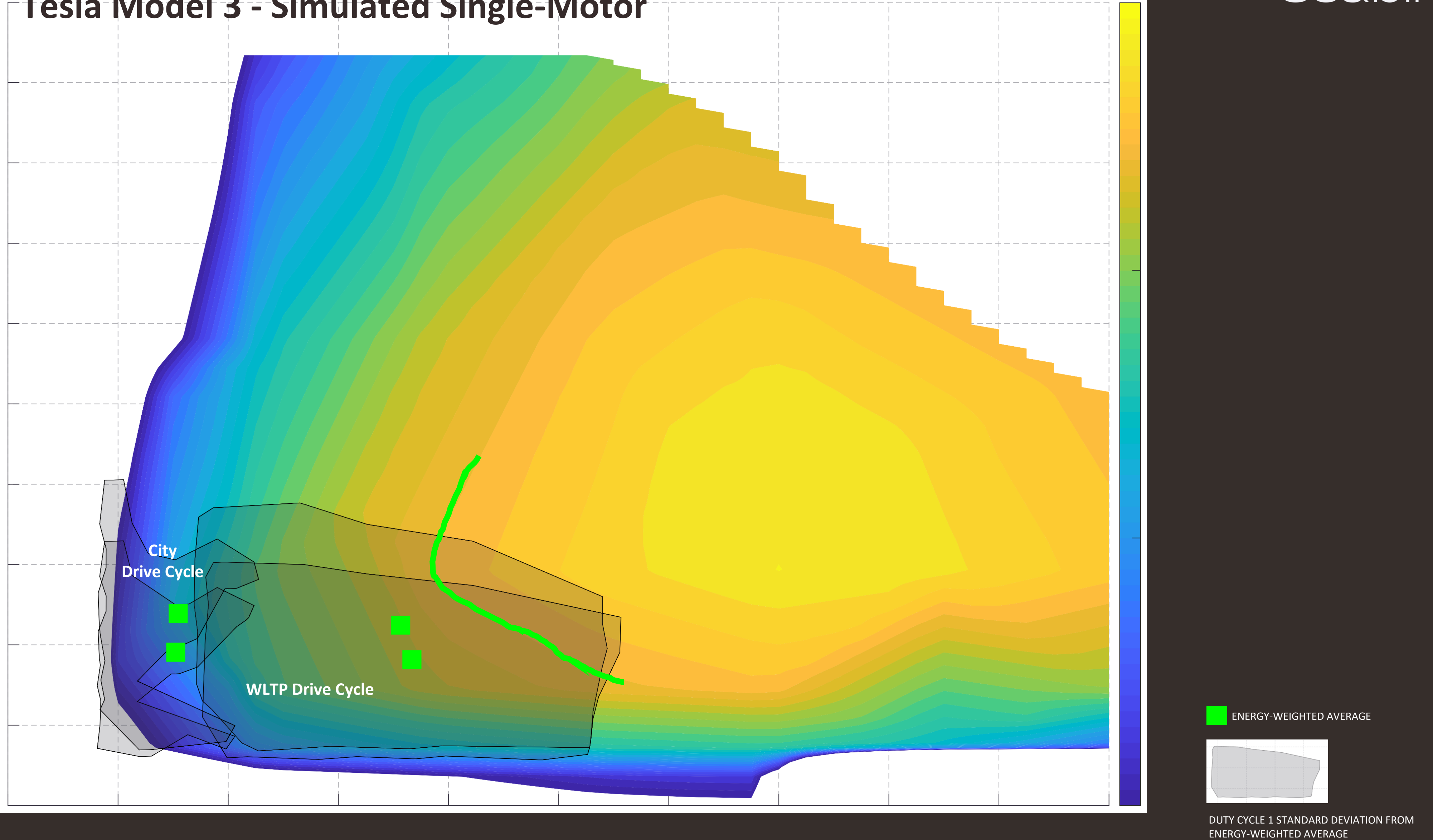
Three Potential Motor Selection Approaches:

1. Use two high-speed-optimized
 - 1x low-to medium torque
 - 1x high-torque
2. Partner with an OEM or motor supplier to develop new motor technology that is low-speed-optimized and can over-speed

3. **REDACTED**

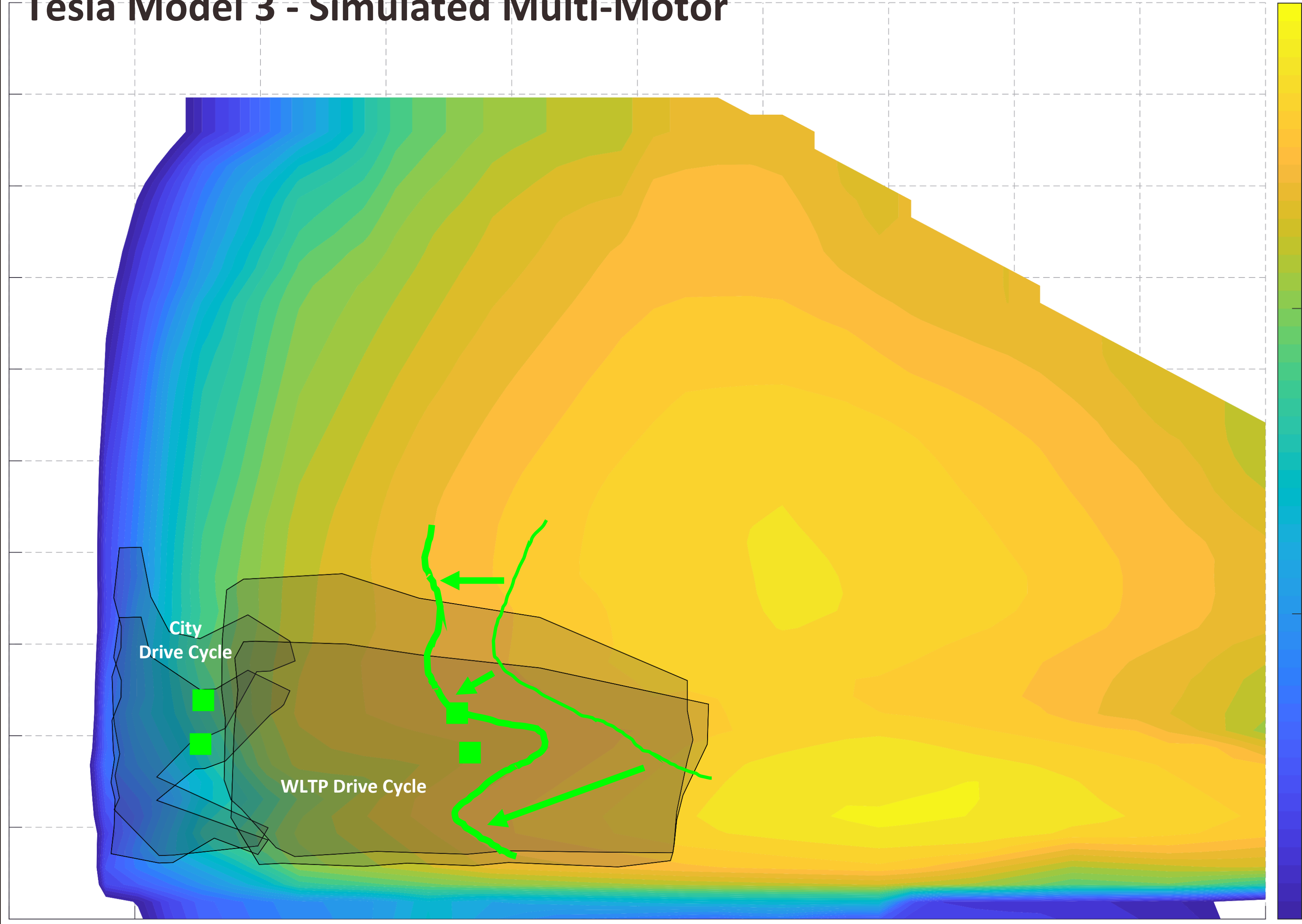


Tesla Model 3 - Simulated Single-Motor





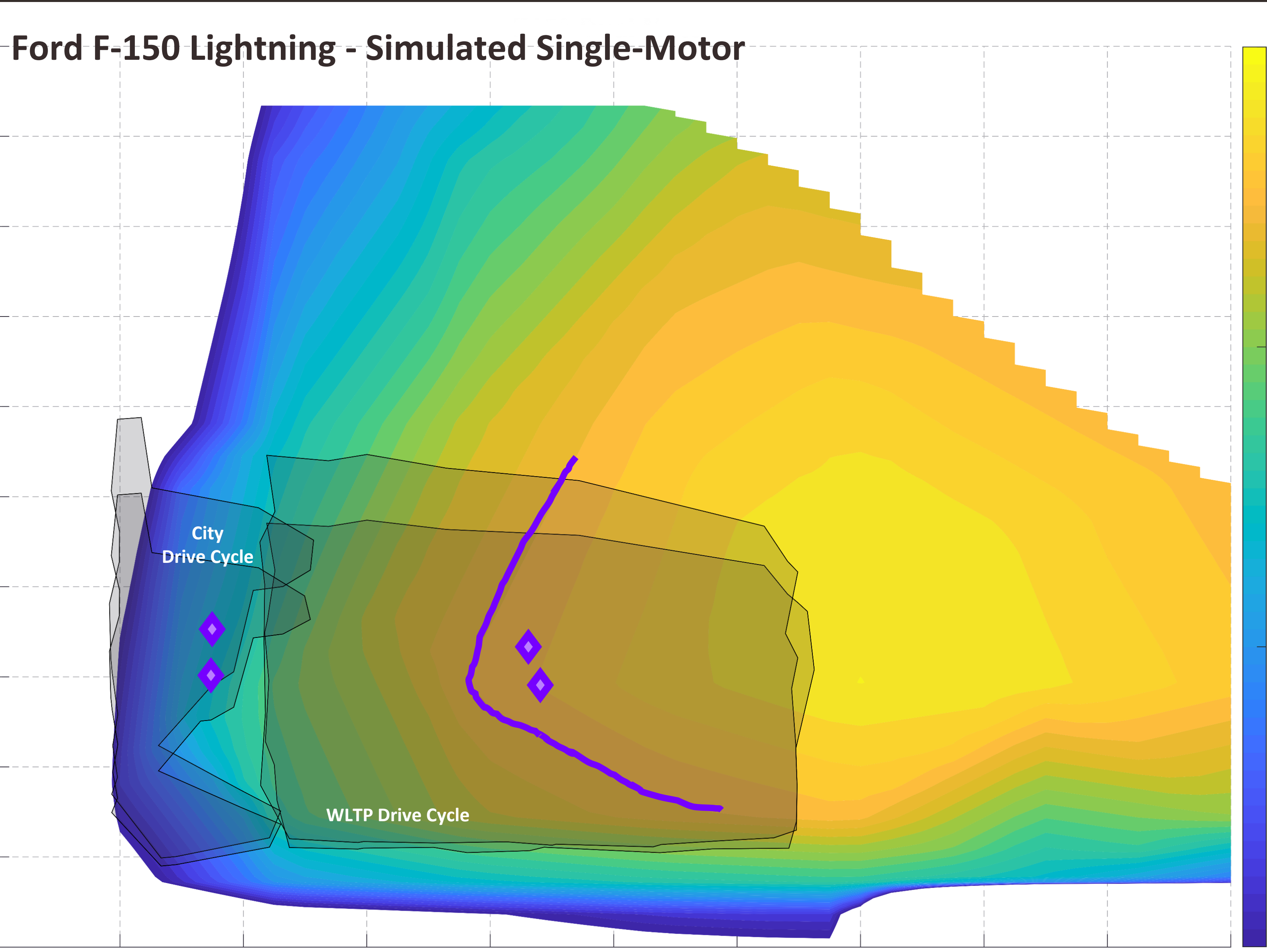
Tesla Model 3 - Simulated Multi-Motor



 ENERGY-WEIGHTED AVERAGE

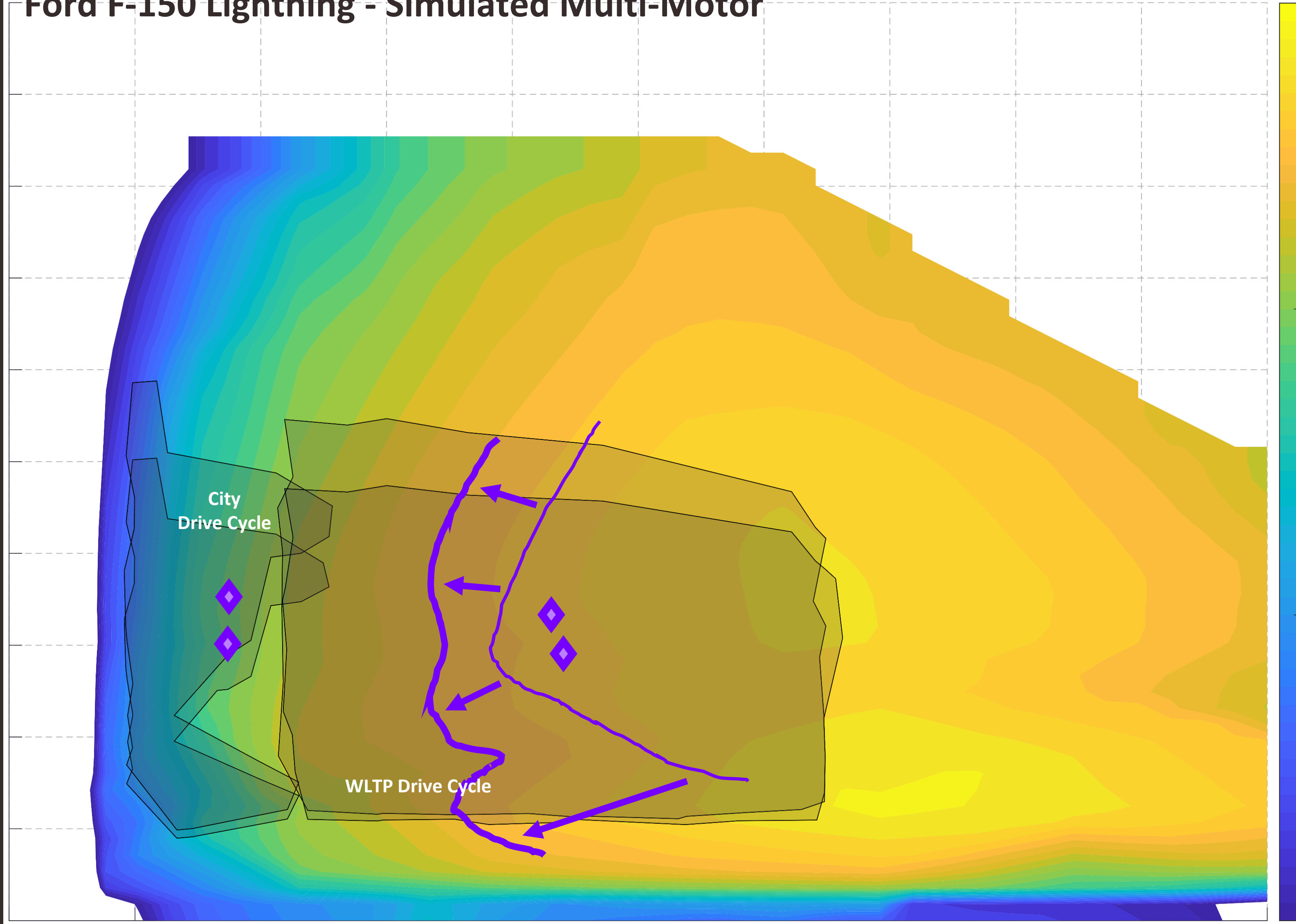


DUTY CYCLE 1 STANDARD DEVIATION FROM ENERGY-WEIGHTED AVERAGE





Ford F-150 Lightning - Simulated Multi-Motor



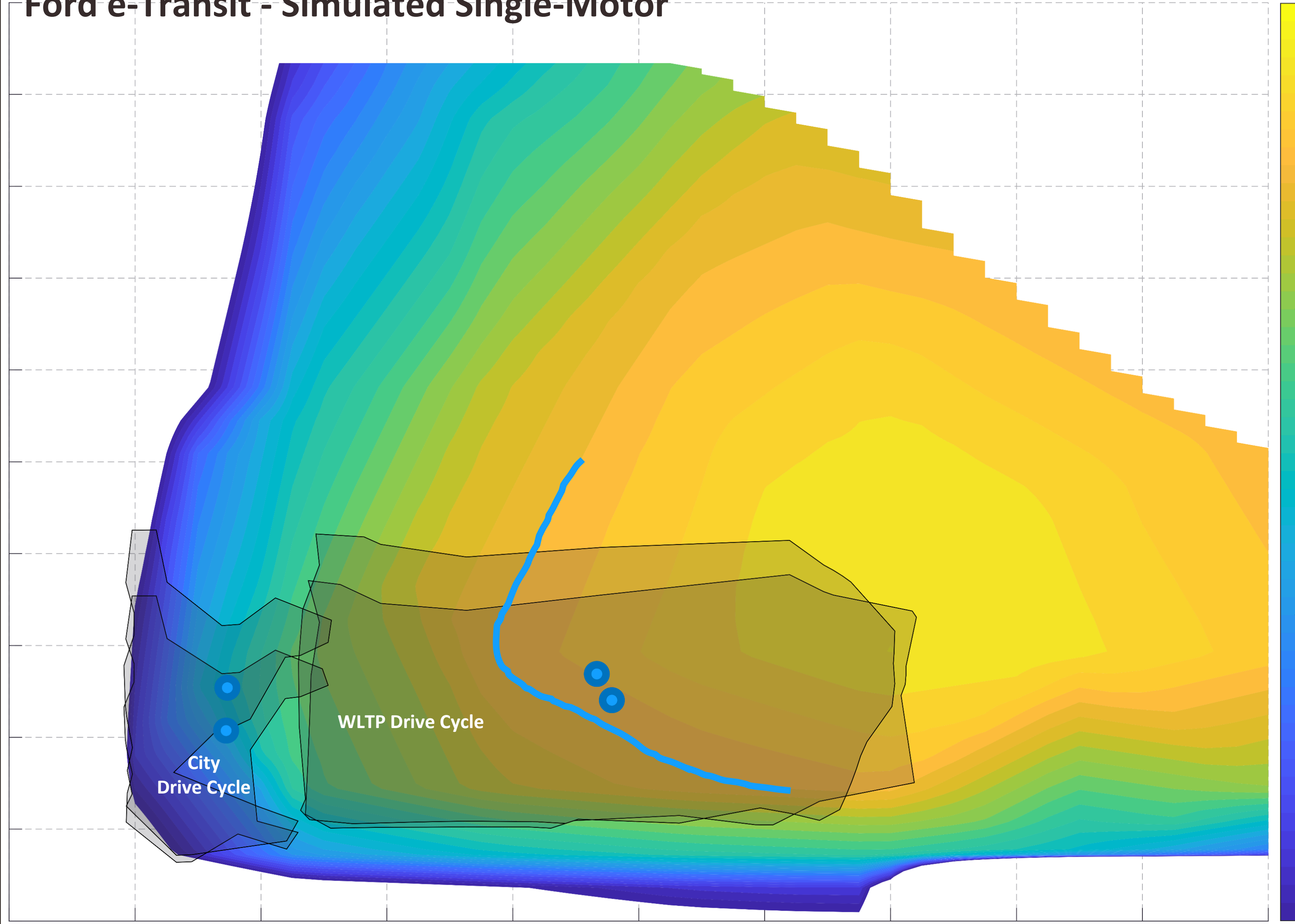
◆ ENERGY-WEIGHTED AVERAGE



□ DUTY CYCLE 1 STANDARD DEVIATION FROM ENERGY-WEIGHTED AVERAGE



Ford e-Transit - Simulated Single-Motor



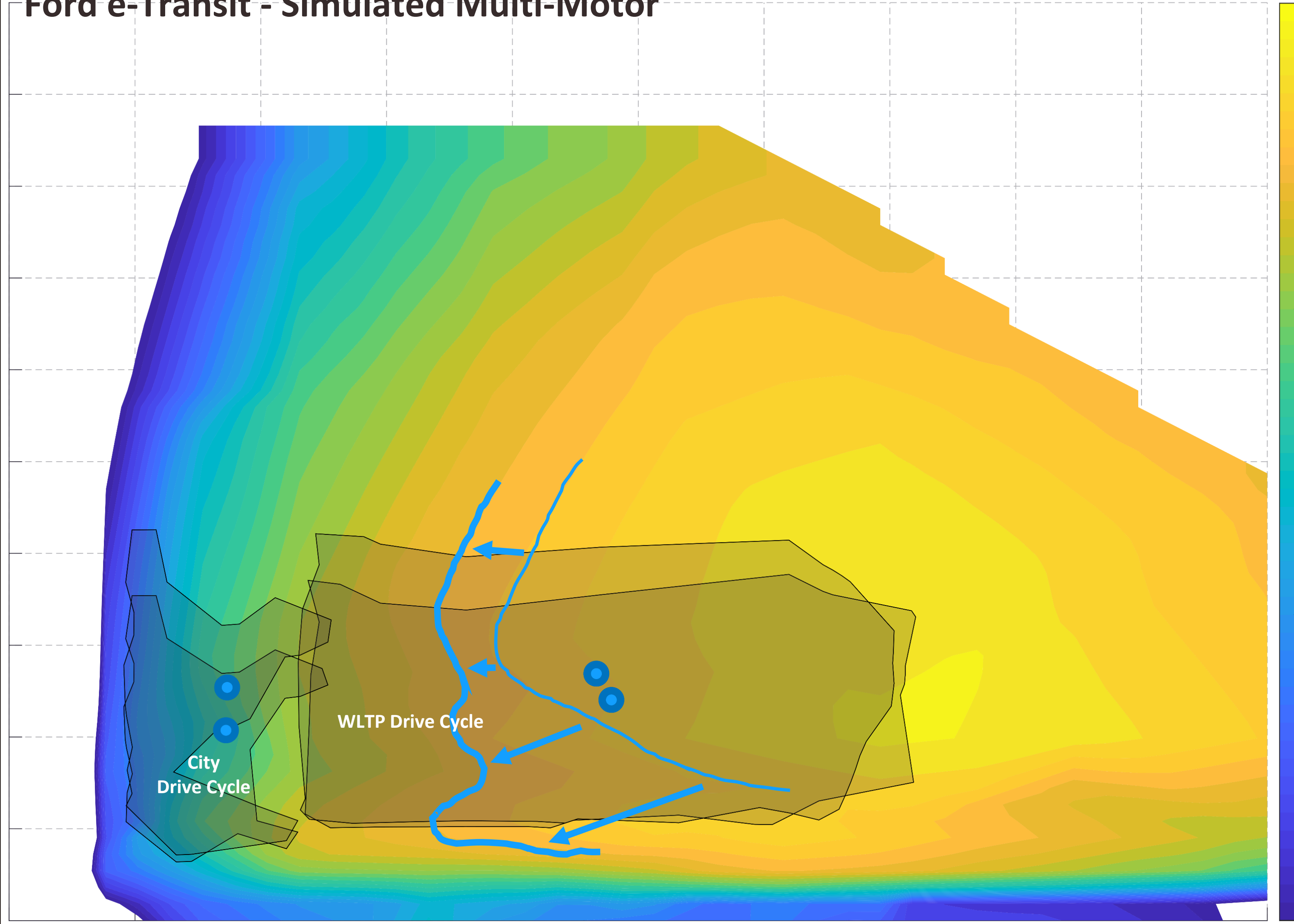
 ENERGY-WEIGHTED AVERAGE



DUTY CYCLE 1 STANDARD DEVIATION FROM ENERGY-WEIGHTED AVERAGE



Ford e-Transit - Simulated Multi-Motor



 ENERGY-WEIGHTED AVERAGE

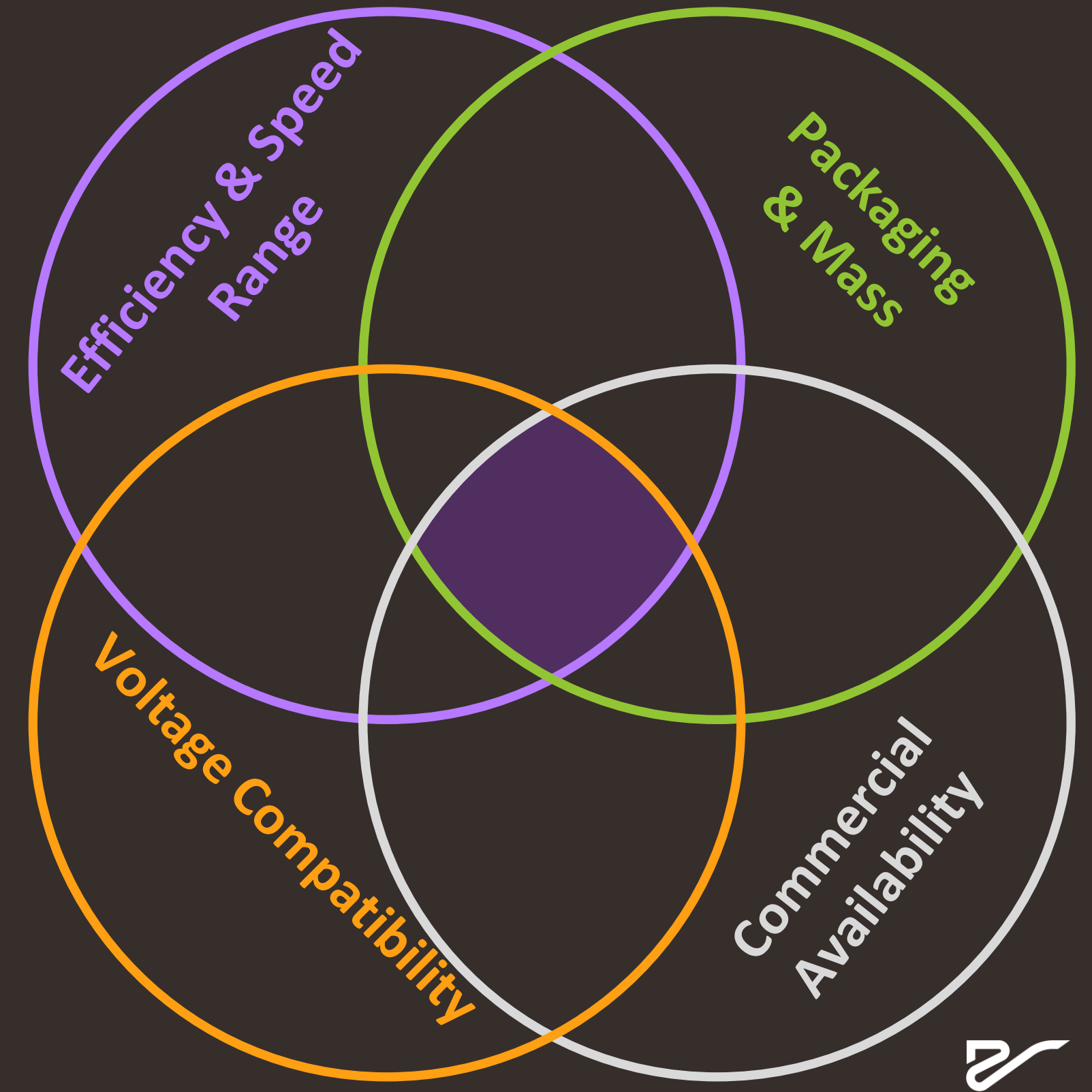


DUTY CYCLE 1 STANDARD DEVIATION FROM ENERGY-WEIGHTED AVERAGE



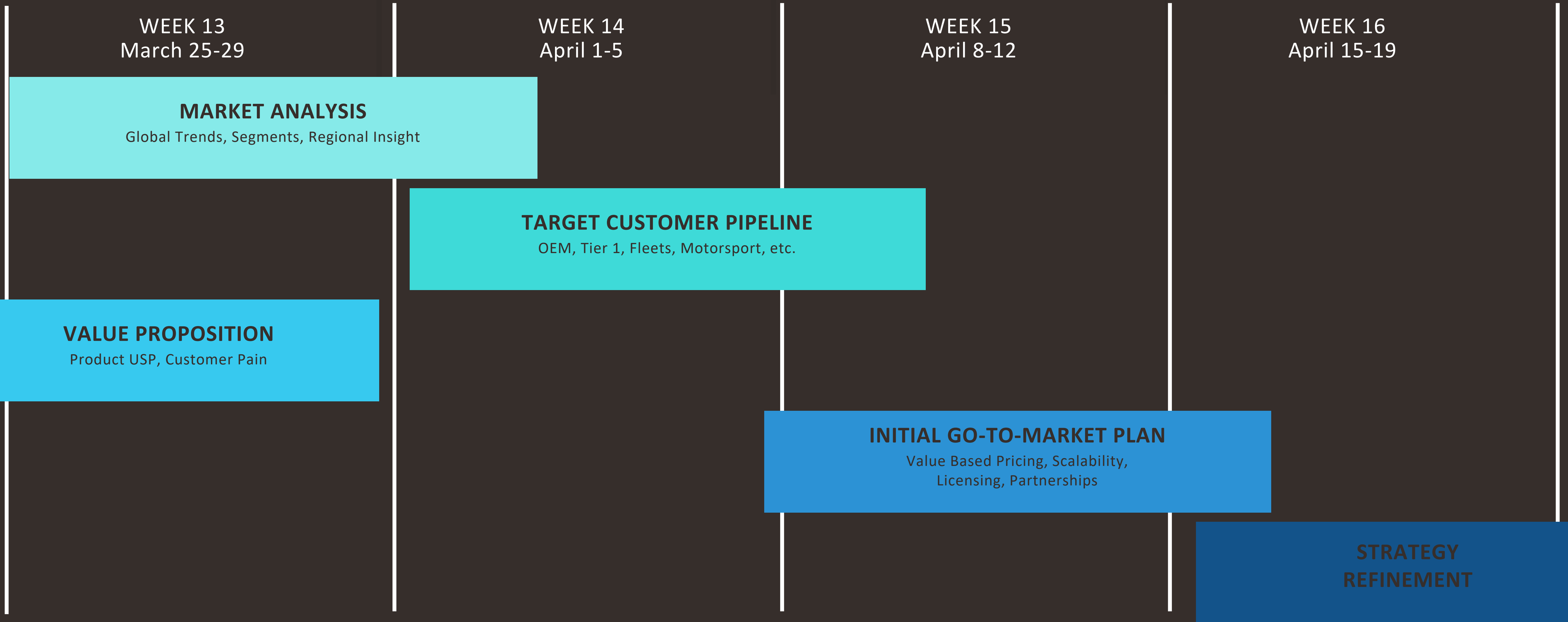
E-Motor Landscape

- Collecting data from e-motor suppliers
[REDACTED] tors from supplie [REDACTED]
- Conversations with bespoke suppliers
[e.g. [REDACTED]]
- Shortlisting Motors





Commercial Strategy First Pass





Next Steps

- Vehicle Benchmarking
- Select & Benchmark Spare IDU
- Remove Primary IDU from Vehicle
- Commercial Strategy Alignment