

Jibebe Internship 2022

Progress report Week 6
Electric team

Name: Amos Wanene

Tasks completed last week

[#47] Battery sizing for tractor: Calculations were done by the team to determine the appropriate battery to run the Shujaa tractor and a report was uploaded on GitHub. The team is working on a program to aid in these calculations for future iterations.

[#33] Calculation of power requirements for the Shujaa tractor: This was a joint issue with the mechanical team. Collaboration was done to understand the power demand and supply scheme of the motor.

[#52] Simulation of motor characteristics for the Shujaa tractor: A simulation of the motor characteristics for the Shujaa tractor was performed.

System A

Clyte H3540

☒ Hubmotor ☐ Middrive

96V 0.2Ω 200Ah c

35A 70A 0.03Ω V

Throttle (☐ Auto)

100 %

[Show Advanced](#)

Vehicle Parameters

26" Wheel

MTB, Upright

650kg (1433lbs) c

Human Power

0 W

Grade

0 %

[Reset](#) [Simulate](#)

[Run Simulation Set](#)

[Open System B →](#)

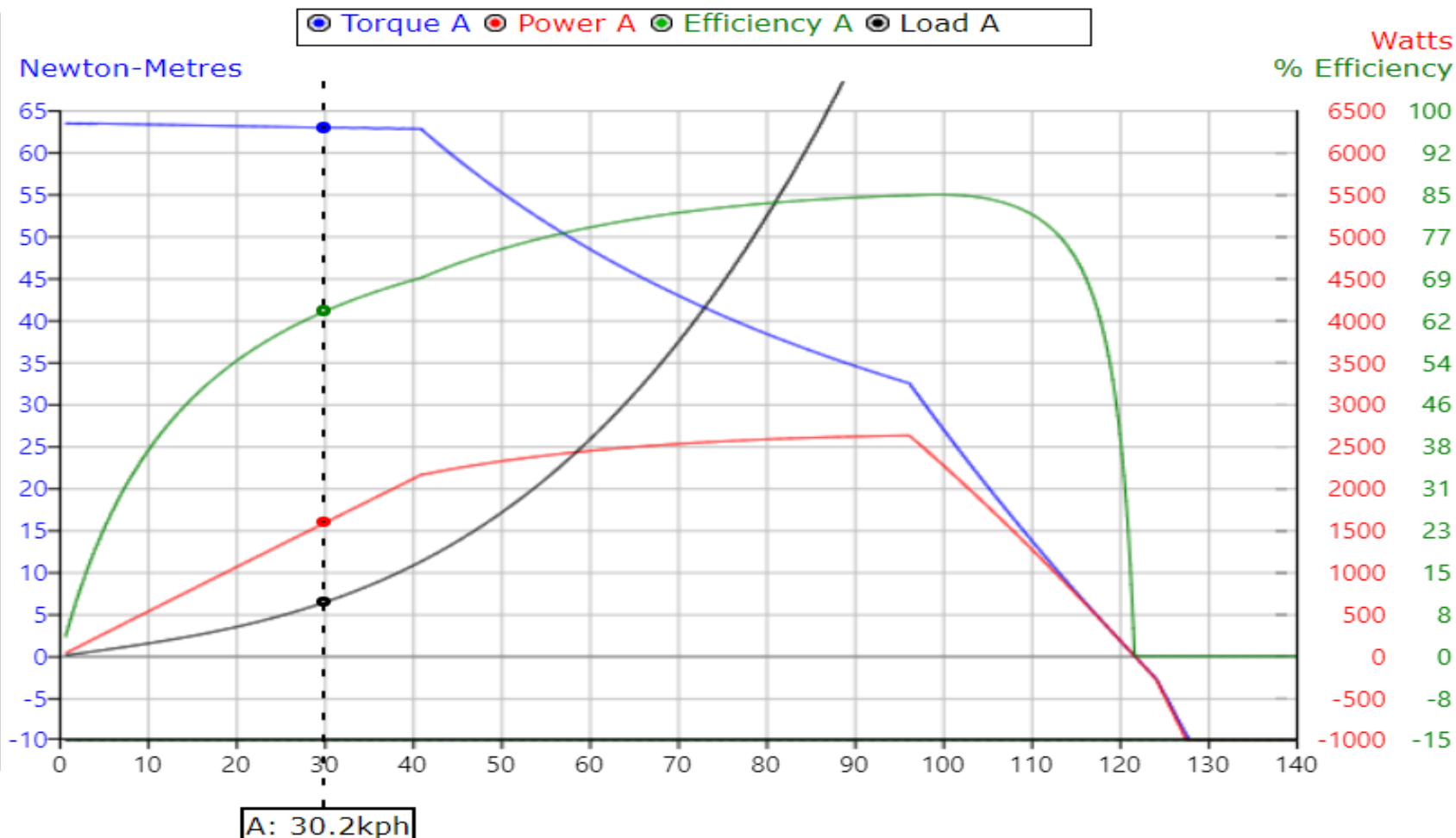


Chart Options

X Axis units

Km/h

Blue Curve

N-m Torque

Black Curve

Load Line

Graph	Syst A
Wheel Torq	63.0Nm
Mtr Power	1600W
Load	649W
Efficiency	63.3%
RPM	242.7 rpm

Electrical	Syst A
Mtr Amps	69.8A
Batt Power	2528W
Batt Amps	28.0A
Batt Volts	90.4V

Performance	Syst A
Acceleration	0.63 kph/s
Consumption	83.7 Wh/km
Range	216 km
Overheat In	3.7 minutes
Final Temp	>250 °C

System A

Clyte H3540

☒ Hubmotor
☐ Middrive

96V 0.2Ω 200Ah c

35A 70A 0.03Ω V

Throttle (
☐ Auto
)

100%

[Show Advanced](#)

Vehicle Parameters

26" Wheel

MTB, Upright

650kg (1433lbs) c

Human Power

0 W

Grade

2%

Reset
Simulate

Run Simulation Set

[Open System B →](#)

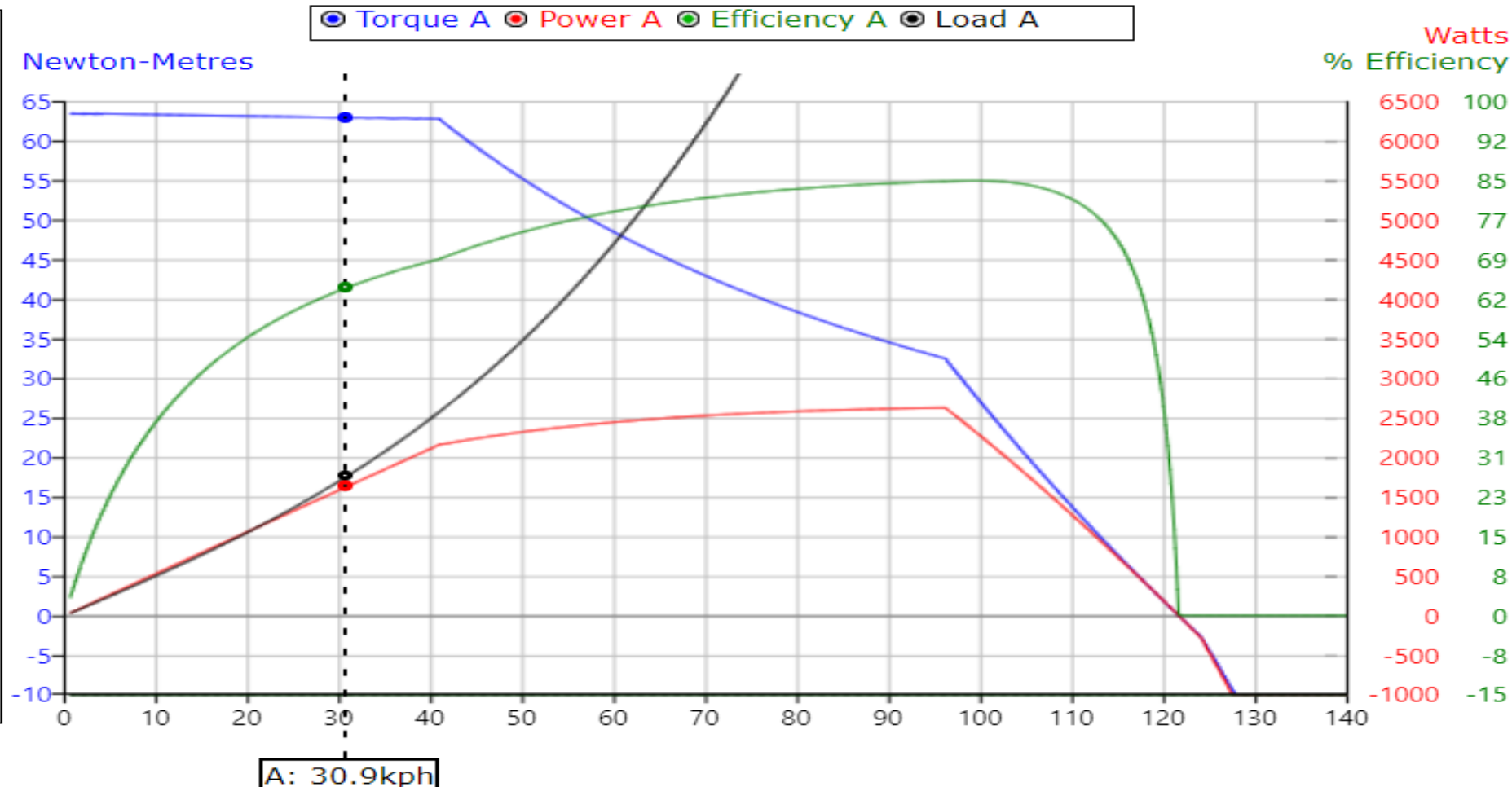


Chart Options

X Axis units

Km/h

Blue Curve

N-m Torque

Black Curve

Load Line

Graph	Syst A
Wheel Torq	63.0Nm
Mtr Power	1637W
Load	1769W
Efficiency	63.8%
RPM	248.4 rpm

Electrical	Syst A
Mtr Amps	69.8A
Batt Power	2566W
Batt Amps	28.4A
Batt Volts	90.3V

Performance	Syst A
Acceleration	-0.08 kph/s
Consumption	83.0 Wh/km
Range	217 km
Overheat In	3.7 minutes
Final Temp	>250 °C

Tasks in this week

[#18] Analysis of the performance curves for the Shujaa tractor

[#53] Calibration of the throttle for the e-tricycle.

Total estimation of weeks: 12

Week	Tasks	Reporting	Hrs	Month
5 - Requirements review				
5.1	Finalize on battery acquisition for the Tricycle	None	20	Feb
5.2	Finalize on motor and torque requirements for the Tractor	None	8	
5.3	Clarify best choice for motor orientation for use in Tractor to allow for automation	Team meeting to review the best course of action	5	
6 - Research				
6.1	Research and recommend best motor for our specific use case in the Tractor	Electric Team Meeting	20	Feb
6.2	Get experimental data for motors and run simulations for verification	None	20	
7 - Testing				
7.1	Alpha testing of newly arrived battery for the tricycle.	Electric Team Meeting	20	Feb
7.2	Testing of integration with other components of the electric subsystem	None	25	
8 - Deployment				
8.1	Deployment of the electric subsystem of tricycle to finalized Tricycle	None	20	March
8.2	Fixing of any issues that may arise during Integration	None	20	
9 - Testing				
9.1	Alpha testing of newly arrived components for the tricycle.	Electric meeting	16	March
9.2	Getting experimental results of the components and NDT to validate correct operation and performance under load	None	24	

10 - Integration				
10.1	Integration with other subsystem	Team meeting	40	March

11 - Testing				
9.1	Alpha testing of entire assembled tractor	Team meeting	40	March

12 - Deployment				
12.1	Deployment of Shujaa Tractor	Team meeting	40	April