
Electric Tractors at Windflower Farm
Ted and Nate Blomgren

These had been the key tools in our weed control toolbox

Our four-row crops were weeded using basket weeders, flex-tine weeders and duck-foot sweeps

We started with Steketee hoeing elements: blades and side blades

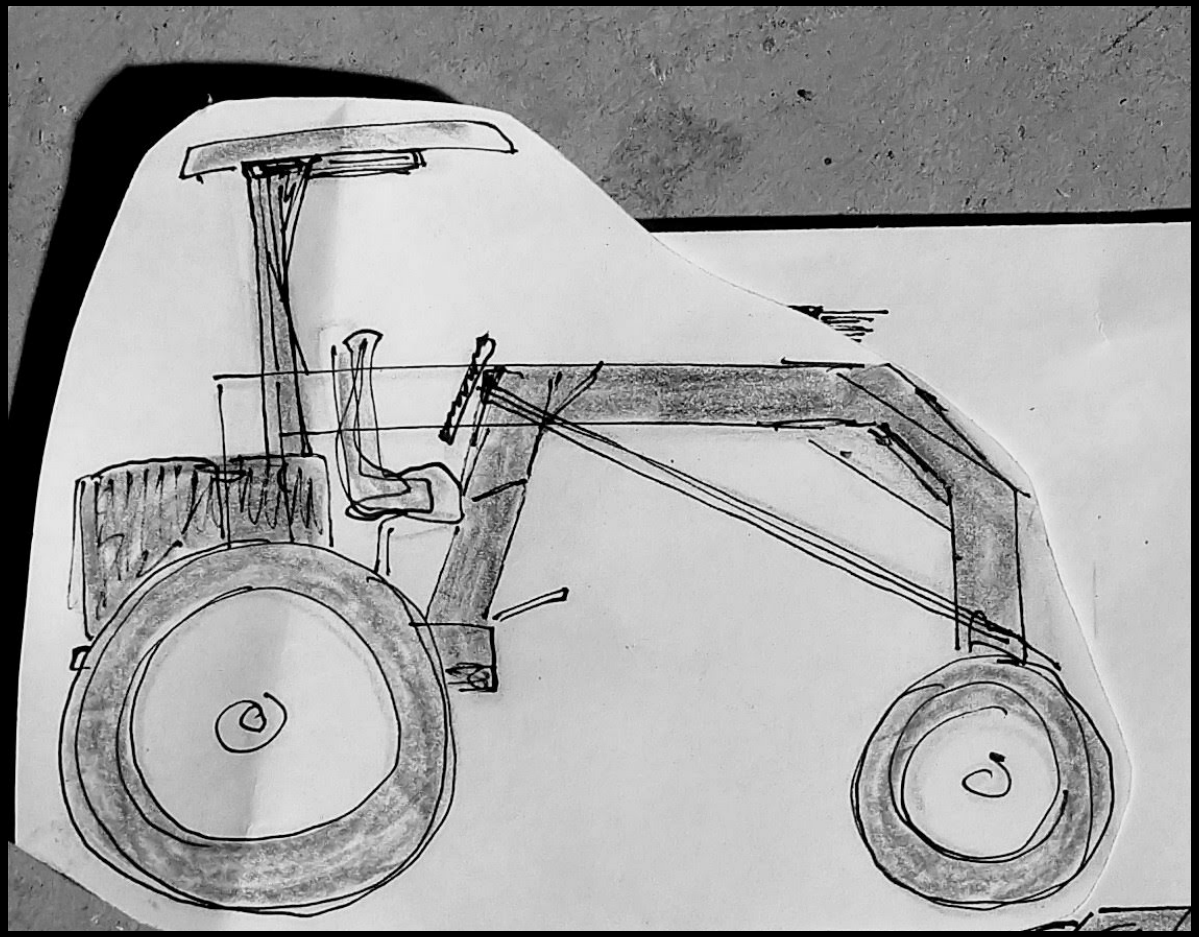
We were also looking for in-row tools beyond our blind flex tines…

So, we made a steerable cultivator made to accommodate finger weeders

For information on the conversion to electric, see the detailed SARE-funded how-to document (FNE03-472) by Ron and Kate Khosla at Flying Beet Farm from twenty years ago.

A neighbor modified the front end of our Electric Allis Chalmers G for add-on tools.

Four-row set up using five hoeing elements



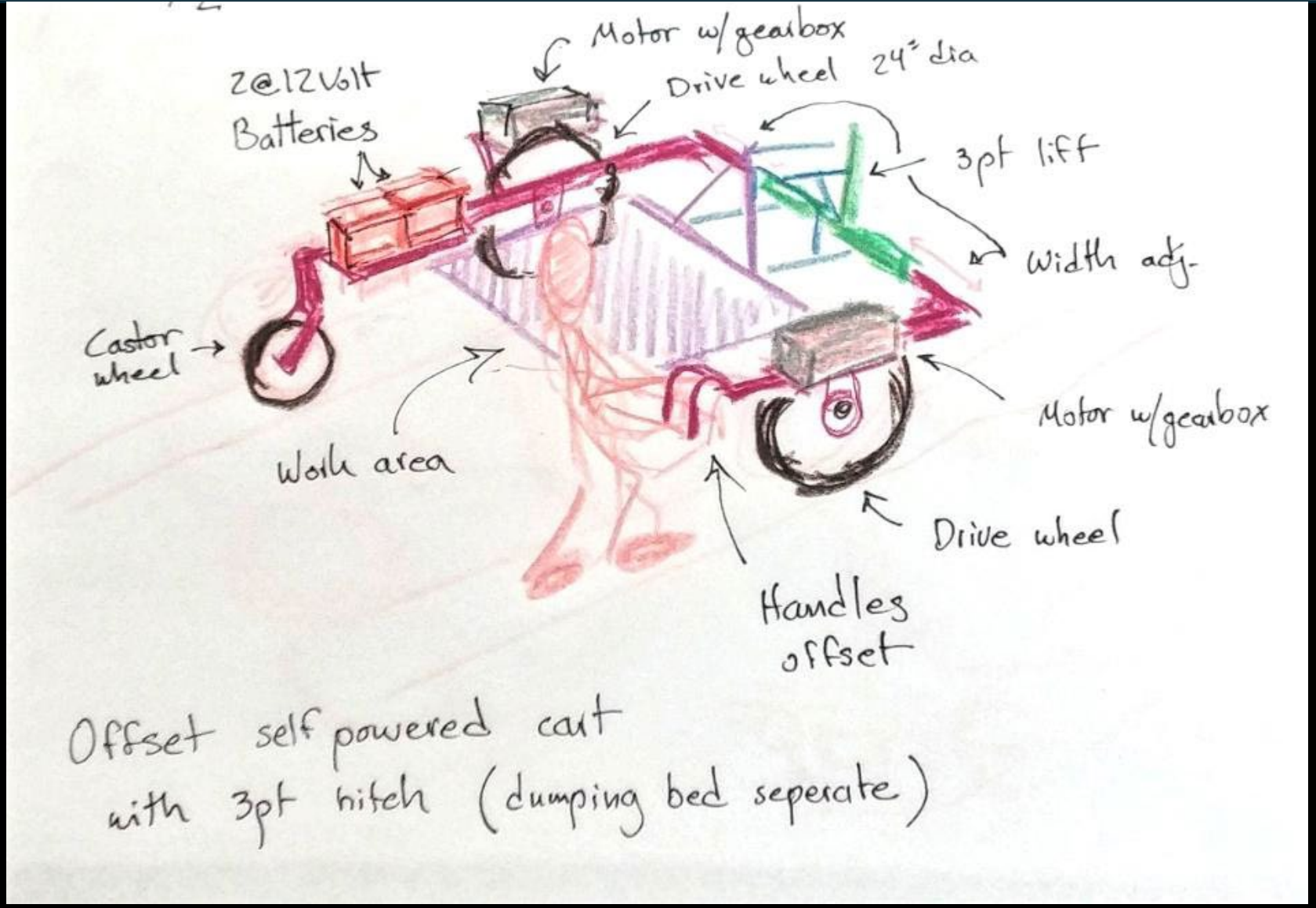
New design based on feedback from previous talk at NEVF Conference


MAZZOTTI
Q8
Oils


HUSKY

To eliminate steering rod, we redesigned
with hydraulic steering

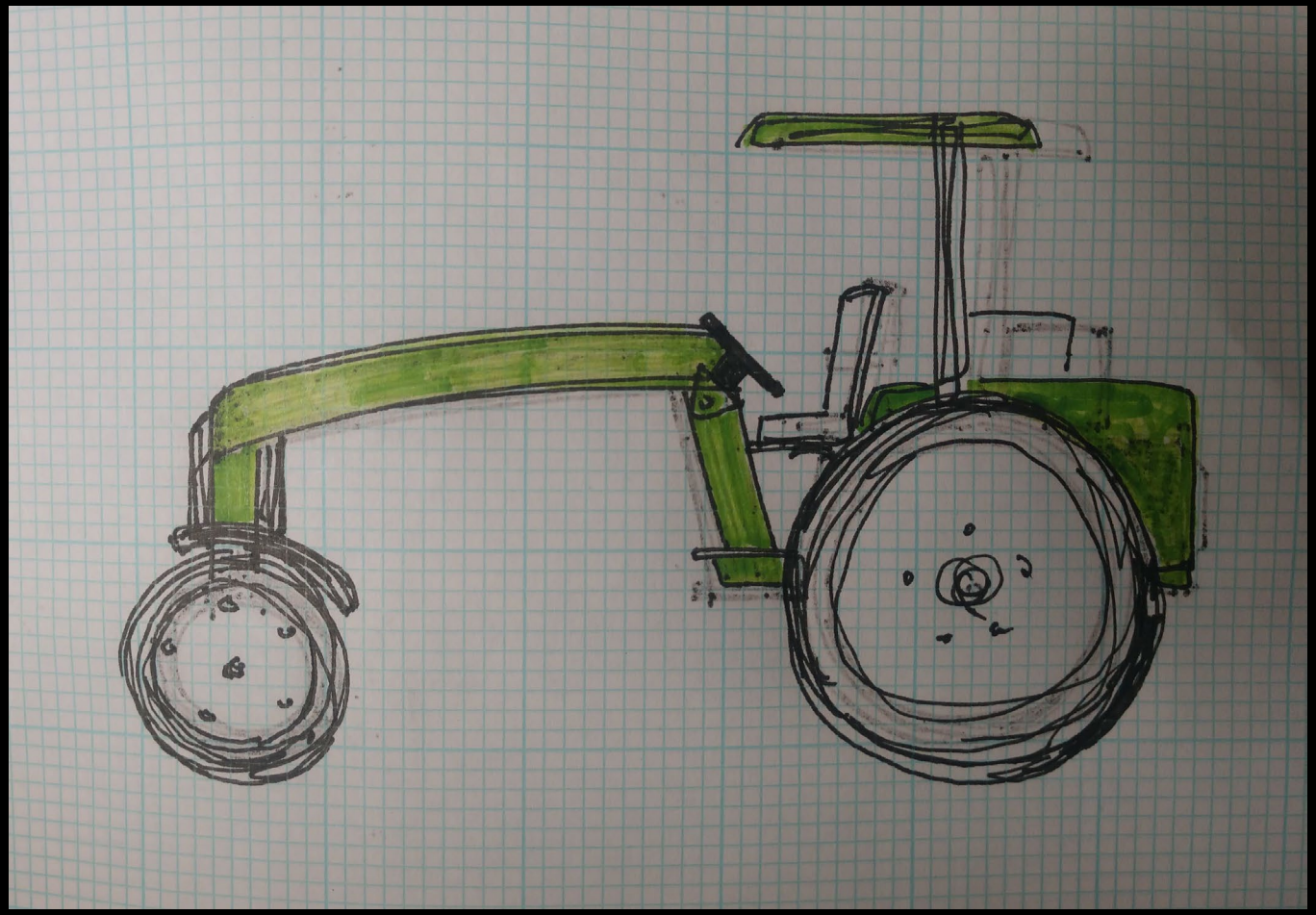
… and this is what we made. A 12-volt hydraulic lift kit powered the 3-point lifts after trialing linear actuators.



On to other ideas…

Twin 36V DC motors power this zeroturn planting and harvest aid that we call the Peapod.


Miller
Millermatic
211



Back to the electric G…

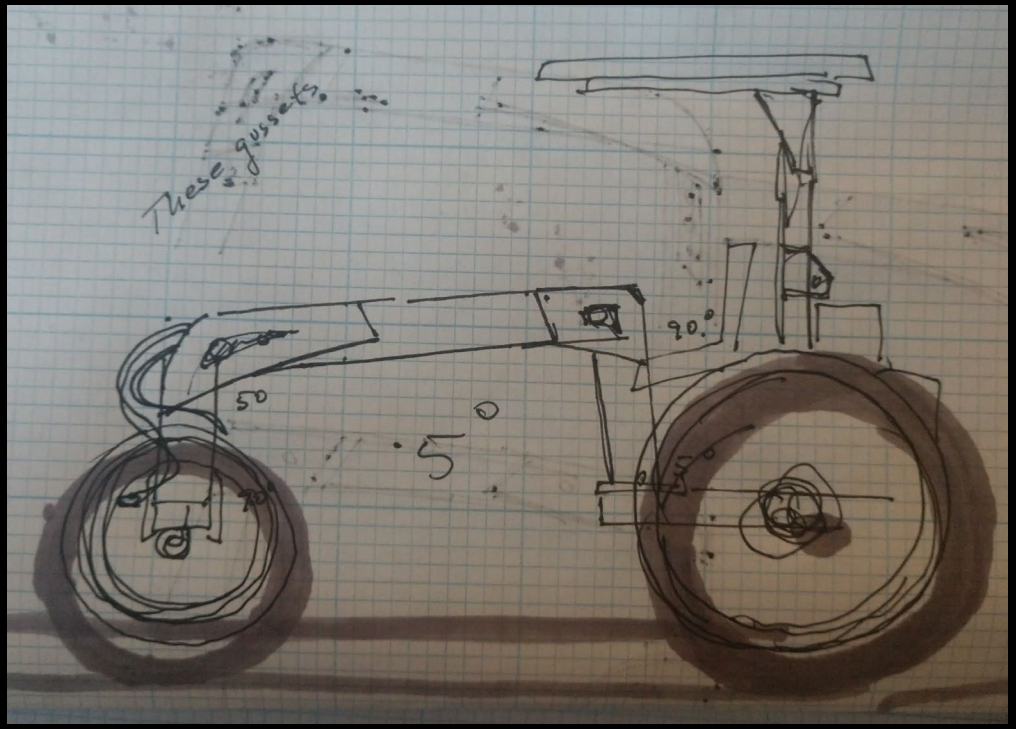
Looking for more height under the beam and a cleaner build…

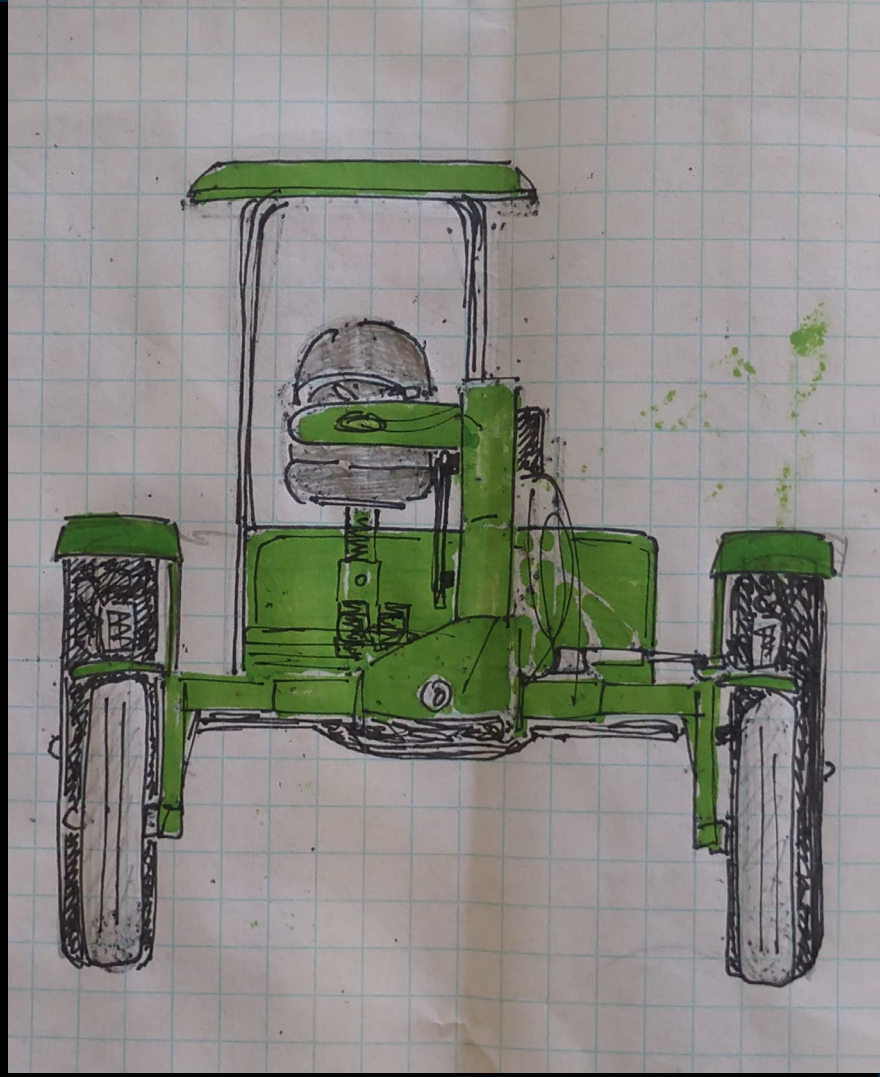
Better working height under the beam

Fairly good visibility

Kress Duos on the belly

Our last G build…





Sketches for a build with a new purpose-built electric drivetrain.

So, what kind of power transmission?

Hydraulic hub motor powered by an electric motor and pump?

An electric hub motor?

An electric transaxle?

Spring 2020

Italian electric transaxle with 80:1 gearbox, and 3-phase AC motor (6.5 kW). 42 Nm torque (compared with 20Nm in 10 hp gas powered G).

German inverter/controller.

Chinese throttle.

Fueled by a 255 Ah 48-volt lead acid battery.

Open differential, mechanical drum service brakes and electromagnetic parking brake.


SEASTAR

Offset carrying beam and seating for better visibility.
8X36” Unverferth wheels for 23” of clearance.


Steketee
Steketee
Steketee
Steketee

Steketee hoeing elements and I&J row cleaners.

Steketee hoeing elements plus finger weeders and Kovar flex tines

Some numbers…

Tractor wt. = 2400 lbs (10,860 N)

Tractor wt including
operator + Steketee
+ flex tines = 3500 lbs (15,600 N)

Rolling resistance – up to 990 N
Slope force at 10 deg = 2700 N

Drag force – Steketee = 900 N
Drag force – flex tines = 700 N

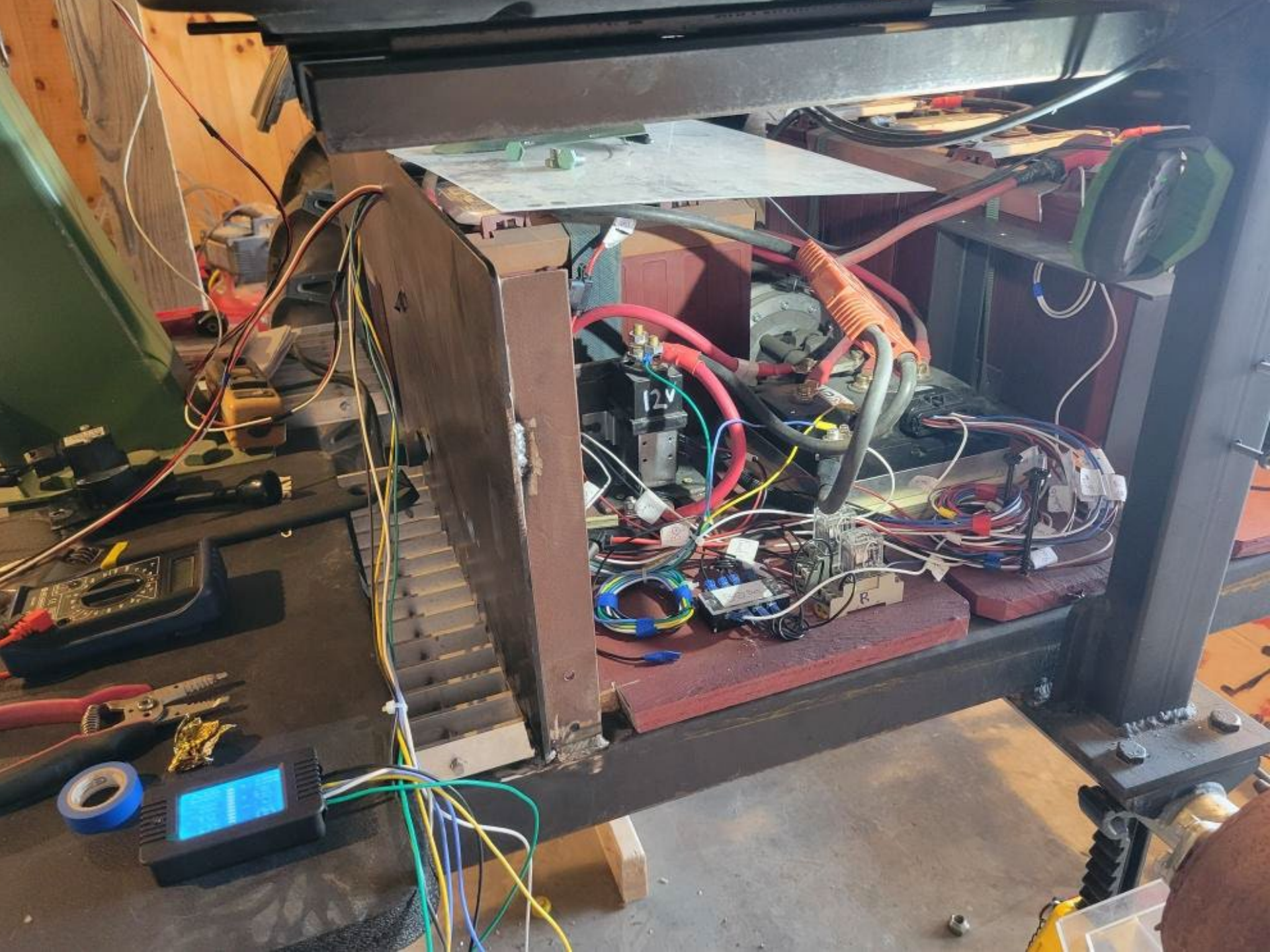
Sum of forces – up to 5290 N

If sum of forces = 5290 N

Torque load on axle = 3100 Nm (sum of forces x wheel radius)

If using an 80:1 gear ratio, motor torque requirement = 39 Nm

A second build (goals: improve build quality, safety, ergonomics)


12V


Fwd
Therm
OV

48-volt system utilizes 8 6-volt deep-cell lead acid batteries in series.

255 Amp hours.

Onboard charger charges in 8 hours at 120 volts.

Run time 6-8 hours.

Hybrid option with small Honda generator.

Shown here with basket weeders.
Solar system maintains charge on
12-volt lift system.

Showing offset steering and fertilizer sidedresser


Bean seeder where it can be easily monitored.
Room enough for our 4-row Planet Junior.

This winter’s build? A lighter version: Lithium batteries, lightweight frame and wheels, smaller motor (4 kW, 29 Nm torque).

Thank you (tedblomgren@gmail.com)