



Freedom to Walk

**A wearable solar garment
exploring portable energy**

by Mariam Baghdasaryan



Solar energy is everywhere

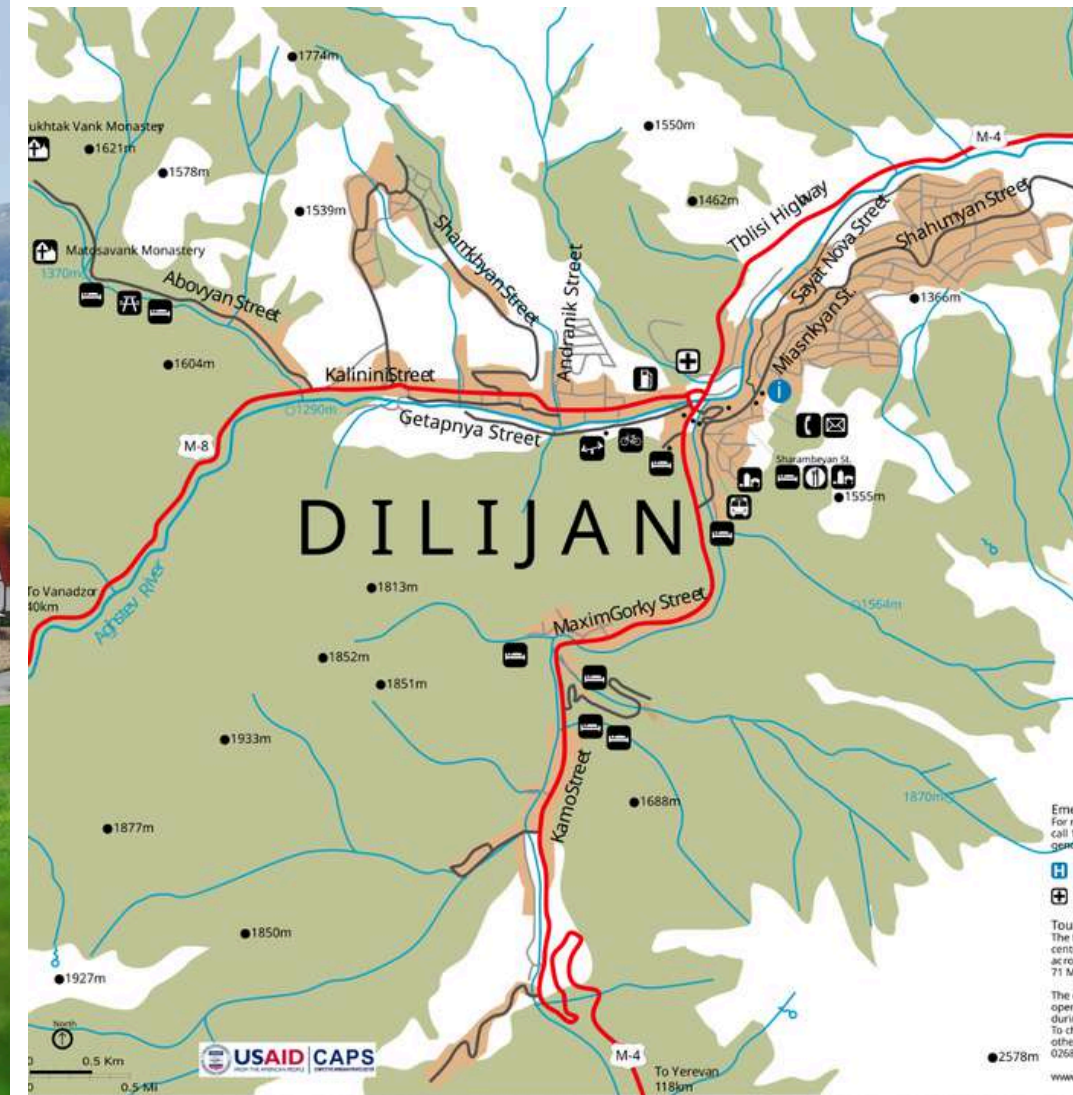


It powers cities and buildings.

But what if a small part of that **energy**
could travel with us?

Why this project

- Living close to mountain trails
- Background in outerwear design
- Interest in wearable technology



Previous explorations



Pauline van Dongen
Solar fashion research

Tommy Hilfiger × Pvilion
Solar jacket prototype



Project concept

A modular solar garment
designed for outdoor movement

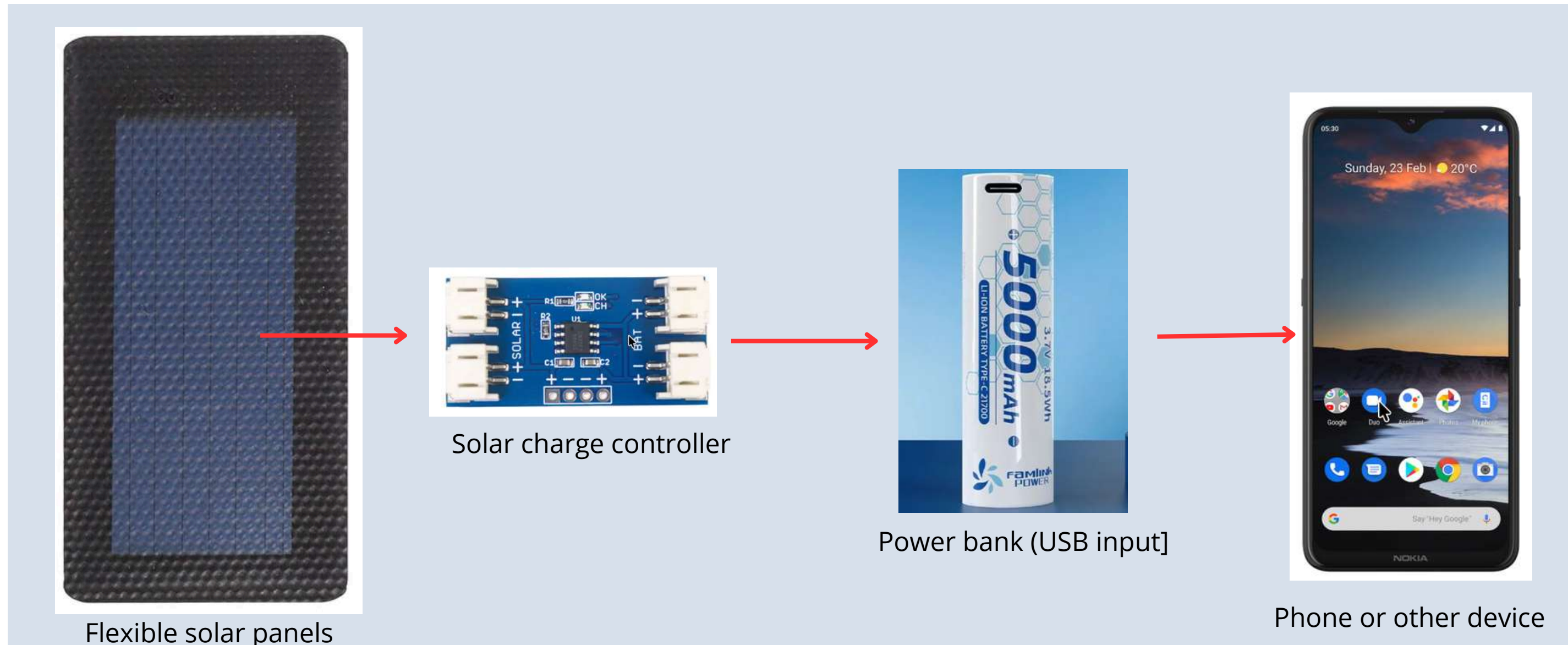
Prototype:

hooded solar neck garment

System components (technical system)

Solar panels → Solar controller → Power bank

Output voltage: ~4.2 V



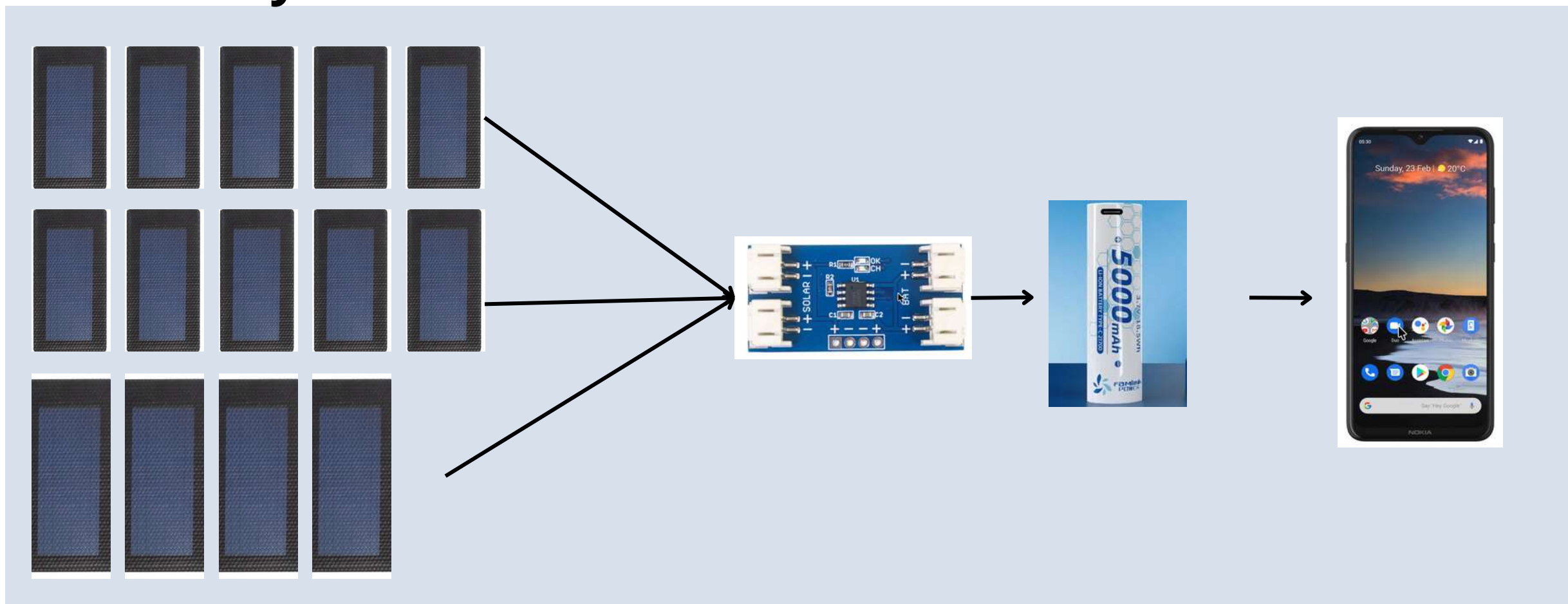
Technical System Overview

Panel configuration:

- 2 × series strings: 5 panels × 0.3 W (1.5 V each)
- 1 × series string: 4 panels × 0.5 W (2 V each)

String	Panel Type	Count	Series Voltage
A	0.3 W / 1.5 V	5	~7.5 V
B	0.3 W / 1.5 V	5	~7.5 V
C	0.5 W / 2 V	4	~8 V

Electrical layout:



Energy chain:

Solar array

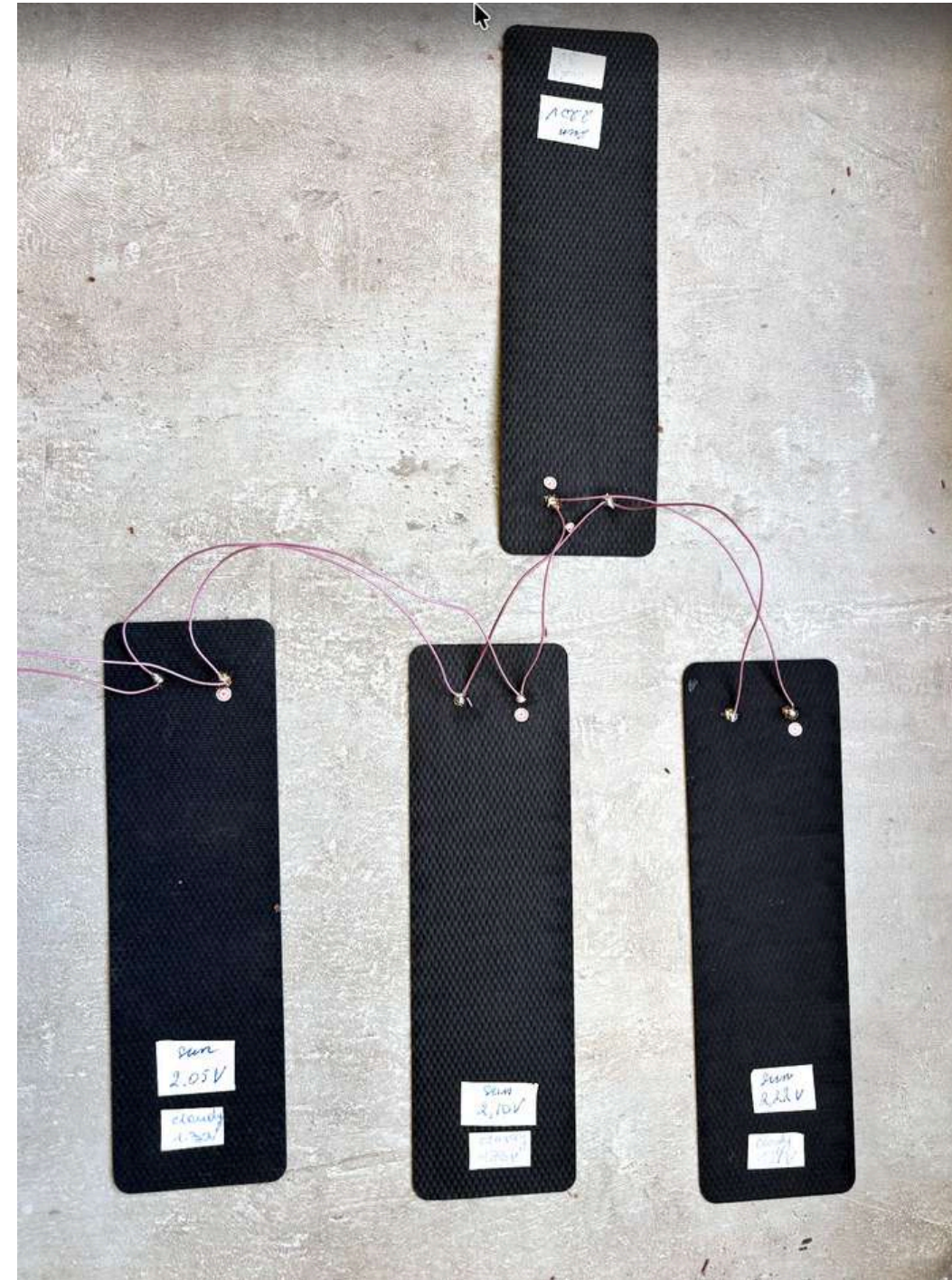
- solar charge controller (CN3065 class)
- USB input power bank (5000 mAh)
- device charging while moving

Peak solar array power: ~4–5 W (ideal sun)

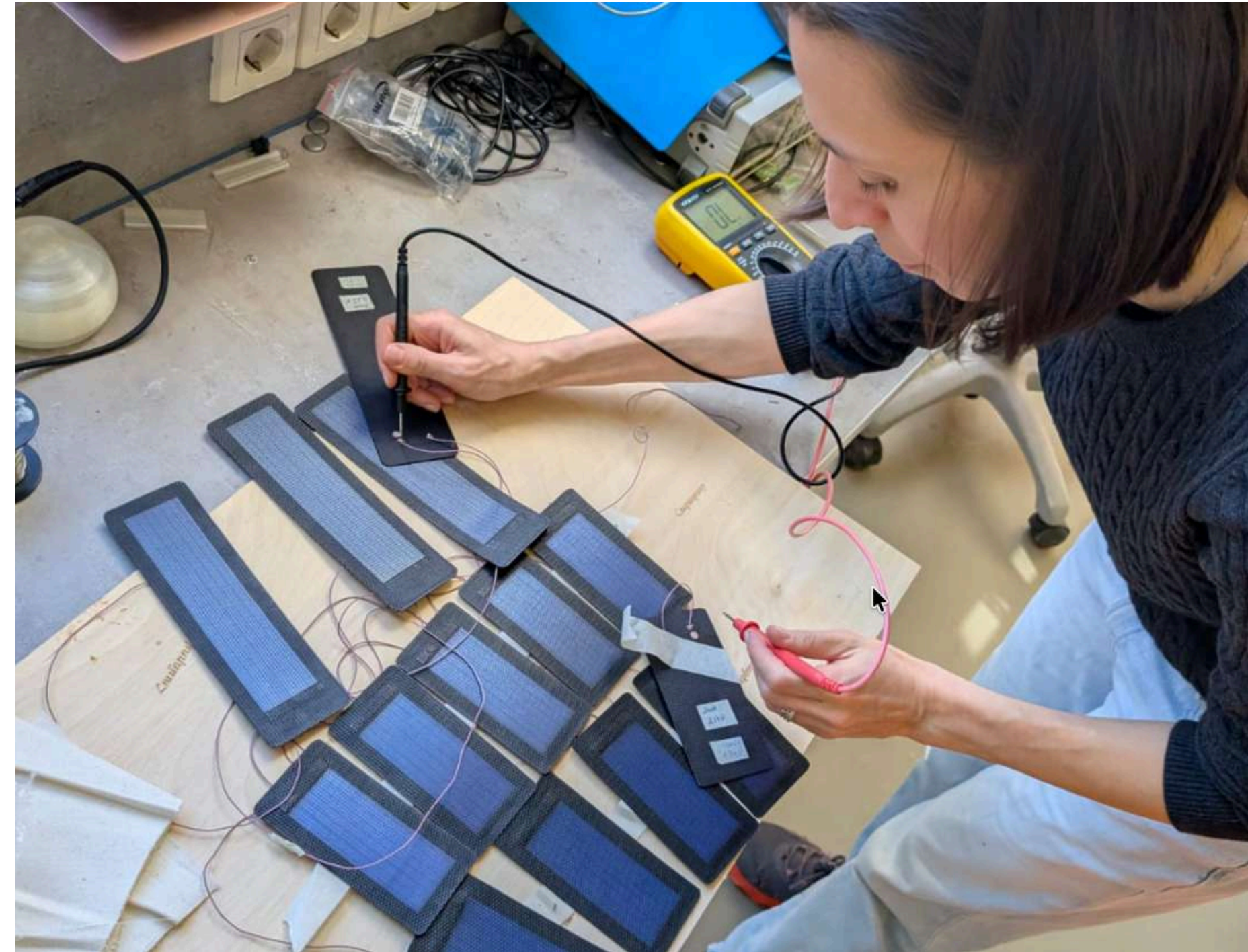
Prototype development



Testing solar panels

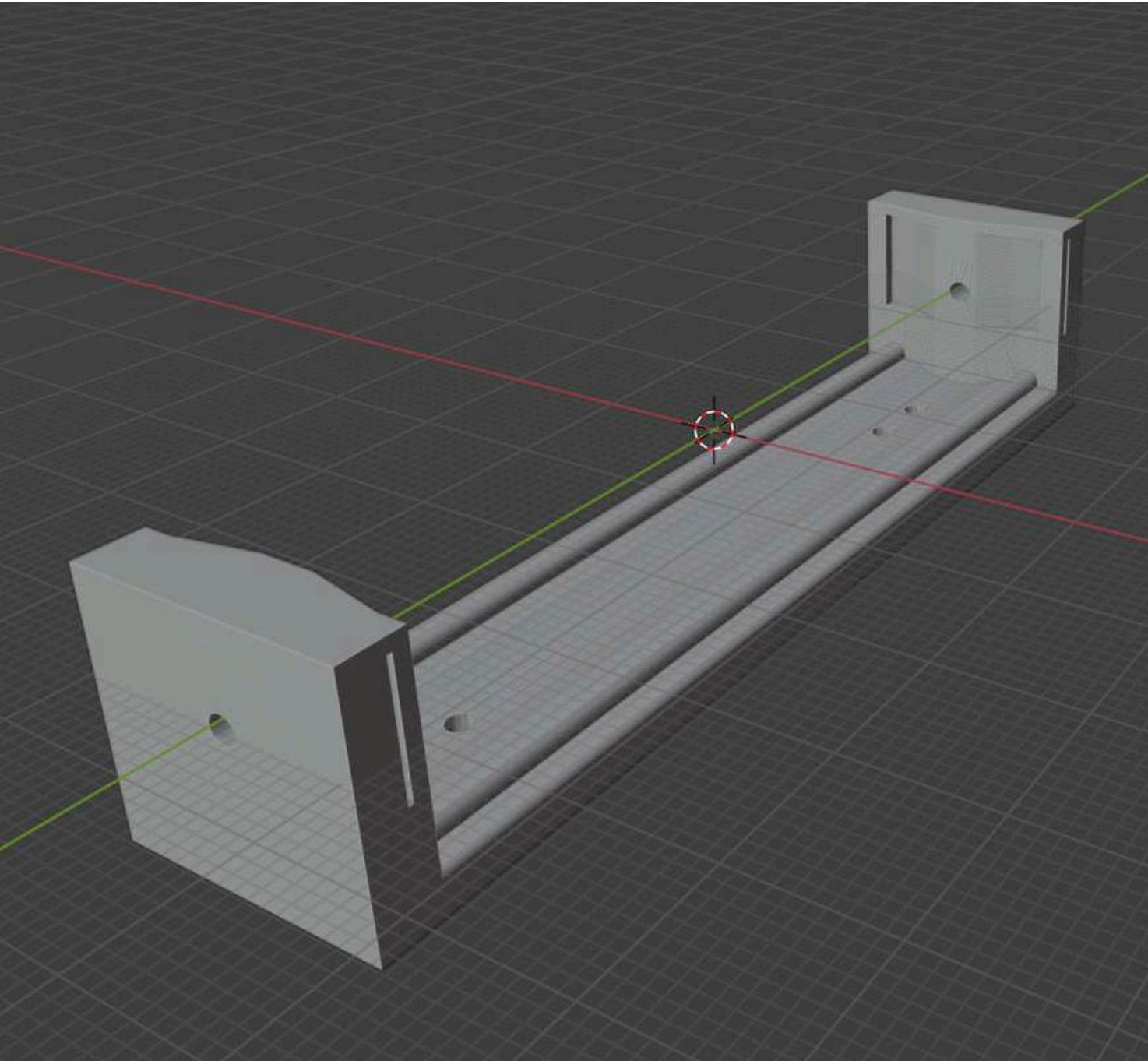


Building panel branches

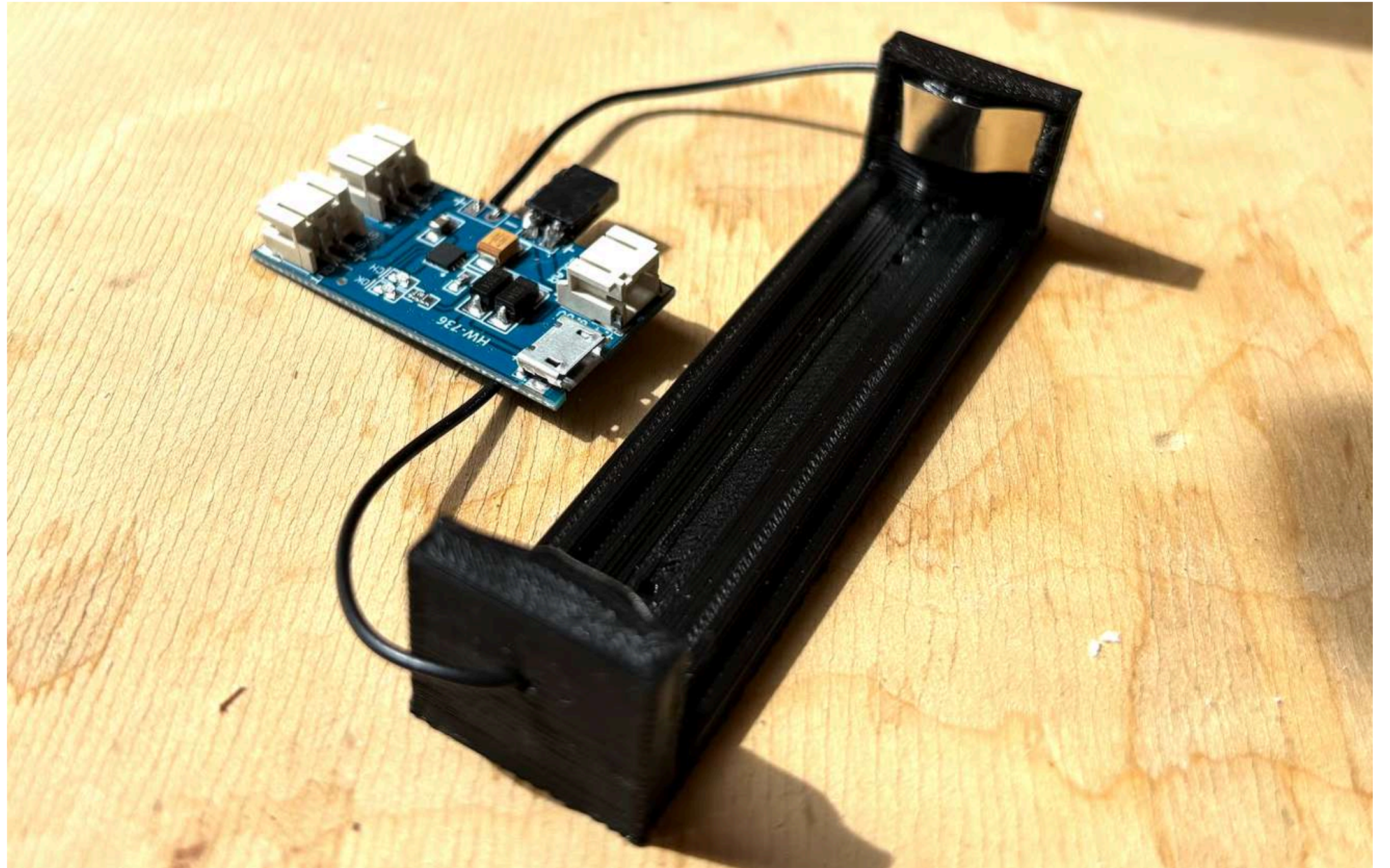


Testing panel branches

Prototype development

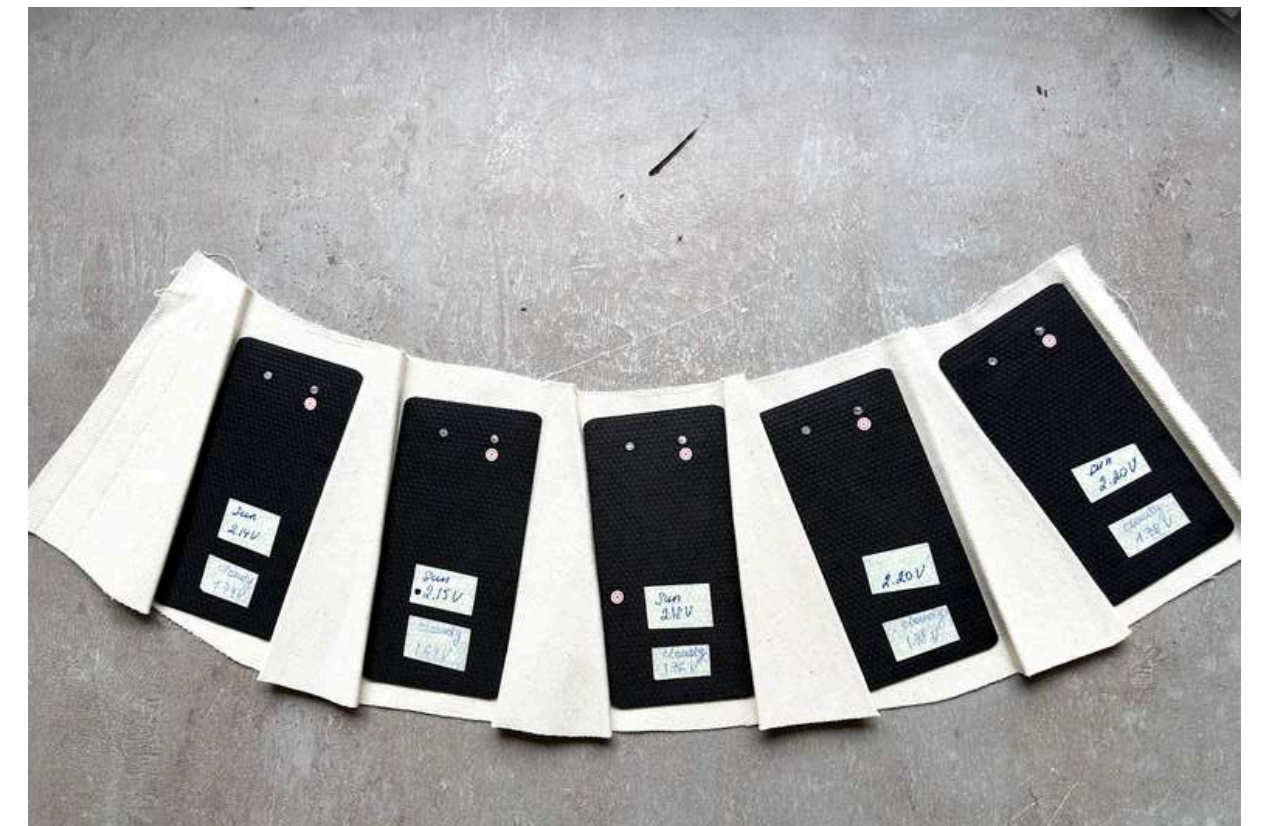
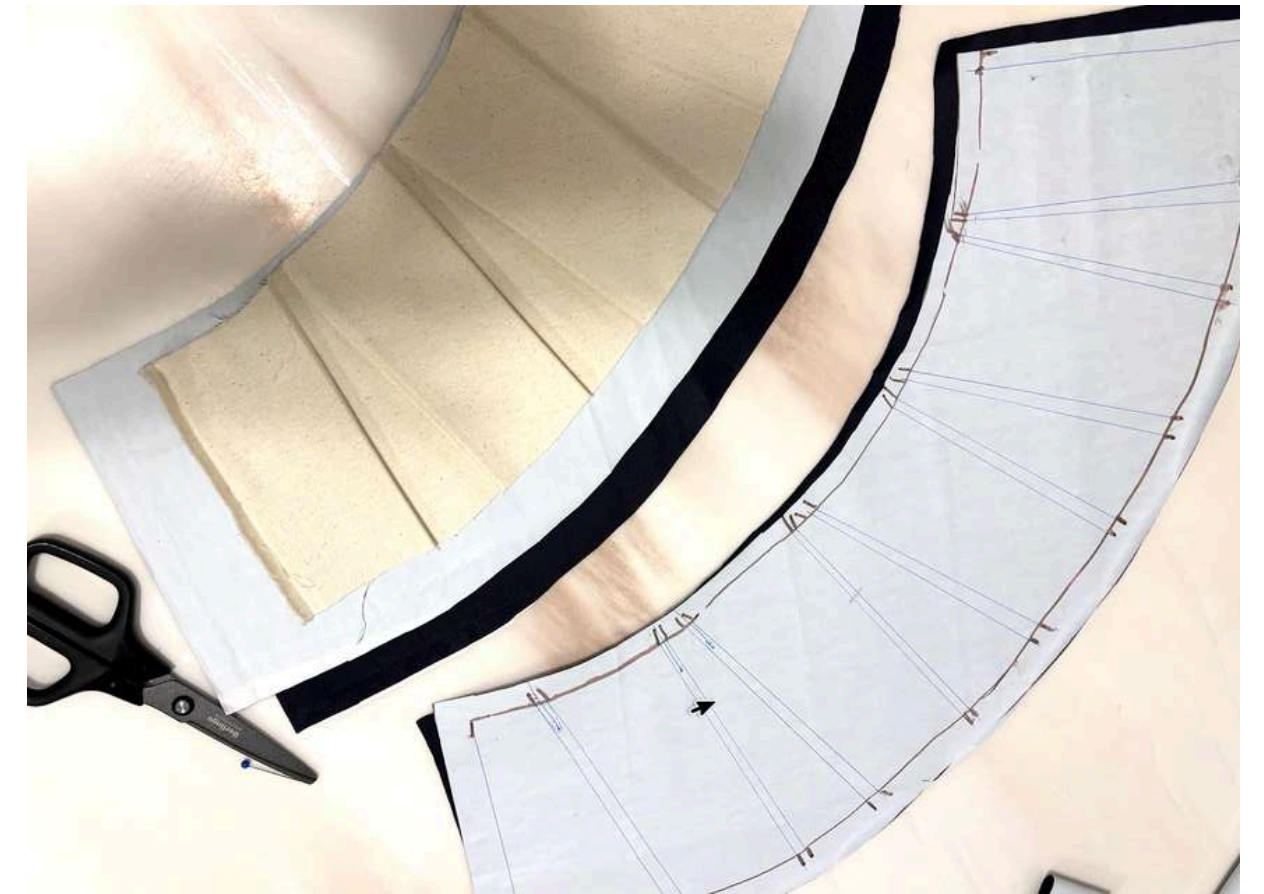


Adjusting Battery holder in Blender



Printing and soldering metal plates and wires to it.
Connecting to a solar microcontroller

Prototype development. Garment design



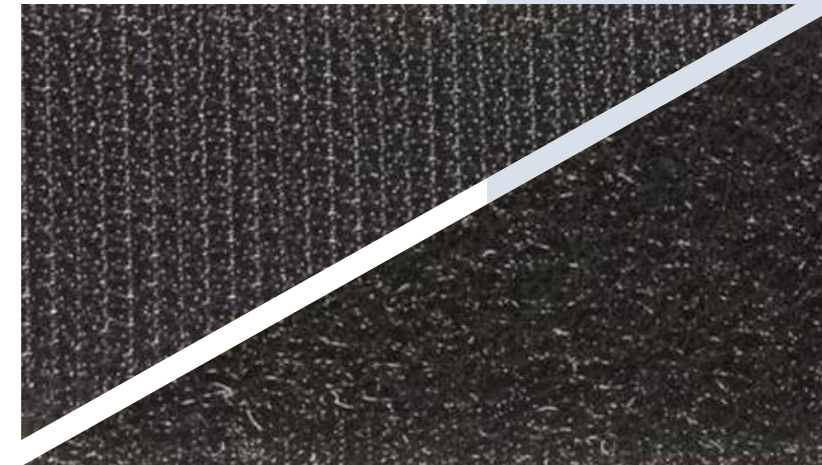


Garment layers

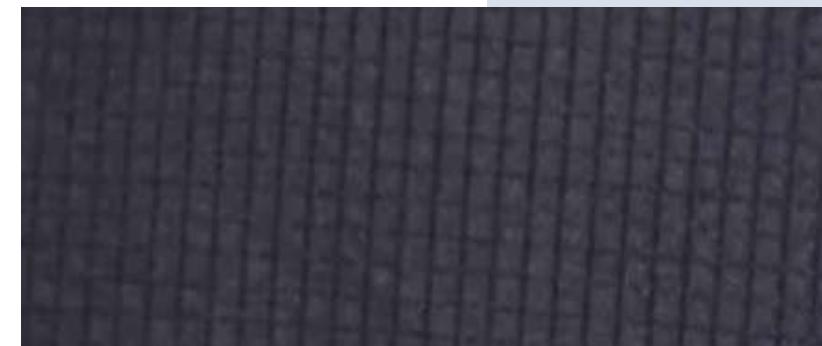


Flexible solar panel

- Amorphous Silicon
- Waterproof



Self-adhesive Velcro tape



Shell fabric

- 100% Nylon
- Finish - WP, WPU, PU



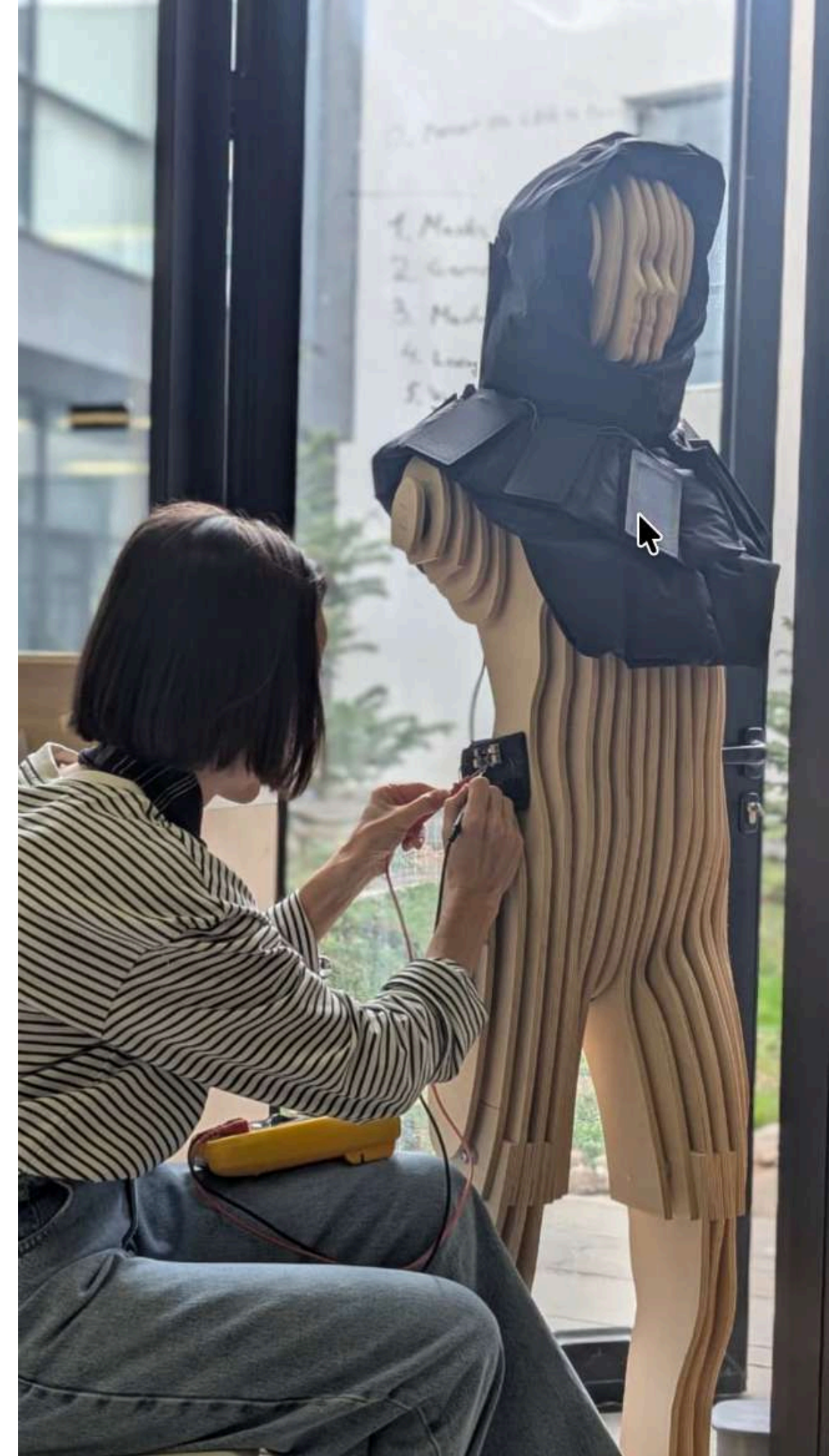
Padding

Synthetic Down
100% Polyester



Shell fabric / Lining

- 100% Nylon
- Finish - WP, WPU, PU



Prototype development



The solar charge controller and battery are housed in a small pouch that can easily fit into a backpack pocket or attached on the bib with velcro tape.



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**Freedom to Walk
Energy from the sun.
Power that moves with us.**

Thank you.

