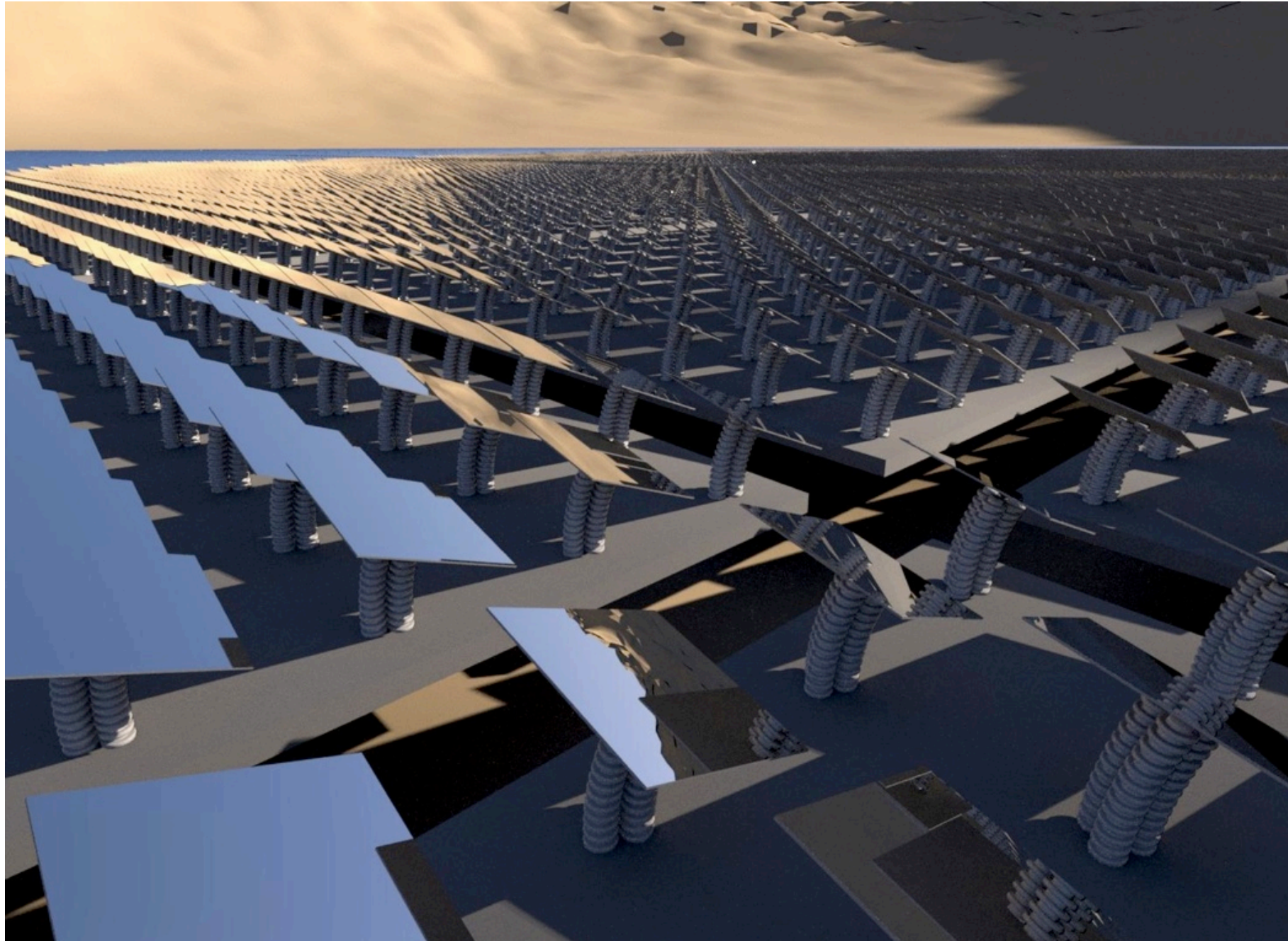


Fluidic Solar Collectors



New Materials and Mechanisms for Heliostats

ARPA-E Open FOA

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Dr. Matthew Zaluzek (FORD)

Start Date: 2/1/2013

Heliostats: State of the Art

Motivation: Direction for Disruption

Innovation: Otherlab's Approach

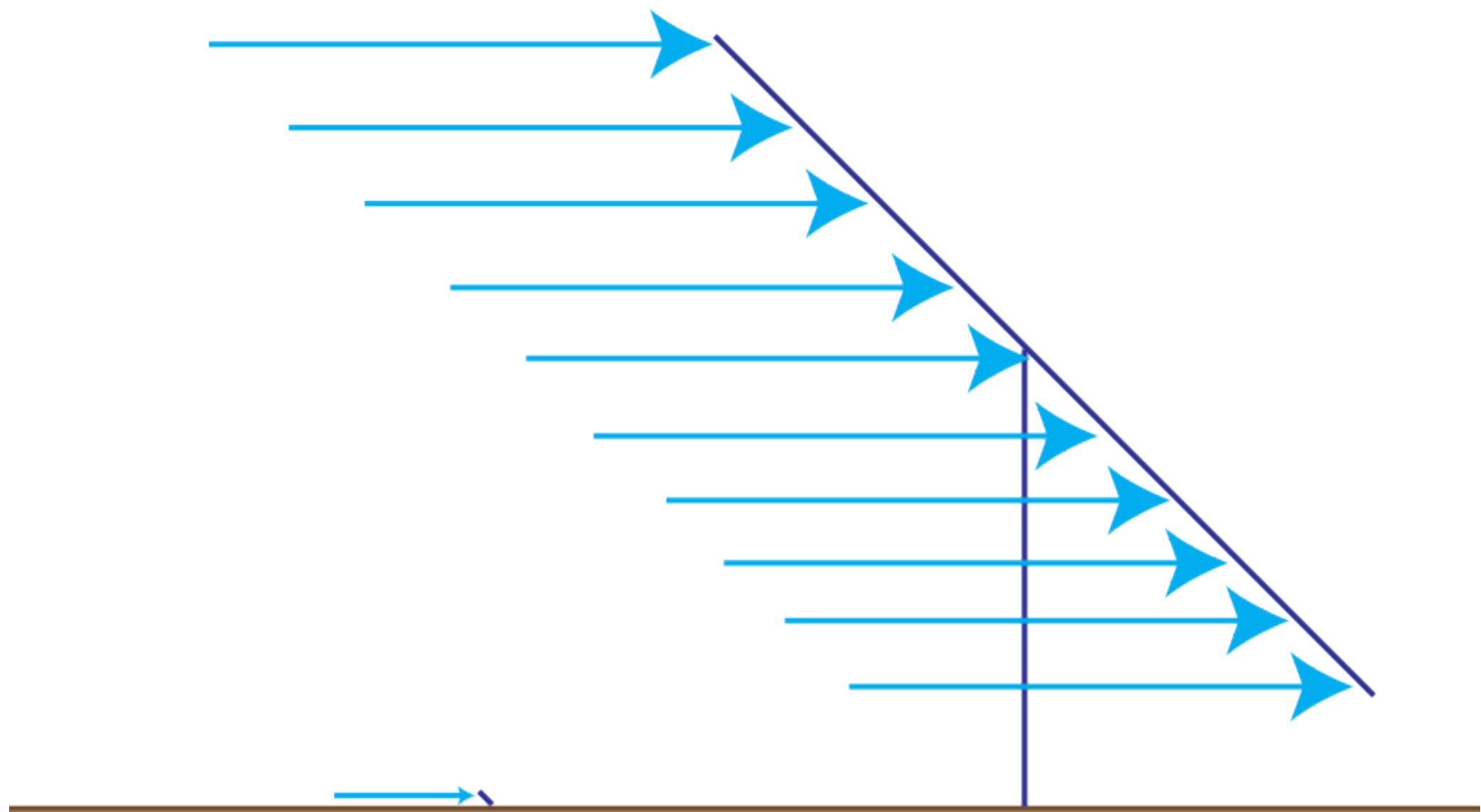
Key Risks

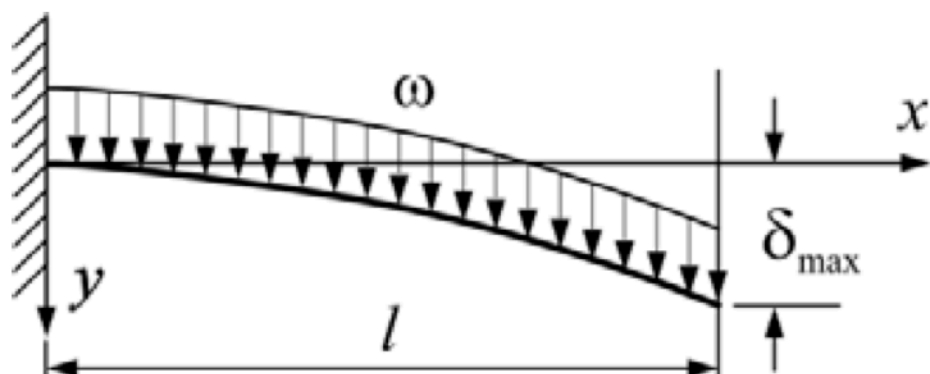
Potential Impact

DOE/ARPA-E Deliverables









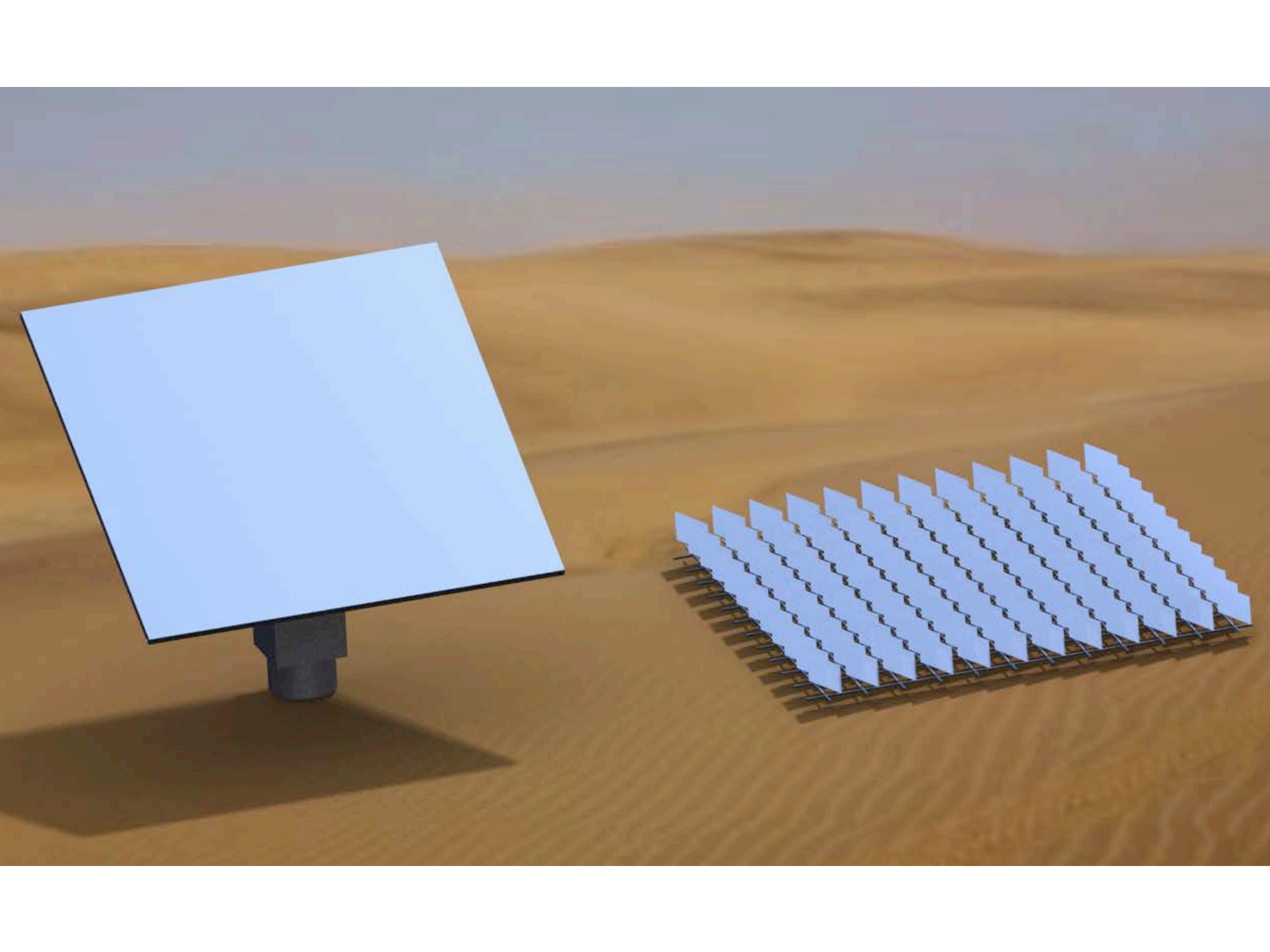
$$\theta = \frac{wL^3}{6EI}$$

$$I = \frac{bt^3}{12}$$

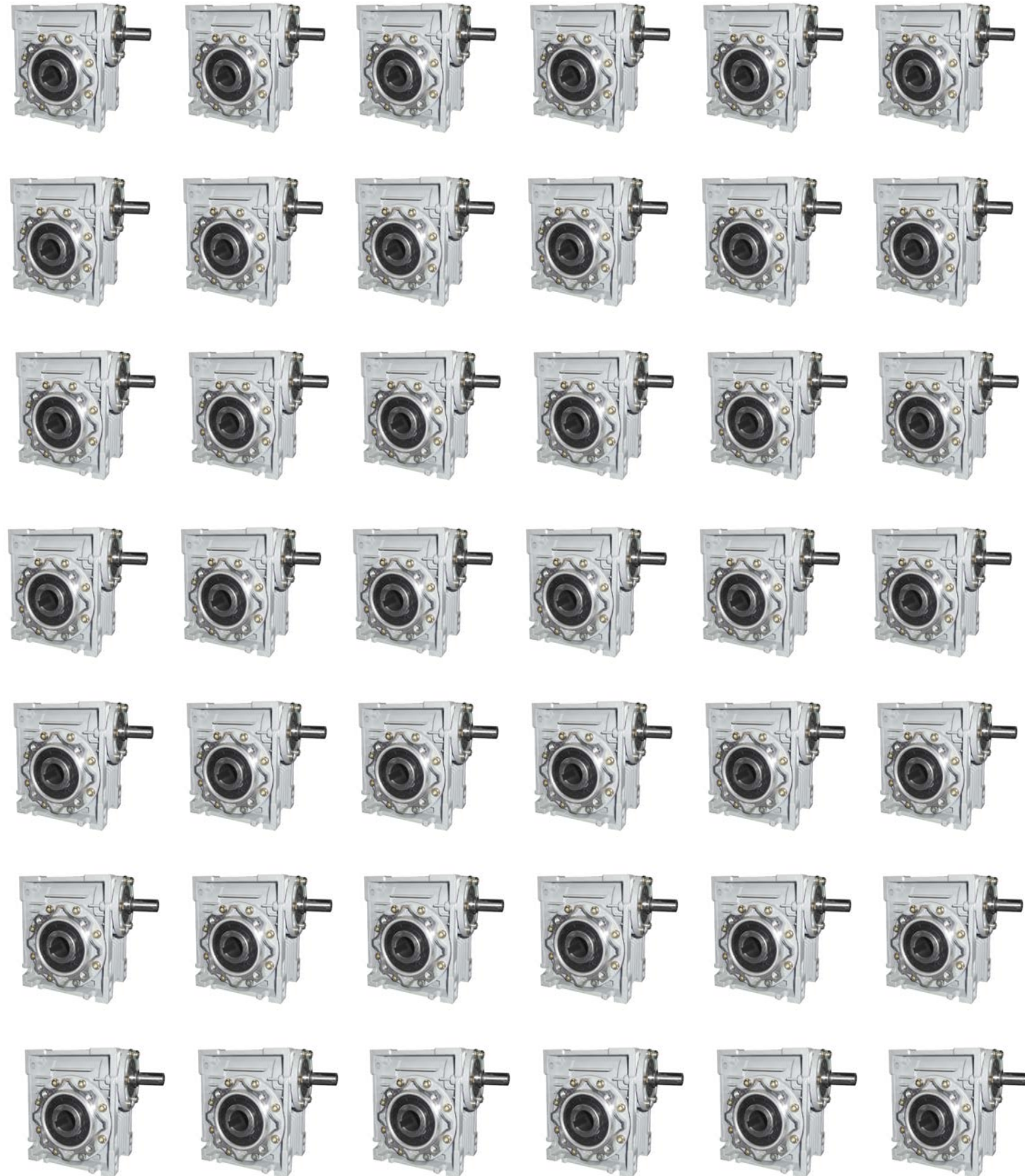
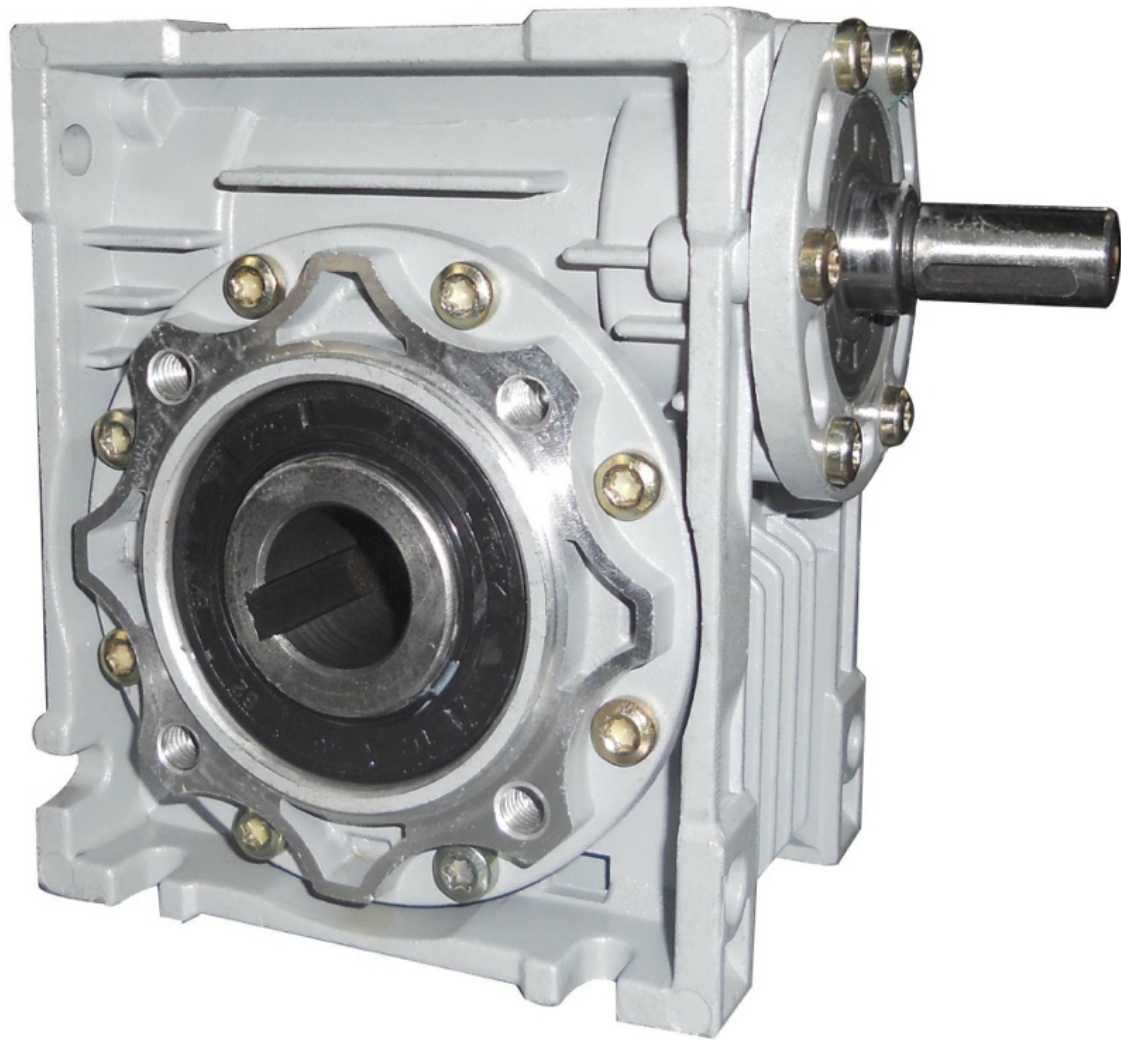


$$t \propto L$$

$$v_{\text{wind}}(z) = v_0 \left(\frac{z}{z_0} \right)^\alpha$$



Drives don't scale



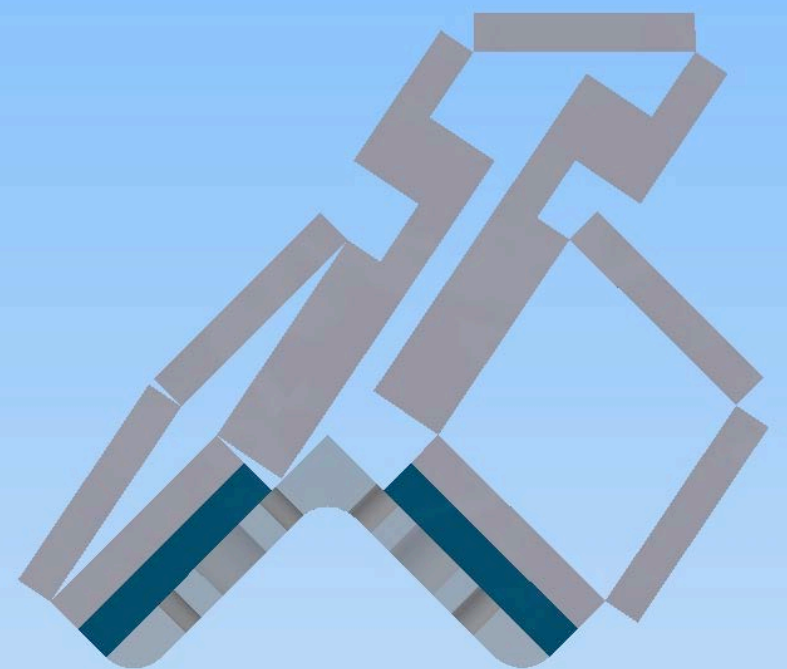
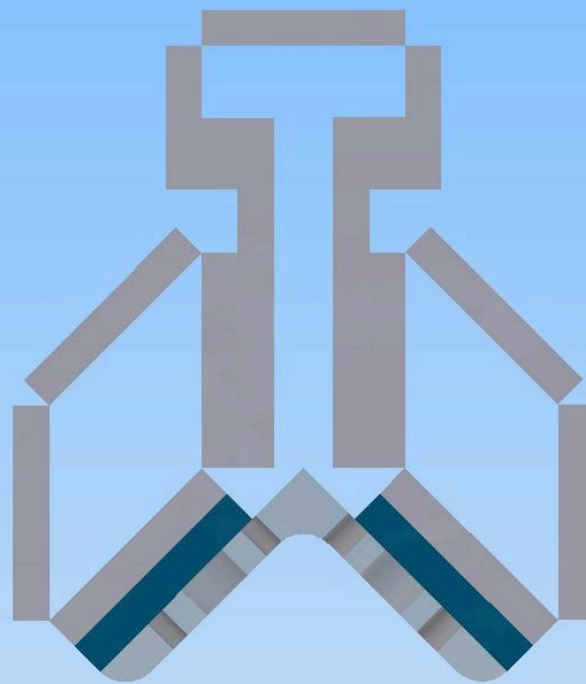
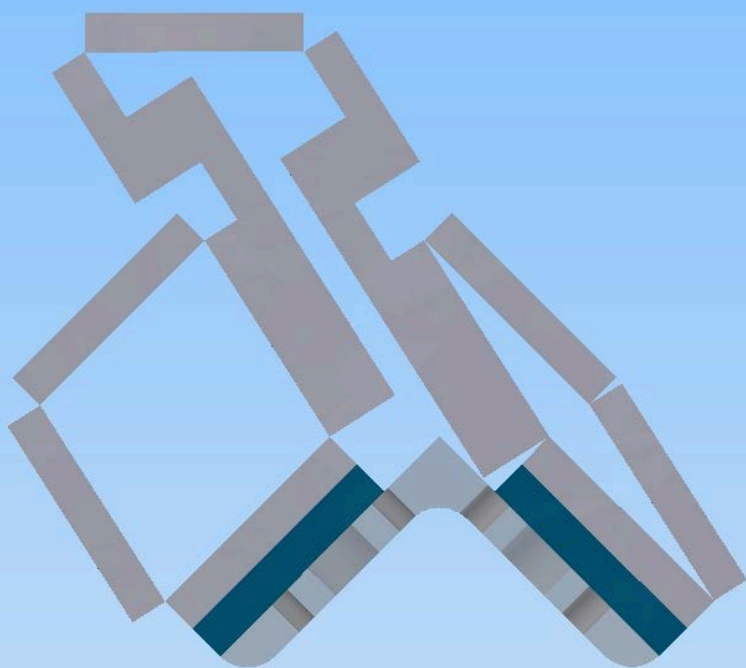
Low cost, high volume industries



Mass Manufacturing

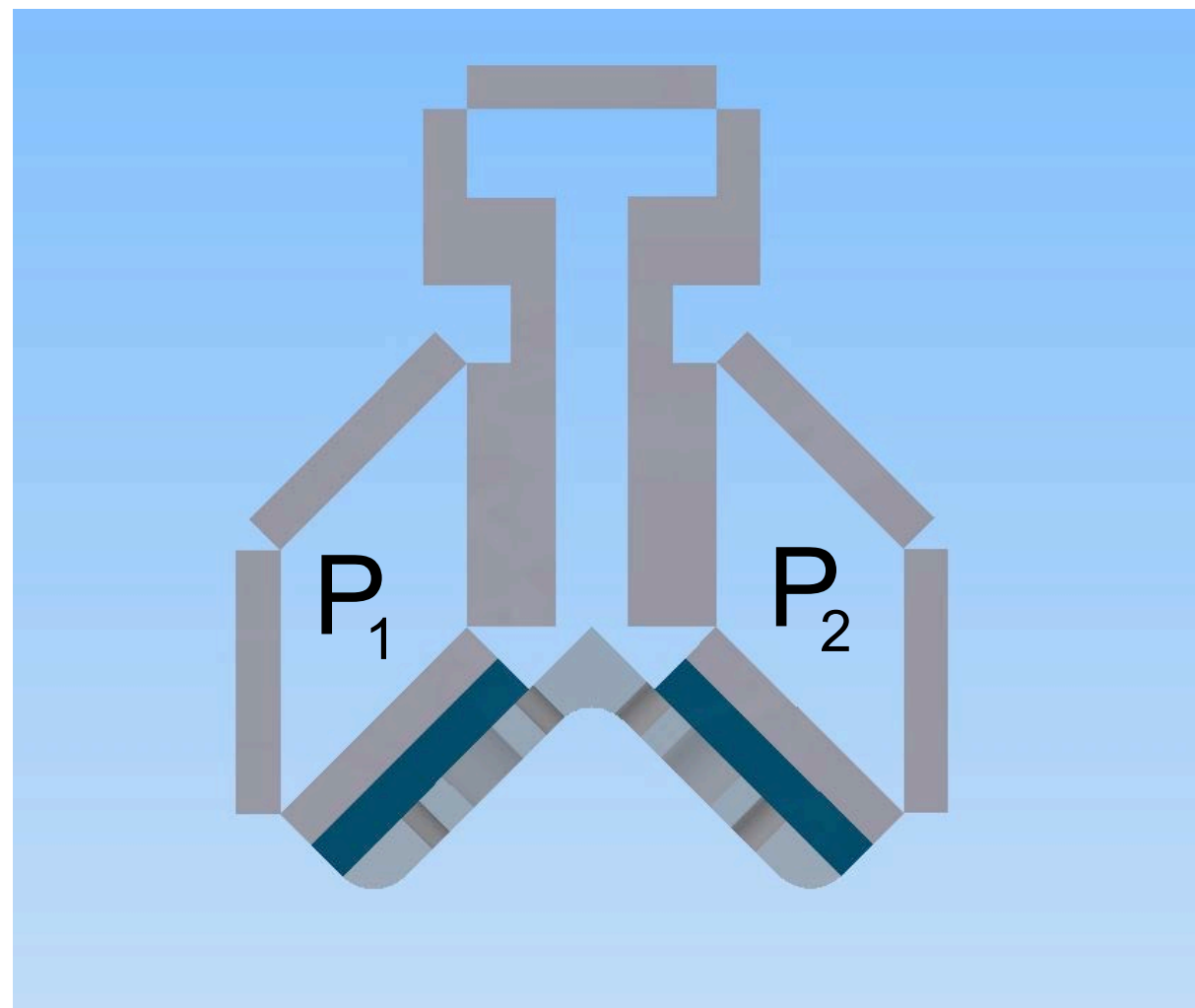


A new class of
pneumatic actuator.



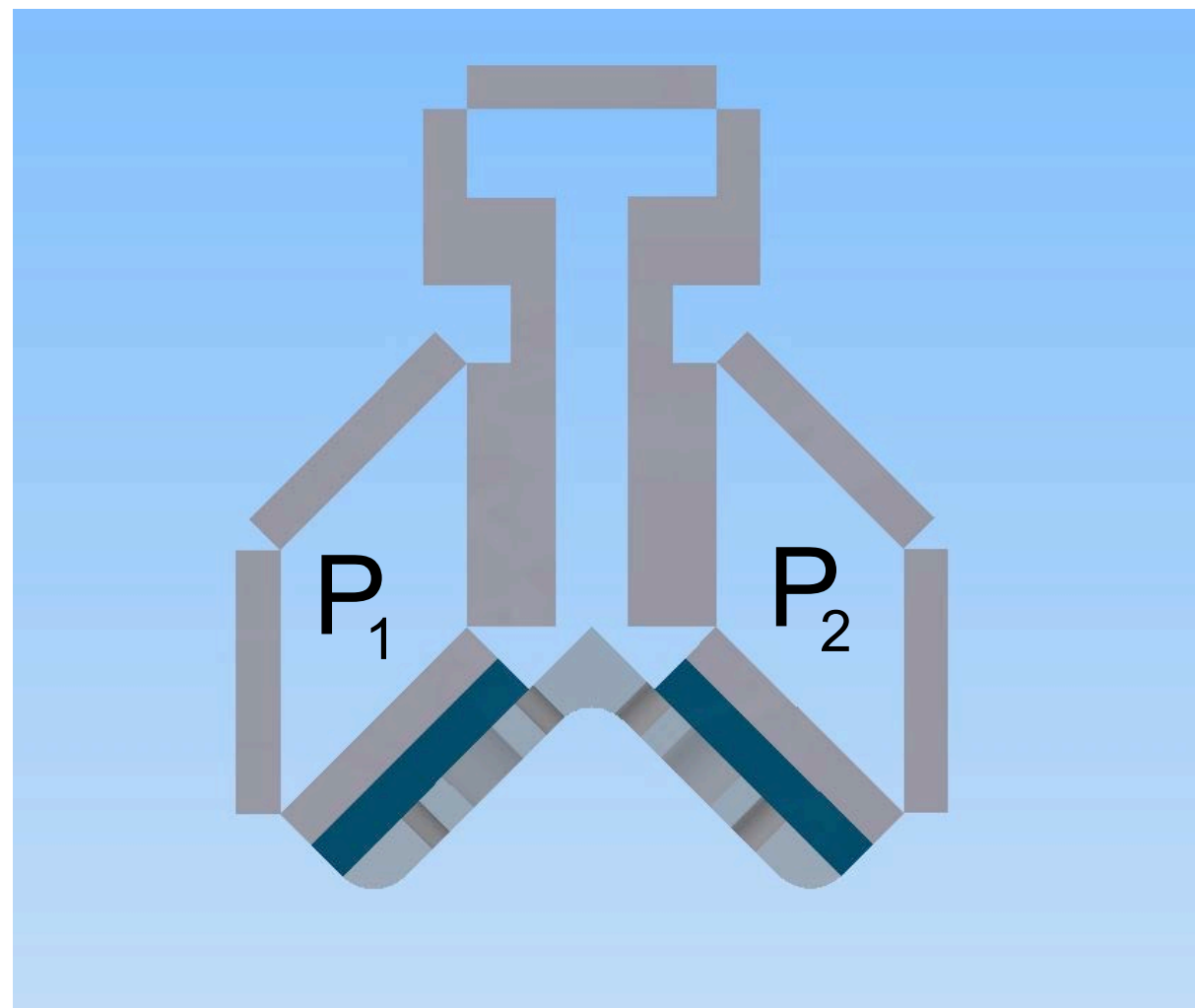
Mirror
Angle

$$\propto \frac{P_2}{P_1}$$



Mirror
Angle

$$\propto \frac{P_2 * K}{P_1 * K}$$



Benchtop prototype:



Heliostats: State of the Art

Motivation: Direction for Disruption

Innovation: Otherlab's Approach

Key Risks

Potential Impact

DOE Deliverables

Key Risk: Endurance of polymers

Risk	Mitigation
Environmental wear: Temperature, UV, sandblasting	Robust, Outdoor Polymers Early environmental tests
Flexural Endurance	Flexural hinge lifetime: millions- billions of cycles typical (Fearing et al) Required lifetime: <20K cycles



Otherlab