KINKAJUICE : HUMAN POWERED GENERATOR

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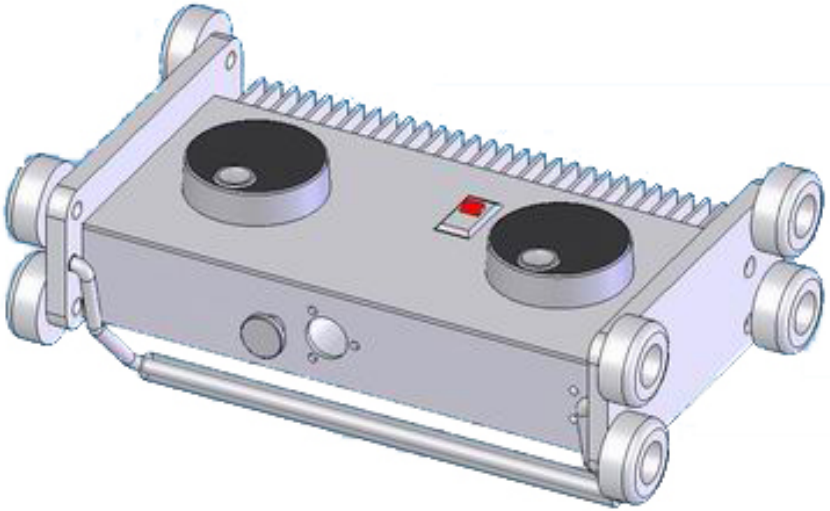
THE CLIENT

Kinkajou Microfilm Projector (projected 10,000+ units)

THE NEED

5-15 Watt Off-Grid Power Supply

- lightweight
- portable
- durable
- environmentally conscious
- reliable
- cost effective ($25 target)
- 10:1 use to charge ratio



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THE POWER REQUIREMENTS

Voltage	12 V DC
Current	1.0 A
Min. continuous duty cycle	2 hrs
Reliability	10,000 hrs MTBF

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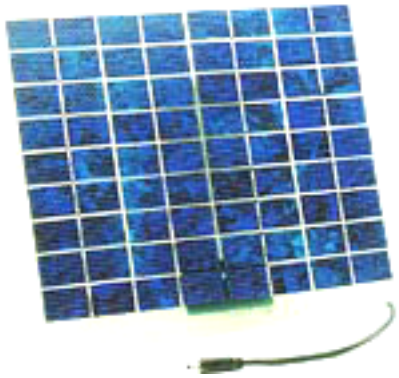
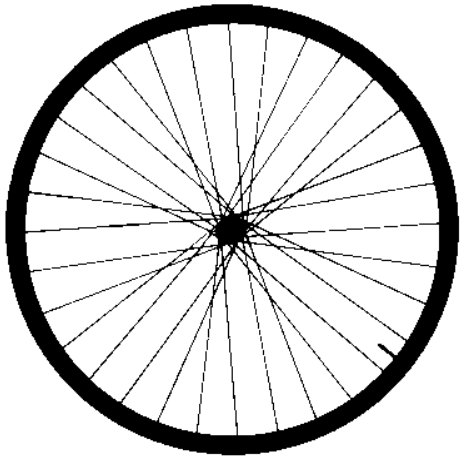
INVESTIGATED POWER SUPPLIES & CONS

15 W Solar Panel	Cost ($130 total)
Bicycle powered generator	Low reliability, overall size
Hand crank	3:1 use to charge ratio





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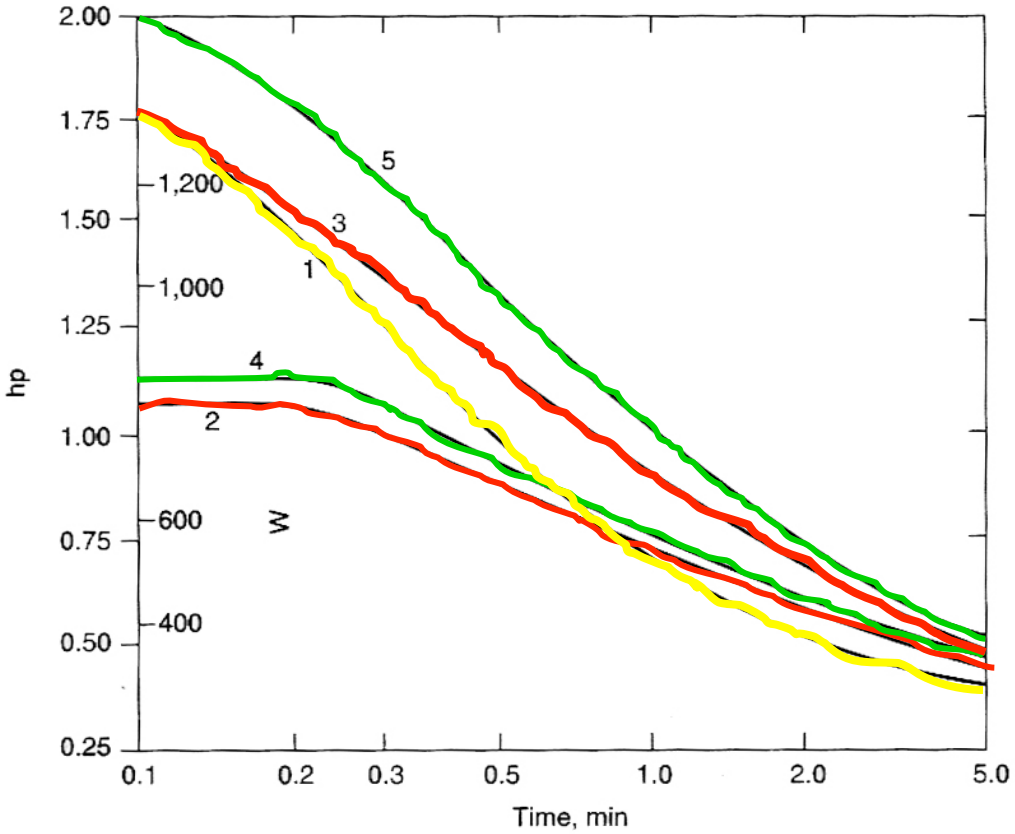
BICYCLING VERSUS ROWING



Source: *Bicycling Science,* David Gordon Wilson

- **Curve 1 – cycling**
- **Curve 2 – free rowing w/ fixed feet**
- **Curve 3 – forced rowing w/ fixed feet**
- **Curve 4 – free rowing w/ fixed seat**
- **Curve 5 – forced rowing w/ fixed seat**

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THE TYPICAL ROWING MACHINE

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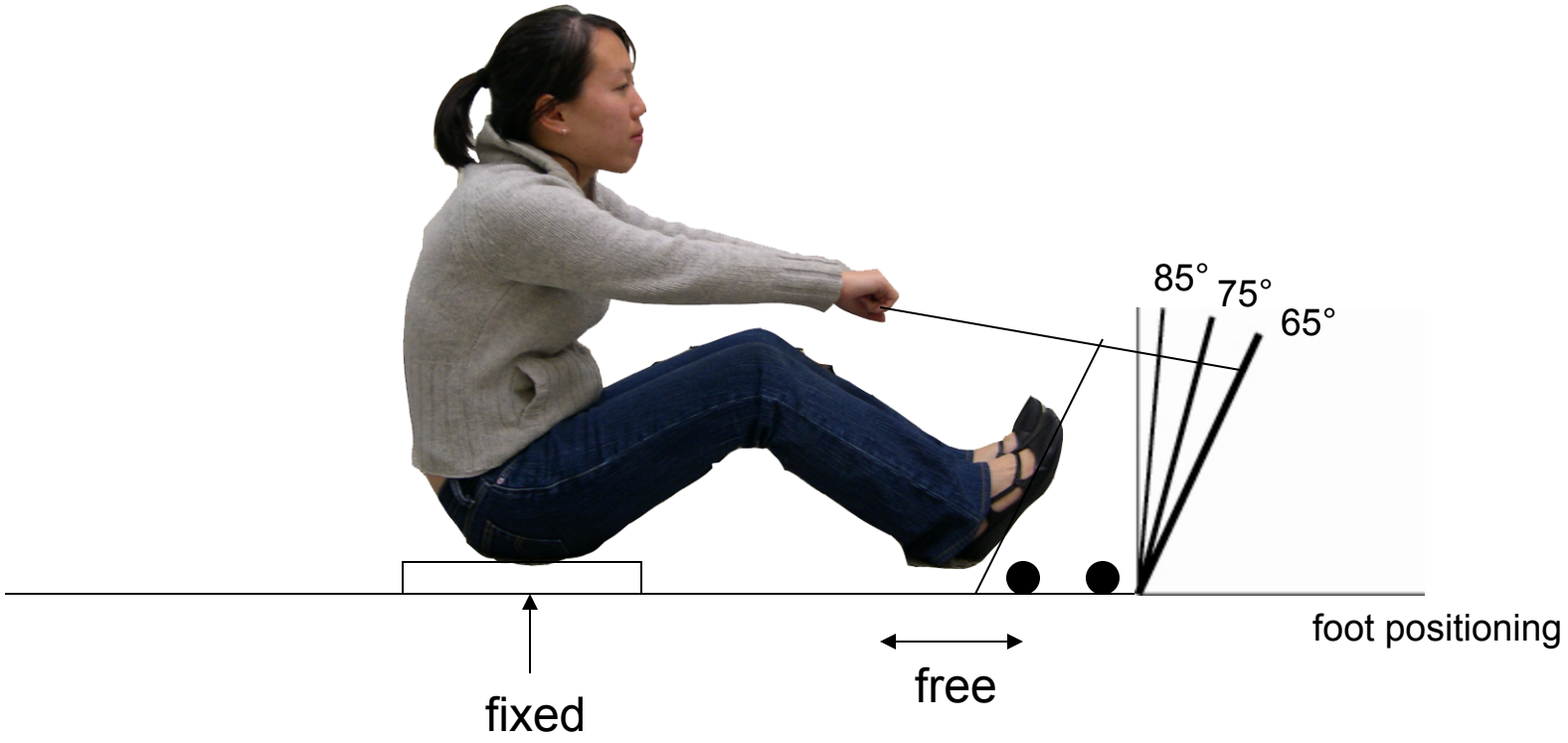
REDESIGNING THE TYPICAL ROWING MACHINE



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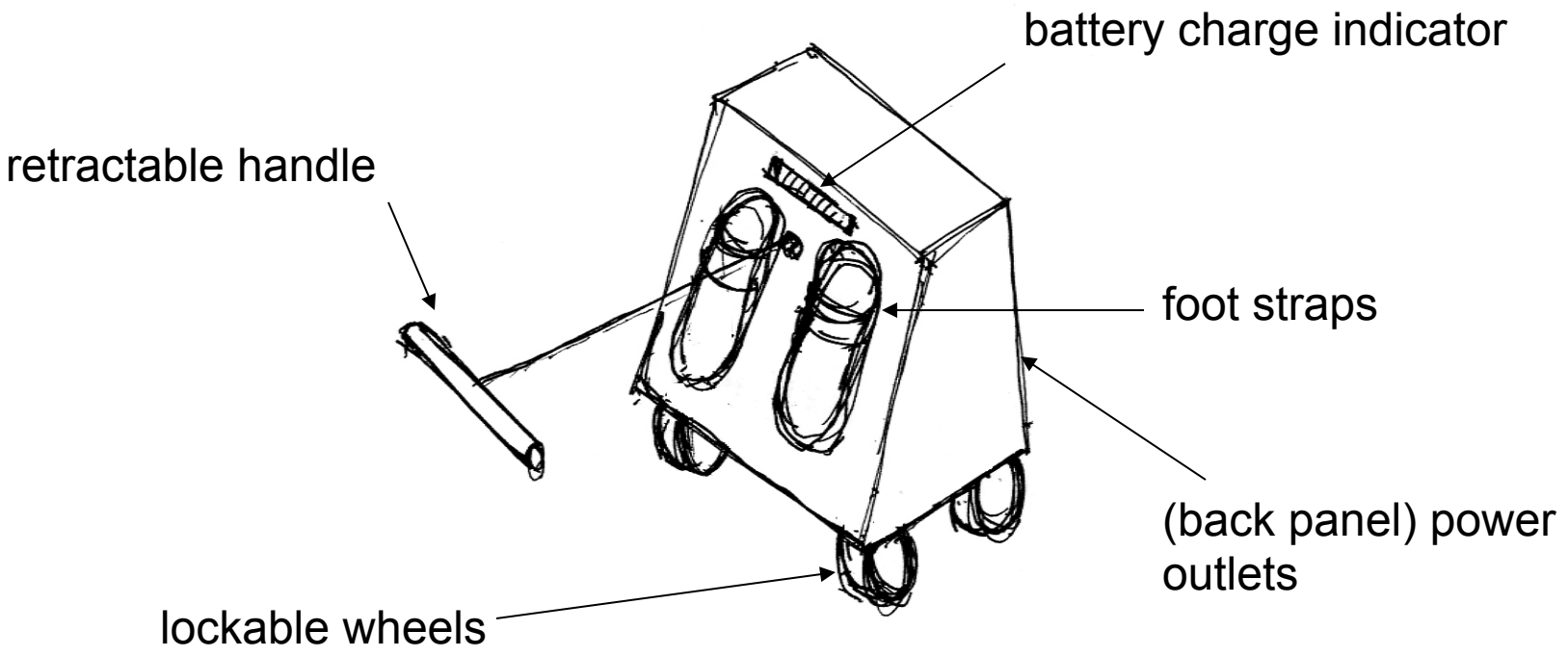
THE PRELIMINARY DESIGN



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THE PRELIMINARY DESIGN