ORANGE TEAM

ENERGY EFFICIENT REFRIGERATION

VACCINE REFRIGERATOR

OVERVIEW OF IDEA:

- **One in four children born each year does not receive proper immunization**
- **Three million of these will die due to vaccine-preventable diseases**
- **Lack of immunization causes ~8,000 deaths a day**

VACCINE REFRIGERATOR

APPROACH:

- **Existing vaccine refrigerators:**

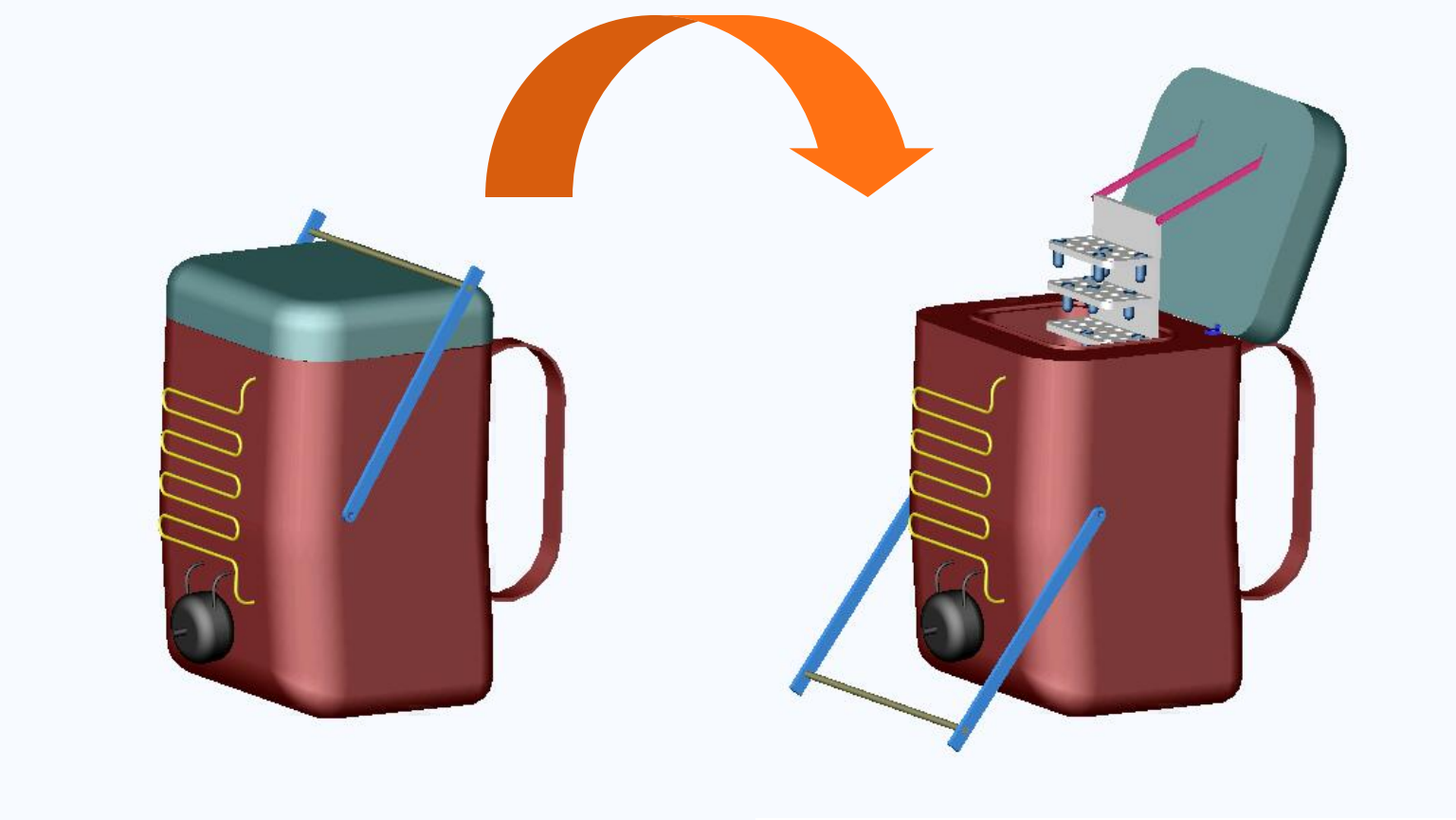
  Marginally portable (need wheels or animal to transport)

  Use high cost solar cells and need battery replacement

- **Our idea:** **Backpack refrigerator**

  Continuous power generation

VACCINE REFRIGERATOR



VACCINE REFRIGERATOR

TECHNICAL FEASIBILITY:

- **COP ~ 1.5**
- **Power input = 3W (comes to ~56 min. pumping per day)**
- **Time to cool air$_{100F - 38F}$ ~ 20sec. pumping**
- **Target weight of backpack < 30lbs.**

MARKET:

- **Non-profit organizations that immunize villages and communities in the third world by going door to door.**
- **$30,000 per year: average amount spent by a developing countries on cold chain supplies**