D-Lab Development
2009.10.13
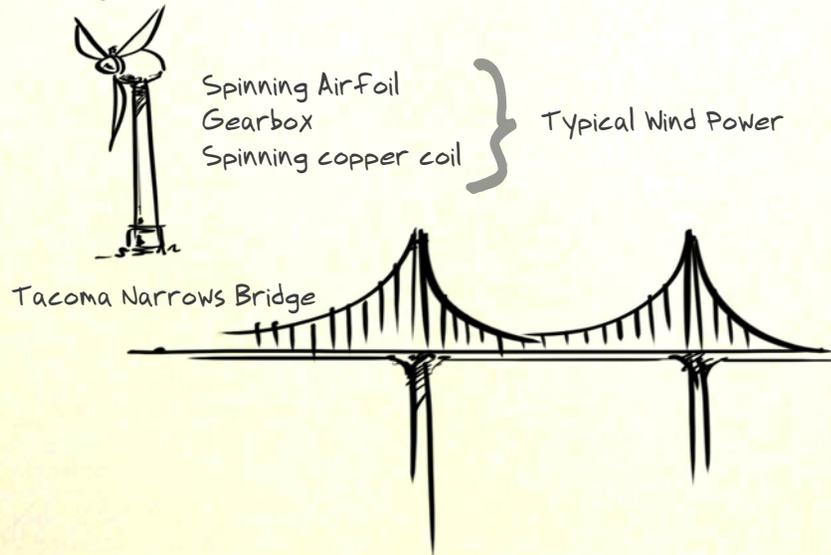
Sean Frayne | Wind Power
HUMDINGER WINDBELT

1. Know your resource
   - How much power is available in a given area
   - commercial viability - Standard of reality
   - solar example of current room

SMALL SCALE
   energy is what matters, not power (electricity)

Spinning Airfoil
Gearbox   } Typical Wind Power
Spinning copper coil

Tacoma Narrows Bridge

Windcell w/o Gears
   go where wind + solar can't go
   - result of design challenge of wind energy in Haiti
   - maybe 10-15 windcells could power your house

- Wind Belt @ 1 Meter scale starts to effect performance
      - aluminum @ 1m can ... tweak (?)
- Vorticy shedding not main part of system power capturing
- Expected to have about 25 year life with current materials

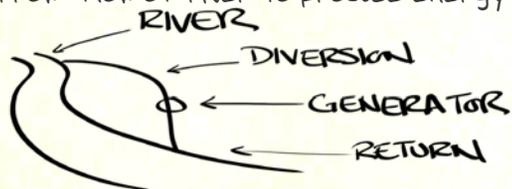Rapid Prototyping Windbelt
   square tube with holes popped out the side
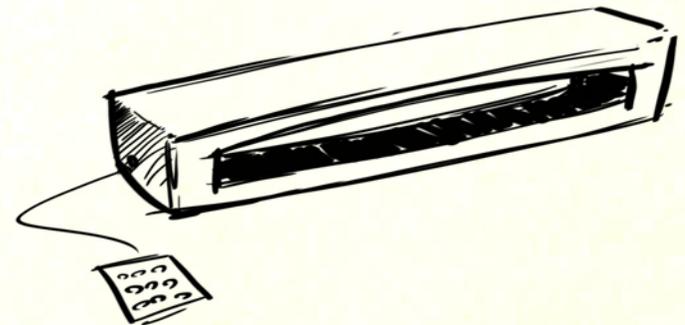
Pete Haas | Water Power
AIDG

Introduction to Microhydro
        (sub 100kW electric system)

-How it Works
        "Borrow" flow of river to produce energy

RIVER
DIVERSION
GENERATOR
RETURN

Most complext part: Load Controller
        - consider low and peak usage
        - electrical power is mechanical load on turbine
                Dump Load   ->   Light/Heat
                (excess load)
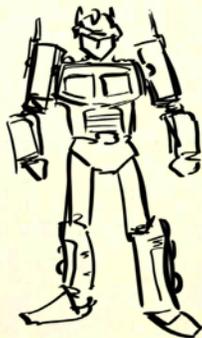AC or DC Choice - depend on the size of system
        Sub 500W - DC
        AC advantage: larger transmission length

-Remember one formula to calculate the power of system
        Head x Flow X Gravity x Efficienty (assume 51%) = P

- Balancing Safety vs. Cost

- Distribution -> Professionals : Transformers

SP.721 / 11.025J / 11.472 D-Lab I: Development

Fall 2009