

# The How-To Guide for Light Industrial Microbusinesses

Startup strategies, retrofitting your facility,  
and the dawn of the “Eco Shop”

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# My background

- Grew up working for my mother's small business
- Have operated my own small business since the age of 15, Capital Players ([www.capitalplayers.com](http://www.capitalplayers.com))
- Architectural Engineering major with a minor in Violin Performance
- Plan to pursue a Master's Degree in Building Science/Technology

# In interdisciplinary look...

- Entrepreneurial recommendations from local business owners
- Building performance knowledge
- Green construction methods
- Sustainable building practices

# Put these together...

- An instructional guide for the budding entrepreneur in the industrial building sector
- Why green building & sustainable business practices will save you money

# Startup strategies

- Your product & your niche
- Intellectual property
- Paperwork, codes, and policies
- \$\$\$: taxes, government incentives, capital, and loans
- Equipment
- Insurance
- Employees
- Marketing
- Internet presence
- Keeping customers: IT infrastructure

# Why should I build green?

- Buildings consume 70% of our country's energy and emit 38% of our CO<sub>2</sub>
- Government incentives & tax breaks
- Green building certification is a marketable characteristic
- A business is at its most vulnerable when it is a startup: saving money is a must!
  - 2% upfront → 20% savings
  - By not building green, you are throwing money away
    - More money saved = more capital to reinvest into your business

# The Sustainability Pyramid

Reduce. Lower your consumption of energy.

- Size your building appropriately.
- Make your building tight.

**2. Be efficient.**

- Upgrade mechanical systems and appliances.
- Use LED light bulbs, high-performance windows, etc.

**3. Produce.**

- Wind turbines, solar panels, wood stoves, etc.



# The EcoShop

- A retrofitted or newly constructed workshop/warehouse that implements sustainable construction practices and green building methods, resulting in high performance and better working atmosphere.



# How do I build an Eco Shop?

- If you have a retrofit project...
  - Insulate
  - Install more efficient appliances
    - Windows, light bulbs, compost toilets
  - Water catchment
  - Improve IAQ through better ventilation
  - Recycle and compost

# How do I build an Eco Shop?

- New construction project...
  - Solar orientation
  - Smart glazing (and shading)
  - Thermal mass
  - Materials & coatings
    - Embodied energy
    - Paints, stains, solvents, wood, & plastic
  - Insulation & Insolation

# Efficient Systems

- Water
  - Greywater
  - Composting toilets
- Window
  - Smart placement
  - Operability
  - U-factor & SHGC
- Air
  - Redefine 'comfort zone'
  - IAQ
    - Ventilation & filtration
- Lighting
  - Daylighting
  - Task lighting vs. ambient

# Power Generation

- Wind turbines
- Photovoltaic cells
  - Hot water or electric
- Geothermal
- Wood stoves

# Recycling & Composting

- Construction waste
- Manufacturing waste
- Biodegradable waste → Compost
- Storage & disposal of volatile products

# The Real Proof: Cost Analysis

- Light bulbs
  - Incandescent
    - Power use: 109.5 kWh/year
    - Heat loss: \$121.50/year
  - CFL
    - Power use: 29.2 kWh/year
    - Heat loss: \$10.80/year
    - **Savings: \$110.70/year**
    - **Payback period: 290 days**

# The Real Proof: Cost Analysis

- Insulation

- R-13

- \$1.11/m<sup>2</sup>/year
    - Adds up to \$111.00/year

- R-40

- \$0.36/m<sup>2</sup>/year
    - Adds up to \$36.00/year
    - **Savings: \$75.00/year**
    - **Payback period: 3.2 years**

# The Real Proof: Cost Analysis

- Windows
  - Single-pane
    - \$10.95/m<sup>2</sup>/year
    - Adds up to \$219.00/year
  - Double-pane
    - \$4.97/m<sup>2</sup>/year
    - Adds up to \$99.51/year
  - Superwindow
    - \$1.40/m<sup>2</sup>/year
    - Adds up to \$28.03/year
- **Payback periods:**
  - **Single to double: 33.6 years**
  - **Single to super: 37.8 years**
  - **Double to super: 100 years**



# Thank you

- Dr. Tony Denzer
- Cheryl Campbell
- The EPSCoR program
- Laramie businesses
- Mark Schimelpfenig

**Any  
questions?**