

Where are California's Green Jobs?

Four *Simple* Recommendations

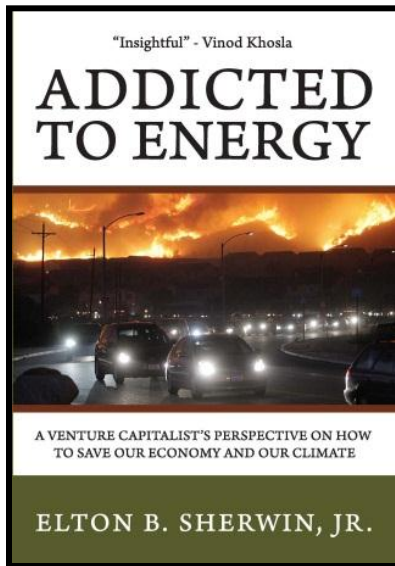
any state can implement

to Create Full Employment



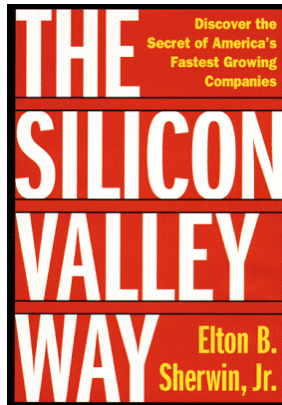
Elton B. Sherwin
Sr. Managing Director
Ridgewood Capital

Author of
The Silicon Valley Way and
Addicted to Energy



Letter to a fictional governor

- 70 recommendations for state policy
- Job creation

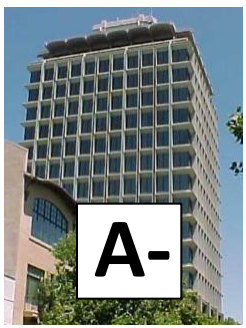


Previous Book

- Creating new products
- Creating new companies

Four Recommendations Job Creation

- All create sustainable jobs
 - Don't require ongoing subsidies
 - Involve no new taxes
- Permanent, new jobs
 - Reduce structural unemployment
- Wealth creating: businesses, homeowners and for our children.



Recommendation

#1

Grade Every Building in the State

A+ to D-

Based on Energy Consumption



And publish
the grades

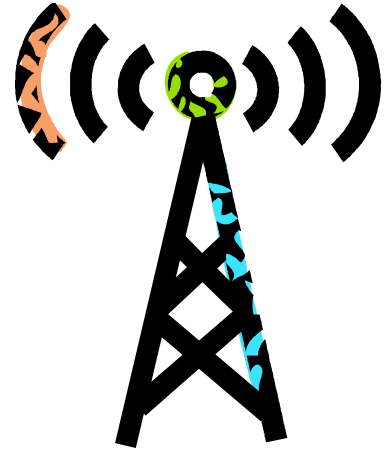
1 Main St. D-

2 Main St. A-

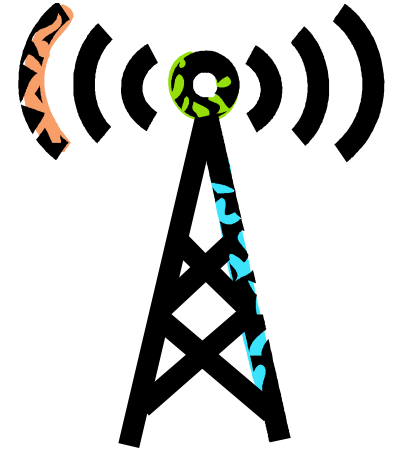
Unexpected Question in a Radio Interview

If the President called you today and asked for your advice:

“Elton, how do I create millions of jobs quickly?”



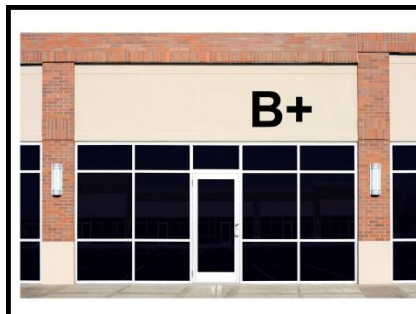
I answered:



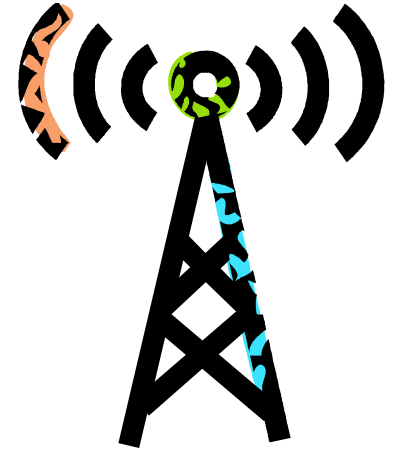
“Publish every utility bill in America on the Internet.

“Grade every building A to F.

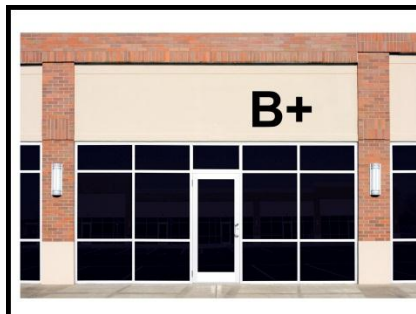
“Post the grades on the front of every building.”



I forgot to start with:
“Mr. President.”



The White House
never called.



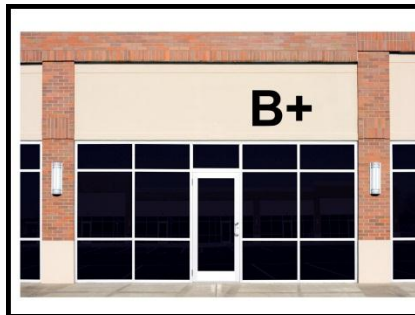
My Answer was Criticized

- Email feedback:
 - I don't want my home's utility bill public.



Refine the Thought

- Don't disclose utility bills
- Disclose the grades
 - Homeowners can opt out

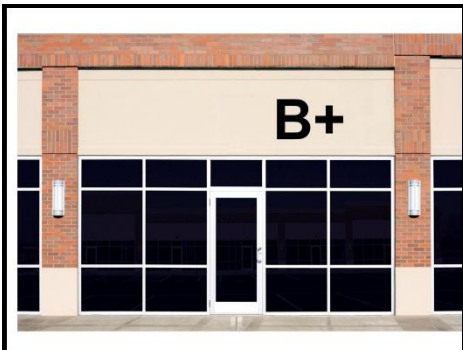


Thought Experiment

What *would* happen

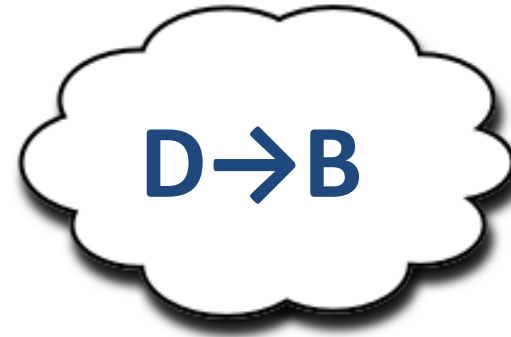
- Graded every building in California A+ to D-
- Posted grades on front door and Internet

1 Main St. D-
2 Main St. A-



Based on actual energy consumption per square foot and per person.

Grade and Disclose



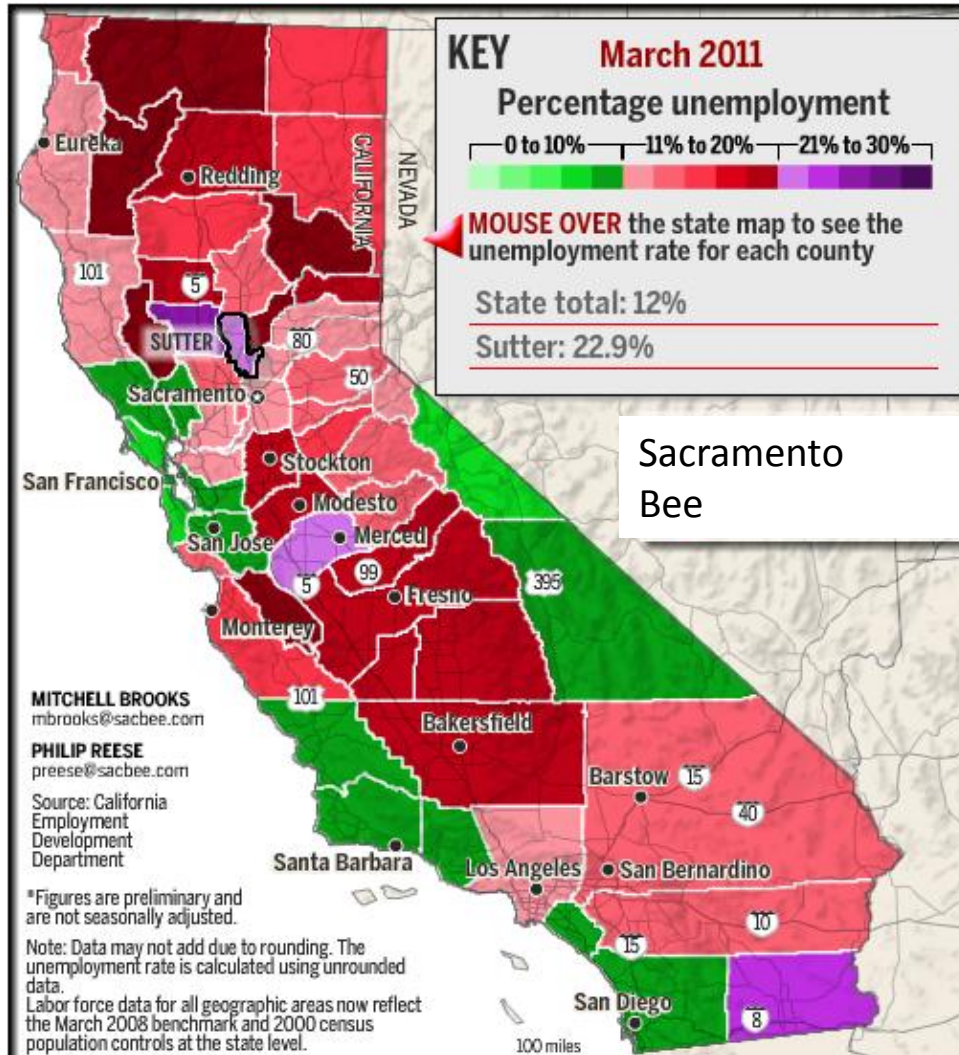
Lots of upgrading:

- HVAC
 - Windows
 - Insulation
 - Lighting
 - Pumps
- Create blue and white collar jobs
 - Auditors: short supply
 - Lower utility bills
 - Send less money out of state to buy natural gas and coal-generated electricity



Increased investment

Unemployment Would Go Down



Many counties would benefit:

San Bernardino

Trinity

Madera

Imperial

Riverside

Shasta

Fresno

Kern

Sutter

Lake



Sherwin's Law

“When performance is *graded*
performance *improves*.

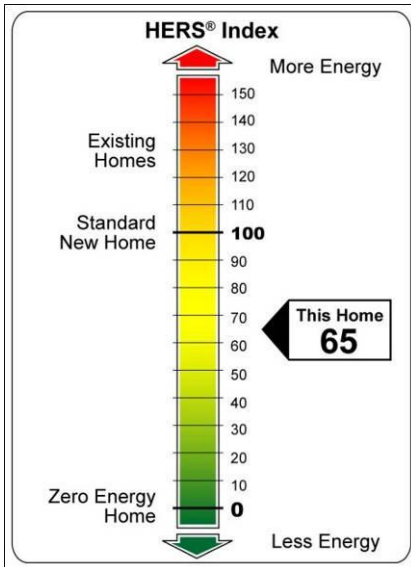
When grades are published,
the rate of improvement *accelerates*.”

Using letter grades: A+ to D- based on actual energy
consumption per square foot and per person.



Phrasing adapted from Thomas S. Monson

Analyzed 17 Building Rating Systems Around the World



European Unions Energy Performance Certificates

UK Display Energy Certificates

LEED – New Construction

LEED – Health Care

ENERGY STAR – Commercial buildings

ENERGY STAR homes

PlaNYC (**New York City**)

Australia's Greenhouse Rating

HERS

ASHRE EQ

CALGreen level 2

California AB 1103

California AB 758

DOE home energy scoring pilot

Passive Home Certification

City of **Seattle**

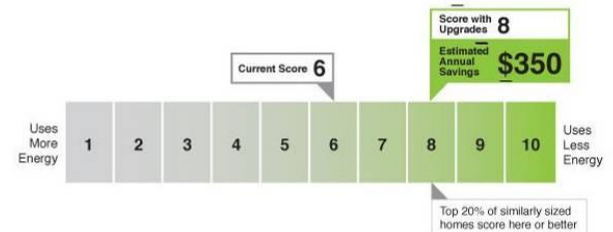
San Francisco



Energy Efficiency Rating

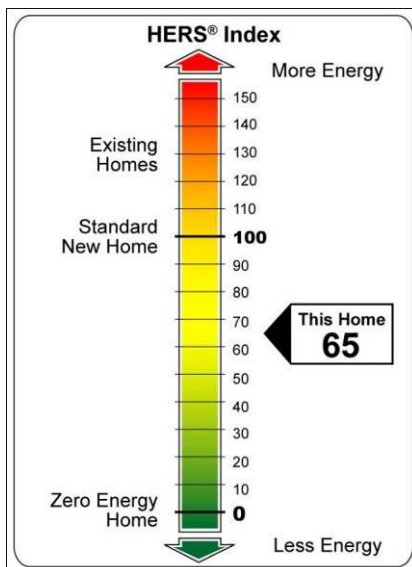
	Current	Potential
Very energy efficient - lower running costs		
(92 to 100) A		
(81 to 91) B		
(69 to 80) C		
(55 to 68) D		
(39 to 54) E		
(21 to 38) F		
(1 to 20) G	19	22
Not energy efficient - higher running costs		
England & Wales	EU Directive 2002/91/EC	

CALGreen

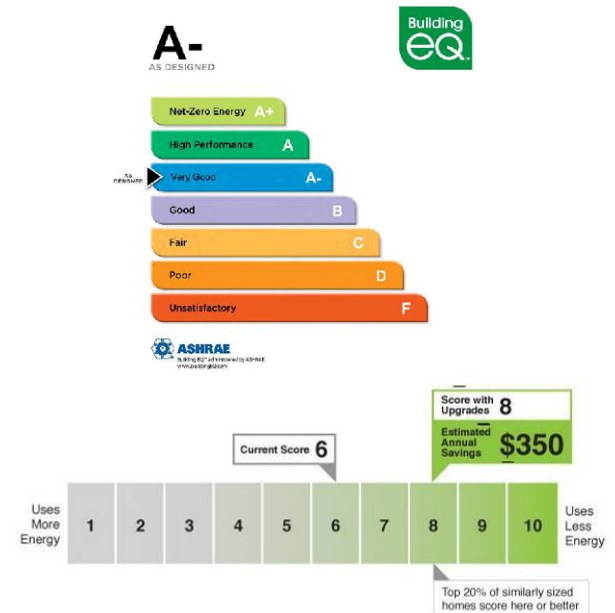


Which Will Motivate the Most Effective Investment?

Which Would Create the Most Jobs?



Energy Efficiency Rating		Current	Potential
Very energy efficient - lower running costs			
(92 to 100)	A		
(81 to 91)	B		
(69 to 80)	C		
(55 to 68)	D		
(39 to 54)	E		
(21 to 38)	F		
(1 to 20)	G	19	22
Not energy efficient - higher running costs			
England & Wales		EU Directive 2002/91/EC	



Everyone Wants a Report Card

When I spread all the different ratings on a table and ask, “Which system do you want for your house?”

Everyone picks this one:

	J	F	M	A	M	J	J	A	S	O	N	D	YTD
Total Energy													
Per sq. ft.	C+	C-	C	C-	D								C-
Per person	B-	C	B-	C	D+								C
Gas													
Per sq. ft.	C-	D	C	D+	D-								D+
Per person	C	D+	C+	C-	D								C-
Electricity													
Per sq. ft.	B-	C	C+	C-	D+								C
Per person	B	C+	B-	C	C-								C+

YTD is Year-to-date

Grades Motivate Change

Monthly grades are especially powerful

	J	F	M	A	M	J
--	---	---	---	---	---	---

Total Energy

Per sq. ft.	C+	C-	C	C-	D	
Per person	B-	C	B-	C	D+	

Gas

Per sq. ft.	C-	D	C	D+	D-	
Per person	C	D+	C+	C-	D	

Electricity

Per sq. ft.	B-	C	C+	C-	D+	
-------------	----	---	----	----	----	--

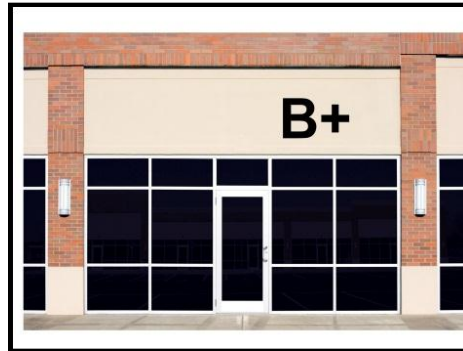
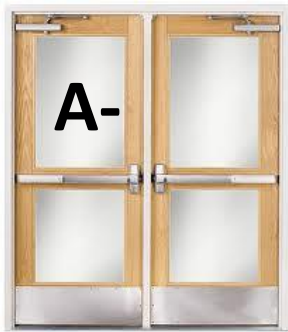
Grade Every Building in the State Publish the Grades on the Internet

- One year of grace
- Allow homeowners to opt out*

1 Main St. D-
2 Main St. A-

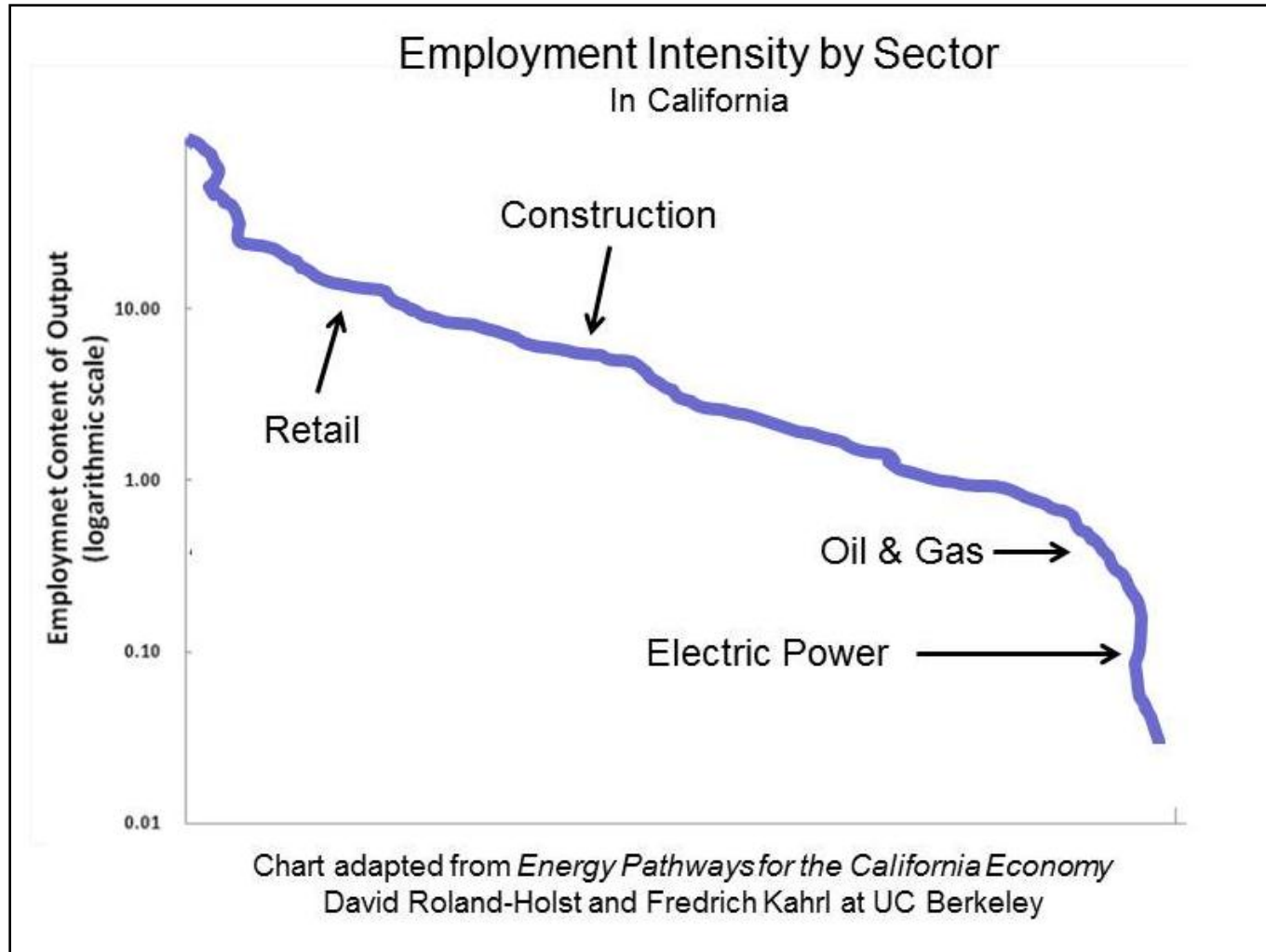
Send Window Stickers to the Best Buildings

- Window stickers are optional

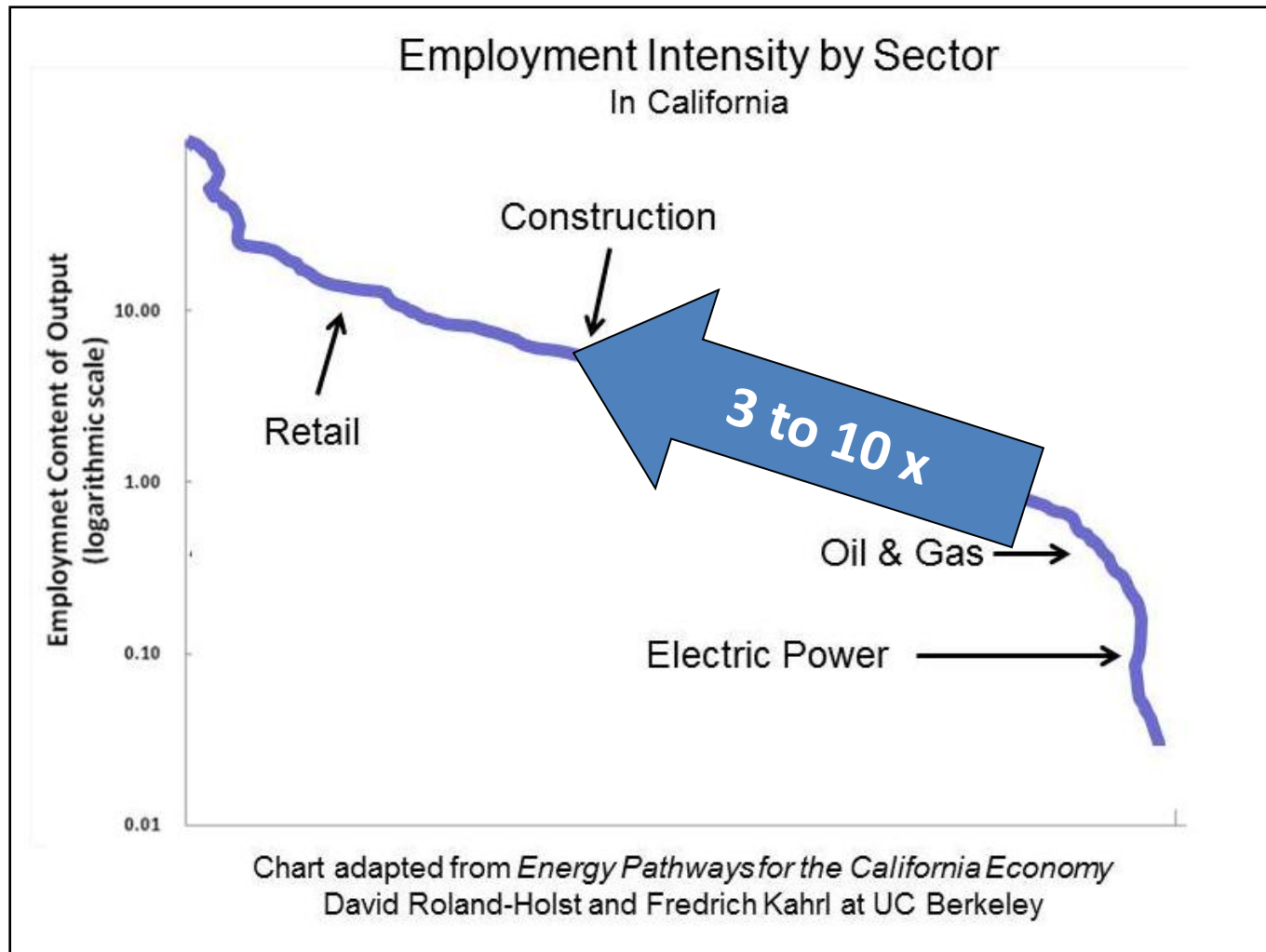


Internet disclosure and window stickers
will create a lot of jobs

Reduce the Use of Fossil Fuels and Electricity Creates a Lot of Jobs



Shift Away from Fossil Fuels and Electricity Create 3 to 10 Times as Many Jobs



Accelerate the Pace of Energy Efficiency: Over One Million Jobs Just in California

- HVAC mechanics and installers
- Plumbers, pipefitters, and steamfitters
- Electricians
- Machinists and welders
- Environmental scientists, specialists, and technicians
- Energy auditors and accountants
- Truck drivers and construction workers

One million jobs projected using numbers from *Renewable Energy and Energy Efficiency: Economic Drivers for the 21st Century*, by Roger Bezdek.

See appendix for more details.





Assembly Bill 1103

Assembly Bill 758

- Signed into law
- Not yet implemented
- Require benchmarking of buildings
 - Disclosure on sale



Assembly Bill 1103

Assembly Bill 758

- Important legislation
- Could be an engine of job growth
 - Added monthly grades and annual disclosure

1 Main St. D-
2 Main St. A-

	J	F	M	A	M	J	J	A
Total Energy								
Per sq. ft.	C+	C-	C	C-	D			
Per person	B-	C	B-	C	D+			
Gas								
Per sq. ft.	C-	D	C	D+	D-			
Per person	C	D+	C+	C-	D			

San Francisco's Groundbreaking Law

Create Jobs

Reduce Utility Bills

Annual
Internet Disclosure

All Commercial Buildings



High = 100

Low = 1

NY City has
passed a similar law



Energy used ÷ size of building

Adjusted by type: Office, hospital, etc.



D buildings consume about 60% of building energy

Objective: Move 80% of the *D* buildings to a passing grade by 2020.

<i>A</i> Top 20%		<i>B</i> Next 20%		<i>C</i> Middle 20%		<i>D</i> Bottom 40%	
A+	>95%	B+	75-79%	C+	55-59%	D+	35-39%
A	85-94%	B	65-74%	C	45-54%	D	25-34%
A-	80-84%	B-	60-64%	C-	40-44%	D-	<25%

Top 20% is *A*

- Top 5% is *A+*

Bottom 40% is *D*

- There is no *F*, just a *D-*

Compared with similar buildings in similar climates

- Homes with pools compared to homes with pools
- Hospitals with laundries to similar hospitals, etc.
- Ranked against the 2000 to 2005 data



**If This Doesn't Create
a Labor Shortage,
The Next Recommendation Might.**



Recommendation #2



Require Smart Lighting in *All* Commercial and Government Buildings

Smart lights:

- Off when empty
- Dim when sunlit



World's Leader in Smart Lighting Controls



- Fremont, California
 - Lumenergi*
- Reduce office lighting by 50% to 80%
 - Dim lights when rooms are sunlit
 - Turn off (or dim) the lights when empty



*Ridgewood is not an investor



What Percent of California
Office Buildings
Automatically Dim their Lights When
the Sun is Streaming Through the
Windows?

Less than 1%





I have never seen a lighting upgrade in California that did not pay for itself in reduced utility bills.

Smart Lighting Requirement



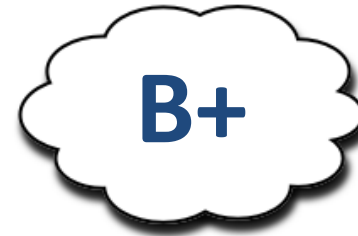
- All non-residential buildings
 - Dim lights when rooms are sunlit
 - Each fixture separately controlled
 - Turn off (or dim to 20%) the lights when empty
- Phase in
 - Shortage of electricians to do the retrofits
- Retrofits that pay for themselves

Summarize

First Two Recommendations

#1 Motivate with grades

- Grade monthly
- Disclose annually



#2 Install smart lighting controls

- Retrofit commercial buildings



We can do this.
It is not that hard.

Recommendation #3

Pop Quiz

What Consumes Half the Electricity in America?

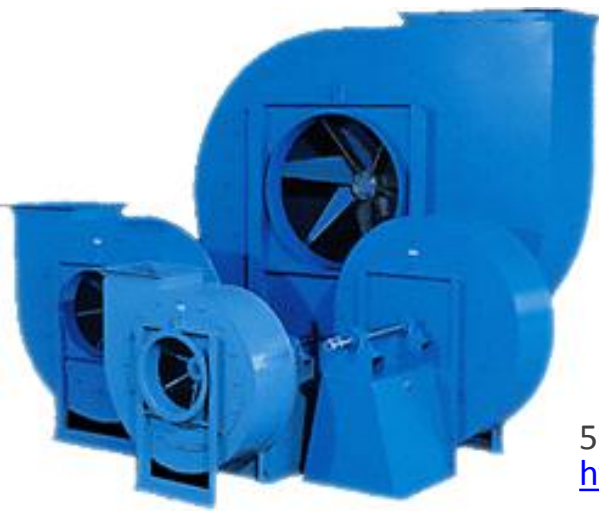
Clue:

It's not lights.



Electric Motors Consume About 50% of Electricity in U.S.

- Fans
- Pumps
- Compressors
- Air Conditioners

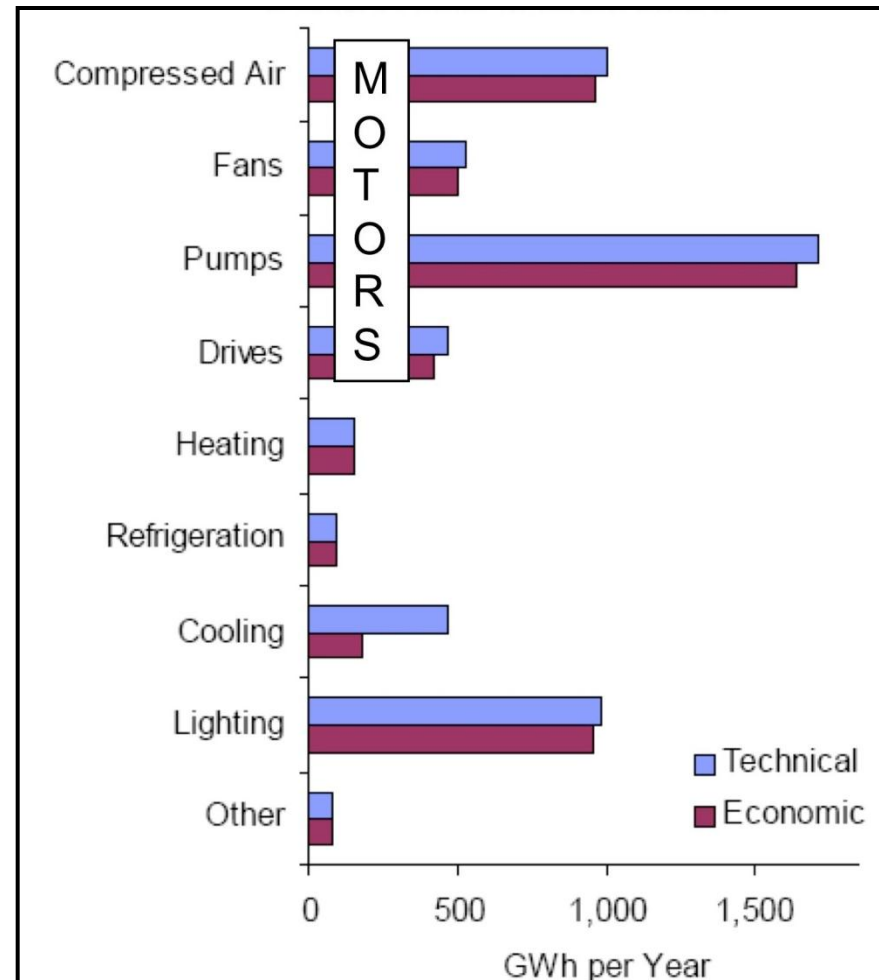


50% statistic from the US DOE:

<http://www1.eere.energy.gov/industry/bestpractices/pdfs/mc-0382.pdf>

Potential Electricity Savings for California Industries

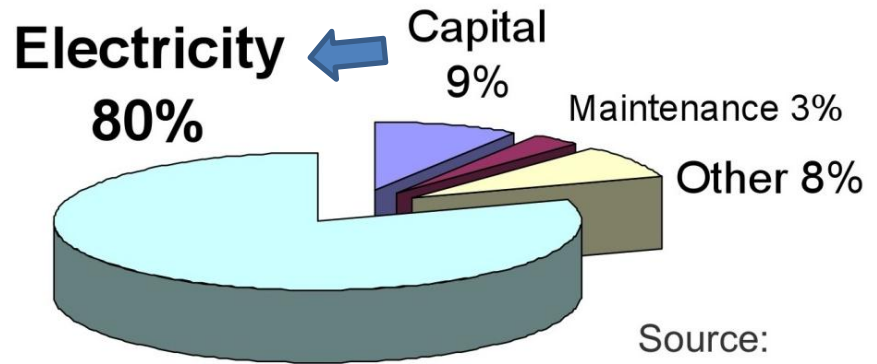
- Four of top five are motors
 - Water treatment plants
 - Factories
 - Office HVAC systems
 - Pools



Electric Bill Can Be *10 to 20 times* Cost of the Motor

- Like a car using \$500,000 in gasoline

Motors for Compressed Air Systems – Five Year Costs



Source:
www.ecompressedair.com

True in residential as well

The Best Pool Pumps

- Use 75% less energy than the typical pool pump
- Use 50% less than most new pumps
- Save \$50 to 100 a month or more



Pentair IntelliFlo

Recommendation #3



Require Smart Motors Everywhere

Smart motor

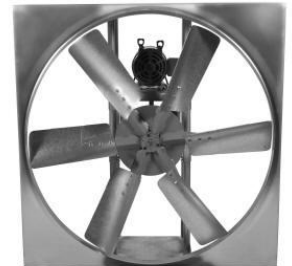
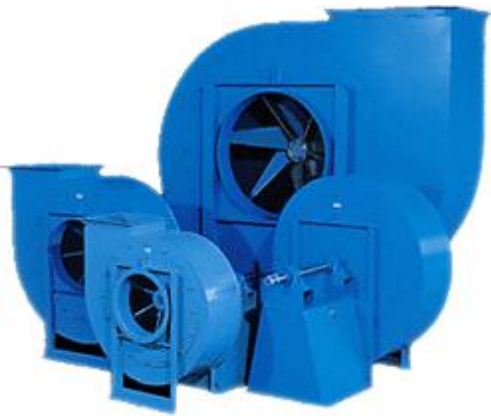
- Variable speed
- Sensor and microprocessor to control speed



50% to 80% Savings Potential



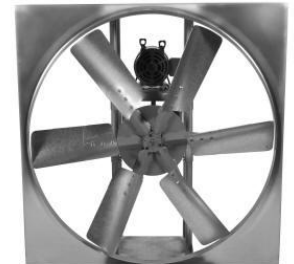
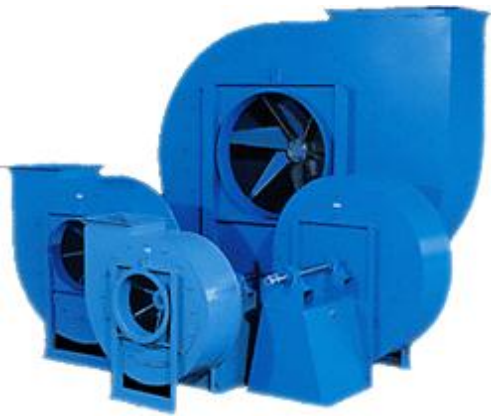
- Fans, furnaces, and air handlers
- Pumps
- Air Conditioners
- Motors and compressors



Why?

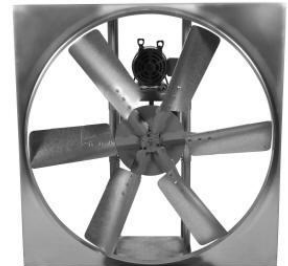
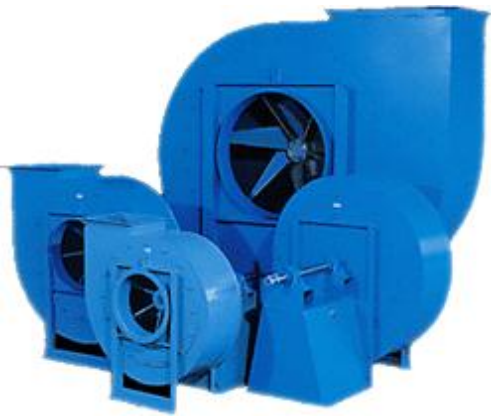


- Fans and pumps need to run on high during startup
- Usually only need 10% to 50% to maintain flow
 - Most motors do not automatically slow down



Unbelievable Waste of America's Wealth

Almost half of America's electricity is used by motors stuck on high speed.



Recommendation #3 Require Smart Motors

Variable speed

- Minimum 85% reduction*

Microprocessor controls

- Automatically slow down
 - Backpressure and temperature



*of energy consumption on low speed

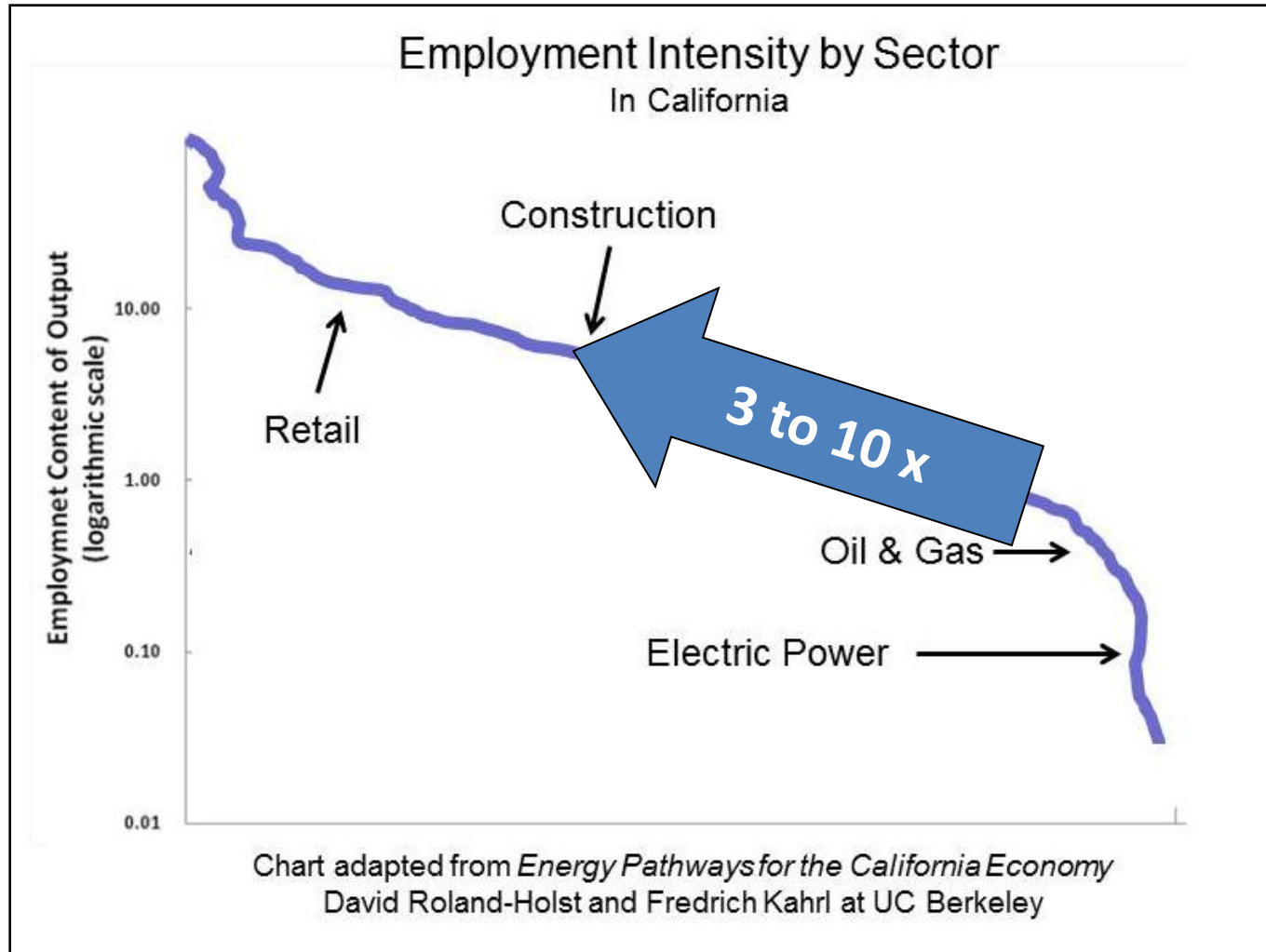
You might be thinking:

Lights, Pumps, Fans, Grades:

But Where Are The Jobs?

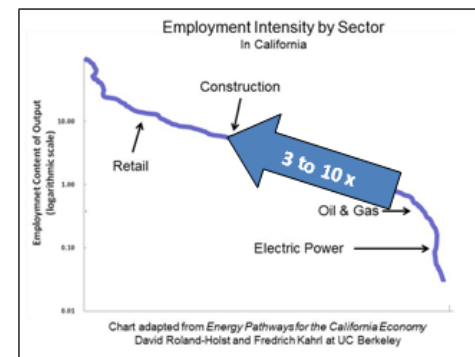


Shift Away from Fossil Fuels and Electricity Creates Jobs



Trifecta of Job Creation

1. Hire contractors
 - Creates jobs
2. They spend their salaries
 - Creates more jobs
3. Building owner spends the savings
 - Benefits last for decades
 - Creates jobs in future years



The More Efficient the Retrofit

The bigger the savings

The more jobs created

Efficiency matters

Target investments that save the most energy:

- Lights and motors



The Most Efficient Lights and Motors Create the Most Jobs



Corollary

“A” buildings create more jobs than
“D” buildings



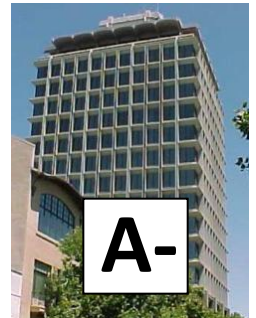
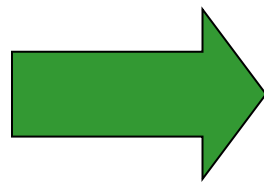
A Race to the Top,
A Race to Excellence,
Creates the Most Jobs

Building Grades
Create a Race



How to Pay for Lights, Fans, Motors and Other Upgrades?

(that building owners are installing in a race to improve their grades)





Recommendation

#4



Energy Savings Accounts

Universal On-bill
Financing
With a twist





San Diego Gas & Electric Leader in On-bill Financing

Funds efficiency upgrades

With zero interest financing on the
monthly utility bill

Similar to PACE



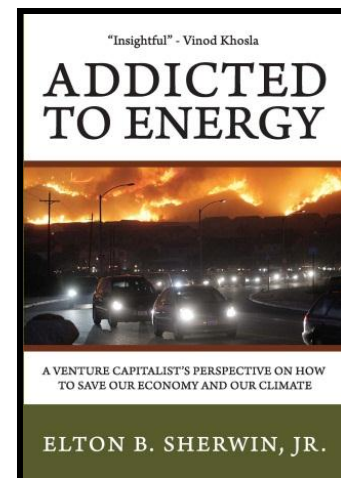
Energy Savings Accounts

Two Pieces

1. Borrow from the utility
 - Pay back in monthly utility bill
2. Poor performing buildings
 - Forced to save for future investments

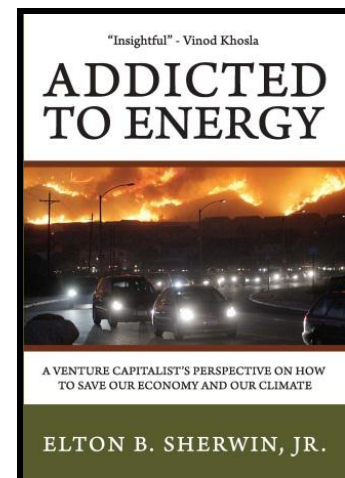
Provides money and motivation

- It is your money accruing on the utility bill



Summarize

Sherwin Job Program



Benefits

- Create sustainable jobs
 - Don't require ongoing subsidies
 - Involve no new taxes
- Reduce structural unemployment
- Wealth creating
 - Businesses
 - Homeowners
 - For our children

Sherwin Job Plan

Four Recommendations

#1 Motivate with Grades

- Grade monthly
- Disclose annually



#2 and #3 Require retrofits

- Commercial lighting
- Motors



#4 Finance

- Energy Savings accounts



Most Highly Skilled Green Workforce in the World

#1 Motivate with Grades

- Grade monthly
- Disclose annually

#2 and #3 Require retrofits

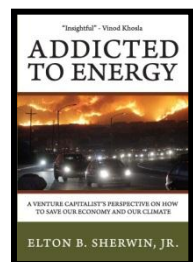
- Commercial lighting
- Motors

#4 Finance

- Energy Savings accounts



Create a labor shortage



Appendix

Looking to the Future

- Require large air conditioners use wind power
 - Ice Energy, CALMAC, and BAC thermal storage
- Smart circuit breakers
 - Report energy consumption by room
- Biochar and soil sequestration of carbon
- Up the standards for hot water heaters
- HVAC
 - Downsize, micro-zone and variable output
- Performance-based code



Over One Million Jobs Just in California

Accelerating the Pace of Energy Efficiency

U.S Renewable Energy and Energy Efficiency Industries 2030*

	Total Number of Jobs Created		
	Base Case Scenario	Moderate Scenario	Advanced Scenario
Renewable Energy	1,305,000	3,138,000	7,918,000
Energy Efficiency	14,953,000	17,825,000	32,185,000
Combined Totals	16,258,000	20,963,000	40,103,000

**Renewable Energy and Energy Efficiency: Economic Drivers for the 21st Century, by Roger Bezdek.*

Bezdek's results are summarized here by Aaron Lehmer, in *Renewable Energy Development Creates More Jobs than Fossil Fuels*.

Almost all the jobs created in the energy efficiency category relate to buildings and their contents. The actual number of new jobs created by aggressive programs promoting building, appliance and electronics efficiency may be closer to 16 million jobs nationwide (32.18 million minus 14.9 million minus the transportation sector). California's share of these jobs is at least 10% or 1.5 million. The challenge is to accelerate these jobs from into the current timeframe and to get on the advanced scenario, which could create these 1.5 million additional jobs.

