SWEEP

SOUTHWEST ENERGY EFFICIENCY PROJECT

A S.W. Energy Efficiency Project Presentation:

Monetizing Energy Improvement Opportunities

Christopher Russell

Energy PathFINDER

www.energypathfinder.com

(443) 636-7746

crussell@energypathfinder.com

PURPOSE

- Demonstrate the strategic connection between energy use and business performance
- Present clear and compelling investment performance metrics for energy improvements
- Demonstrate energy's potential contribution to business results

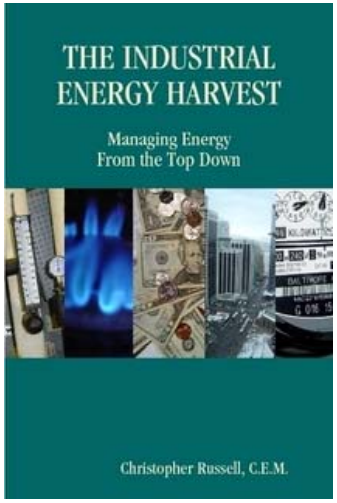
"It's what you learn after you know it all that counts."

Harry S. Truman
33rd President of the United States of America

(1884 – 1972)

About Christopher Russell, C.E.M., C.R.M.

- Independent consulting since 2006
  Principal, Energy Pathfinder
- From February 2012: Visiting Fellow for Industrial Programs, American Council for an Energy Efficient Economy
- Energy Manager, Howard County, MD, 2010-2012
- Director of Industrial Programs, Alliance to Save Energy, 1999-2006
- Comm. & Indus. Program Manager, American Gas Association, 1995-1999
- MBA, M.A., University of MD;
  B.A., McGill University



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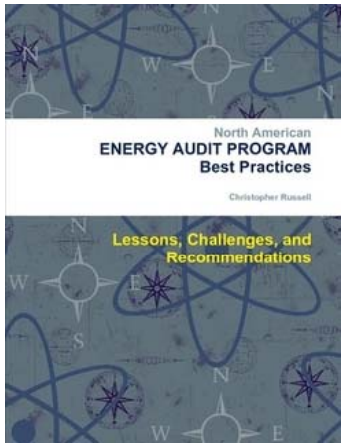

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Outline

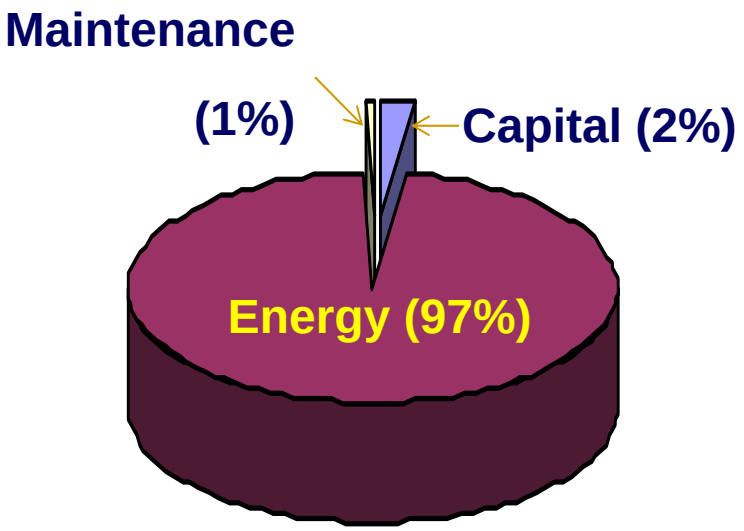
1.	**ENERGY & BUSINESS**
2.	PAYBACK vs. RATES OF RETURN
3.	MONETIZING ENERGY OUTCOMES
4.	A NEW BUSINESS PROPOSITION

Energy is a Small Portion of Costs?

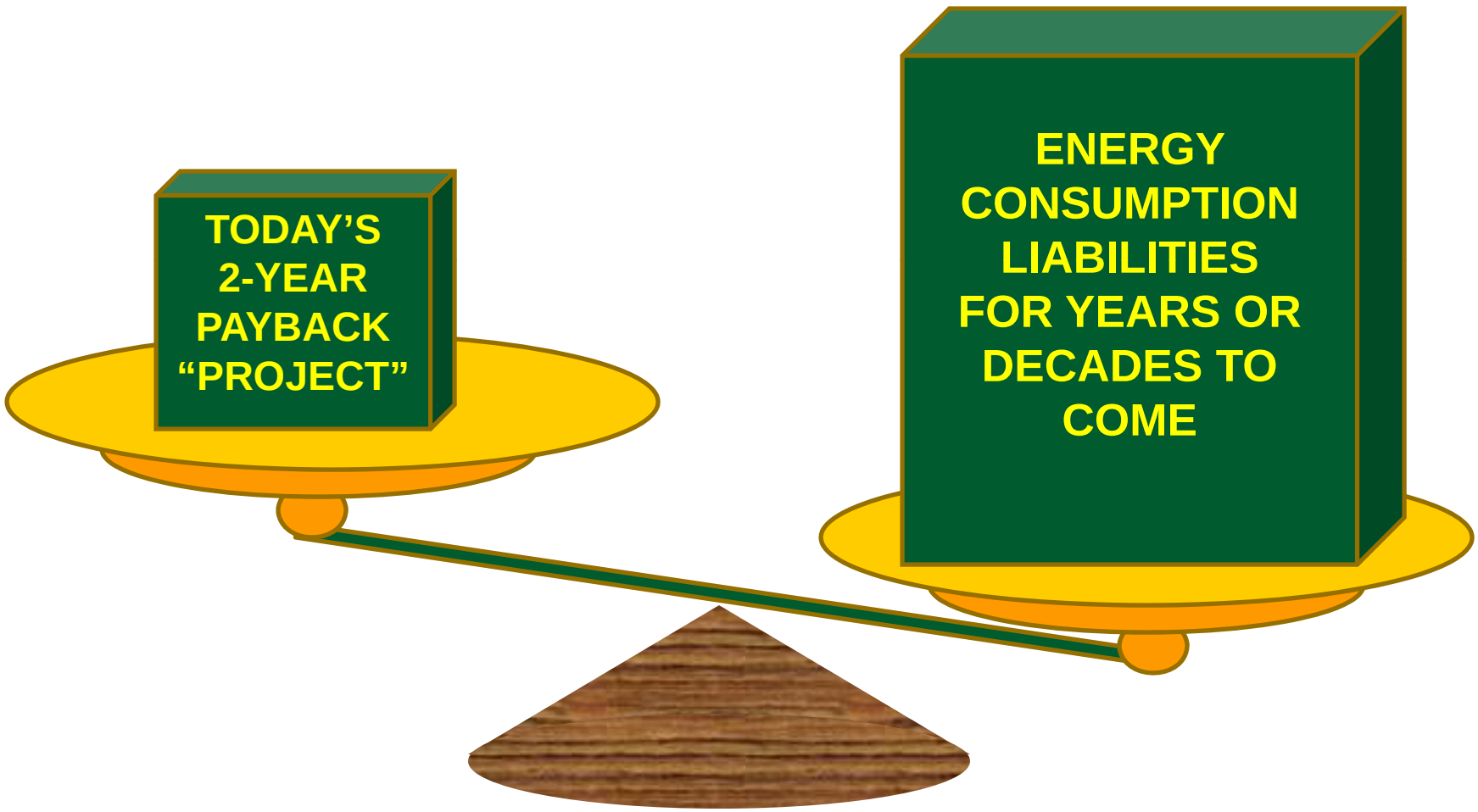
YES, relative to the **annual** budget.

NO

Relative to total cost of asset ownership



Energy is a Small Portion of Costs?



FACILITY MANAGER'S
(OLD) VALUE PROPOSITION

- Just avoid failure mode
- Be available for emergencies

It's all we can do to "keep the car on the road"
…much less tinker with its efficiency!

CHANGE …happens anyway

- Rapid turnover of technology, management, corporate ownership
- Certain industries “re-shoring” back to the U.S.
- Volatile energy markets
- Integrated utility resource planning
- Real-time energy metering & verification
- Popular demand for sustainability
- Aging facilities management leadership

CHANGE = OPPORTUNITY

Connect the dots between sustainability and business performance

Answer facility managers' question: "What's in it for me?"

Facility Manager's New Value Proposition

- Facilities = a profit center
- Monetize your energy position
- Success = show value created
- Contribution to cash flow and growth

FUTURE-PROOF
YOUR BUSINESS PERFORMANCE
…and your job.

YOUR FACILITY CAN BE…

AN ATM MACHINE!

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1.	ENERGY & BUSINESS
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Simple Payback…

- Ignores value accruing after the investment pays for itself
- Payback ≠ cost of capital
  ≠ rate of return over time
  ≠ investment comparison metric
- Says nothing about the impact of doing nothing
- **IGNORES THE BALANCE OF INVESTMENT RETURNS**
- **Don't like the payback? Just walk away…**

Can You *Walk Away* from the Investment?

TYPE 1: **NEW INITIATIVE**

- Facility addition
- Expanded production process
- New product line

TYPE 2: **EXISTING OBLIGATION**

- Efficiency improvement
- Still bear the cost of waste if no investment is made

ENERGY: Existing Obligation

- Investors WILL PAY either way:
  - For the energy solution, or
  - For the energy waste

  You can't walk away.

- Goal for energy solutions: seek the least cost of meeting an obligation.

How do you….

…measure mutual fund performance?

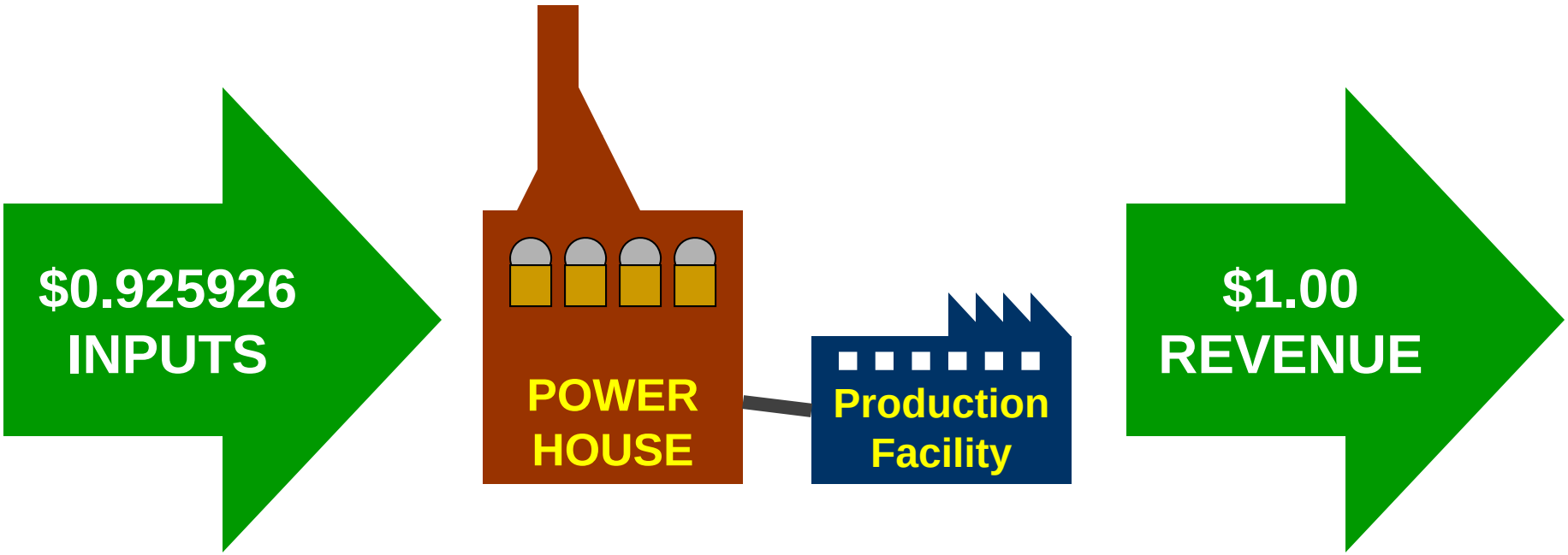
Simple payback?

Think INVESTMENT, Not PROJECT

- PROJECTS:
  - Cost money
  - Take up time
  - Distract from operating goals & procedures
- INVESTMENTS:
  - Produce a cash flow
  - Earn a rate of return
  - Grow the business, create wealth

A MONEY-MAKING MACHINE

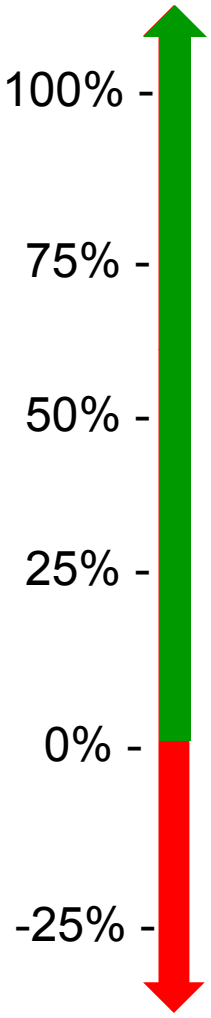
(Over simplified)



Example: 8% Rate of Return

RATES OF RETURN ARE THE KEY

Capital never rests
…even if you "do nothing"



%?

- Core business: cost of internal capital
- Energy project: After-tax rate of return
- Stocks/mutual funds

compare to

- Cost to borrow
- Rate of capital destruction

BOILER / STEAM UPGRADE

- $1,500,000 cost
- $200,000 rebate (YR1)
- $200,000 downpayment
  Cap. recovery:
  25 YRS/8%
- $1,300,000 borrowed
  20YRS/4%
- 25 YR economic life
- 1.5%/yr energy price escalation
- 39-YR Straight-line depreciation
- 35% marginal tax rate
- $0.50/therm natural gas
- $0.09/kWh electricity
- $30,000 O&M saving/yr

	BEFORE	AFTER
ELEC kWh	5,260,000	4,734,000
GAS therm	2,700,000	2,294,680
Annual O&M	$72,000	$42,000

Cash Flow Elements - Example

FIRST YEAR RESULTS

A		ENERGY SAVINGS……	$250,000
B		O&M COST SAVINGS……..	$30,000
C	**= A+B**	OPERATING INCOME …….	$280,000
D		DEPRECIATION…….	$33,333
E	**= C-D**	TAXABLE INCOME……	$246,667
F	**= E x Tax**	INCOME TAX (35%)……..	$86,333
G		CAPITAL RECOVERY (8%/25)…	$18,524
H	**= D+E-F-G**	NET INCOME……	$175,143
I		DEBT SERVICE……..	$94,533
J		TAX SAVINGS ON INTEREST….	$17,924
K		REBATE……	$200,000
L	**= H-I+J+K**	FREE CASH FLOW……	$298,534

Project Cash Flow

YR	NOMINAL INVESTMENT	OPERATING INCOME	NET INCOME AFTER TAX CAPITAL RECOVERY	AFTER TAX FINANCE OUTLAY*	FREE CASH FLOW
0	-$1,000,000				-$200,000
1	$200,000	$280,000	$175,143	-$76,609	$298,534
2	$0	$283,750	$177,581	-$77,227	$100,354
3	$0	$287,556	$180,055	-$77,870	$102,185
4	$0	$291,420	$182,115	-$78,539	$104,027
5	$0	$295,341	$187,702	-$79,960	$105,880
…	…	…	…	…	…
25	$0	$387,376	$408,271	$0	$408,271

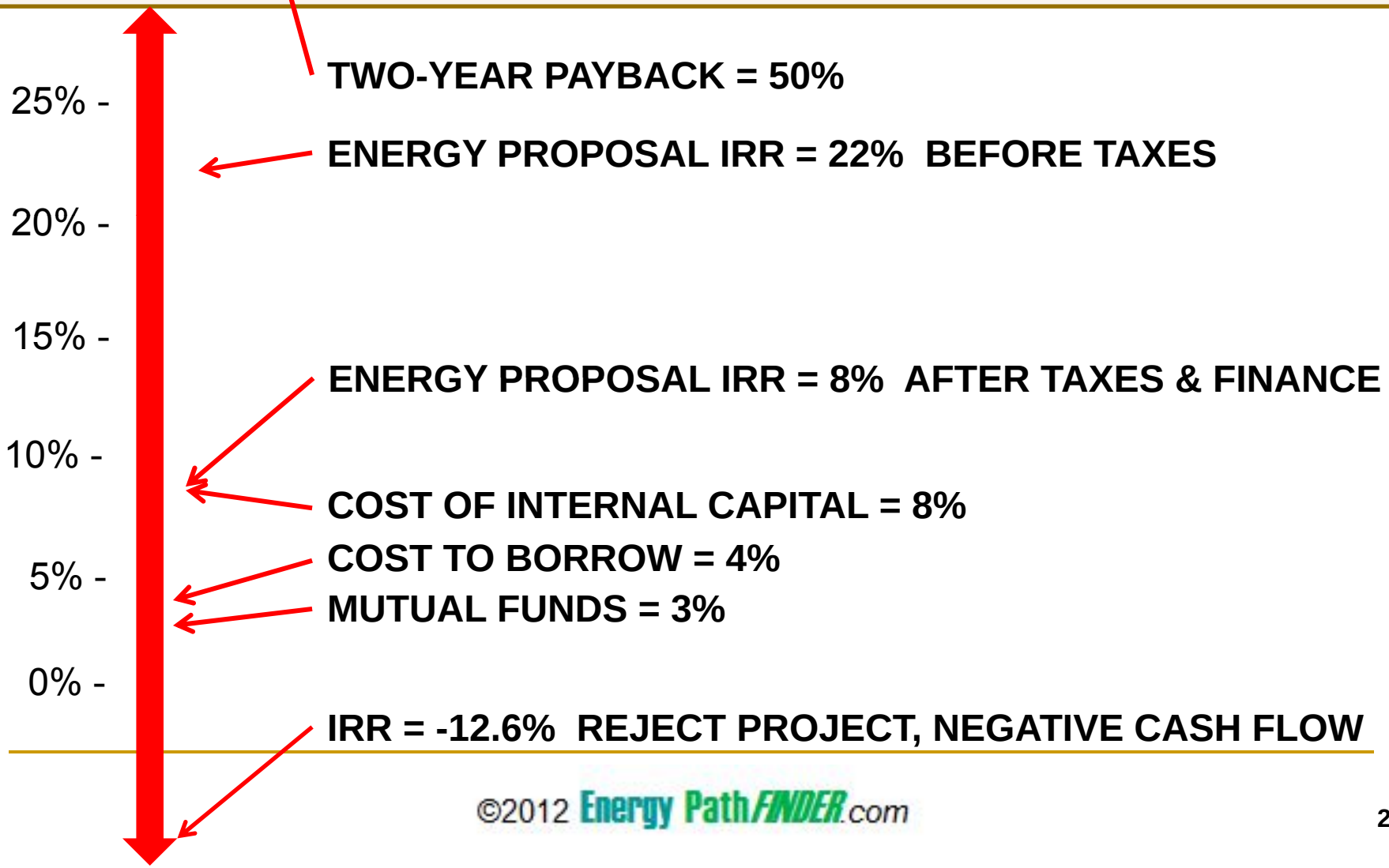
*Annual debt service = $94,533 (20 YRS @ 4% compounded monthly)

Investor's Rates of Return (Thru 25 Yrs)

EXAMPLE:

PROJECT COST: $1,500,000
ECONOMIC LIFE: 25 YRS

5-YR Payback Operating Results



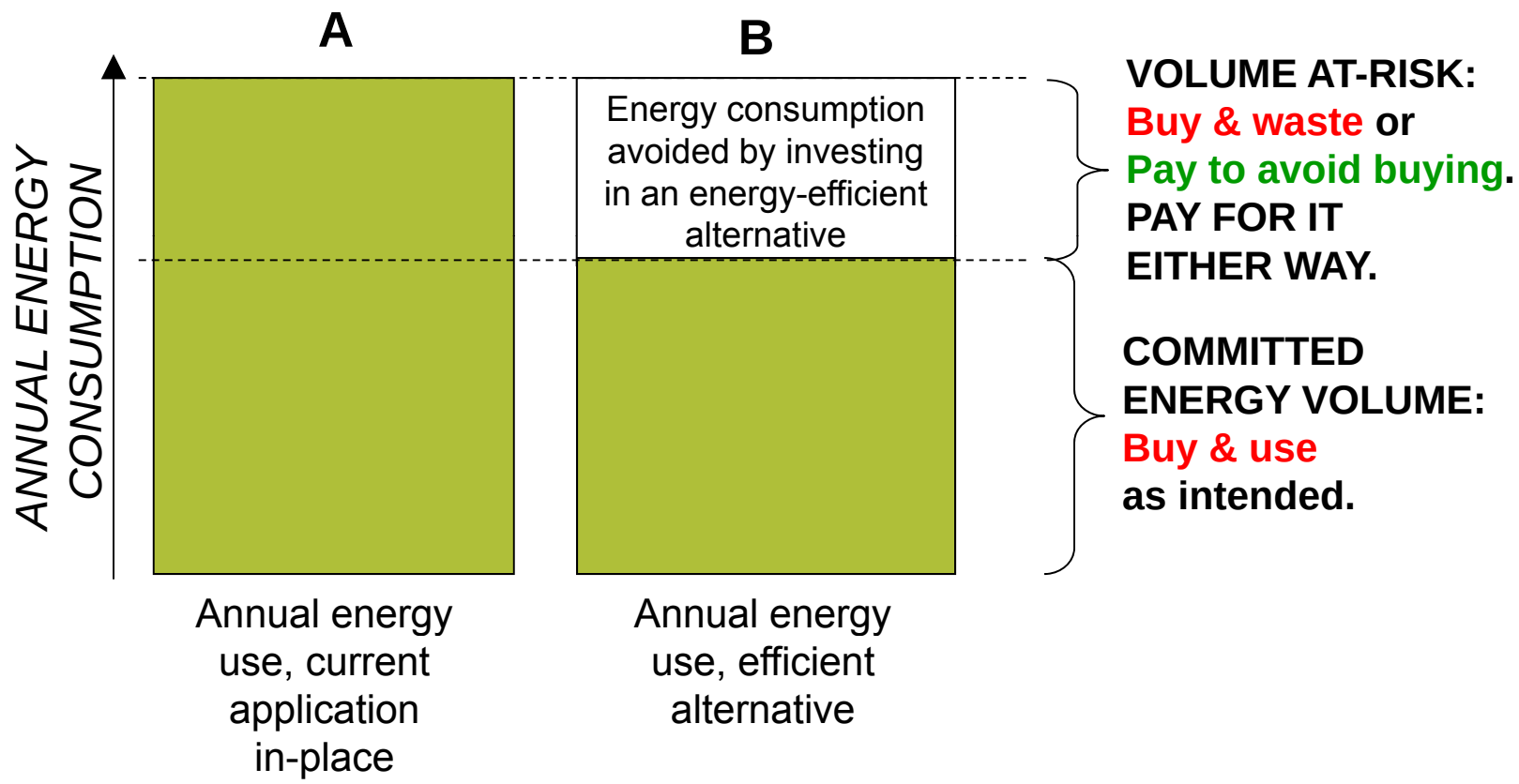
Outline

1.	ENERGY & BUSINESS
2.	PAYBACK vs. RATES OF RETURN
3.	**OUR BOILER EXAMPLE – SAVE OR BUY?**
4.	A NEW BUSINESS PROPOSITION

Business Proposition for Energy Projects

	ACCEPT	REJECT
GET	Gross energy savings	Satisfaction of no capital expenditure?
GIVE UP	Fully amortized project cost	Life-cycle cost of doing nothing
	+FREE CASH FLOW	**-AGGREGATE PENALTY**

Energy At-Risk



SAVE or BUY?

- Continue to **BUY**:
  - Live with the waste
  - Remain exposed to energy price volatility
- Or **SAVE:**
  - Eliminate the volume at-risk
  - Do projects when cost to save a unit of energy is less than the price to buy it
  - Cost/unit saved stays fixed over the economic life of the project

ANNUALIZED COST

ANNUALIZED PROJECT COST = (NET PROJECT COST) X (CAPITAL RECOVERY FACTOR)

VS

CAPITALIZED COST

$$\frac{\text{ANNUALIZED PROJECT COST}}{\text{CRF}} = \text{NET PROJECT COST}$$

$$A = B \times C$$

$$\frac{A}{C} = B$$

$$\text{CAPITAL RECOVERY FACTOR (CRF)} = \frac{i(1+i)^n}{[(1+i)^n]-1}$$

Where:

i = weighted cost of capital – "velocity" of capital already invested

n = economic life (years) of remedy (energy improvement project)

WHY ANNUALIZE?

- **Operating budgets are ANNUAL**
- **Energy savings are accounted ANNUALLY**
- **Compare ANNUAL cost to ANNUAL benefit**
- **Compare 3-yr project to 10-year or 5-year projects….**

BOILER EXAMPLE:

Annualized Project Cost Per MMBtu Saved

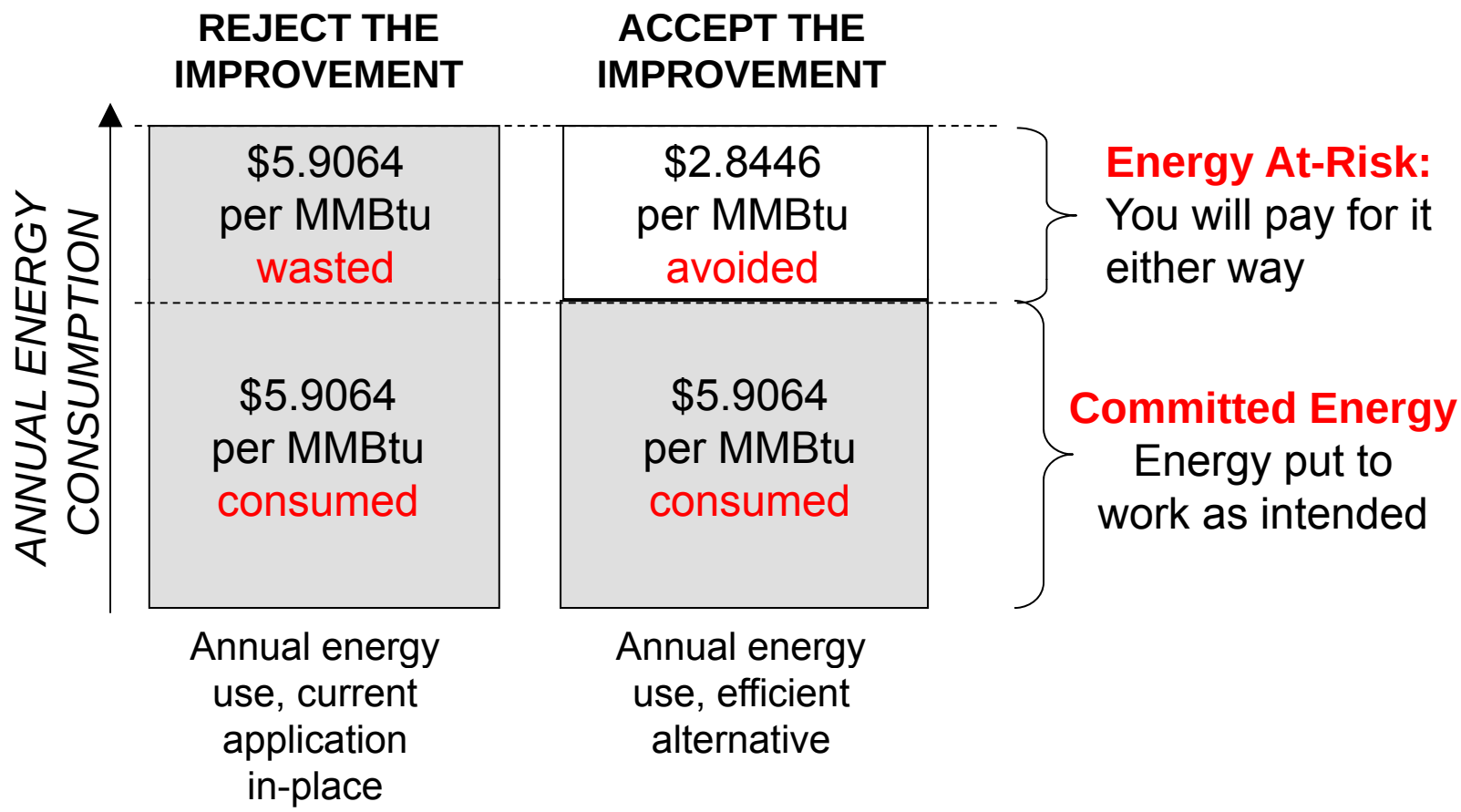
ANNUALIZED PROJECT COST = (NET PROJECT COST) x (CAPITAL RECOVERY FACTOR)

$120,403 = ($1,300,000) x (.0926)

ANNUALIZED PROJECT COST PER ANNUAL MMBtu* SAVINGS = $\frac{\$120,403}{42,327}$ = $2.8446

* MMBtu are common denominator for disparate fuel types

Boiler Example: Save or Buy Choice

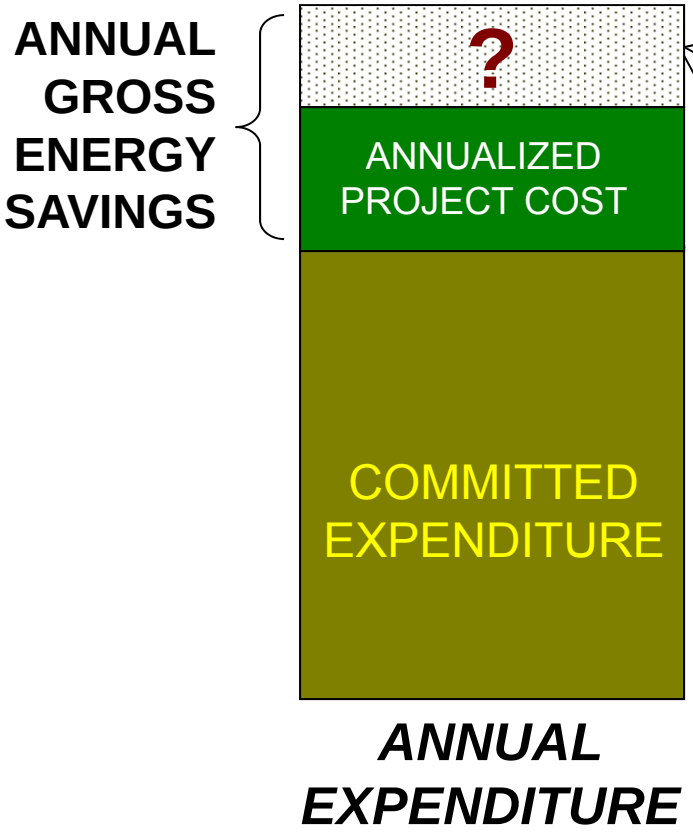


COST-BENEFIT RATIO

$$\frac{\text{COST TO SAVE AN MMBtu}}{\text{PRICE TO BUY AN MMBtu}} = \frac{\$2.8446}{\$5.9064} = 0.4816$$

This project allows the investor to pay $0.48 to avoid buying $1.00's worth of energy

INTERPRETING ANNUALIZED COST ANALYSIS



Annualized net savings

Annualized penalty for ***DOING NOTHING***

Free cash flow to:

- Working capital

(finance your operations)

Or

- Investment capital

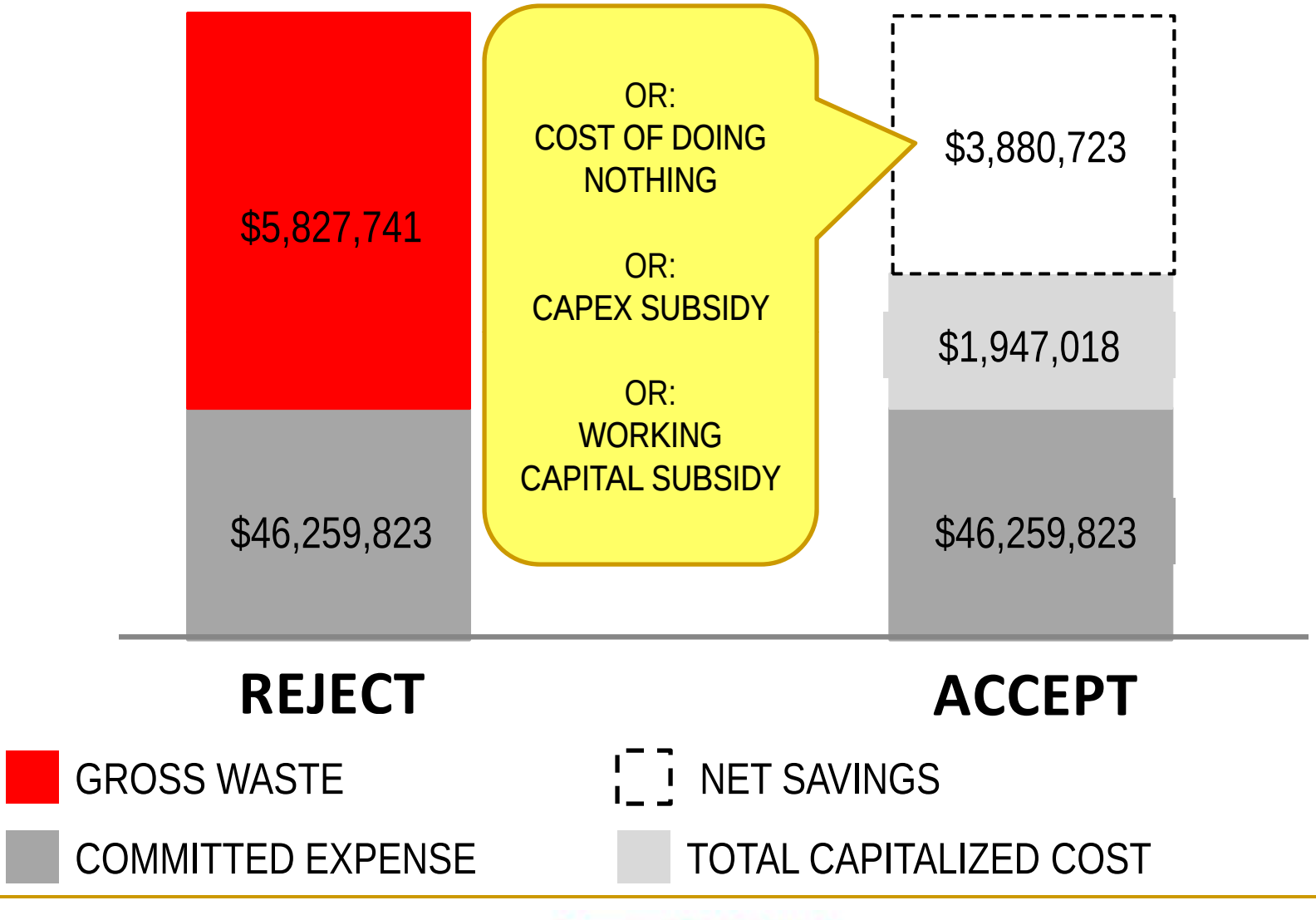
(finance your asset base)

Accept or Reject?

Our Boiler Example: 25-Year Results

	DO	DON'T DO
GET	Gross energy savings $5,827,741	Satisfaction of no capital expenditure? $0
GIVE UP	Fully amortized project cost $1,947,018	Cost of doing nothing $5,827,741 -$1,947,018
	GET – GIVE UP= **+$3,880,723**	GET – GIVE UP= **-$3,880,723**

Boiler Example: 25-YEAR RESULTS



BREAK-EVEN POINT

ANNUALIZED PROJECT COST = TOTAL VALUE OF ANNUAL ENERGY SAVINGS

What's the MOST that should be paid for the project, given certain investment criteria?

Calculating the Financial Break-Even Cost

MAXIMUM ACCEPTABLE ANNUALIZED PROJECT COST *SHOULD BE NO MORE THAN* ANNUAL VALUE OF AVOIDED ENERGY PURCHASES

MAXIMUM ACCEPTABLE ANNUALIZED PROJECT COST = (DELIVERED PRICE PER UNIT OF ENERGY) X (UNITS OF AVOIDED ENERGY CONSUMPTION) = ANNUAL VALUE OF AVOIDED ENERGY PURCHASES

IF: ANNUALIZED PROJECT COST = UP-FRONT PROJECT COST x CRF

THEN:

$$\frac{\text{ANNUALIZED PROJECT COST}}{\text{CRF}} = \text{NET PROJECT COST}$$

ALSO:

$$\frac{\text{MAXIMUM ACCEPTIBLE ANNUALIZED PROJECT COST}}{\text{CRF}} = \text{MAXIMUM ACCEPTIBLE NET PROJECT COST}$$

Break-Even Calculation

Our Boiler Example

$$\text{MAXIMUM ACCEPTABLE INVESTMENT} = \frac{\left(\text{DELIVERED PRICE PER UNIT OF ENERGY} \times \text{UNITS OF AVOIDED ENERGY CONSUMPTION}\right) + \text{NET O\&M COST SAVINGS}}{\text{CRF}} = \textbf{BREAK-EVEN PROJECT COST}$$

$$\text{MAXIMUM ACCEPTABLE INVESTMENT} = \frac{(\$5.9064 \times 42{,}327) + 30{,}000}{0.0926} = \$3{,}023{,}172$$

NOTE: CRF = 0.0926 when n=25 and i=8%

Amortized monthly

Net cost is only $1,300,000… definitely worth it.

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The Real Business Proposition

Boiler Replacement Project

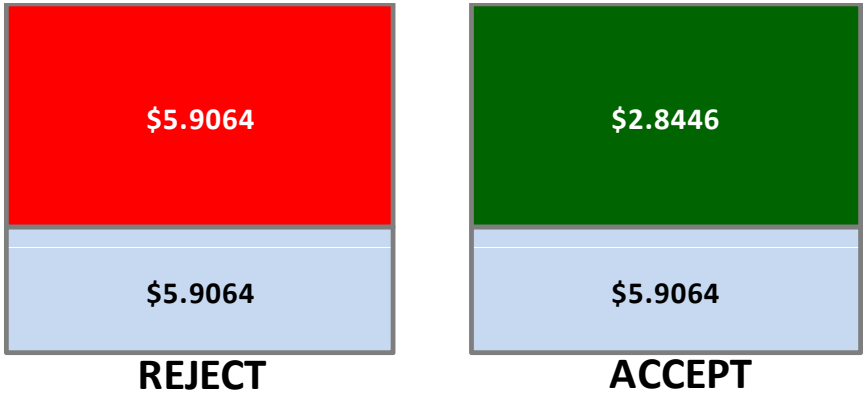
	ACCEPT	REJECT
25-YEAR GROSS ENERGY SAVINGS	$5,827,741	$0
PAYOUT FOR ENERGY AT-RISK	Amortized project cost (capital + interest) -$1,947,018	$5,827,741 life-cycle expenditure for energy waste minus $1,947,018 amortized project cost avoided
"PRICE TAG": CAPITALIZED ANNUAL PAYOUT	**$1,300,000** (per invoice)	**$3,023,172** ($147,861/CRF*)
TOTAL 25-YEAR CASH FLOW	**$3,880,723**	**-$3,880,723**

*CRF: = [i(1+i)^n]/[((1+i)^n)-1] NOTE: CRF = 0.0926 when n=25 and i=8%

ENERGY AT-RISK: WASTED OR AVOIDED?
YOU WILL PAY FOR IT EITHER WAY: CHOOSE YOUR PRICE.

ENERGY AT-RISK:

CURRENTLY WASTED:	42,327 MMBtu	@ $5.9064 per MMBtu
POTENTIALLY AVOIDED:	42,327 MMBtu	@ $2.8446 per MMBtu
MMBtu USED AS INTENDED:	245,620 MMBtu	@ $5.9064 per MMBtu



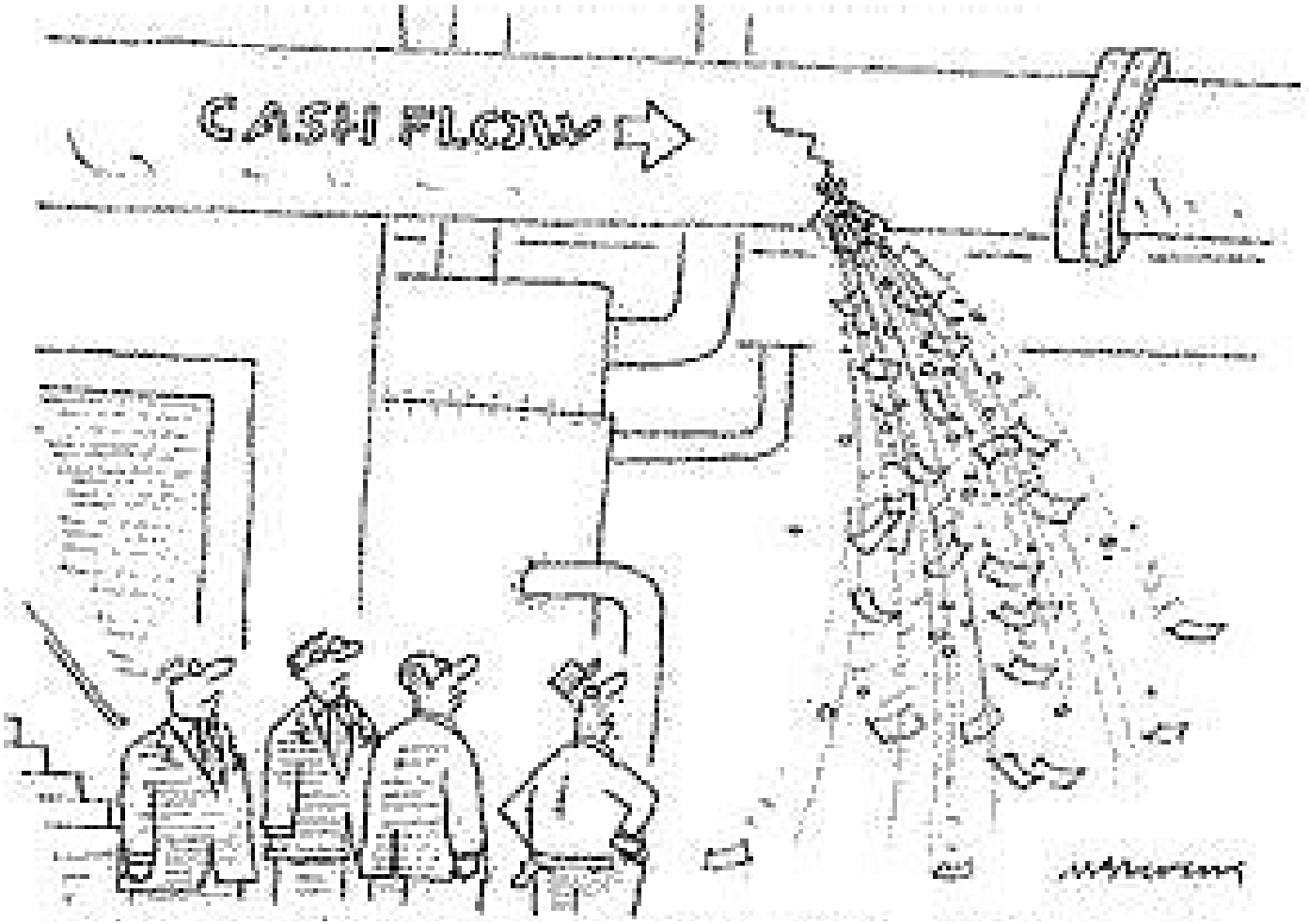
PERFORMANCE METRICS

	OPERATING Before depreciation and taxes	ECONOMIC After depr. & taxes; before finance	FINANCIAL Free cash flow after finance	TARGET
SIMPLE PAYBACK (TOTAL COST / 1st YEAR INCOME):	5.4	8.6	--	2.0 years
RETURN ON INVESTMENT:	25.4%	16.5%	--	n.a.
PROFITABILITY INDEX:	--	--	1.1	--
UNPROFITABILITY INDEX:	--	--	-1.5	--
INTERNAL RATE OF RETURN THRU YR 25:	22%	--	8%	--

LIFE-CYCLE COST (25 YEARS):	$48,206,840 undiscounted value; includes costs of finance
ANNUALIZED COST TO SAVE 1 MMBtu:	$2.8446
COST TO BUY 1 MMBtu:	$5.9064

PAYBACK vs. ANNUALIZED COST

FEATURE	PAYBACK	ANNUALIZED COST ANALYSIS
Account for cash flows over the life of the improvement?	NO	YES
Incorporate the time-value of money?	NO	YES
Provide basis for break-even cost evaluation?	SORT OF	YES
Compare value of projects with different economic lives?	NO	YES
Describe value of free cash flow?	NO	YES
Provide the “price tag” for NOT taking action?	NO	YES



“Well, gentlemen, there’s your problem.”

ACEEE American Council for an Energy-Efficient Economy

aceee.org

YOUR VOICE, YOUR POLICY

Study of Manufacturing Investment Decision-Making

Telephone survey of Stakeholders, ~ 20 minutes

Describe the corporate investment decision process
SHAPE THE NEXT ROUND OF ENERGY OUTREACH & ASSISTANCE PROGRAMS

Report due Oct 2012

PLEASE REPLY: crussell@aceee.org

THANK YOU!

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ACEEE INVESTMENT DECISION-MAKING SURVEY: crussell@aceee.org

Christopher Russell

Energy PathFINDER

www.energypathfinder.com
(443) 636-7746
crussell@energypathfinder.com

@ENERGYpathfndr

View my profile on LinkedIn