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APPA 2014 Business and Financial Conference
Alternative Means to Adding to a Utility's Bottom Line

September 16, 2014

Disruptive Solutions and Pressures on Electric Rates

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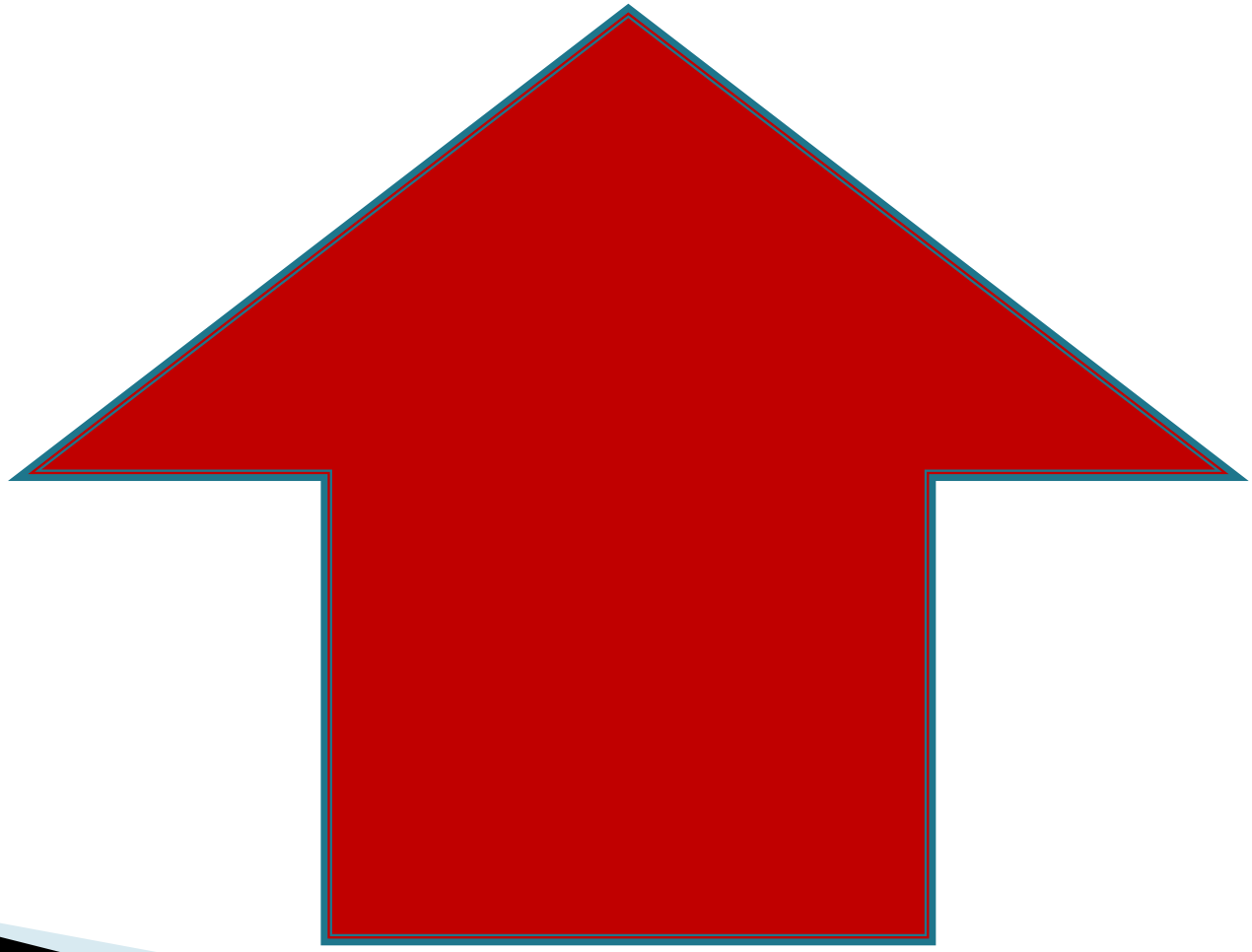
What is the Future of Electric Rates?



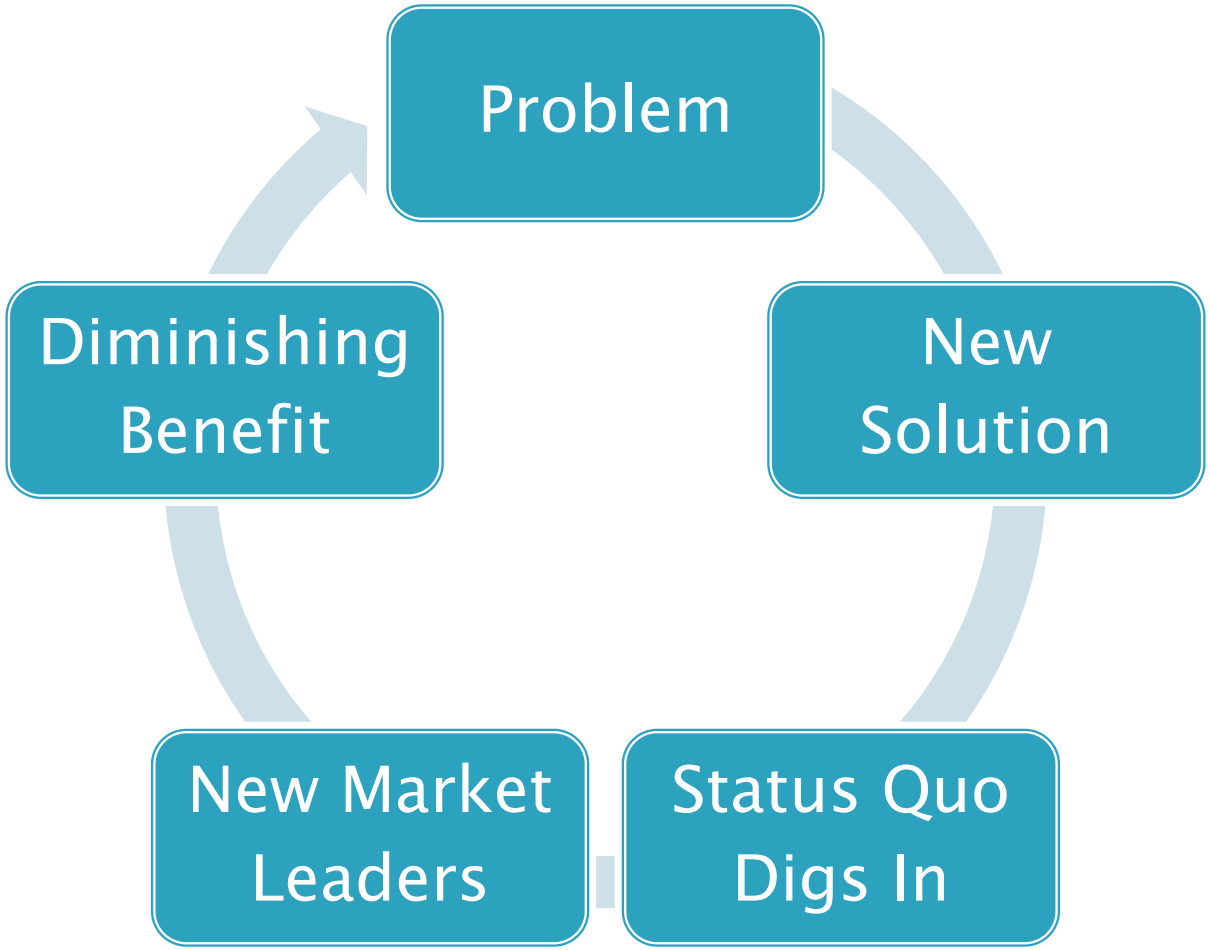
Topics and Disclaimers

- Direction of rates as impacted by:
  - Competitors
  - New technology
  - Consumer preferences
- Disruptive Solution Cycle
  - How rates will likely behave as utilities find themselves in the cycle
  - View of rates in isolation…many variables impact rates
- The future…the next 5-15 years

Selected Rate Properties

- Shared cost – that's why it's a rate.
- Little to no consumer control given the vast number of participants.
- Who pays what portion of the cost for service is derived by economics and politics.
- The majority of cost within a rate is designed to recover long-term power supply costs.
- Fixed portion of rate maybe understated (amplified with "net-metering")

Disruptive Solution Cycle



Example One – Pony Express

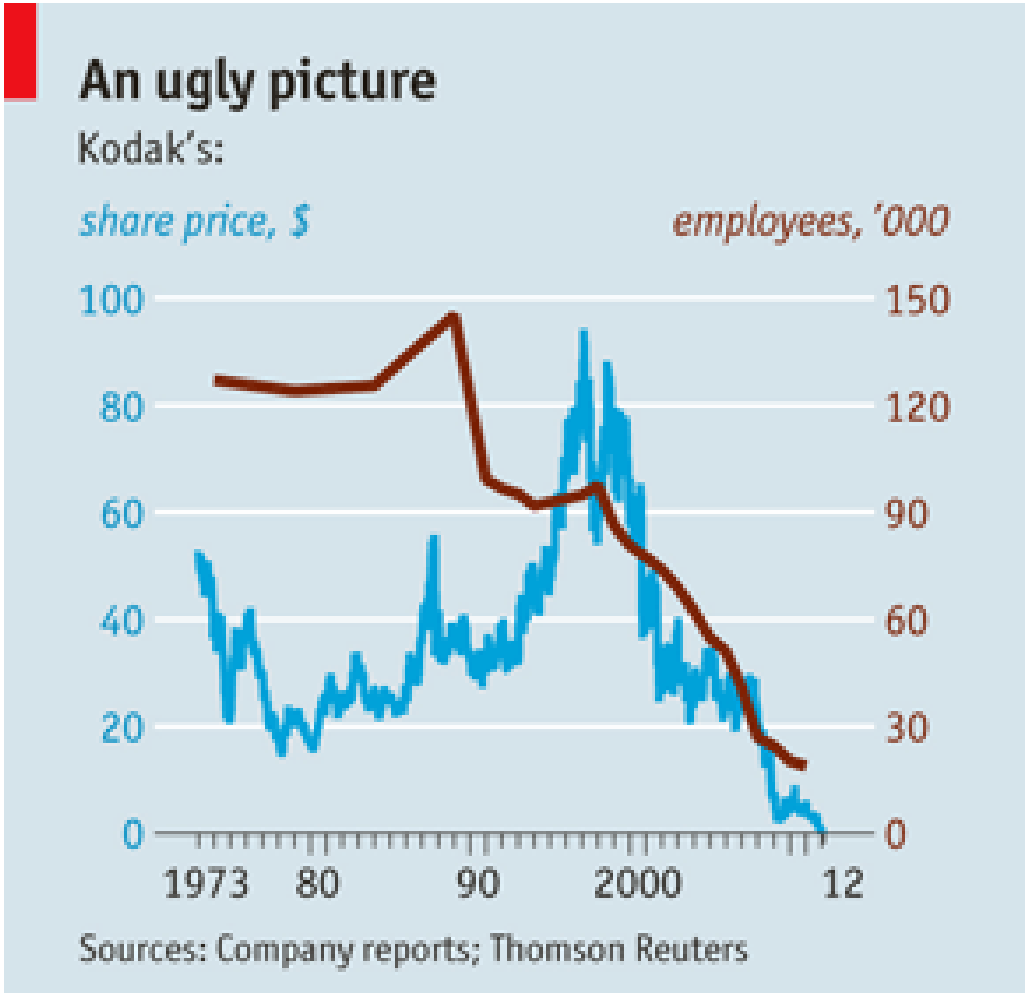
- On Oct. 24, 1861, after 112 days of construction, Western Union completed the first transcontinental telegraph, rendering the 18-month old Pony Express obsolete.
- The Problem: Expensive, Slow, Dangerous
  - New Solution?
  - Challenge Status Quo?
  - New Market Leader?
  - Did it last?

What did Western Union do with the telephone? Cellular telephone?

Example Two – Newsweek

- In December 2012, Newsweek printed it's last issue on paper. Forbes called it "Funeral for a Friend"
- The Problem: Expensive, changing consumer preferences, substitute products
  - New Solution?
  - Challenge Status Quo?
  - New Market Leader?
  - Did it last?

Example Three – Kodak



Example Four – Ocean Liners

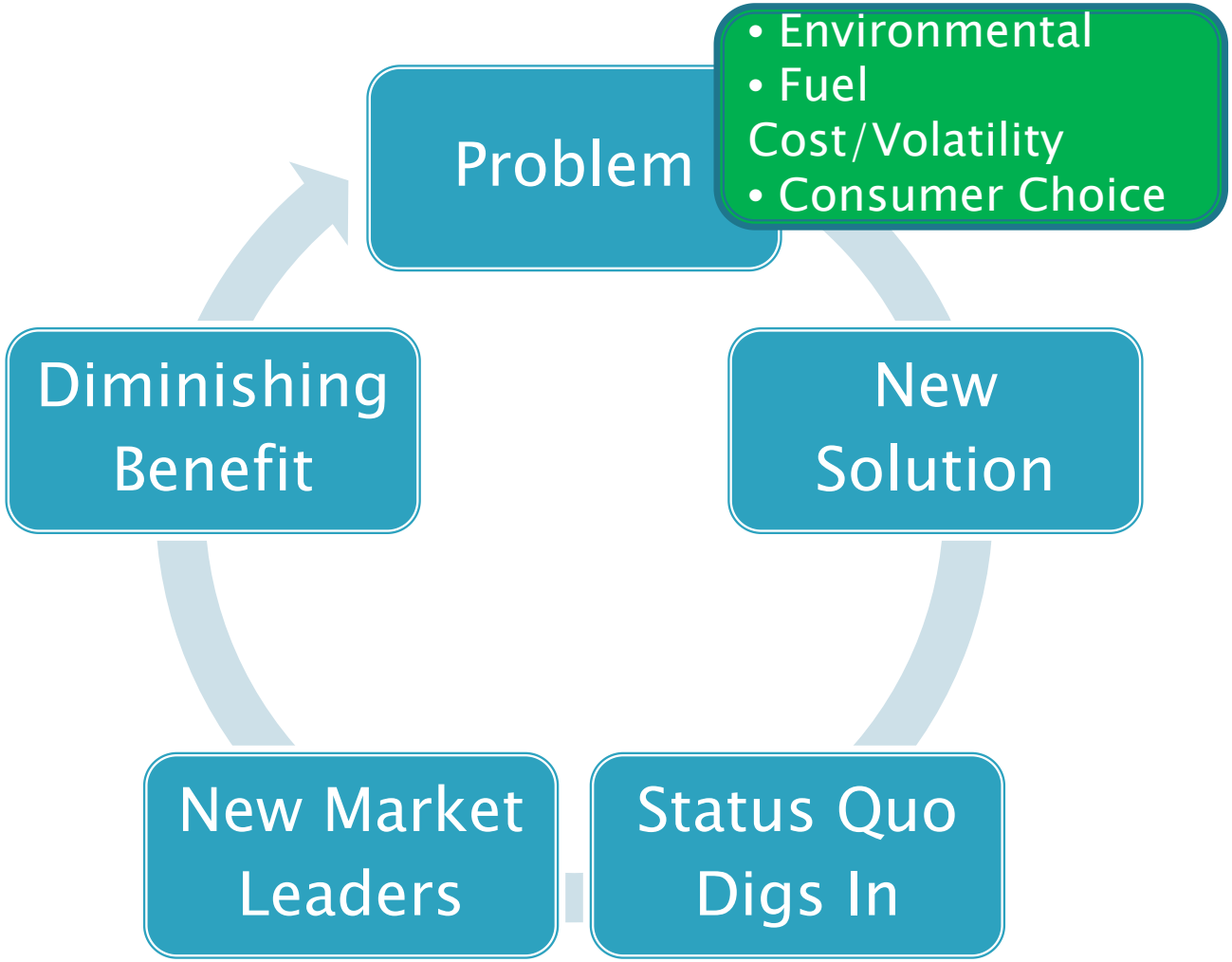
- 1900-1950 was the golden age of ocean liners. Enter commercial aviation and the industry essentially died in a ten year period.
- The Problem: Slow, Expensive, High Capital Costs
  - New Solution?
  - Challenge the Status Quo?
  - New Market Leader?
  - Did it last?

Is fossil fuel generation headed towards a similar fate?

The Problem(s)

- Environmental impact of bulk power grid dominated by fossil fuel
  - Perception not politics
- Fossil fuel cost volatility – consumer risk
- High base-load capacity power plant costs – significant investment risk
- Frustrated consumer – few options

Disruptive Solution Cycle

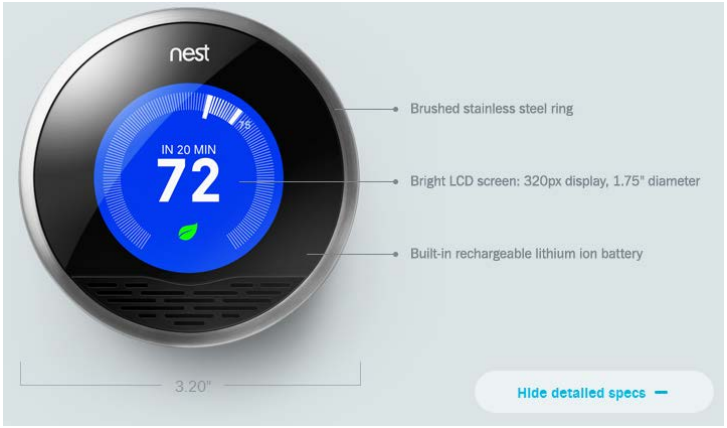


Disruptive Solutions – Energy Market

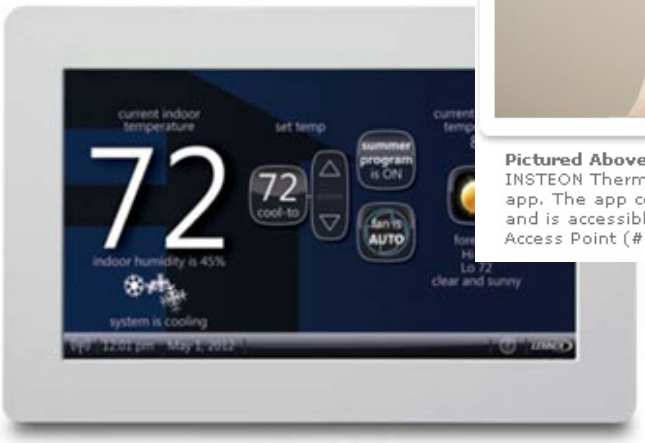
- Example: Four companies directly impacting the utility business (and our energy consumers) today.
  - What problems are they addressing, attempting to solve or solving?
  - Which markets are they disrupting?
  - What is the potential impact on your utility?
  - How does this impact the problems your trying to solve?

Disruptive Solution One – Nest Thermostat

- Most people leave the house at one temperature and forget to change it. So Nest learns your schedule, programs itself and can be controlled from your phone. Teach it well and Nest can lower your heating and cooling bills up to 20 percent. (From website)
- Stats and Info
  - Buy at Home Depot, Amazon etc.
  - $200 and dropping



Demand Response – Consumer Driven



Pictured Above
INSTEON Thermostat (#2441TH) controlled by an iPhone running INSTEON app. The app communicates to SmartLinc (#2412N) connected to a router and is accessible from home or anywhere in the world. Setup also requires Access Point (#2443).

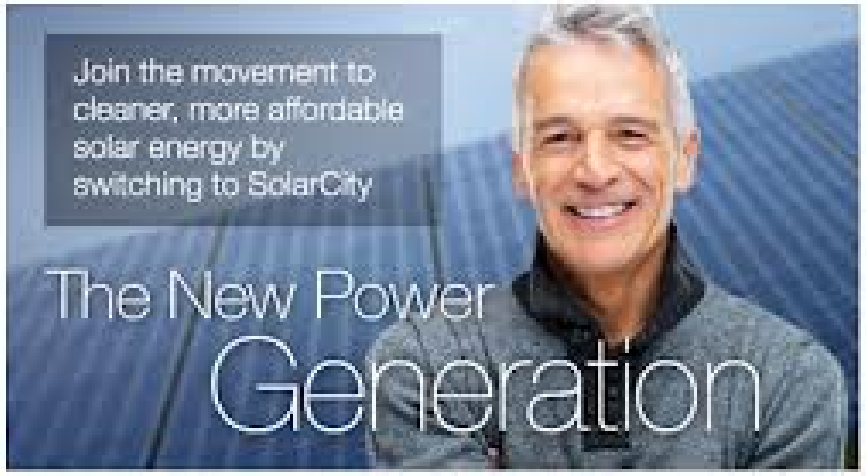
Nest Thermostat – Utility Impact

- What problem are they trying to solve?
  - Power Supply Cost/Environmental
  - Customer Offer (Satisfaction)
- What does it mean to utilities?
  - What is the utility role in consumer-driven DR?
  - What part will be owned by the consumer market?
  - If it's long path, how do we integrate consumption/pricing signals into third-party consumer portals?
  - What are communication performance requirements from the meter?

Disruptive Solution Two – Solar City

- Solar City is a provider of energy services to homeowners, businesses and government/non-profit organizations. Among its primary services, the company designs, finances and installs solar energy systems, performs energy efficiency audits and retrofits and builds charging stations for electric vehicles. (wiki)
- Stats
  - 1,600 employees
  - Operating in 14 states
  - 31 Distribution centers
- Customers (from website)
  - Solar City's customers include thousands of homeowners, more than 100 schools including Stanford University, government agencies such as the U.S. Armed Forces and Department of Homeland Security, and well-known corporate clients, including eBay, Intel and Wal-Mart.
- Net/Net?
  - **They take traditional utility customers off the grid.**

SolarCity



A Cleaner, More Affordable Alternative to Your Utility Bill

Solar City – Utility Impact

- What problem are they trying to solve?
  - Power Supply Cost/Environmental
- What does it mean to utilities?
  - What happens to obligation to serve?
  - What happens to fixed costs for other utility customers?
  - Power supply planning – uncertainty
  - Distributed generation (grid stability)
  - Communication requirements (AMI)
  - Net metering
  - Rate impact
  - Etc.

Wal-Mart

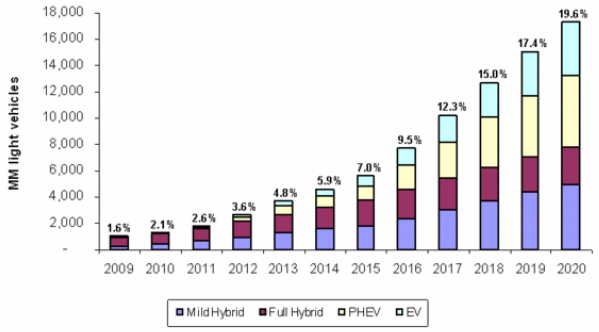
- Points from Smart Grid News:
  - Produce or procure 7 billion KWh of renewable energy every year (up 600% from 2010 levels!)
  - Reduce the energy intensity of its buildings by 20% compared to 2010 levels
  - Install solar on at least 1,000 rooftops by 2020 (it has 200 in place or in development now)
  - Increase LED usage indoors and outdoors
  - Be supplied 100% by renewable energy by 2020
- Mike Duke Quote:
  - "When I look at the future, energy costs may grow as much as twice as fast as our anticipated store and club growth," Duke said. "Finding cleaner and more affordable energy is important to our every day low cost business model and that makes it important to our customers' pocketbooks. Our leadership in this area is something our customers can feel good about because the result is a cleaner environment. And savings we can pass on to them."

Electric Vehicles (EV's)

- A few stats
  - 2009 – Battery cost per kWh – $1000
  - 2010 – Battery cost per kWh – $500
  - 2012 – Predicted to soon drop below $200 kWh
  - Expected sales by 2020 – 3.8 million units/year (Pike Research)
  - Some predict up to 20 million units/year by 2020

Global HEV/PHEV/EV Market Projections

Global xEV Volume by Type (Million Units), Percentage Global Vehicle Sales



Source: Deutsche Bank, Electric Cars: Plugged In 2, November 3, 2009

ROCKWOOD HOLDINGS, INC.

49

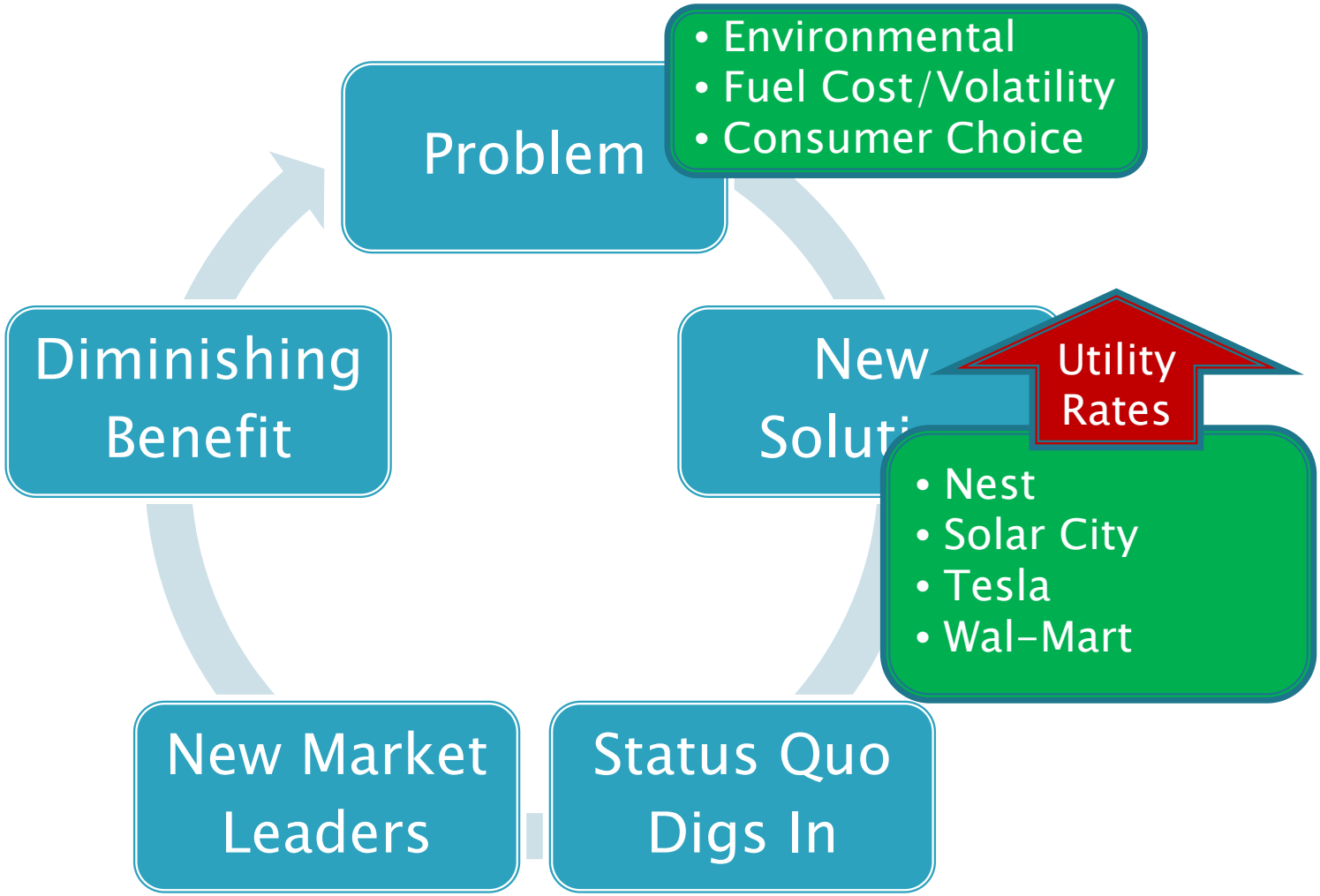
Disruptive Solution Three – Tesla Motors

- $57,400 (before tax credits)
- 265 miles on a charge
- 0–60 – 4.4 seconds
- Limit of 6,500 reservations – sold out

EV – Utility Impact

- What problem are they trying to solve?
  - Power Supply Cost/Environmental
- What does it mean to utilities?
  - Planning for high additional spot loads
  - Resellers
  - Distributed generation (Grid stability)
  - Communication Requirements (AMI)
  - Net metering
  - Rate redesign
  - Etc.

Disruptive Solution Cycle



Status Quo Digs In….

The Status Quo – Change Resistant

Can coal be cleaned before it's burned?

Yes . inside and out!

Washing coal with ordinary water is nothing new.

But now – after thorough pilot testing – we are pioneering a much better and a more economical way to wash coal.

And clean it deeply, too.

The process is quite simple:

Raw coal is crushed, exposing more of its natural inner impurities.

The crushed coal is passed through a bath of heavy liquid. The lighter "cleaned" coal floats to the top and the heavier impurities sink to the bottom.

Test results have been so promising we are building a demonstration plant to process 125 tons an hour of tenaciously dirty coal.

Our objective is coal not angel-clean, but deep cleaned. Cleaner, certainly, than it could be with present washing methods.

And it will burn better as well as cleaner.

We expect this pioneering to make abundant Eastern high-sulfur coal more usable from an environmental standpoint. And more efficient from an operational standpoint.

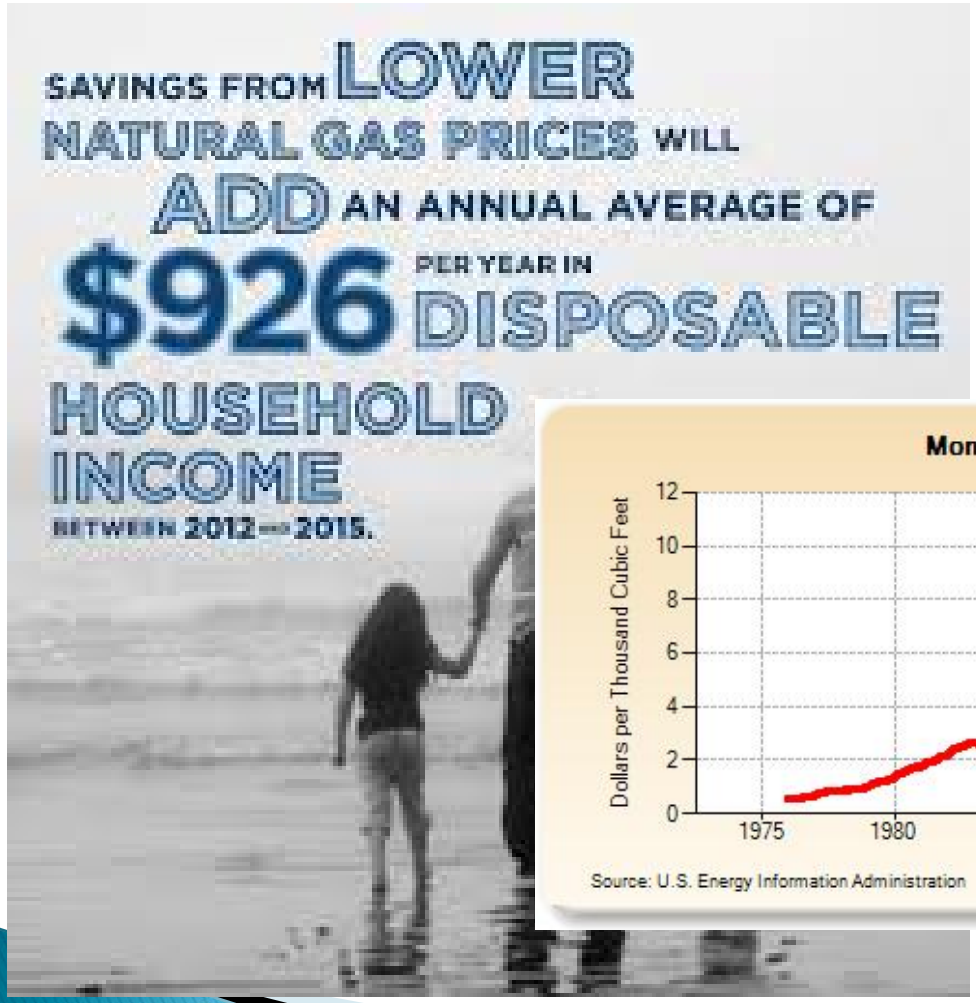
Cleaner coal. It will help make the America we see ahead a better America.

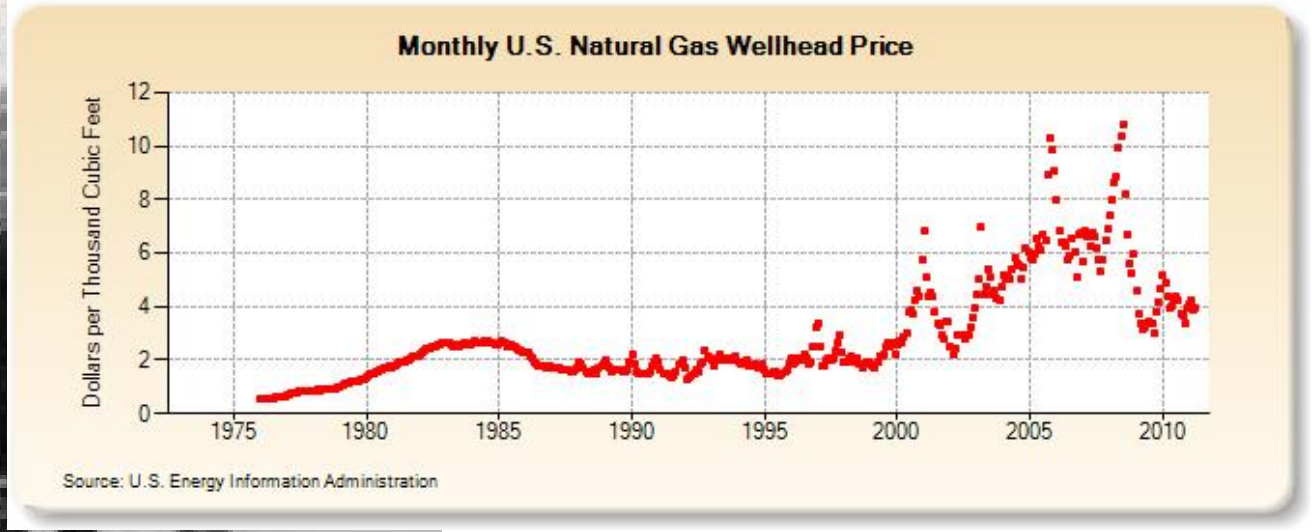
American Electric Power
we see a busier, better America

Serving in Ohio, Indiana, Michigan, Virginia, West Virginia, Kentucky, Tennessee.

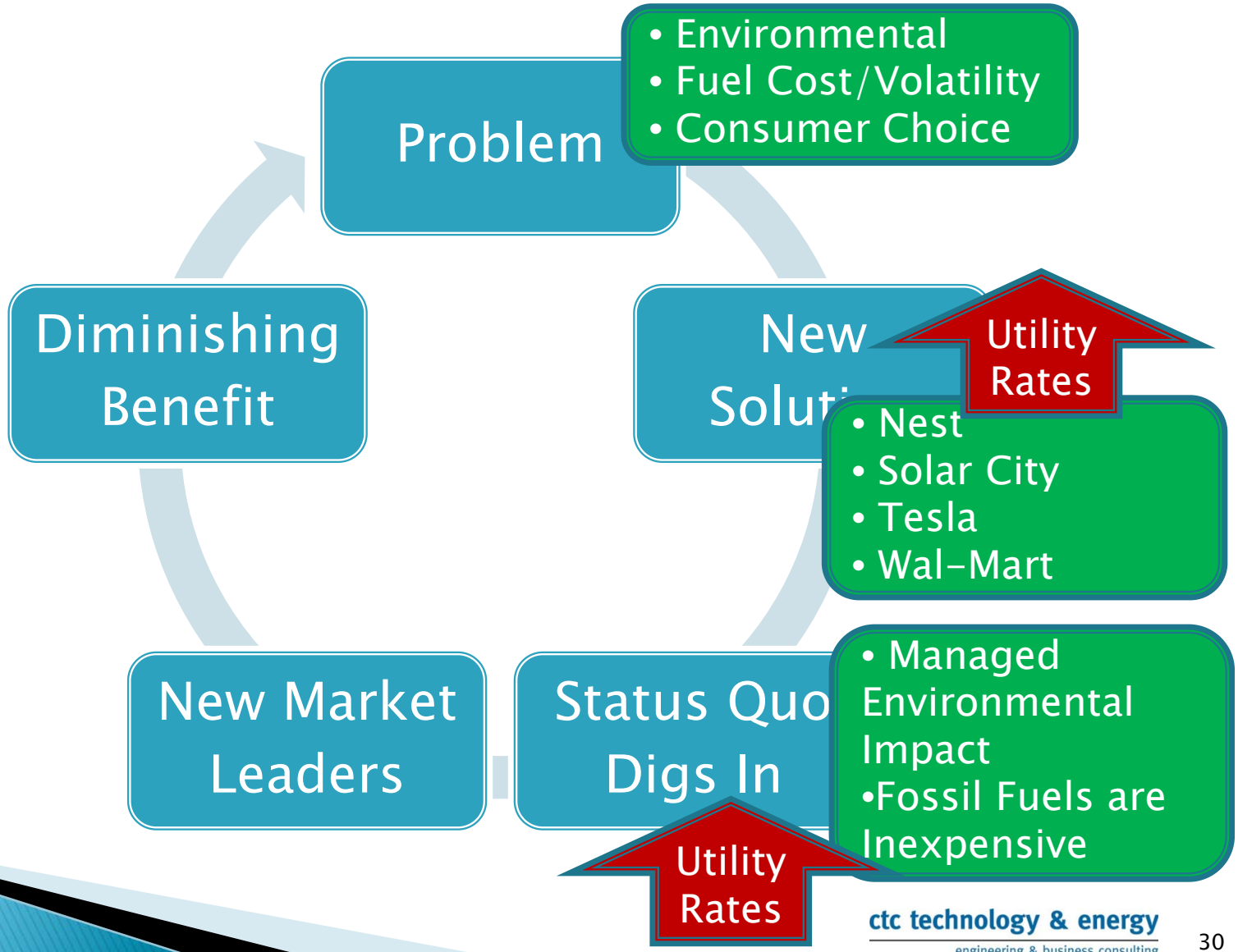
The Status Quo – Change Resistant

Status Quo – Change Resistant





Disruptive Solution Cycle



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New Market Leaders

- Market leaders will:
  - Give the customer what they want
    - At a price their willing to pay
    - When they want it
    - How they want it
- So…how do utilities thrive in this new world?

Be Leaders

- Understand energy technologies in the consumer marketplace
  - Leverage and partner
- Design business models that deliver electric energy to EV market
  - Retail
  - Sub metering
  - Pricing Options
  - Storage

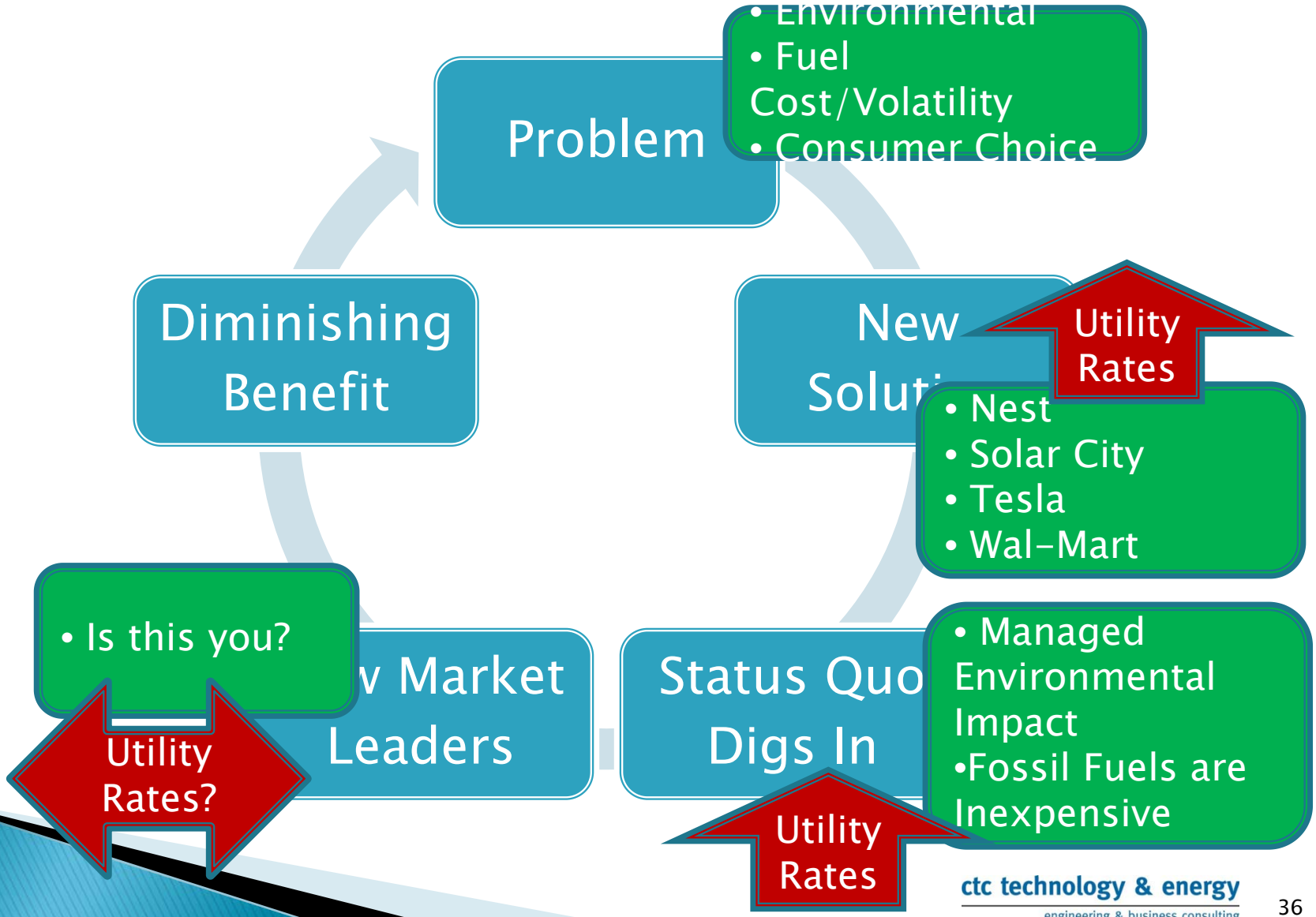
Be Leaders

- Build renewable generation for your customers that want it
  - Avoid market erosion
- Build high capacity, low latency communication networks to tie distributed supply to loads
  - Think micro-grid
  - Optimizing schemes

Be Leaders

- Get involved with thought leaders
  - Google
  - Wal-Mart
  - Smart Grid Developers
  - Solar City
  - Verizon
  - EcoFactor
  - Comcast
  - ……..

Disruptive Solution Cycle



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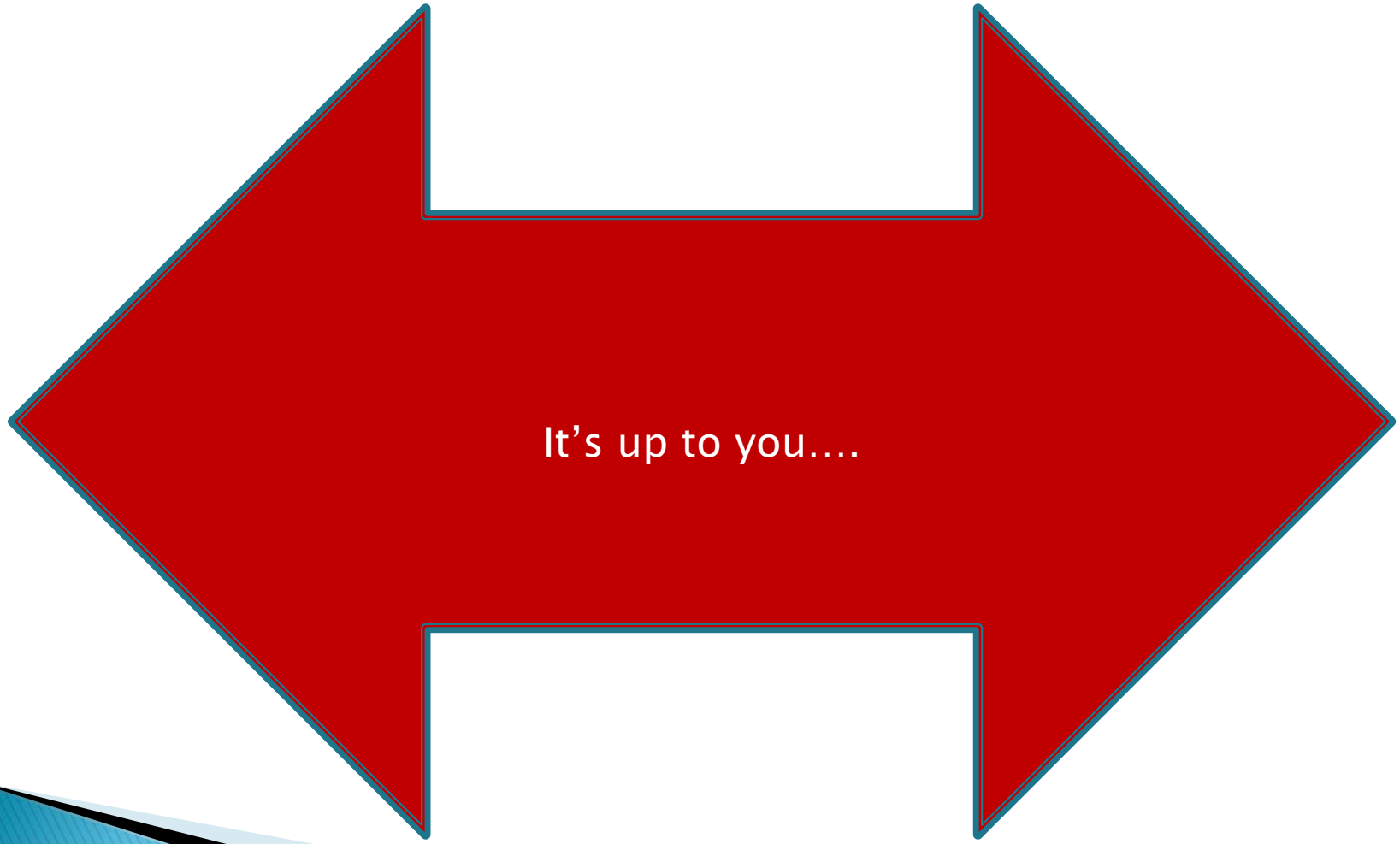
So…The Future of Rates?



Case Study
Tipmont Community Solar
Tipmont REMC

Community Solar Overview

- Community solar allows participation by members who may have physical, financial, or other limitations for installing solar on their own property.
- Community solar provides an alternative to the traditional process of member installing solar on their property.
- Community solar allows members to use a solar energy system installed off site and benefit from its output remotely through billing and accounting mechanisms.
- Tipmont Community Solar will follow the utility managed model. Tipmont will design and operate a community solar program that is open to voluntary participation by their members.

Why Community Solar?

Interest

- High member interest during public meetings over past several years
- Continue to receive inquiries from members about solar and other renewables

Costs

- Costs to install solar continues to decline
- In some cases solar power cost is on par with retail electric rates
- Tipmont is already trusted source for electric, positioned to be same for solar
- Community projects share initial costs making ownership more affordable

Popularity

- Interest has driven availability of types of project support
- Wider variety of choices in equipment and pricing structures

"Right thing for members"

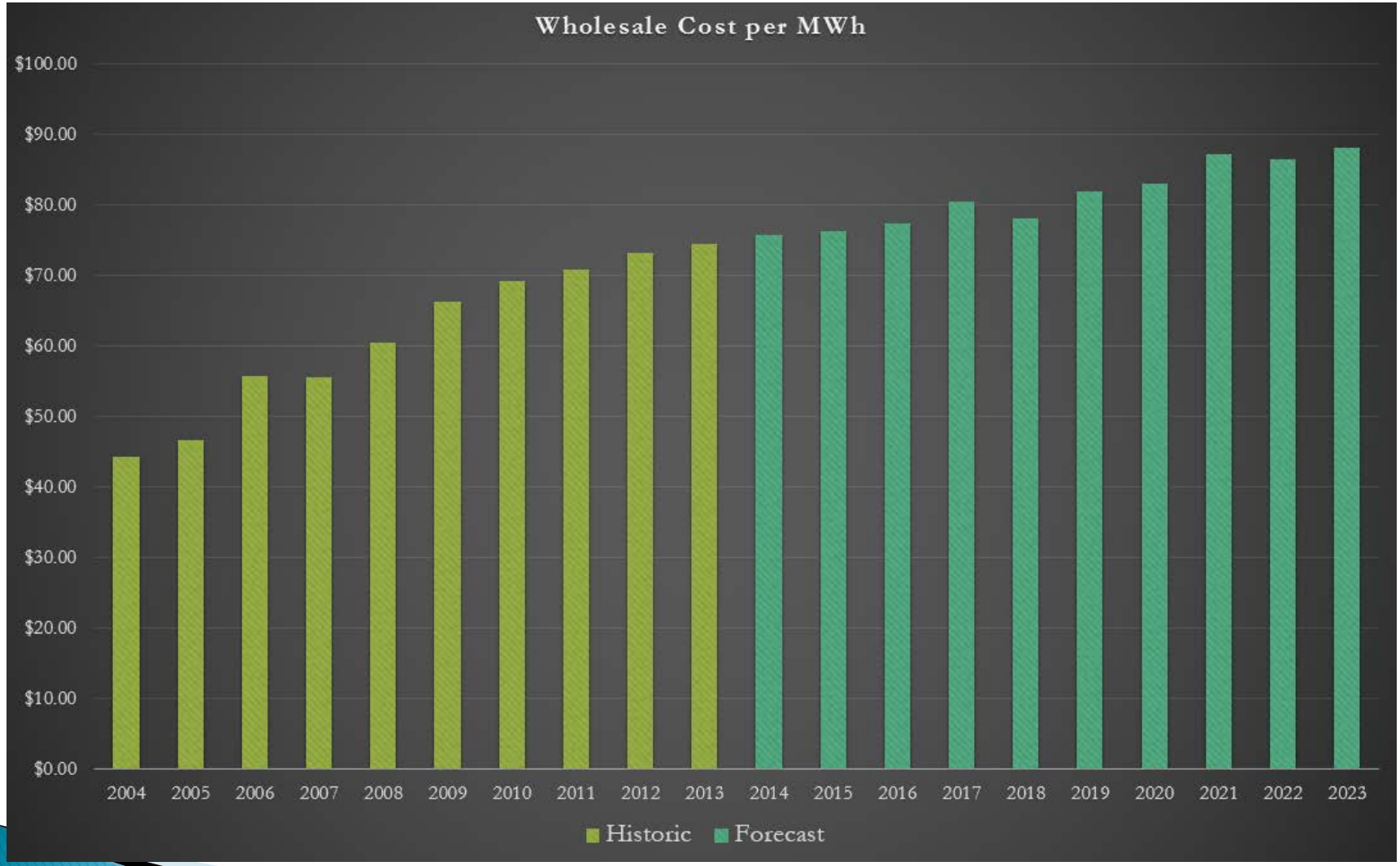
Financial Model Assumptions

- Project costs are amortized over 25 years.
- Member benefits are assuming a 25 year lease on solar panels.
- Rate Escalation Factor was generated by using 10 years of historical rate increases from WVPA (Wabash Valley Power Association) and 10 years of forecasted rate increases from WVPA.
- The forecasted rate increases do not include all of the potential environmental impacts. Tipmont expects the rate escalation factor to increase.

Calculating Avoided Costs

- Provider rates for project year one are based on WVPA 2013 rates. A rate escalation factor has been applied to each subsequent year's rates.
- WVPA time of peak was based on 2013 Coincident Peak Data. The calculated avoided power cost assumes the time of peak remains unchanged from 2013 values.
- Avoided kWh costs were calculated using the projected kWhs generated and verified by PVWatts on www.NREL.gov and solar manufacture projections.
- On Peak and Off Peak kWhs were divided based on projected hourly output by month and verified by PVWatts.

Wholesale Power Cost Trend



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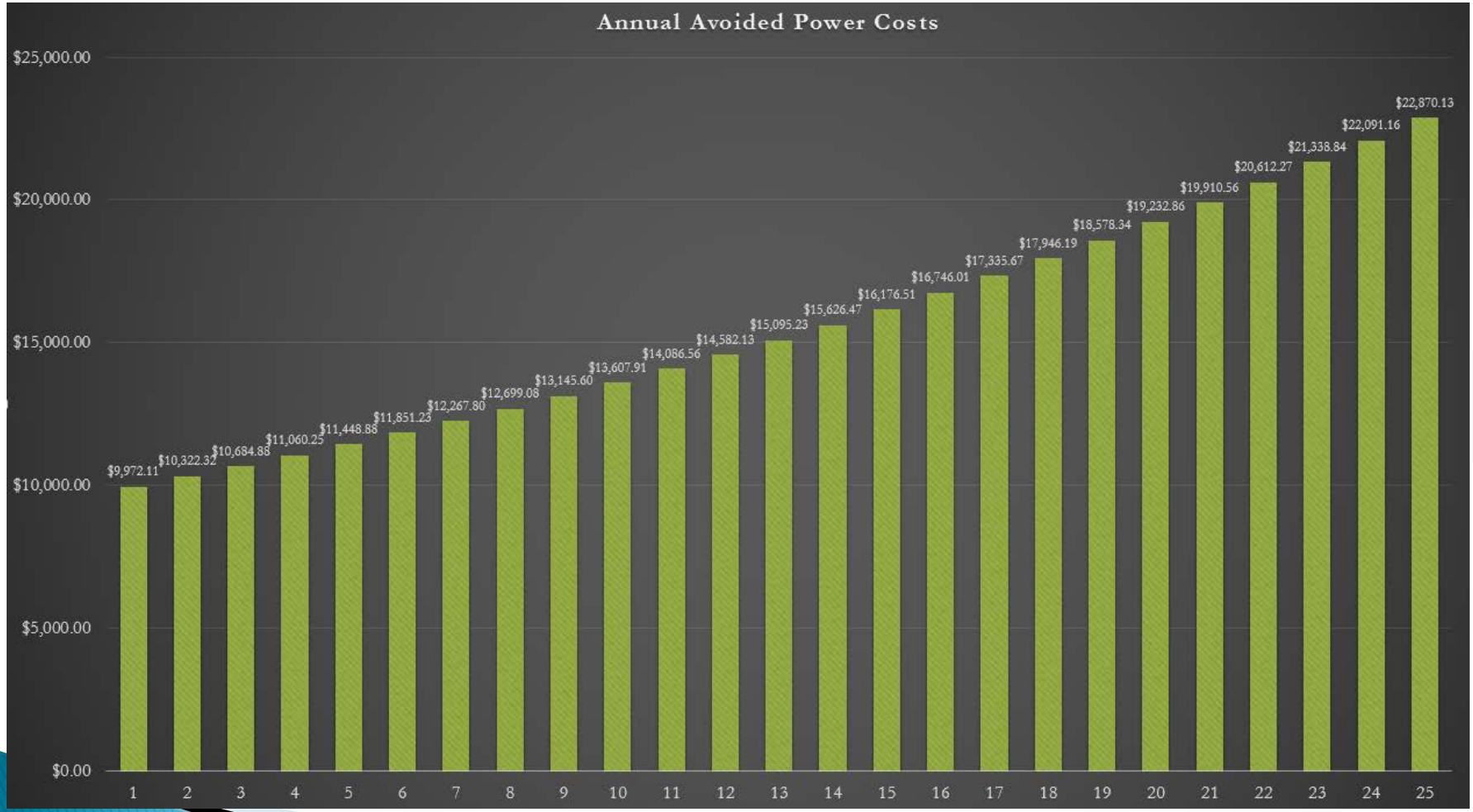
Avoided Wholesale Power Costs

Total avoided costs over 25 years = $389,288.98



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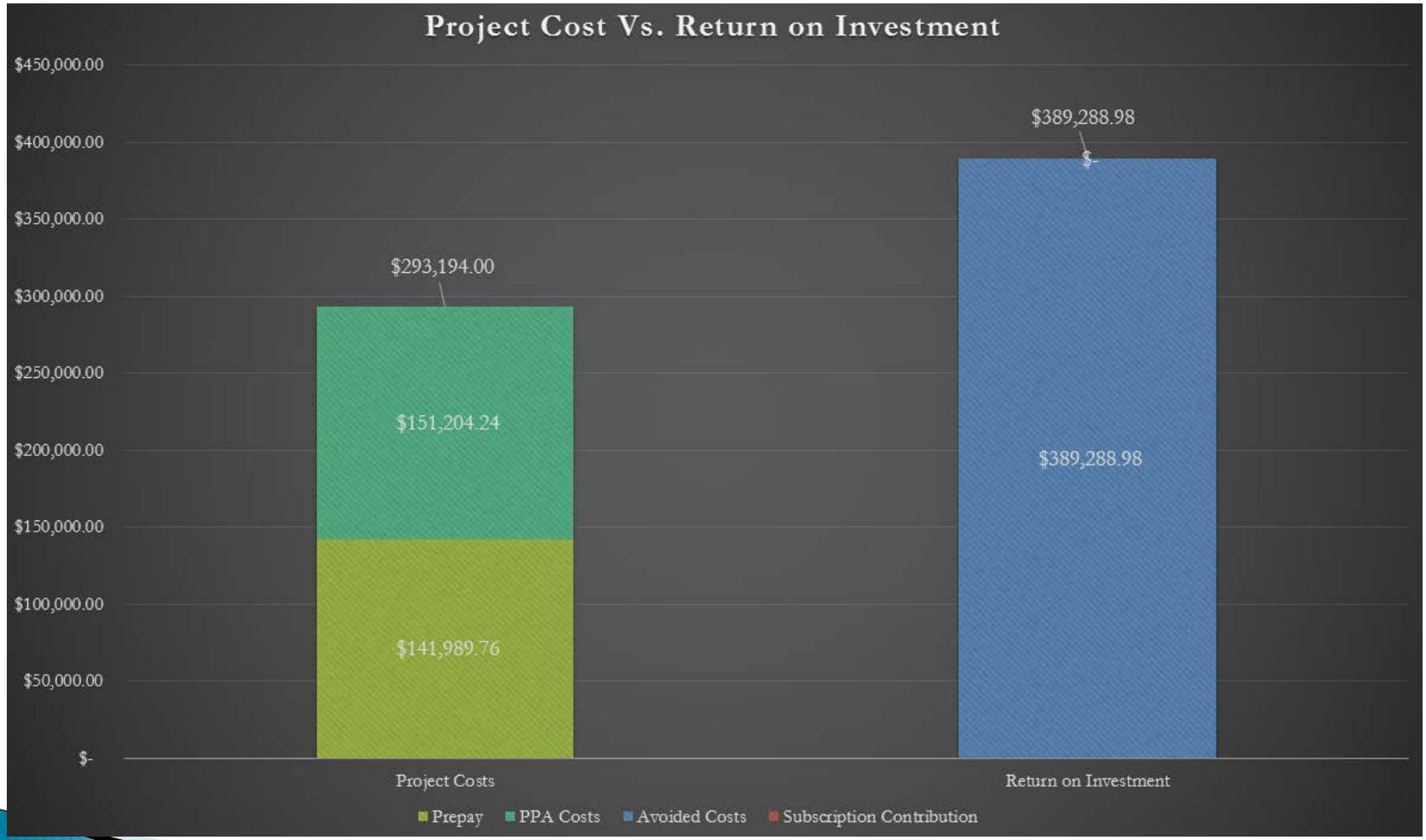
Scenario With Zero Panels Subscribed



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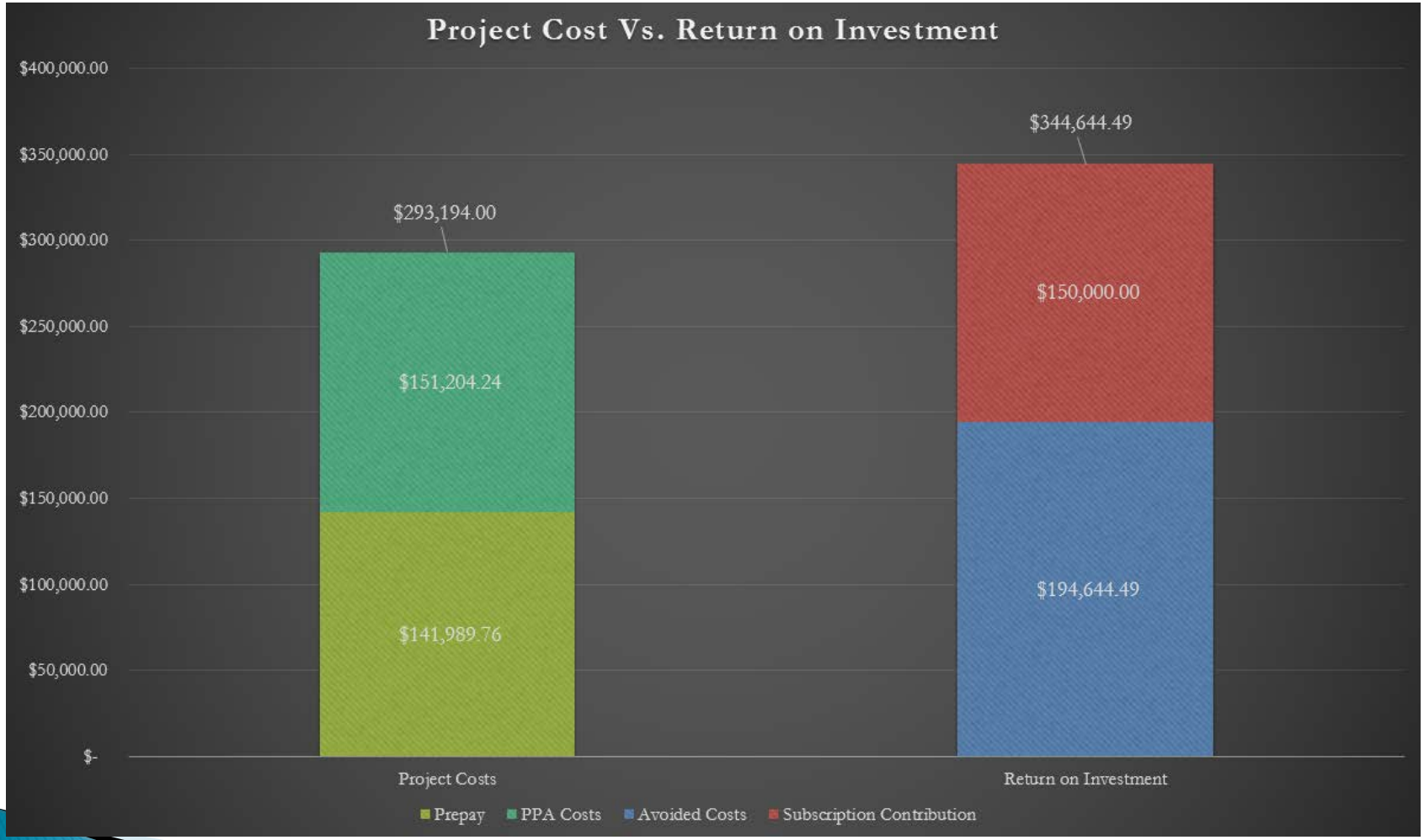
Scenario With 50% Panels Subscribed



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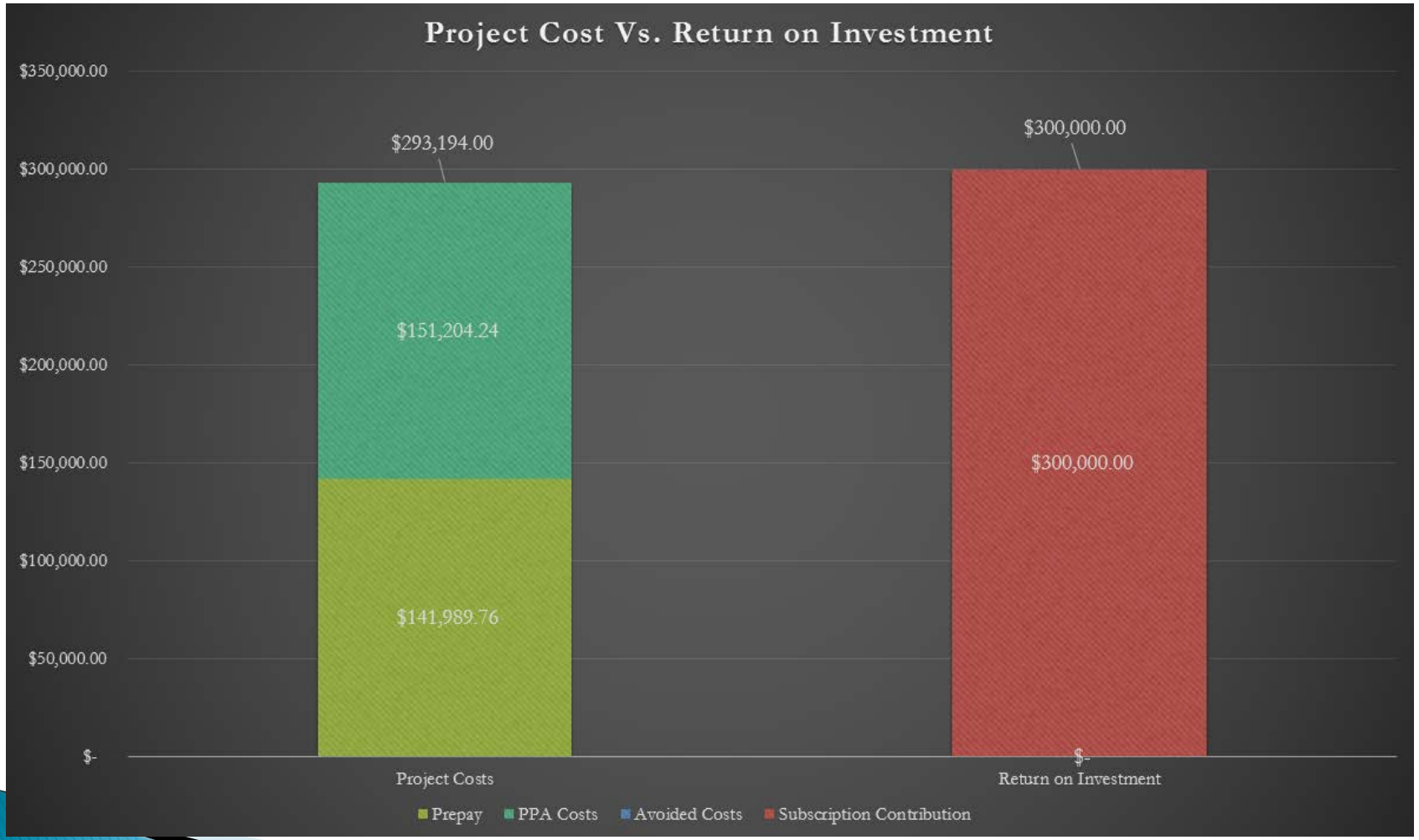
Scenario With 100% Panels Subscribed



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Proposed Solar Array

- 100 kW array, 240 panels, 410 watts each
- south of Linden headquarters
- on Tipmont-owned property
- room for additional panels in same area, up to ~ 200 kW
- proximity to office provides visible connection between solar array and Tipmont REMC
- opportunity for member tours, media visits, community events, employee training
- Constructed, operated, and maintained by Tipmont

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Member Agreement

- $1,250 to lease output per panel
- One time payment or 1, 2, or 3 years to finance
- May lease up to 50 percent total usage but no more than 10 panels
    - 1-2 panels first 2 months; 1-4 panels next 4 months; 1-10 panels after 6 months
- Agreement for term of 25 years
- Can expect an average of $5.00 credit per month in the first year
    - Credit will increase as rates change over time
- Panel stays with member if member moves to new Tipmont location
- Option to transfer panel to another member or back to Tipmont
- Array is owned, operated, and maintained by Tipmont

Member Financial Impact

Panel Price	$1,250.00
Total Projected Production (25 year lease)	14,154 kWh
Cost per kWh	$0.08831
ROI Term	15.84 years
Avoided Costs (25 year lease)	$2,280.70
Net Gain	$1,030.70

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Financing Options

Members who elect to finance their solar panel subscription over a 1-3 year term will receive a 'solar panel charge' as a line item on their monthly electric bill.

Term	0	1 year	2 years	3 years
Interest Rate	-	5%	5%	5%
Monthly Payment	-	$109.38	$57.43	$40.20
Total Cost of Panel	$1,250	$1,312.56	$1,378.32	$1,447.20

Member Engagement - Methods

- News Media: news releases, press conferences
- Purchased Advertising: radio ads, print ads, online banner ads
- Multi-Media: online view of solar output, smart device app
- Direct Member Communication: bill inserts, bill messages, ebill banner
- Indirect Member Communication: website, Electric Consumer, social media

Member Engagement - Details

- Announcement
- Website / Social Media
- Lobby Display
- News Release
- Bill Inserts – (inserts, SmartHub message, printed bill messages)
- Paid Advertising
- Television Coverage
- Other – (direct mail, email, video)
- Community Day

Project Timeline

Item	Time Frame
Internal Requirements Complete	July 1
Employee Meetings	June
Employee Training	June, July, August
Ground prep and stone	Jul 21 – Aug 1
Announcement at Annual Meeting	Jul 26
News Release	Aug 6
Pre-Sale Opens	Aug 6
Advertising Campaign	Aug 1 – Oct 31
Anchor Installation	Aug 1 – Sep 1
Array Installation	Sep 1 – Oct 15
Operational	Oct 15

RAIS PV Ground Mount System

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Thank you

Questions?

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