This slide deck was modified to remove references to LPEA’s long term power supply contract with Tri-State. Because this represents the CEO’s vision and this will be evaluated by the LPEA Board of Directors in the coming months, it was appropriate to remove those slides.

October, 2017
Mission

• LPEA provides its members safe, reliable electricity at the lowest reasonable cost while being environmentally responsible.

Vision

• Shaping the future by building trustworthy community partnerships as an innovative forward-thinking industry leader, delivering excellence in our member-owned cooperative.
2050 Vision – Now, Next, Then

• Environmental assessment – to vision what we should do now to prepare for 2050, we need to vision what 2050 looks like. What is happening today that foretells our industry and market in 33 years?

• Vision is not about our past.

• Vision past the political winds of change.

• What now? What next? What then?
Shaping the future by building trustworthy community partnerships as an innovative, forward-thinking industry leader, delivering excellence in our member-owned cooperative.
Shaping the future by building trustworthy community partnerships as an innovative, forward-thinking industry leader, delivering excellence in our member-owned cooperative.

LPEA 2050 Outlook

Time into the Future

Uncertainty Risk

Batteries

Solar
Background on the “Now”

- Rates
- Energy Markets
- Renewables and Distributed Generation
CAMU Residential Survey
July 2017 - Cost of 700 kWh

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<thead>
<tr>
<th>Municipality</th>
<th>Cost of 700 kWh</th>
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<tr>
<td>FORT MORGAN</td>
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<td>GLENNWOOD SPRINGS</td>
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<th>Investor</th>
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<tr>
<td>BLACK HILLS ENERGY</td>
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Note: The graph shows the cost of 700 kWh for municipalities and investor-owned utilities in Colorado. The municipalities are represented by vertical bars, while the investor-owned utilities are represented by horizontal bars.
Table 5.6.A. Average Price of Electricity to Ultimate Customers by End-Use Sector, by State, June 2017 and 2016 (Cents per Kilowatthour)

<table>
<thead>
<tr>
<th>Census Division and State</th>
<th>Residential</th>
<th>Commercial</th>
<th>Industrial</th>
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Source -https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a
RATIO 38 --- RESIDENTIAL REVENUE PER KWH SOLD (MILLS)
# 2016 Key Ratio Trend Analysis (KRTA)
## La Plata Electric Association, Inc. (LPEA)

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**BASE GROUP (RATIOS 1-5)**

**RATIO 38 --- RESIDENTIAL REVENUE PER KWH SOLD (MILLS)**

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**FEUS $112.80**

**Aztec $120.75**
Electricity prices reflect rising delivery costs, declining power production costs

Over the past decade, retail electricity prices have not closely followed the costs of fuels used to generate electricity, such as coal or natural gas, mainly because of changes in the other costs involved with producing and delivering electricity in the United States.

Source: https://www.eia.gov/todayinenergy/detail.php?id=32812
What does the rate comparison data tell us?

• Comparatively speaking, LPEA rates are in the upper range when compared with other electric coops and muni’s. Unattended to, rates become their own existential threat to LPEA.

• LPEA wires costs has only so much cost to cut without impairment of service.

• Tri-State wholesale costs are expected to gradually increase in the short run market that’s long in generation, which creates more rate risks for LPEA.

• High retail electric rates drive alternative penetration and statutory change, (retail dereg).

• Commercial Rates reflect costs, minimal cross-rate subsidy.
Energy Markets

• Bulk Power Deregulation – it’s coming
• Retail deregulation – the higher the rates, the greater the likelihood
• Colorado is long on generation; with expected population growth and the correlating load growth that goes with it. As the market contracts, prices will rise.
Durango 100 percent renewable by 2050?

Petition calls for city to reach local renewable energy goal

By Mary Shinn Herald staff writer
Friday, Sept. 1, 2017 9:01 PM  Updated: Friday, Sept. 1, 2017 9:29 PM
Renewables

• LPEA’s members expect and will continue to deploy DG, most likely solar.
• Renewable prices are declining
• LPEA has proven DG can be effective, if the physics and economics are properly managed
• Solar and wind, while inexpensive energy producers, are only intermittently available to service the demand of the grid by electric consumers.
Storage

• Indirect role in reliability, indirectly helping critical and sensitive loads ride through electric service anomalies.

• Current growth spurred by EV, to large extent.

• Market entrance for residential

• Utility deployment for some distribution and transmission ancillary service support, (volt, VAR, frequency) and in lieu of some line extension or system improvements on a strictly exploratory evaluation basis or positive cost-benefit.
U.S. Energy Storage Deployment Forecast

Source: GTM Research/ESA | US Energy Storage Monitor: June 2017

35 GW of Energy Storage by the year 2025
What Kind of Issues Can Storage Address?

- **Duck Curve Challenges**
  - Over generation during the day and dramatic ramping curves at day-end
  - Storage can serve the ramp and flatten the “belly”

- **Renewables Firming**
  - Customers don’t turn off AC or stop a production plant because it is cloudy
  - Battery energy storage has been proven to effectively smooth intermittent renewable generation

What (to do) now?

• Manage costs to “hold the line” on rates
• Optimize reliability resources to “best in class”
• Track and know technological developments and how they might play a role at LPEA
Background on the “Next” (2020-2030)

• The energy future
• Transmission - Update
• Electric vehicles – it’s now beyond commercial introduction, will be refined and mass produced
• Microgrids
Shaping the future by building trustworthy community partnerships as an innovative, forward-thinking industry leader, delivering excellence in our member-owned cooperative.

The world will undoubtedly experience a rapid energy transition, driven by electrification, boosted by a strong growth of wind and solar power generation, and further decarbonization of the energy system, including the decline in coal, oil, and gas, in that order.

Coal use has already peaked, oil will peak within the next 10 years and gas in 20 years, but gas remains the biggest single source of energy for the world through to 2050.

The world will manage the shift to a renewable future without increasing energy expenditures; the future energy system will require a smaller share of Gross World Product (GWP) than at present.

Primary energy supply will peak in 2025, as electricity grows its share of the energy mix and losses are reduced through the accelerated uptake of efficient renewable sources.

Source: DNV GL Energy Outlook 2017-2050
Shaping the future by building trustworthy community partnerships as an innovative, forward-thinking industry leader, delivering excellence in our member-owned cooperative.

Energy demand will plateau after **2030**, mainly owing to efficiencies in the generation and use of energy – even as the world makes steady progress with UN Sustainable Development Goal (SDG) #7 (ensuring access to affordable, reliable, sustainable and modern energy for all).

**2030**

Electric vehicle take-up will be rapid and extensive – by **2033** half of new passenger cars sold globally will be zero emission.

**2040**

The energy transition will be experienced unevenly across the world. Regional energy transitions look very different: e.g. India joining China as a renewable ‘superpower’; fossil-fuel dominant regions like the Middle East and Russia experiencing relatively slow transition.

**2050**

Renewable energy – notably wind and solar PV – holds the most potential for cost-competitiveness. Even so, fossil fuel will still comprise around half of the total energy supply in **2050**.

Total energy-related CO₂ emissions in **2050** will be around half of today’s level.
Shaping the future by building trustworthy community partnerships as an innovative, forward-thinking industry leader, delivering excellence in our member-owned cooperative.

Source
DNV GL Energy Outlook 2017-2050
SPP RTO footprint (as of TS press release 9/22/17)

What’s wrong with this picture?

1. PNM, AZ, Utah missing
2. Seams issue
3. Pancaking issue
LPEA Transmission Assets

• WECC TO
• WECC TOP?
• RTO membership?

• Ownership and operation of assets – LPEA must be a player in the transmission bulk power market if we’re to be effective in cost effective alternatives to TS if the buyout is a possibility.
Electric Vehicles

• GE says there will be 18 different EV models by 2023
• Over 40 sold in Durango in 2017
• What are the opportunities for consolidating renewable production with EV consumption? (hint – TOU)
Microgrids

• Not a panacea
• Variety of applications
• Microgrids are a “wires” solution with various sources and loads
• Think of electric coops as microgrids.
Microgrid opportunities – contingent upon…
(If-then)

• Innovate microgrid concept that enables/empowers Durango members to achieve their renewable objectives.
• Innovate microgrid concept that enables the SUIT to achieve their sovereignty over their energy future.
• Innovate microgrid solution that enables Archuleta County to achieve its reliability and autonomy objectives
• Innovate microgrid solution that enables Fort Lewis College to provide leadership in research and development to help solve the grid challenges LPEA faces.
What does 2030-2050 look like? (What Then)

• Incremental transmission owned by non-traditional utility capital.
• Transmission is alternative to large, central generation projects.
• Are there options for export of locally produced renewable energy? Only the extent to which producers have effective transmission access.
Confluence and questions

• Electric vehicle uptake happens simultaneously with renewable uptake to electric grid. While solar prices are declining, solar has to become more productive, energy output and time relative availability.

• What happens to bulk power flow if Craig goes away completely?

• With the lack of steel transmission infrastructure for natural gas, to what degree will NG supplant solid fuel plants, like Texas, in Colorado?

• Does the quest for all-renewable electric sourcing spawn an all-electric energy model?
Vision

• Along parallel paths, LPEA must move to increase cost effective and diversified, price sensitive DG. Diversity in supply reduces risks. Don’t bet the coop on one solution.

• To create a work environment and culture for employees that rewards their hard work in serving LPEA’s members and rewards their innovation in improving our serve.

• LPEA must provide innovative data and information management tools for members, especially in energy use management and reliability. LPEA will be the leader in reliability performance by maximizing employee capability with technological exploitation.
Transmission (Subject to board approval of business plan)

- Establish transmission affiliate (On or after 2019)
- Asset transfer for transmission assets and dispatch
- Transfer transmission funds to affiliate or reserve for transmission expenditures.
- Establish board of governance consisting of mgmt and LPEA BOD observers
Distribution Automation and optimization

• ERMCO transformers – GridBridge Energy Router
• Improved coordination and sectionalizing
• Proactive versus reactive maintenance to improve power quality delivery.
Affiliate

• What is LPEA’s ownership expectation for FastTrack?
  • To engage with LPEA’s membership community and play a leadership and service role in delivering improved and competitive telecommunications services.
  • To be profitable and provide year-over-year cash back to LPEA and EEA if not used for retail service in LPEA and/or EEA’s territories.
  • To manage growth within LPEA and EEA’s service territory while managing the risk associated with retail services.
  • To grow its core middle mile service.
  • To position itself as a valuable entity from which LPEA and EEA can derive financial benefit.
Vision for the board

• John F. Kennedy, Profiles in Courage
• Legacy is about achievement
• Look for the solutions that exist in compromise.
Advocacy

• As bulk power deregulation evolves, we must be involved, learning, participating and advocating for our member’s interest.

• As state and federal legislation is introduced or involved, we must participate and advocate for our members interest.
DG and renewables

• With solar prices declining, use TS Policy 101 and 118 to assist members with local DG projects

• Continue PV interconnection behind meter
Electric Vehicles and ETS

• LPEA must learn how to leverage EV load and storage. TOU rate structure can help with that evolution.

• LPEA must leverage thermal storage, (ETS, water heaters, etc.), through TOU pricing.

• LPEA must look for opportunities to partner EV loads, as well as other potentially disruptive energy consumers, and renewable generation through technology and pricing

• LPEA needs to reconsider pricing virtual net metering and net metering
PV

• Grid Parity – PV rates should reflect LPEA expenses
• Follow battery technology evolution
• Identify derating, renewal/replacement, reclamation needs
2050 wires company – it’s about the people

• Doesn’t matter what we’re billing/charging in 2050, it’s all about the service we provide.
• The 2050 LPEA member will value above all else, the exceptional service their cooperative employees provide. Members needs and desires drive the business model in 2050.
• Nimble, adaptive organization remains LPEA’s biggest strength in 2050
• LPEA’s members trust all of the employees in the organization to do what’s in the members best interests.
• LPEA is a wires company now, and will most likely be a wires company in 2050 (Any vision that excludes LPEA as wires company in 2050 MUST begin collecting decommissioning funds.)
Where do we go from here?

• Ruminate
• Revisit
• Keepers go to O&I’s, (catch), everything else, (release)
Questions?