Reliable Renewable Electricity with Reasonable Rates for SDCEA

Sangre de Cristo Electric Association

Ark Valley Coalition
For a Sustainable Energy Future

Ken Regelson
4/24/2024

Image: pixabay.com

Energy ShouldBe.org

Energy ShouldBe.org

abundant secure for all forever

Drive a rapid and responsible transition to a clean energy future based on data driven actions.

Topics:

- **SDCEA and Neighbors**
- **Reliable & Renewable**
- **Reasonable Rates & Bills**
- **SDCEA Lowering SDCEA Costs**
- **SDCEA Lowering Power Purchase Costs**
- **Actions to Lower Our Bills**

Image: pixabay.com

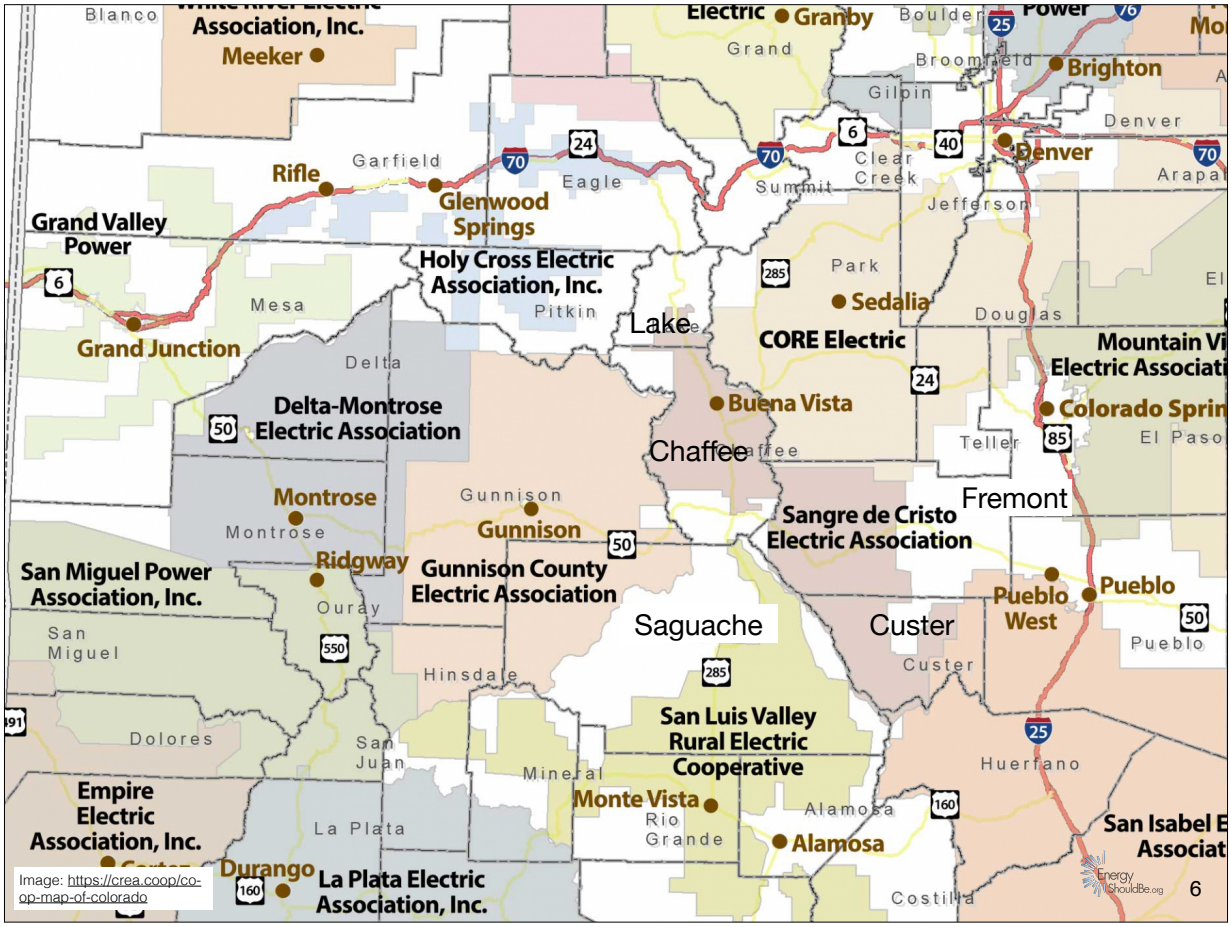


Image: https://crea.coop/co-op-map-of-colorado

14,000 members/customers/electricity-meters

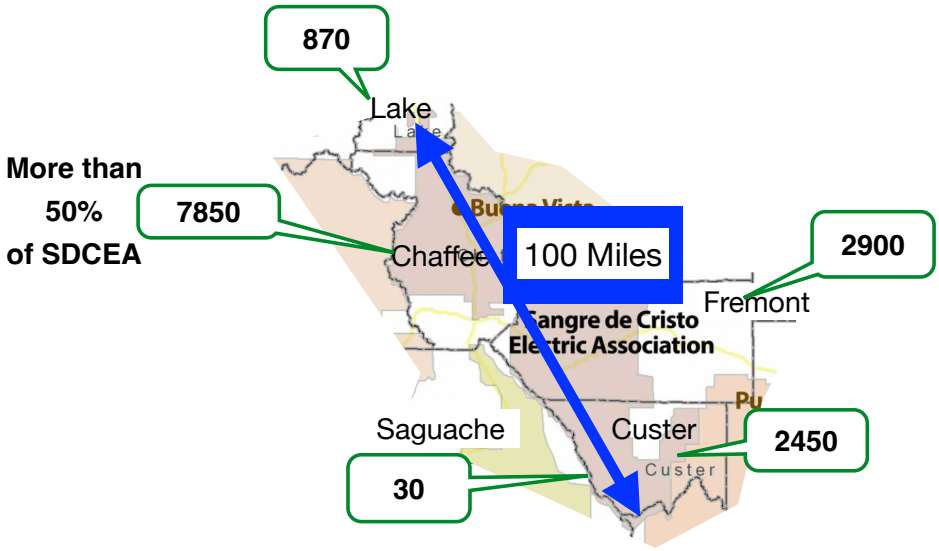
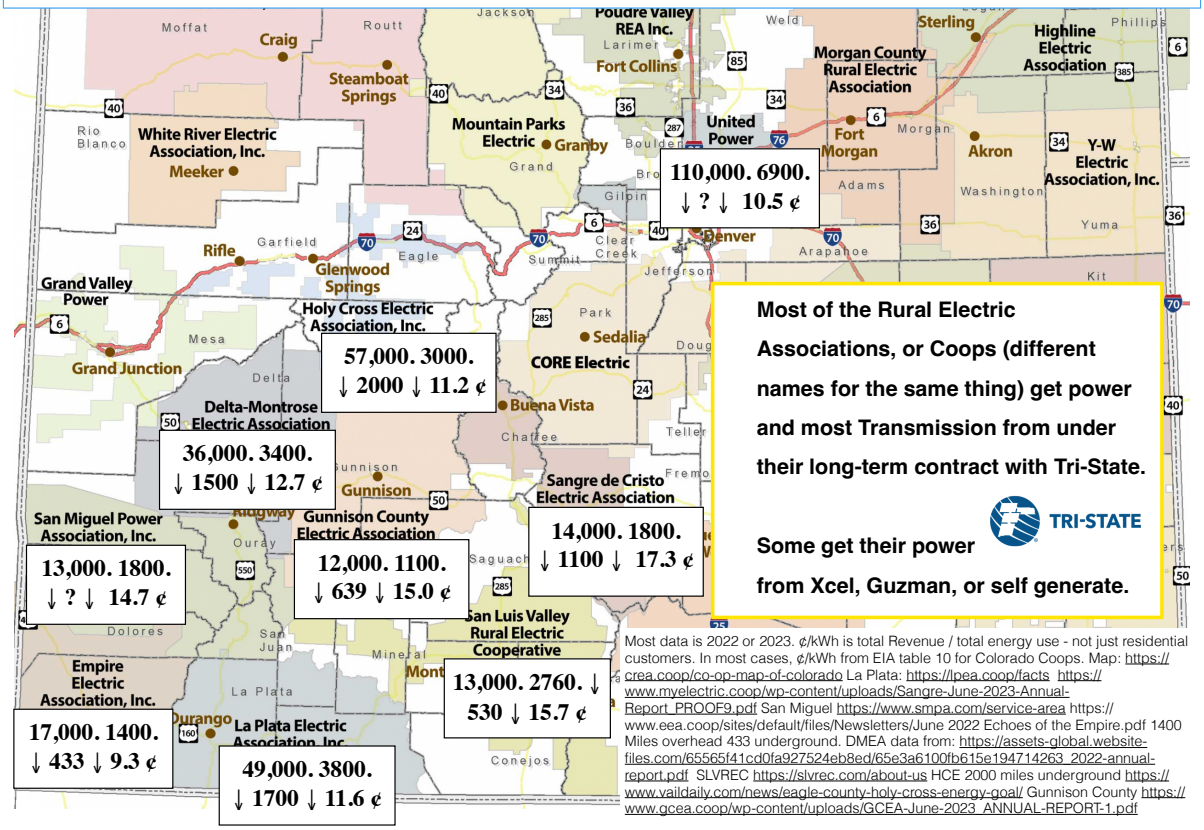


Image: https://crea.coop/co-op-map-of-colorado Consumers in each county data from https://www.myelectric.coop/safety/outages/

XX,000 Members. YY00 Total Miles of Lines. ↓ UU00 ↓ Miles Line Underground. ¢/kWh



Most data is 2022 or 2023. ¢/kWh is total Revenue / total energy use - not just residential customers. In most cases, ¢/kWh from EIA table 10 for Colorado Coops. Map: https://crea.coop/co-op-map-of-colorado La Plata: https://lpea.coop/facts https://www.myelectric.coop/wp-content/uploads/Sangre-June-2023-Annual-Report_PROOF9.pdf San Miguel https://www.smpa.com/service-area https://www.eea.coop/sites/default/files/Newsletters/June 2022 Echoes of the Empire.pdf 1400 Miles overhead 433 underground. DMEA data from: https://assets-global.website-files.com/65565f41cd0fa927524eb8ed/65e3a6100fb615e194714263_2022-annual-report.pdf SLVREC https://slvrec.com/about-us HCE 2000 miles underground https://www.vaildaily.com/news/eagle-county-holy-cross-energy-goal/ Gunnison County https://www.gcea.coop/wp-content/uploads/GCEA-June-2023_ANNUAL-REPORT-1.pdf

Worst Cold Snaps by Year in BV

Winter Season	Min Temp	Degree Hours	Hours Long
2023-24	-6.7	92	
22-23	-15.7	151	
21-22	-27.7	362	18
20-21	-16.7	388	36
19-20	-18.2	198	
18-19	-19.3	262	
17-18	-2.4	470	41
16-17	-20.6	272	
15-16	-17.1	167	
14-15	-20.6	347	14
13-14	-25.4	245	
12-13	-14.5	193	
11-12	-15.1	179	
2010-11	-30.5	469	27

14 years of hourly data from https://coagmet.colostate.edu/station/bnv01_main.html Analysis by EnergyShouldBe.org Max DD is Maximum Degree hours based on 5 degrees F. (so an hour of minus 7 would be 12 degree hours (5 - - 7 = 12)/ An hour of -7 with an hour of 3 would be (5 - - 7) + (5 - 3) = 14 degree–hours.

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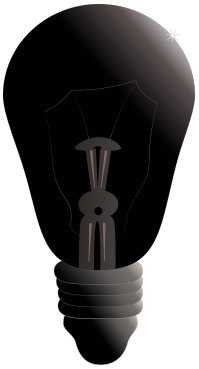
Image: pixabay.com

Reliability Means Electricity Stays ON and Stable



Blackouts:

People injured or killed
Our economy stops
If electrified our heat stops
Electric transportation impacted
Pipes freeze

1 hour - 0.01% - per year of blackout - not good, but mostly survivable.

→ **UNACCEPTABLE for the lights to go out for very long.**

→ **Utilities like SDCEA and Generators like Tri-State are keenly aware of this.**

Image: pixabay.com

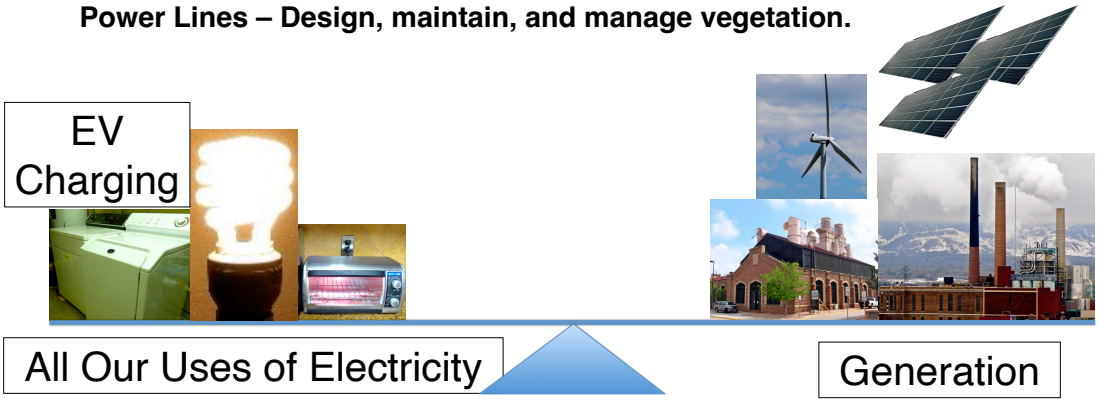
Reliability = Resource Adequacy

"Adequacy" means enough generators, storage, and wires.

- **to cover peak electricity even in extreme events**
- **to cover failures of generators and wires**

"Adequacy" is changing to include much more managed electricity use.
Use far more when renewables and storage are plentiful and cheap.
Use far less when they are not plentiful and cheap.

Power Lines – Design, maintain, and manage vegetation.



Images: EnergyShouldBe.org

Reliable and Lots of Renewables

2004: Utilities:

10% Renewables
Costs $2 Billion

10% wind will
crash the grid.

2004's Amendment 37 was passed by the people and required 10% renewables.

Reliable and Lots of Renewables

2022 - 2024 Utilities say:

Holy Cross Energy: 2022: "… the cost of renewable energy is cheaper than its fossil fuel counterparts. "
and 2024: "…100×30 goal of … 100% clean energy by 2030… achieving over 90% …by… 2025." with projects already operating or contracted for. "while … first prioritiz(ing) system reliability and overall costs"

Xcel: "Reduce carbon emissions more than 80% by 2030" Zero GHGs in 2050

Tri-State: "In 2030, the preferred plan reduces greenhouse gas emissions 89% in Colorado and 55% systemwide, … with 70% of the energy Tri-State members use coming from renewable resources."

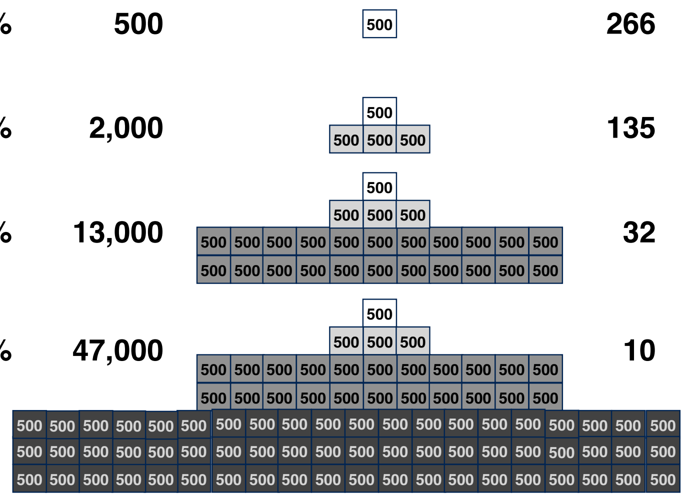
There is a lot of healthy debate, modeling, analysis and testing to insure high reliability with lots of renewables.

There is a lot of disinformation about electricity, renewables, and electrification.

Xcel https://www.xcelenergy.com/staticfiles/xe-responsive/Company/Rates & Regulations/Clean Energy Plan Phase II Info Sheet Jan. 2024.pdf
Tri-State https://tristate.coop/momentum-energy-transition-highlights-tri-states-72nd-annual-meeting HCE https://www.holycross.com/wp-content/uploads/2023/05/HCE_AnnualReport2022.pdf and https://www.holycross.com/press-release-holy-cross-energy-charts-course-for-clean-energy-future/

Example Modeling - Reliability is Built In - > 99% is hard

	Renewable %	Surplus %	Storage (MWh)	Storage used (annual discharge / total storage) (times per year)
Solar Wind Hydro **no storage**	**85%**	**45%**	**0**	**n/a**
Solar Wind Hydro **small storage**	**90%**	**40%**	**500**	**266**
Solar Wind Hydro **big storage**	**95%**	**35%**	**2,000**	**135**
Solar Wind Hydro **very big storage**	**99%**	**31%**	**13,000**	**32**
Solar Wind Hydro **ginormous storage**	**100%**	**30%**	**47,000**	**10**



EnergyShouldBe.org modeling of increasing storage enabling higher %s of renewables.

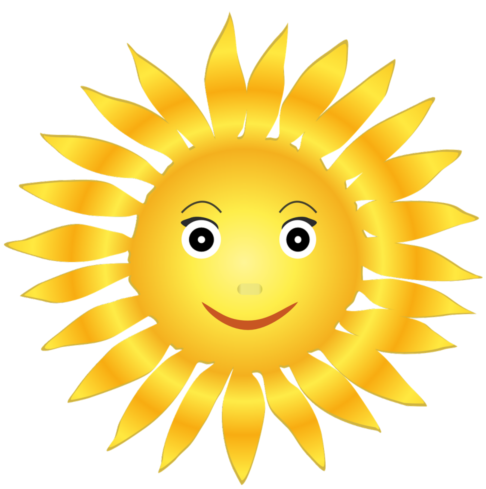


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Image: pixabay.com

Rates Lead to Bills Based on Usage

Typical SDCEA Residential Bill:

- **A fixed Monthly Service and Facility Fee**
- **An Energy Rate times Energy use in kilowatt-hours (kWh).**
  - **Say 13.5 cents per kWh**
- **Taxes and other fees**

Rate Setting is a Complex COMPROMISE. Rates are NEVER perfect.

SDCEA Current Charges Detail		
Energy Rate per kWh	535 @ 0.134850	$72.14
Service Availability Charge		$35.01
Wildfire Mitigation Rider		$8.00
Renewable Energy Charge		$0.60
County Tax		$3.18
Current Charges Due		$118.93
TOTAL CHARGES DUE 03/25/2024		**$118.93**

San Miguel Power Association - Setting Rates

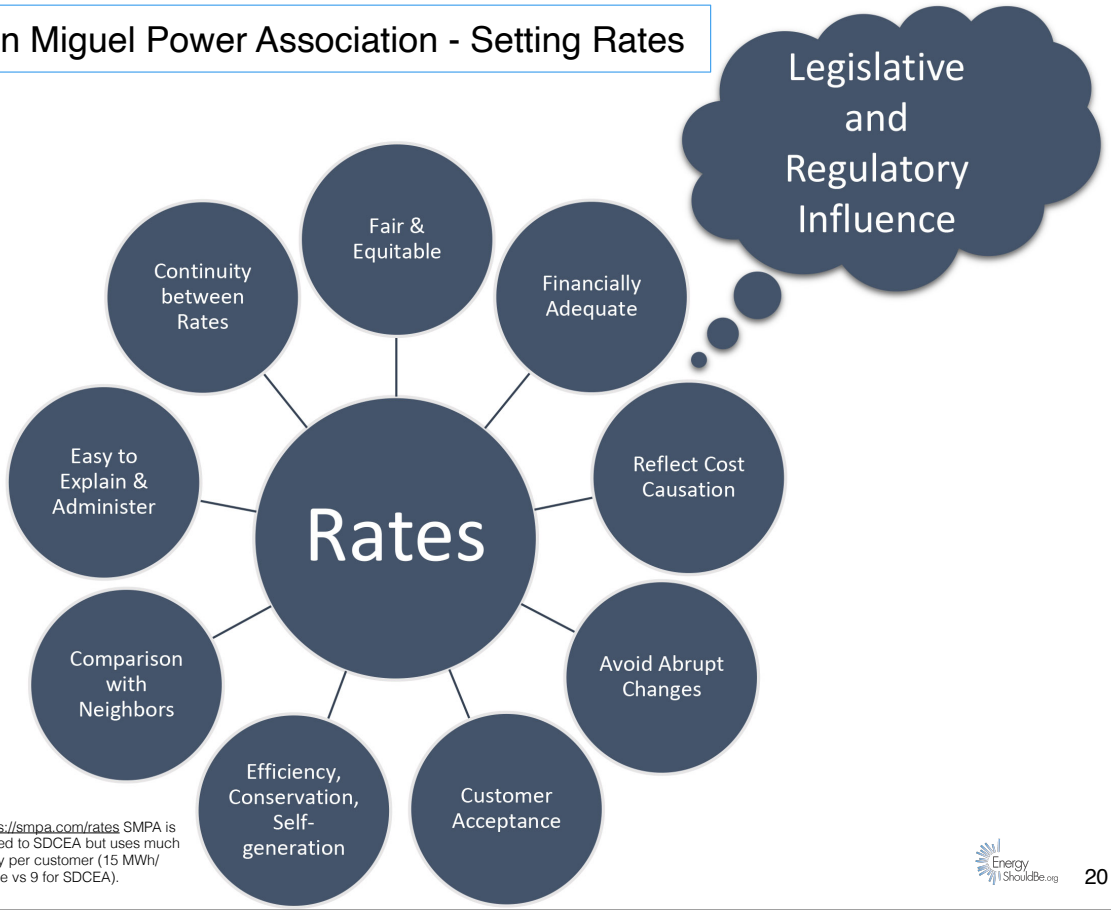
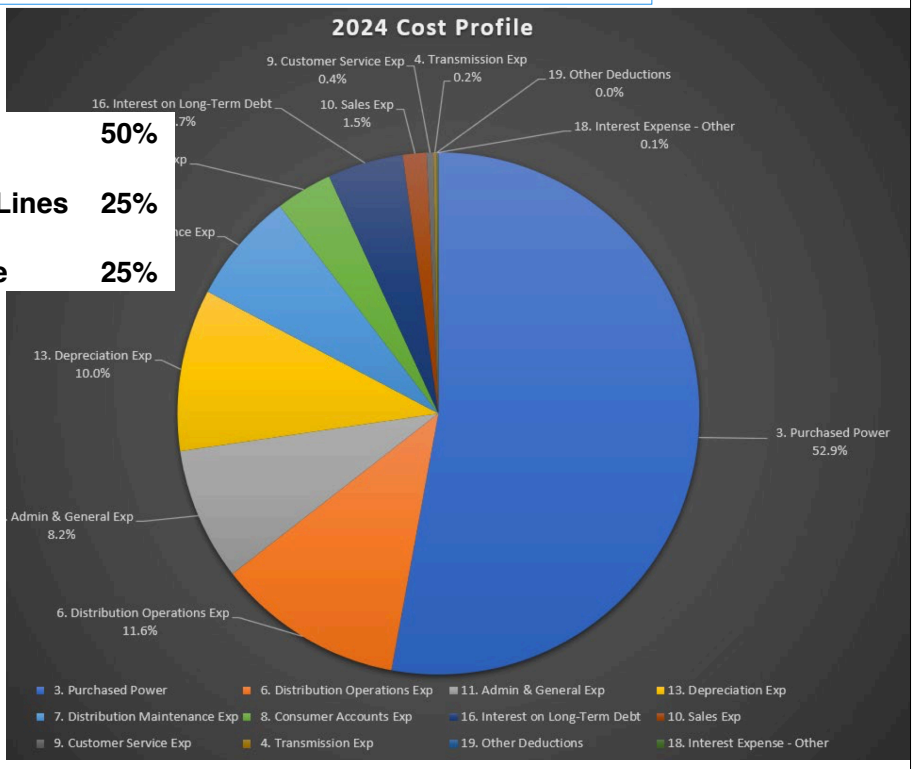


Image: https://smpa.com/rates SMPA is similarly sized to SDCEA but uses much more energy per customer (15 MWh/ year average vs 9 for SDCEA).

San Miguel Power Association - Cost Profile

Roughly:

Cost of Power	**50%**
SMPA Power Lines	**25%**
Everything Else	**25%**



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SDCEA - Cost Profile

Roughly:

Cost of Power	**50%**
SDCEA Power Lines	**25%**
Everything Else	**25%**

From 2022 SDCEA Annual Report:

EXPENDITURES				
Cost of power	$10,325,904	51	$10,603,043	49
Operations and maintenance	4,283,507	21	4,981,499	22
Administrative and general	2,431,216	12	2,537,740	12
Depreciation and amortization	2,013,198	10	2,168,454	10
Taxes, interest and other deductions	1,308,473	6	1,437,599	7
TOTAL COST OF ELECTRIC SERVICE	**$20,362,298**	**100**	**$21,728,335**	**100**

SDCEA: 2022 Annual Report https://www.myelectric.coop/wp-content/uploads/Sangre-June-2023-Annual-Report_PROOF9.pdf

SDCEA - Opportunities to Save on Bills

Roughly:

Cost of Power	**50%**
SDCEA Power Lines	**25%**
Everything Else	**25%**

SDCEA's Monthly bill from Tri-State is broken down into two parts (roughly).

Energy Used (kilowatt-hours)	**50%**
Transmission and Generation (the 30 minute monthly peak in kilowatts)	**50%**

In SDCEA, the 30 minute monthly peak electricity use occurs between 6:00 PM and 8:30 PM all year round.

Peak electricity use can also be called peak demand or just demand.

SDCEA: 2022 Annual Report https://www.myelectric.coop/wp-content/uploads/Sangre-June-2023-Annual-Report_PROOF9.pdf

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Image: pixabay.com

SDCEA - Ways to Save on Everything But Power Purchase

Roughly:

Cost of Power	**50%**
SDCEA Power Lines	**25%**
Everything Else	**25%**

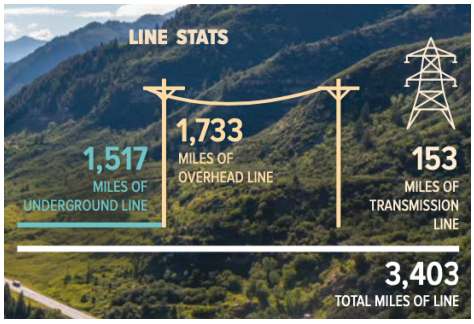
SDCEA: 2022 Annual Report https://www.myelectric.coop/wp-content/uploads/Sangre-June-2023-Annual-Report_PROOF9.pdf

Power lines and poles

SDCEA: 1800 Line Miles, about 1100 miles underground and 16,000 poles.

SDCEA staff knows a lot about cost-effective lines and poles!

- **Poles & wires at risk from wind driven fire.**
- **Power lines can start fires in high winds.**
- **Increased annual costs for vegetation management.**
- **Fire resistant poles and wires.**
- **Under-grounding is expensive. Less but not zero maintenance. Expensive to repair and upgrade when needed.**



2022 DMEA Annual Report

Board's role is oversight and making tradeoffs on budget - maybe underground faster if, if, if…

Source: 1800 miles: 2022 Statistics https://www.myelectric.coop/wp-content/uploads/Sangre-June-2023-Annual-Report_PROOF9.pdf 1100 miles is from a conversation with Ryan Doke of SDCEA. 40,000 poles - an estimate based on DMEA's annual report, 1800 miles of lines above ground and 41,000 poles. SDCEA with 700 above, 41,000*700/1800 = about .16000

https://www.osmose.com/newsletter-2020-q1-universal-solution-to-steel-pole-restorations
https://www.sdgenews.com/article/sdge-replacing-wood-poles-steel-enhance-fire-safety
https://www.mcwanepoles.com/why-ductile-iron/fire-resistance/
https://www.creativecompositesgroup.com/products/utilities/utility-pole-fire-resistant

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Image: pixabay.com

SDCEA - Ways to Save on Power Purchase

Roughly:

Cost of Power	**50%**
SDCEA Power Lines	**25%**
Everything Else	**25%**

Reducing Tri-State Bills.

Pros of staying with and leaving Tri-State.

SDCEA's Monthly bill from Tri-State is broken down into two parts (roughly).

Energy Used (kilowatt-hours)	**50%**	Saving Energy
Transmission and Generation (the 30 minute monthly peak in kilowatts)	**50%**	Lower the Peak or spread it out.

In SDCEA, the 30 minute monthly peak electricity use occurs between 6:00 PM and 8:30 PM all year round.

Peak electricity use can also be called peak demand or just demand.

SDCEA: 2022 Annual Report https://www.myelectric.coop/wp-content/uploads/Sangre-June-2023-Annual-Report_PROOF9.pdf

SDCEA and Tri-State Already Do a Lot to Reduce Energy and Peak

Mostly programs to encourage you to install energy efficiency to reduce energy use and Peak

https://www.myelectric.coop/energy-efficiency/

Easy Links to:

- **Rebates**
- **Carbon Reduction**
- **Consumer-Owned Solar**
- **Energy Savings Guide**
- **Energy & Efficiency Assistance**
- **Consumer Energy Tax Incentives.**

One Way to implement this is by Virtual Power Plants

"Adequacy" is changing to include much more managed electricity use.
Use far more when renewables and storage are plentiful and cheap.
Use far less when they are not plentiful and cheap.

Virtual Power Plants (VPP) can help resolve the inevitable mismatches of when renewables make the most power, and when the most power is used - at the peak .

SDCEA May be Aggressively Considering Virtual Power Plants (VPP) Like Many Others

VPP: Many *small-scale energy resources* aggregated together. When coordinated with grid operations, a VPP can generate energy and address peaks like a natural gas turbine.

"Small scale energy resources" include residential smart thermostats, EV charging, V2G – Vehicle to Grid - where an EVs battery supplies electricity to the grid, hot water heating, Solar systems with storage, etc

Holy Cross and many others are implementing VPP.

Tom Plant (Colorado Public Utility Commissioner) and the Commission are requiring Xcel to quickly implement a 50 MW VPP.

The Brattle Group just released a study saying VPPs in California could "serve more than 15 percent of peak electricity demand in California by 2035, saving roughly $750 million annually."

First point adapted from RMI https://rmi.org/clean-energy-101-virtual-power-plants/
https://www.holycross.com/wp-content/uploads/2023/03/HCE-Strategic-Plan-2023_web.pdf Brattle Group study
https://www.eenews.net/articles/virtual-power-plants-poised-to-grab-california-market-share-study/

Pros of Staying With Tri-State. Pros of Leaving Tri-State.

Stay or Leave? A Question for Members, Board, and Staff.

Pros to Stay

1. **Tri-State is aggressively pursuing low cost high reliability renewables and has a new CEO.**
2. **There is a significant separation charge to leave Tri-State. $30 Million or so.**

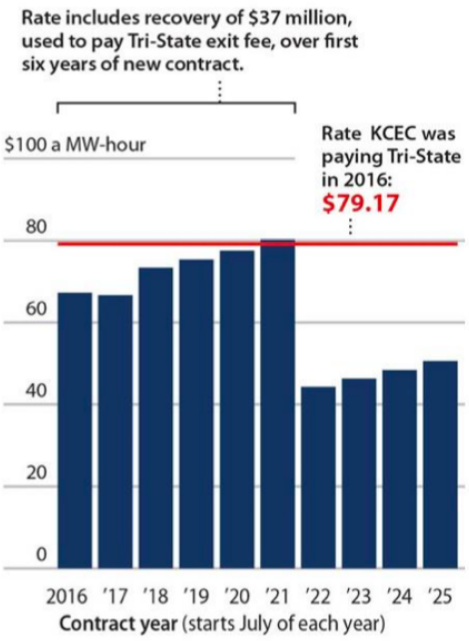
Pros to Leave

1. **8 Colorado Coops have left or are planning to leave their Power Supplier.**
2. **The primary reason is to save money, even including paying off the separation fee.**
3. **The coops that left or are leaving have or believe they will have lower and more stable costs, higher renewables, and more flexibility than they would have with Tri-State or Xcel.**

Image: https://www.cleancooperative.com/news/reports-examine-the-impacts-of-tri-states-high-wholesale-power-costs

Kit Carson Was the First to Leave Tri-State

Figure 1: Kit Carson Electric Cooperative's New Deal Will Drastically Lower Its Wholesale Power Costs by 2022, Once It Has Paid Off Its $37 Million Tri-State Exit Fee



Source: Kit Carson Electric Cooperative

Image: https://www.cleancooperative.com/news/reports-examine-the-impacts-of-tri-states-high-wholesale-power-costs

Coops That Have Left or Plan to Leave

From Tri-State	Year	Actual* or Est.*** Separation Fee	From Xcel:
Kit Carson	**2015**	**$37 M ***	**CORE Electric (formerly Intermountain)**
Delta Montrose	**2020**	**$137 M ***	**Grand Valley Power**
United Power	**May 1, 2024**	**$700 M *****	**Yampa Valley Power**
Nebraska NW Power District	**2024**		
Mountain Parks	**2025**	**$60 M *****	
La Plata	**2026**	**$180 M *****	

Most are working with Guzman Energy as their power supplier.

Interesting links:

https://bigpivots.com/mountain-parks-links-with-guzman-energy/

https://www.unitedpower.com/powersupply
https://www.unitedpower.com/annual-meeting
https://www.guzmanenergy.com/guzman-energy-partners-with-holy-cross-energy-for-power-generated-by-bronco-plains-ii-energy-center/
https://coloradosun.com/2023/10/02/energy-co-ops-xcel-tri-state-clean-cheap-energy/
https://lpea.coop/press-releases/lpea-board-directors-vote-leave-tri-state-generation-and-transmission

Residential 2024 rates: DMEA Monthly fixed: $29.50. Energy 11¢ per kWh.
SDCEA: fixed $35 Energy 13.5 ¢ per kWh

Lightning Round

Fiber to Every Member:
2016, Delta Montrose launched Elevate Internet
2019 Cash Positive
2024 68% speeds up to 6 Gig.

Holy Cross -
Offers every EV owning member a free medium speed EV charger. Member pays installation. The charger slows charging when power costs are high and charges at the maximum when there are lots of renewables and power costs are low.
Impact on member is mostly un-noticeable.
Offered because it pencils out to save all members money.

Holy Cross and City of Vail
Ground and waste heat from sewage treatment based heat pump project proposal. Plan to use it to melt ice that is currently melted by natural gas.

Holy Cross
Thousands in rebates for home storage. A monthly payment for allowing HCE to reduce peaks and charge when high renewables.

Image: https://crea.coop/co-op-map-of-colorado Consumers in each county data from https://www.myelectric.coop/safety/outages/

Fort Collins Data from https://www.fcgov.com/utilities/news/view/7579

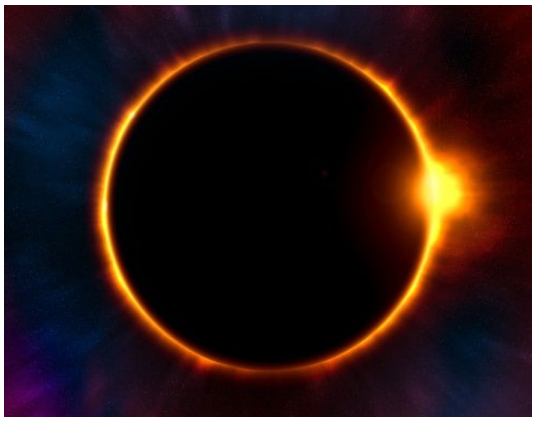


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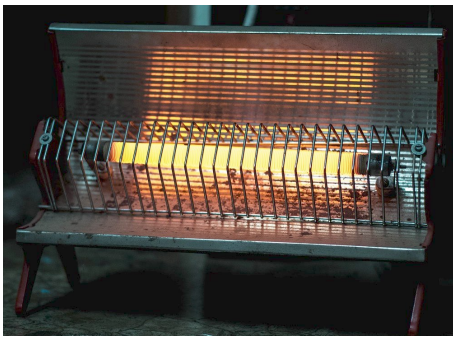
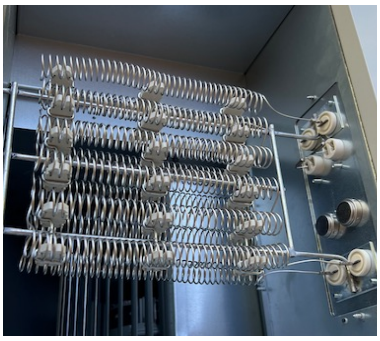
Image: pixabay.com

Actions that lower the peak reduce everyone's costs.
… lower energy use lowers my bill

Electric Resistance Heat





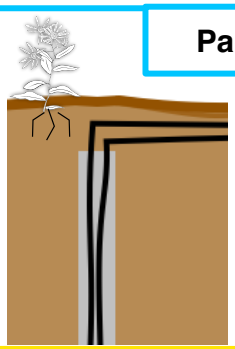
Images:pixabay.com and EnergyShouldBe.org

A Lot of SDCEA's Winter Peaks is from Resistance Heating

Particularly during cold snaps.

Resistance Heat: 1 → 1.
1 kWh of electricity makes 1 kWh of heat.

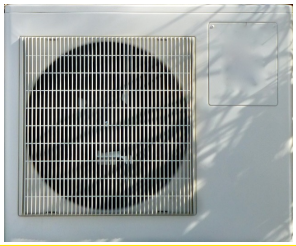
100% efficient at making heat.



Ground Heat Pump:
1 → 4 up to 1 → 5.
COP of 4 or 5

400 to 500% efficient at pumping/moving heat if ground loop is at a moderate temperature.

1 → 5 for cooling.



Air Heat Pump:
1 → 3. A few 1 → 4.
COP of 3 or 4

300% efficient at pumping/moving heat if outside air is at a moderate temperature.

Images: pixabay.com and EnergyShouldBe.org

Heat Home Efficiently With Heat Pumps. Cuts Peak and Energy

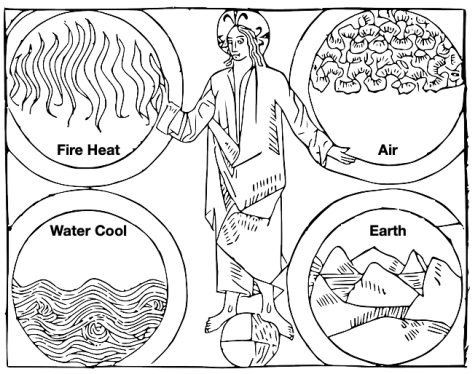
Significant cost savings from resistance or propane heat.

Ground or Air Heat Pump? (Ground = Geothermal)
In a cold climate (Colorado)

Ground: All new construction

Existing Home:
Ground for max efficiency
Air - Lowest upfront $ but higher Peak/cold snap cost

A video by Ken on Ground & Air Heat Pumps



Can we get off fracked gas cost-effectively?

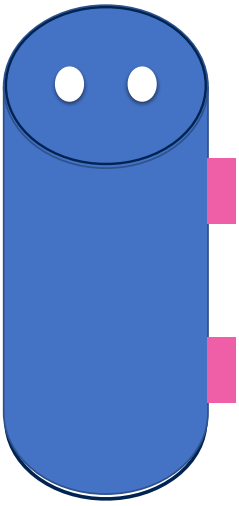
– –

Heat and Cool Your Home Renewably and Get Off Natural Gas Cost Effectively.

Ken Regelson
1/13/2023

Smart Electric Water Heating

Cuts Peak and Maximizes Renewable Use



Best with 60 or 80 gallon tanks.

Most have an upper and lower heating element.

A simple smart controller:

- **Upper off or reduced power during peak.**
- **Turn bottom on when high renewables and low cost.**

Existing Home: Get an Energy Audit

Full Energy audits not available in SDCEA?

Should include blower door, infrared camera pictures, and a report.

Do the cost-effective measures.

Your Upgrades Overview

Prepared for Ken Regelson. Every Home is Different.

Estimated Totals

Installed Cost

$10,185

This is the estimated cost of your upgrades before incentives. It includes material and labor.

Energy Savings

$206/yr.

That's $17/mo.

This is an estimate of much you could save starting in Year 1. These savings will only increase as energy prices rise over the years.

Rebates & Incentives

All costs and estimates in this report are our best guess but not binding.

Your recommended energy upgrades

Details	Installed Costs	Annual Savings	Rebates	SIR	MIRR	ROI	Comfort	Health & Safety
Replace Freezer	$474	$55	N/A	1.7	9%	✓		
Seal Air Leaks	$1000	$100	N/A	1.5	8%	✓	✓	✓
Upgrade Your Heating System	$350	$23	N/A	1	5%			✓
Insulate Floors	$361	$14	N/A	0.8	4%		✓	
Insulate Walls	$5000	$101	N/A	0.4	0		✓	
Seal Duct Work	$1500	$39	N/A	0.4	-0.01	✓	✓	
Insulate Crawl Space	$1500	$-126	N/A	<0	-1		✓	

Add Insulation to the attic

Existing Home: Do it Yourself Energy Audit

DMEA provides a free walkthrough Audit.

All of these reduce peak and energy use.

Things to consider:

- **Caulking - seal air leaks**
- **Replace all incandescent with LED light bulbs**
- **Install a smart thermostat**
- **Add Insulation to an attic**
- **Replace old refrigerators**
- **Replace old freezers**
- **Insulate floors, walls, crawl space.**
- **Seal duct work.**

New Home: Consider Net Zero, Energy Star Rated, or Passive House Construction.

Buy or Lease a Plug-In Electric Vehicle

People do what their neighbors do!

And managed charging saves everyone money.

Install Solar if you have a sunny roof or spot in the yard.

- **Easier to knock snow off of PV on the ground.**
- **Install storage or at least be certain the system is storage ready!**

Images: EnergyShouldBe.org

Actions for VPP

Can work well with VPP

SDCEA Rebate **EV Charging. Timed charging is good. Timing to avoid the peak and maximize cheapest electricity (usually from renewables)**

EV charging with Vehicle to Grid - V2G - Discharge the EVs battery during high cost power. Plus EV charging above.

SDCEA Rebate **Smart thermostat**

Solar. Solar with storage works much better.

Smart hot water heater.

SDCEA Rebate **Induction cooktop with battery storage.**

Maybe smart clothes dryers though just avoiding peak maybe good enough (6-9 PM)

Hot tubs and pool pumps. Other large energy using equipment.

SDCEA Rebate **Recycle old fridge or freezer.**

SDCEA Rebate **Heat Pumps**

Review

Image: pixabay.com

14,000 members/customers/electricity-meters

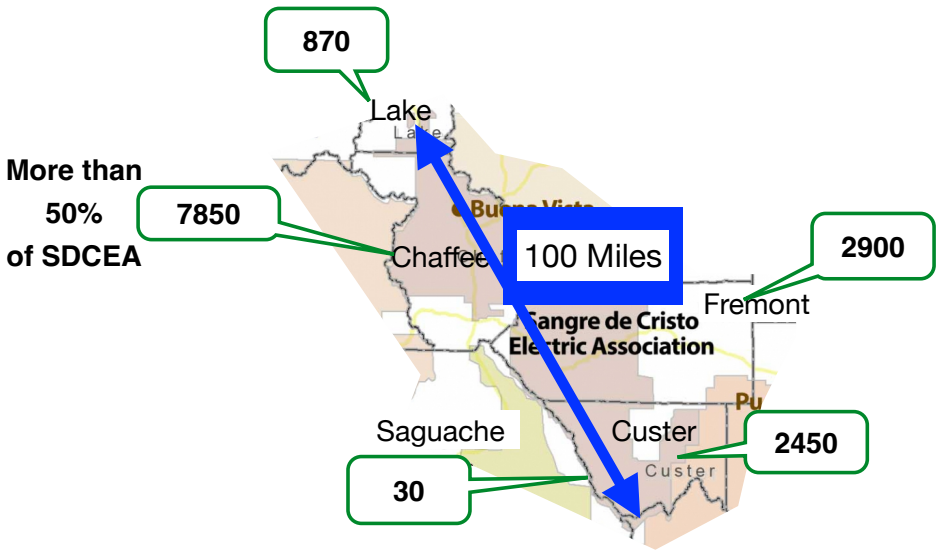


Image: https://crea.coop/co-op-map-of-colorado Consumers in each county data from https://www.myelectric.coop/safety/outages/

Worst Cold Snaps by Year in BV

Winter Season	Min Temp	Degree Hours	Hours Long
2023-24	-6.7	92	
22-23	-15.7	151	
21-22	-27.7	362	18
20-21	-16.7	388	36
19-20	-18.2	198	
18-19	-19.3	262	
17-18	-2.4	470	41
16-17	-20.6	272	
15-16	-17.1	167	
14-15	-20.6	347	14
13-14	-25.4	245	
12-13	-14.5	193	
11-12	-15.1	179	
2010-11	-30.5	469	27

14 years of hourly data from https://coagmet.colostate.edu/station/bnv01_main.html Analysis by EnergyShouldBe.org Max DD is Maximum Degree hours based on 5 degrees F. (so an hour of minus 7 would be 12 degree hours (5 - - 7 = 12)/ An hour of -7 with an hour of 3 would be (5 - - 7) + (5 - 3) = 14 degree–hours.

Reliability Means Electricity Stays ON and Stable

Blackouts:

People injured or killed
Our economy stops
If electrified our heat stops
Electric transportation impacted
Pipes freeze

1 hour - 0.01% - per year of blackout - not good, but mostly survivable.

→ **UNACCEPTABLE for the lights to go out for very long.**

→ **Utilities like SDCEA and Generators like Tri-State are keenly aware of this.**

Image: pixabay.com

Reliable and Lots of Renewables

2022 - 2024 Utilities say:

Holy Cross Energy: 2022: "… the cost of renewable energy is cheaper than its fossil fuel counterparts. "
and 2024: "…100×30 goal of … 100% clean energy by 2030… achieving over 90% …by… 2025." with projects already operating or contracted for. "while … first prioritiz(ing) system reliability and overall costs"

Xcel: "Reduce carbon emissions more than 80% by 2030" Zero GHGs in 2050

Tri-State: "In 2030, the preferred plan reduces greenhouse gas emissions 89% in Colorado and 55% systemwide, … with 70% of the energy Tri-State members use coming from renewable resources."

There is a lot of healthy debate, modeling, analysis and testing to insure high reliability with lots of renewables.

There is a lot of disinformation about electricity, renewables, and electrification.

Xcel https://www.xcelenergy.com/staticfiles/xe-responsive/Company/Rates & Regulations/Clean Energy Plan Phase II Info Sheet Jan. 2024.pdf
Tri-State https://tristate.coop/momentum-energy-transition-highlights-tri-states-72nd-annual-meeting HCE https://www.holycross.com/wp-content/uploads/2023/05/HCE_AnnualReport2022.pdf and https://www.holycross.com/press-release-holy-cross-energy-charts-course-for-clean-energy-future/

Rates Lead to Bills Based on Usage

Typical SDCEA Residential Bill:

- **A fixed Monthly Service and Facility Fee**
- **An Energy Rate times Energy use in kilowatt-hours (kWh).**
  - **Say 13.5 cents per kWh**
- **Taxes and other fees**

Rate Setting is a Complex COMPROMISE. Rates are NEVER perfect.

SDCEA **Current Charges Detail**		
Energy Rate per kWh	535 @ 0.134850	$72.14
Service Availability Charge		$35.01
Wildfire Mitigation Rider		$8.00
Renewable Energy Charge		$0.60
County Tax		$3.18
Current Charges Due		$118.93
TOTAL CHARGES DUE 03/25/2024		**$118.93**

San Miguel Power Association - Cost Profile

Roughly:

Cost of Power	**50%**
SMPA Power Lines	**25%**
Everything Else	**25%**

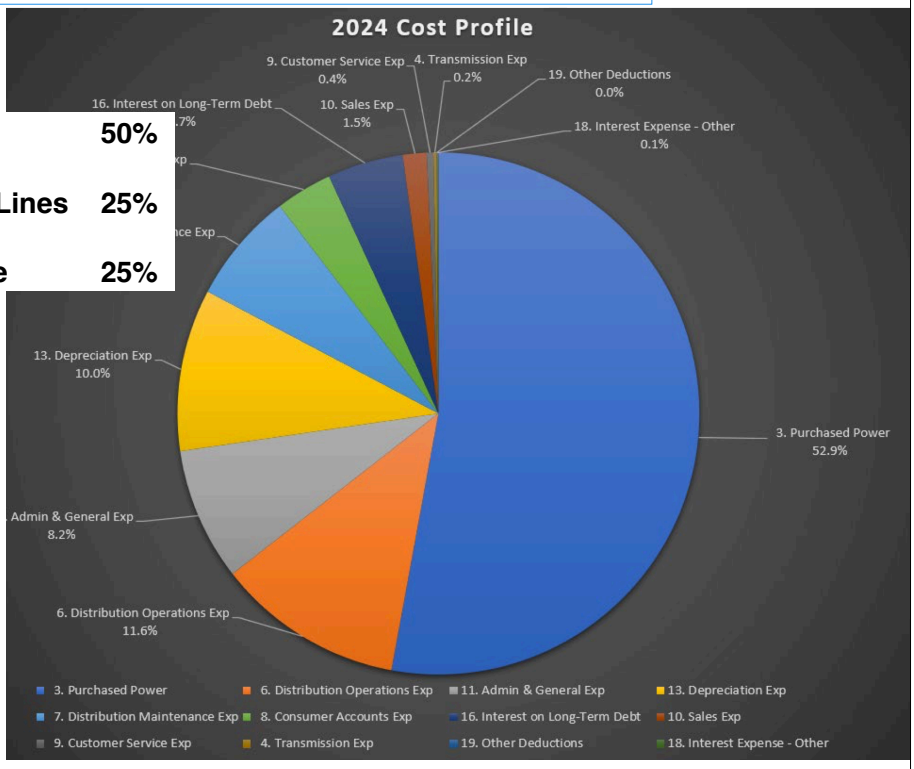


Image: https://smpa.com/rates SMPA is similarly sized to SDCEA but uses much more energy per customer (15 MWh/year average vs 9 for SDCEA).

SDCEA - Opportunities to Save on Bills

Roughly:

Cost of Power	**50%**
SDCEA Power Lines	**25%**
Everything Else	**25%**

SDCEA's Monthly bill from Tri-State is broken down into two parts (roughly).

Energy Used (kilowatt-hours)	**50%**
Transmission and Generation (the 30 minute monthly peak in kilowatts)	**50%**

In SDCEA, the 30 minute monthly peak electricity use occurs between 6:00 PM and 8:30 PM all year round.

Peak electricity use can also be called peak demand or just demand.

SDCEA: 2022 Annual Report https://www.myelectric.coop/wp-content/uploads/Sangre-June-2023-Annual-Report_PROOF9.pdf

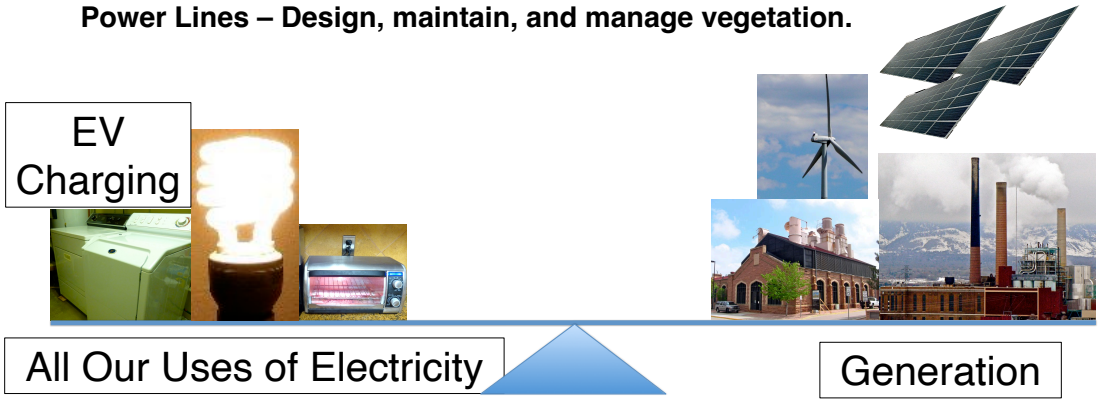
Reliability = Resource Adequacy

"Adequacy" means enough generators, storage, and wires.

- **to cover peak electricity even in extreme events**
- **to cover failures of generators and wires**

"Adequacy" is changing to include much more managed electricity use.
Use far more when renewables and storage are plentiful and cheap.
Use far less when they are not plentiful and cheap.

Power Lines – Design, maintain, and manage vegetation.



Images: EnergyShouldBe.org

One Way to implement this is by Virtual Power Plants

"Adequacy" is changing to include much more managed electricity use.
Use far more when renewables and storage are plentiful and cheap.
Use far less when they are not plentiful and cheap.

Virtual Power Plants (VPP) can help resolve the inevitable mismatches of when renewables make the most power, and when the most power is used - at the peak .

Pros of Staying With Tri-State. Pros of Leaving Tri-State.

Stay or Leave? A Question for Members, Board, and Staff.

Pros to Stay

1. **Tri-State is aggressively pursuing low cost high reliability renewables and has a new CEO.**
2. **There is a significant separation charge to leave Tri-State. $30 Million or so.**

Pros to Leave

1. **8 Colorado Coops have left or are planning to leave their Power Supplier.**
2. **The primary reason is to save money, even including paying off the separation fee.**
3. **The coops that left or are leaving have or believe they will have lower and more stable costs, higher renewables, and more flexibility than they would have with Tri-State or Xcel.**

Image: https://www.cleancooperative.com/news/reports-examine-the-impacts-of-tri-states-high-wholesale-power-costs

Coops That Have Left or Plan to Leave

From Tri-State	Year	Actual* or Est.*** Separation Fee	From Xcel:
Kit Carson	**2015**	**$37 M ***	**CORE Electric (formerly Intermountain)**
Delta Montrose	**2020**	**$137 M ***	**Grand Valley Power**
United Power	**May 1, 2024**	**$700 M *****	**Yampa Valley Power**
Nebraska NW Power District	**2024**		
Mountain Parks	**2025**	**$60 M *****	
La Plata	**2026**	**$180 M *****	

Most are working with Guzman Energy.

Interesting links:

https://www.unitedpower.com/powersupply
https://www.unitedpower.com/annual-meeting
https://bigpivots.com/mountain-parks-links-with-guzman-energy/
https://www.guzmanenergy.com/guzman-energy-partners-with-holy-cross-energy-for-power-generated-by-bronco-plains-ii-energy-center/
https://coloradosun.com/2023/10/02/energy-co-ops-xcel-tri-state-clean-cheap-energy/
https://lpea.coop/press-releases/lpea-board-directors-vote-leave-tri-state-generation-and-transmission

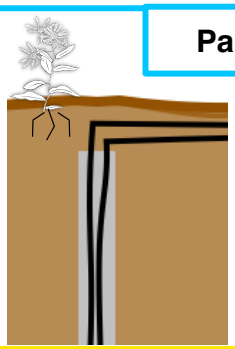
Residential 2024 rates: DMEA Monthly fixed: $29.50. Energy 11¢ per kWh.
SDCEA: fixed $35 Energy 13.5 ¢ per kWh

A Lot of SDCEA's Winter Peaks is from Resistance Heating

Particularly during cold snaps.

Resistance Heat: 1 → 1.
1 kWh of electricity makes 1 kWh of heat.

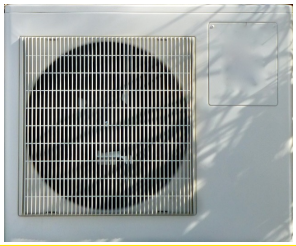
100% efficient at making heat.



Ground Heat Pump:
1 → 4 up to 1 → 5.
COP of 4 or 5

400 to 500% efficient at pumping/moving heat if ground loop is at a moderate temperature.

1 → 5 for cooling.



Air Heat Pump:
1 → 3. A few 1 → 4.
COP of 3 or 4

300% efficient at pumping/moving heat if outside air is at a moderate temperature.

Images: pixabay.com and EnergyShouldBe.org

Heat Home Efficiently With Heat Pumps. Cuts Peak and Energy

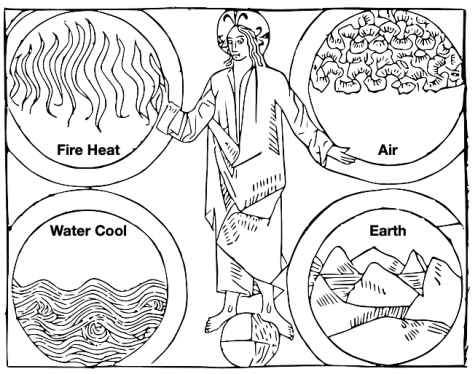
Significant cost savings from resistance or propane heat.

Ground or Air Heat Pump? (Ground = Geothermal)
In a cold climate (Colorado)

Ground: All new construction

Existing Home:
Ground for max efficiency
Air - Lowest upfront $ but higher Peak/cold snap cost

A video by Ken on Ground & Air Heat Pumps



Can we get off fracked gas cost-effectively?

– –

Heat and Cool Your Home Renewably and Get Off Natural Gas Cost Effectively.

Ken Regelson
1/13/2023

Actions for VPP

Can work well with VPP

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- **EV charging with Vehicle to Grid - V2G - Discharge the EVs battery during high cost power. Plus EV charging above.**
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Thank You!

Dozens of people.

For this talk:

John Gavan - Retired Colorado Public Utilities Commission

Bill Althouse - VPP advocate extraordinaire

Sandy Long

Terri Olson

Rick Tazelaar

Ron Sinton “The sun doesn’t stop shining at noon.”


Questions?
ken at EnergyShouldBe.org
Ark Valley Coalition
For a Sustainable Energy Future
https://arkvalleyenergyfuture.org/election-hub
Image: EnergyShouldBe.org