

Customer Education & Demand Side Management

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10/30/2018

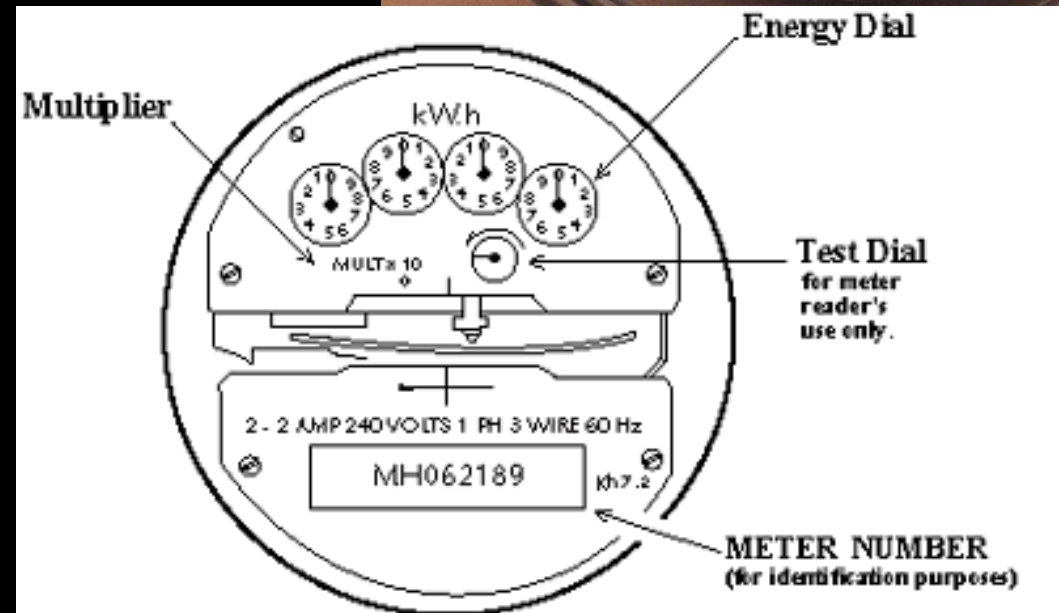
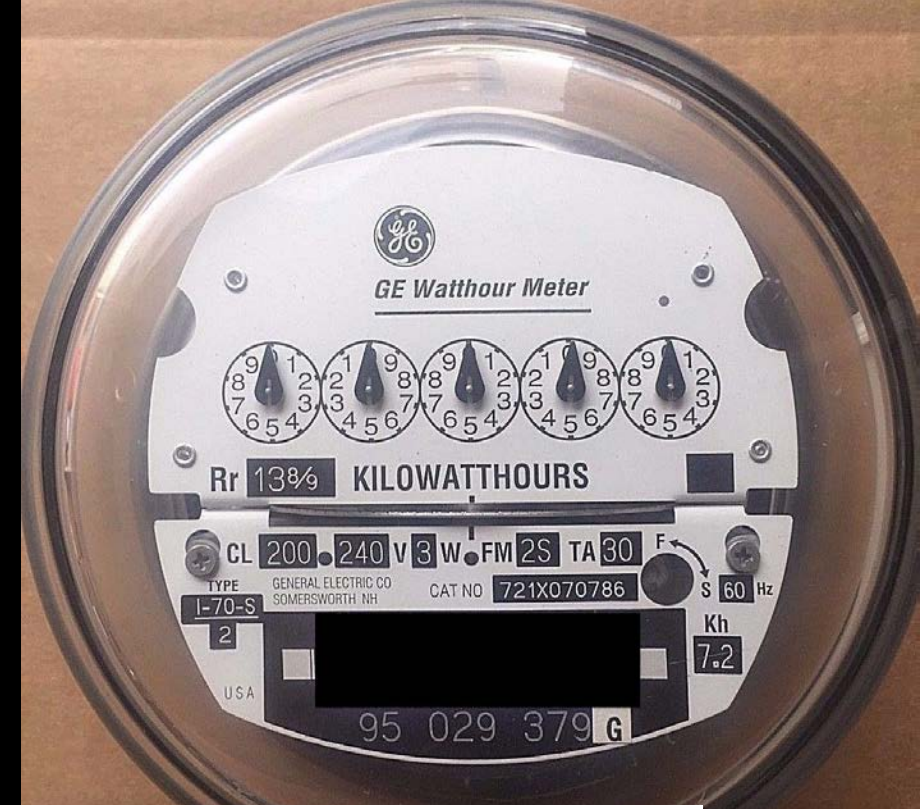
Disclaimer

- The views expressed are my own and do not necessarily reflect those of the Office of the Public Counsel.
 - No rate cases currently filed.
 - Chapter 13 “billing practice” rules currently not open.
- Observations and comments are meant to elicit constructive dialogue.

Part I: Reading a Meter

Electric Meter

- Measured in kilowatt hour (kWh)
 - One kilowatt over one hour, or 3,600,000 joules
- Disk turns at rate proportional to power consumption

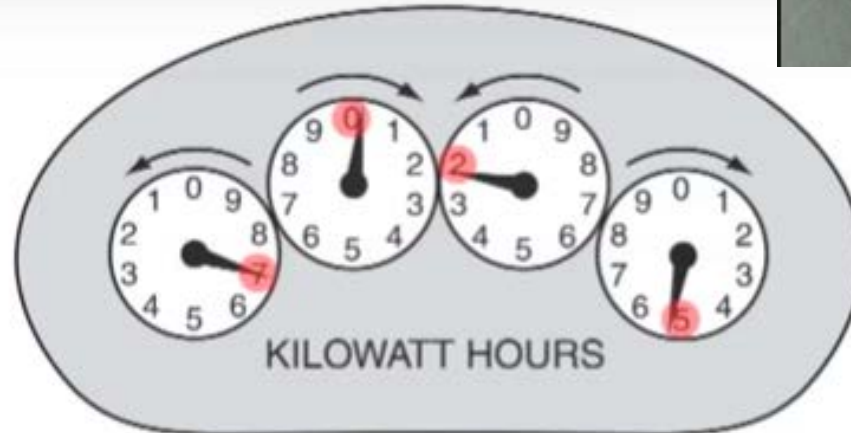


Reading those tricky dials

- Be careful to note the direction of the numbers (usually flips back and forth)
- Round *down* is the safe bet
- Digital electric meters generally do not reset



Meter reads 7830 on March 1



Meter reads 7025 on January 2

$$7830 - 7025 = 805$$

Natural Gas Meter

- Dials work just like electricity meter
 - same round-down method
- Lowest dial usually indicates 1000 cf per full revolution
 - cf means cubic foot, or ft³



Water meter

- Meters typically measure in cubic feet
 - $1 \text{ ft}^3 = 7.48 \text{ gallons}$
 - 1 gallon is 8.33 lb, so $1 \text{ ft}^3 = 62.3 \text{ lb}$
- The meter at right reads 82.114 ft^3
 - the ones digit usually snaps into place quickly so it's not halfway between numbers for very long
 - the little triangle spins if water is flowing



Observations on meter reading

- Older models are not necessarily intuitive
- Newer digital models do not reset
- Different utilities and different metrics
- Speed of the dial or odometer indicates activity
- Not a easy source for customer information
 - Was it ever meant to be?

Part II: Cost Causation

End Use Measures priced at \$0.13 kWh

The cost to power a **wi-fi router** (6W) for 24 hours

- 0.14 kWh or \$0.02 a day / \$0.57 a month



The cost to power a **desktop computer** (100 W) for 6 hours

- 0.6 kWh or \$0.08 a day / \$2.37 a month



The cost to power a **vacuum cleaner** (1400 W) for 10 minutes

- 0.23 kWh or \$0.03 a day / \$0.92 a month



The cost to power **microwave** (1200 W) for 15 minutes

- 0.3 kWh or \$0.04 a day / \$1.19 a month



The cost to power an **Oven** (2400 W) for 1 hour

- 2.4 kWh or \$.031 a day / \$9.49 a month



The cost to power a **Refrigerator** (200 W) on all day

- 4.80 kWh or \$0.62 a day / \$18.98 a month



The cost to power a **washing machine** (800 W) for 1 hour

- 0.5 kWh or \$0.07 a day / \$1.98 a month



The cost to power a **clothes dryer** (3000 W) for 1 hour

- 3 kWh or \$0.39 a day / \$11.86 a month



The cost to power a clothes line (0 W) for 8 hours

- 0.0 kWh or \$0.00 a day / \$0.00 a month



The cost to power a **water heater** (4000 W) for 3 hours

- 12 kWh or \$1.56 a day / \$47.46 a month



The cost to power a **HVAC** (4000 W) for 9 hours

- 36 kWh or \$4.68 a day / \$142.37 a month



The cost to power a **ceiling fan** (78 W) for 8 hours

- 0.38 kWh or 0.05 a day / \$1.48 a month



The cost to power a **electric furnace** (18000 W) for 2 hours

- 36 kWh or \$4.68 a day / \$142.37 a month



The cost to power a space heater (1500 W) for 5 hours

- 7.5 kWh or 0.97 a day / \$29.66 a month



The cost to power a **incandescent** (60W) for 5 hours

- 0.32 kWh or \$0.08 a day / \$1.19 a month

- 117 years in service
- Predates planned obsolescence



• Livermore, CA
Fire Department Bulb

The cost to power a **CFL** (14W) for 5 hours

- 0.07 kWh or \$0.0091 a day or \$0.28 a month



The cost to power a **LED** (10W) for 5 hours

- 0.05 kWh or \$ 0.0065 a day or \$0.20 a month



The supporting cast

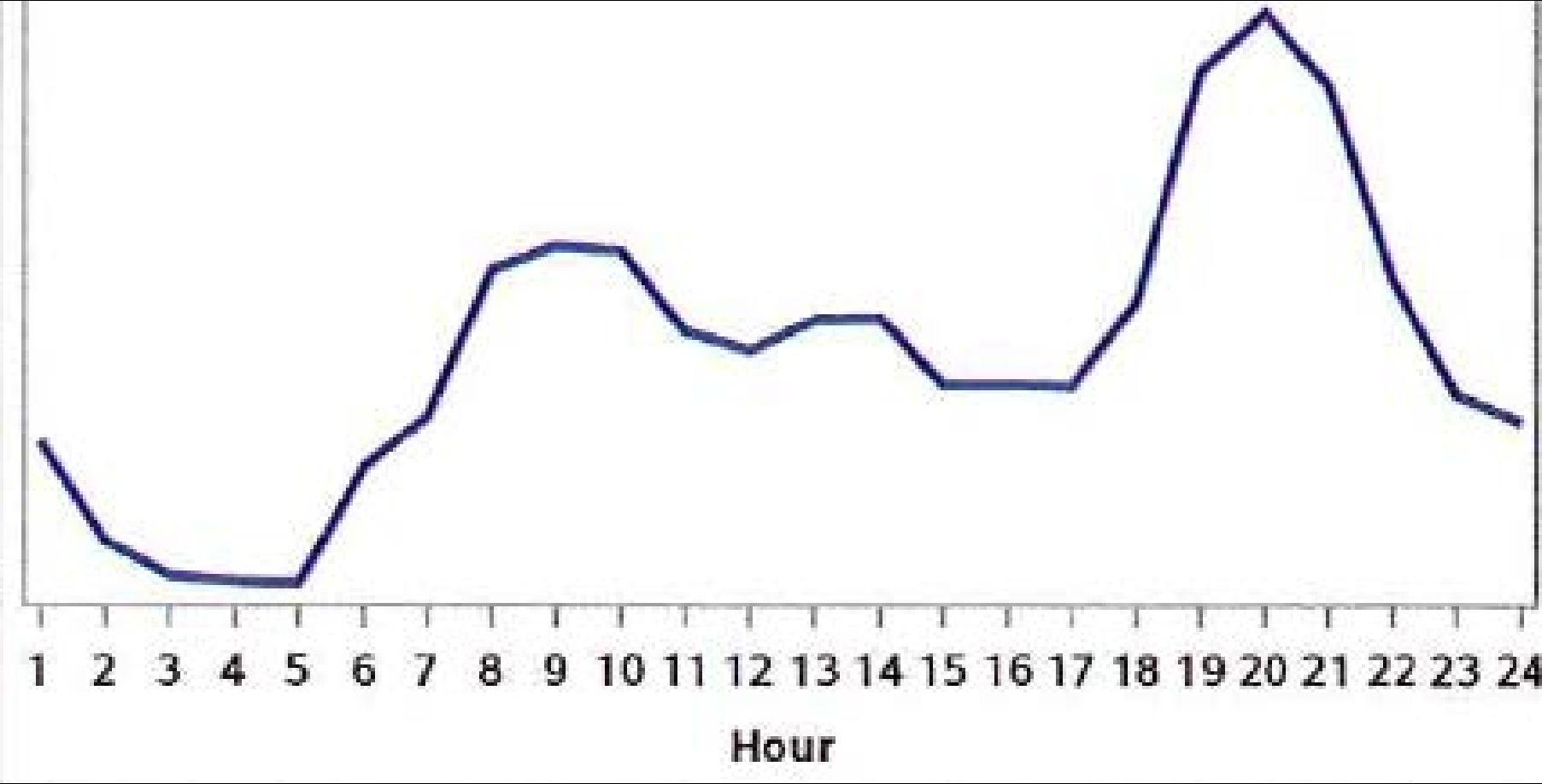


Observations on end use measures

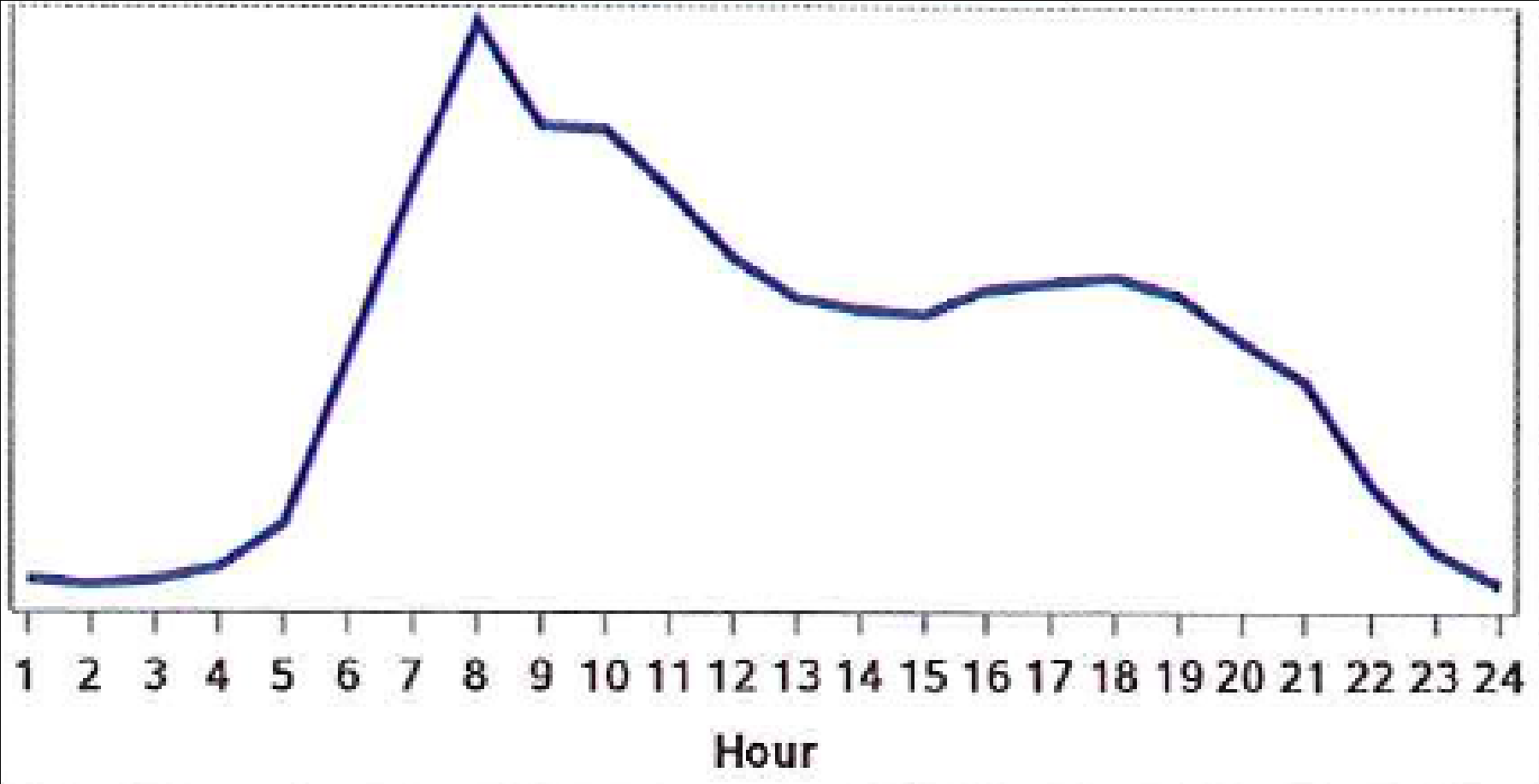
- It takes a huge amount of energy to change the temperature of something, whether it's air, water or a rib roast.
- It costs more to heat something up than cool something down
- Comfort costs money
- Need to think holistically (i.e., supporting cast)
- Do ratepayers know this? Should they?
- What about timing? Does *when* we use something matter?

Part IV: Time of Use Load Shapes

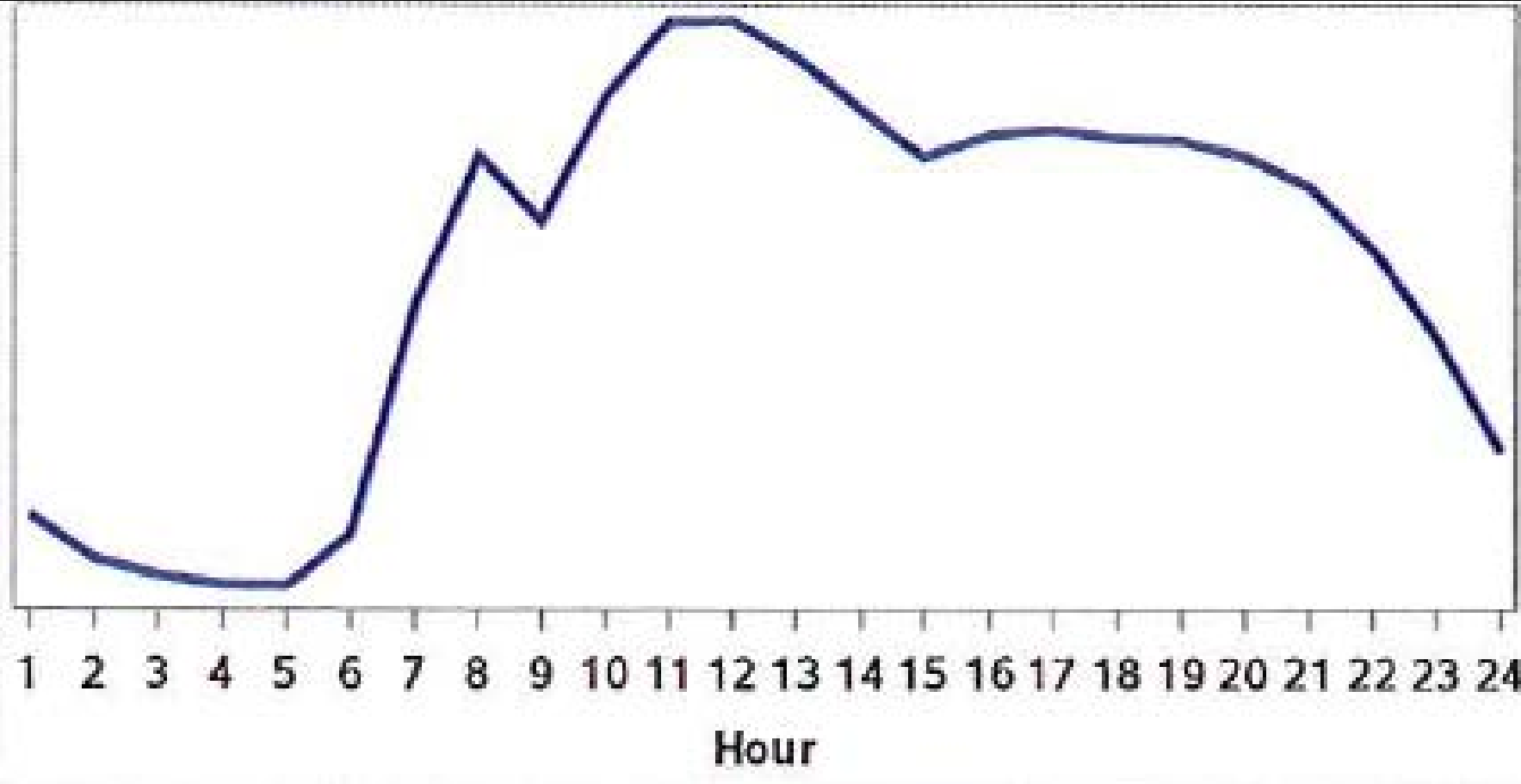
Dishwasher



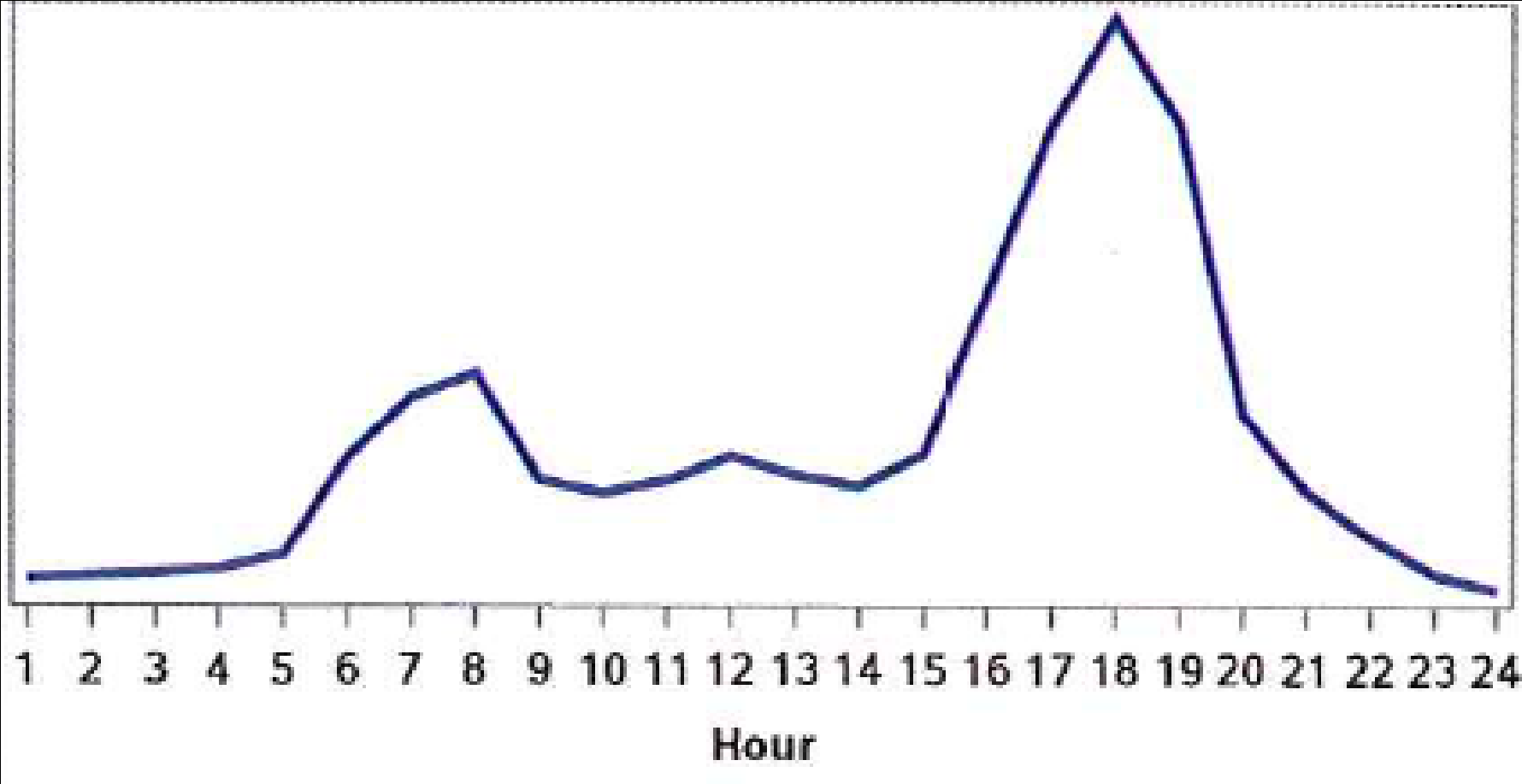
Washing Machine



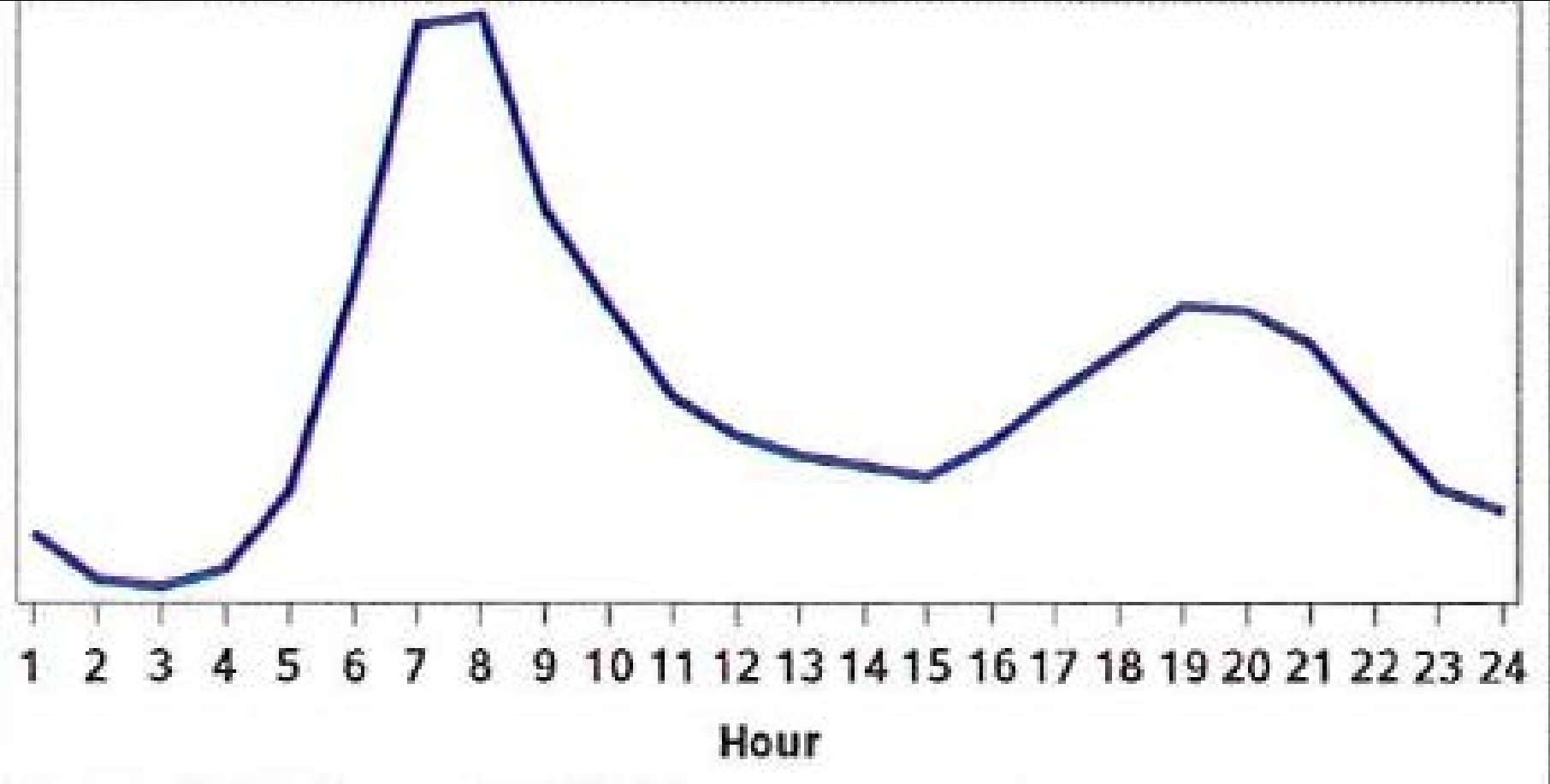
Dryer



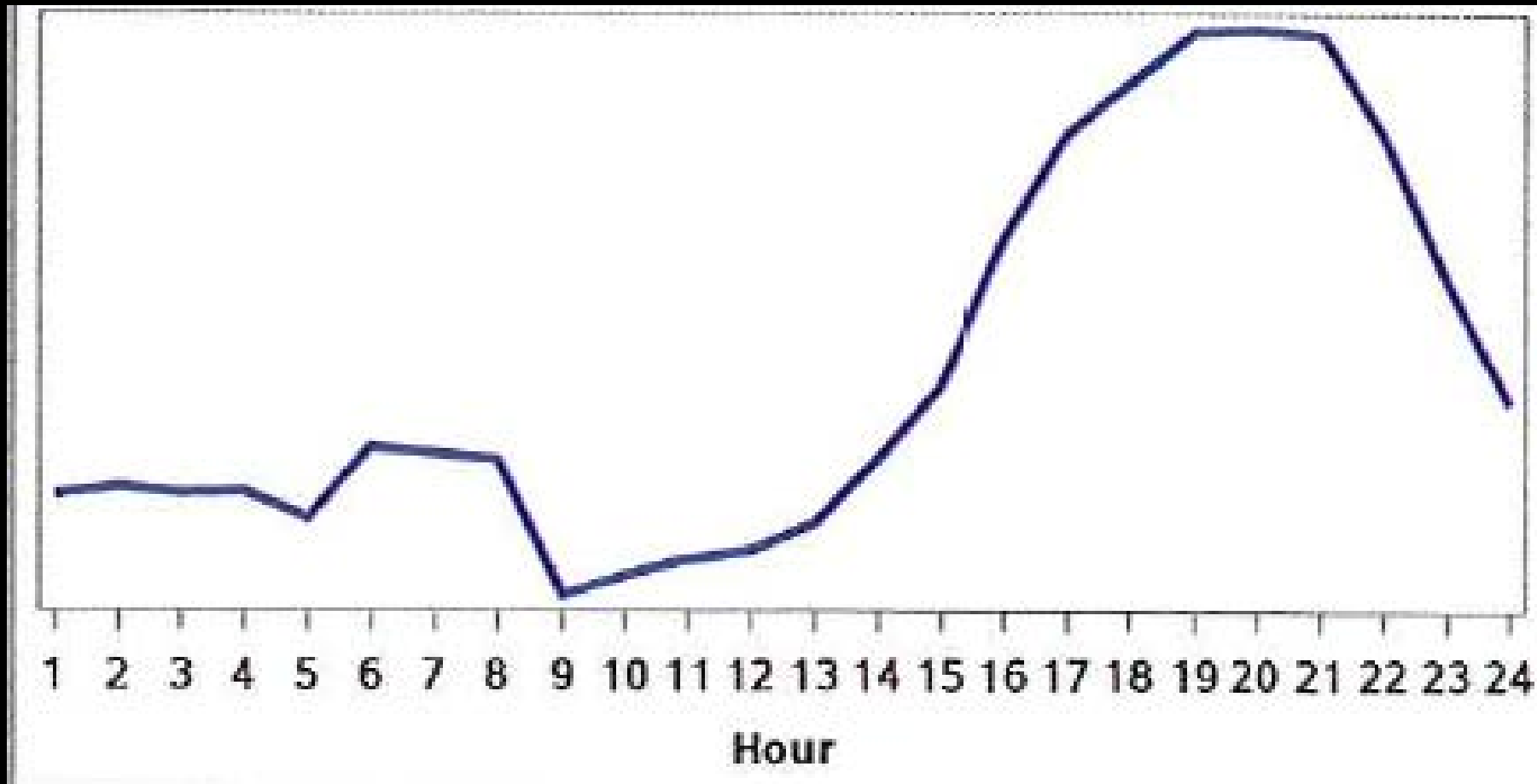
Residential “Cooking”



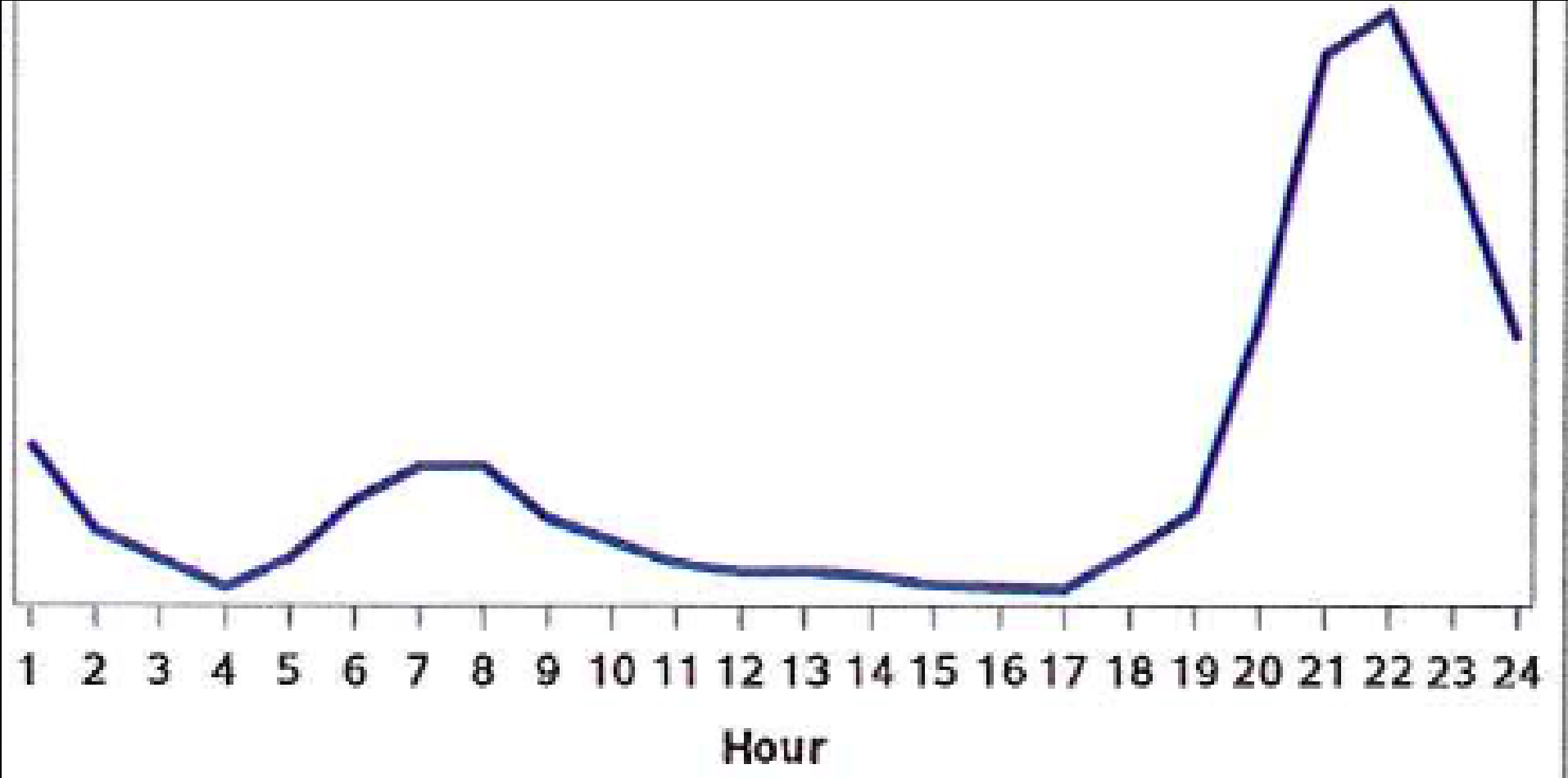
Water Heater



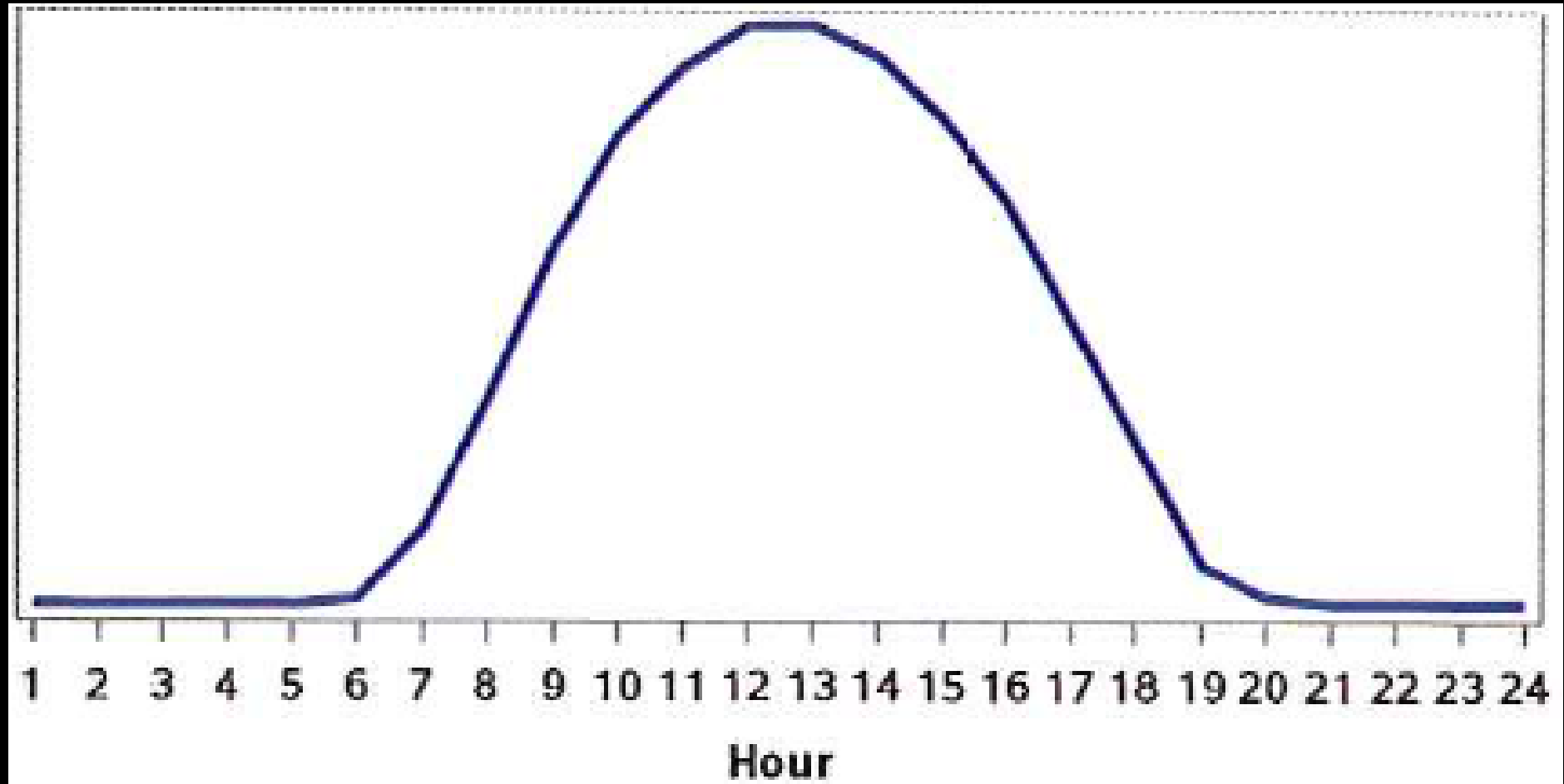
TV



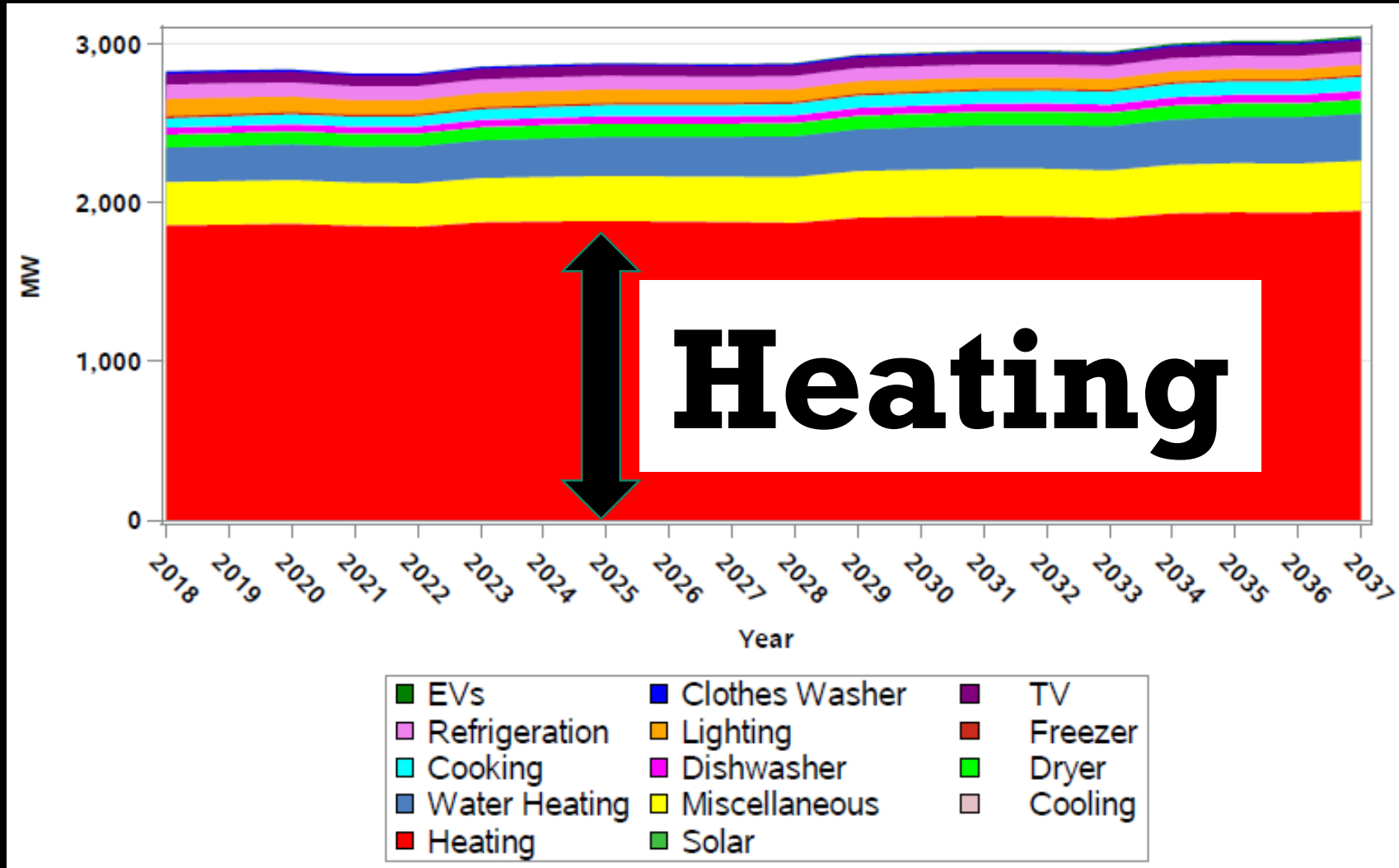
Lighting



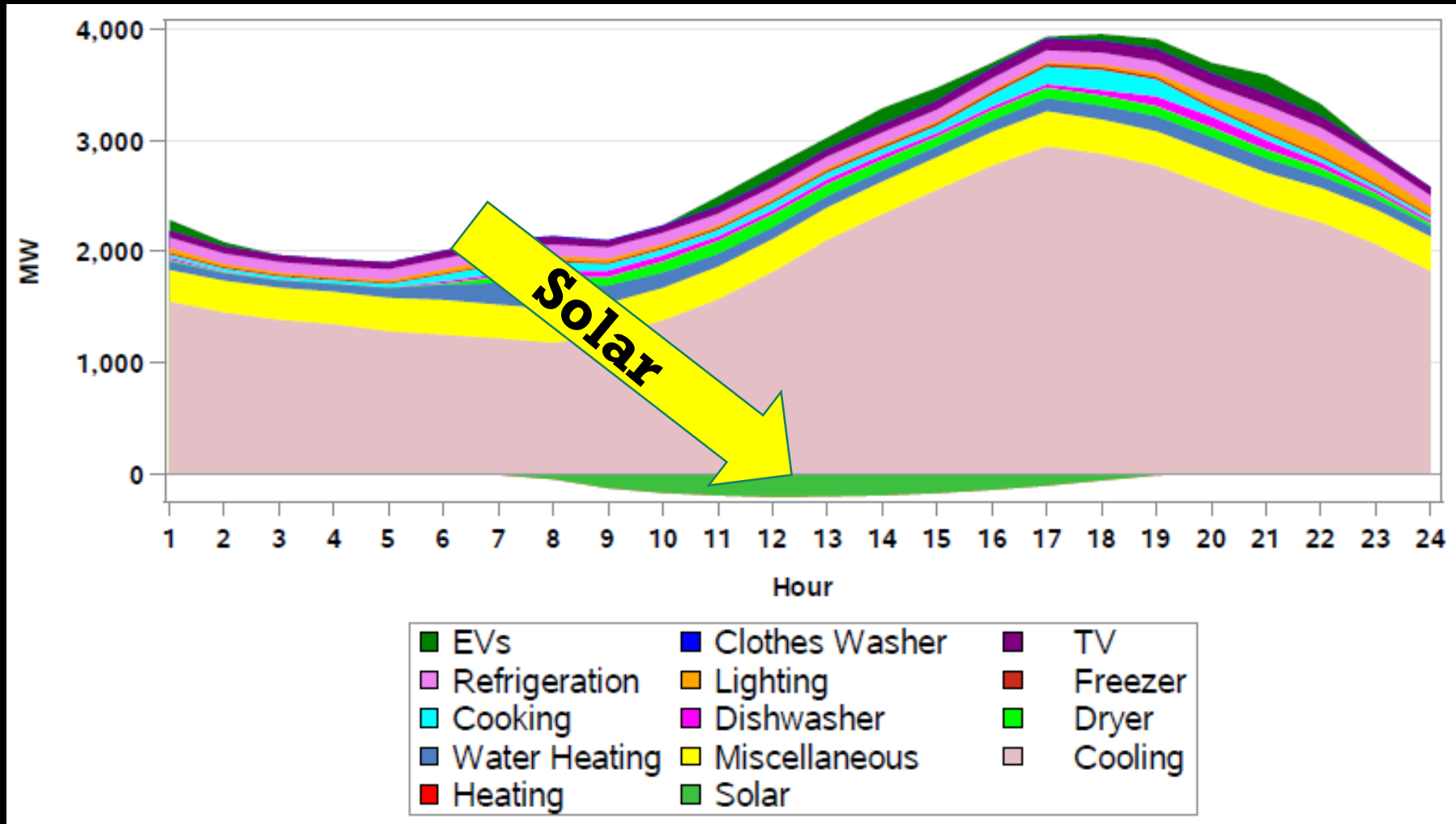
Solar



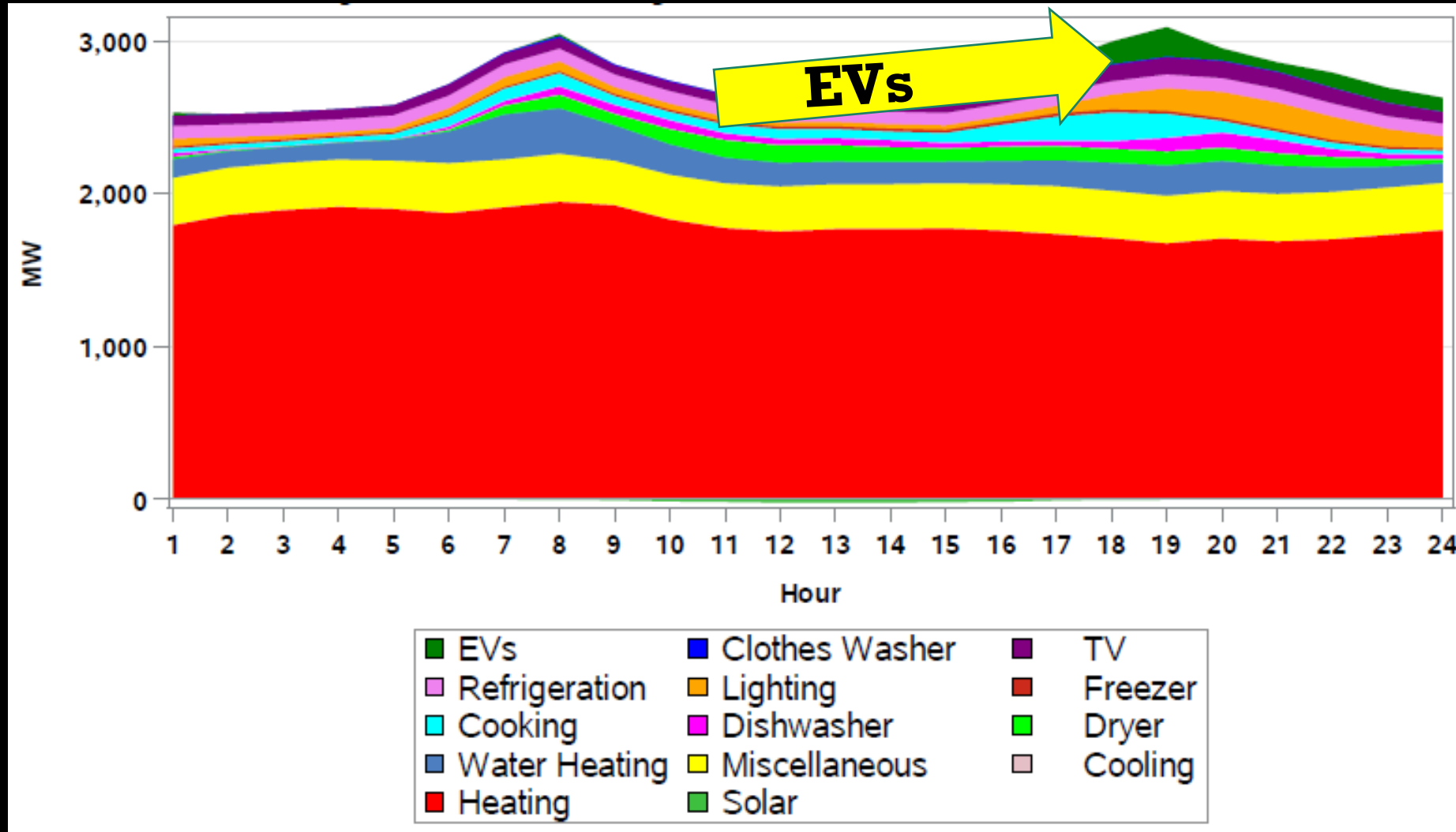
Forecast of Winter Coincident Peaks for Residential End Use (MW)



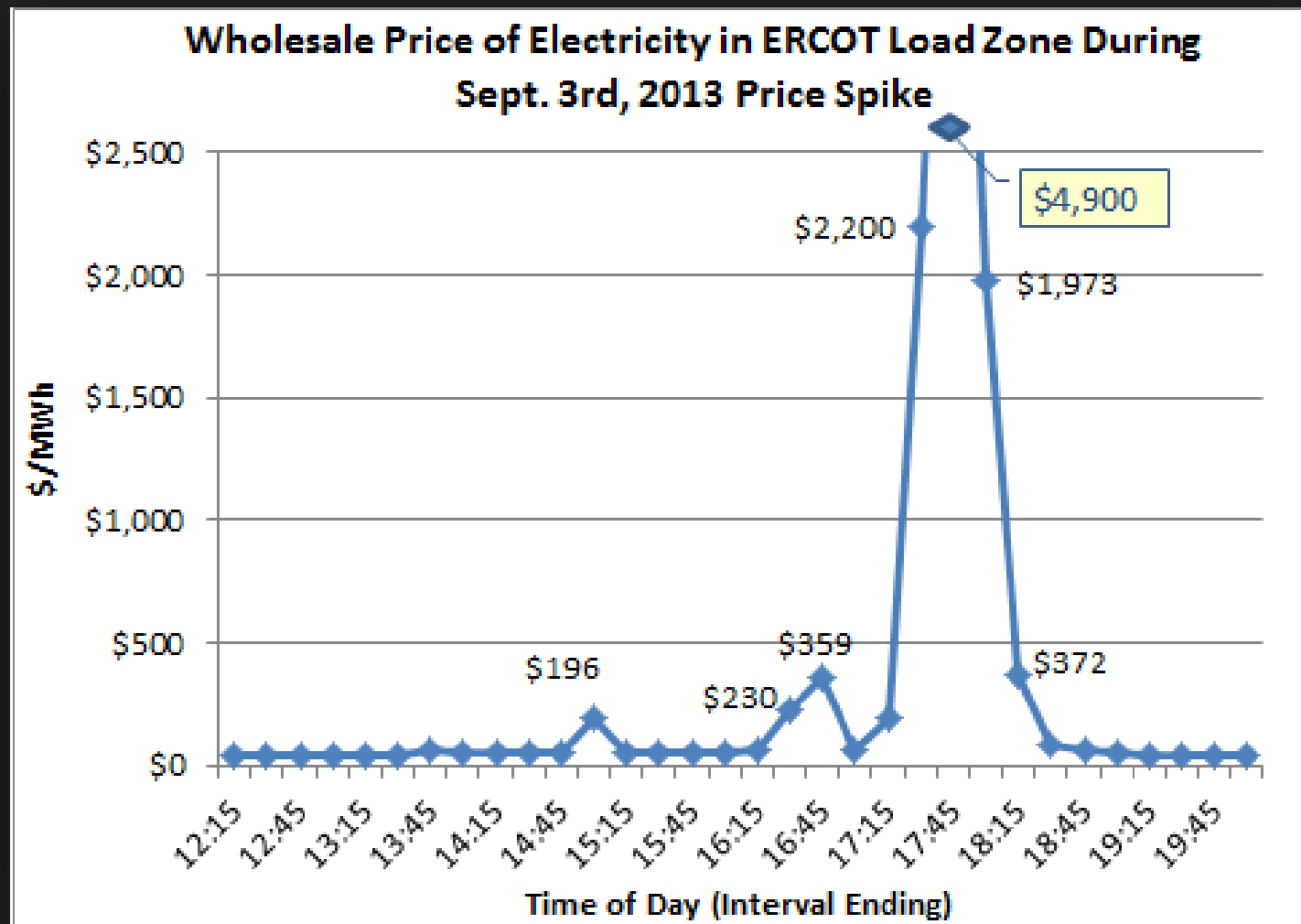
Summer 2037 System Peak Day Residential End Use Profiles (MW)



Winter 2037 System Peak Day Residential End Use Profiles (MW)



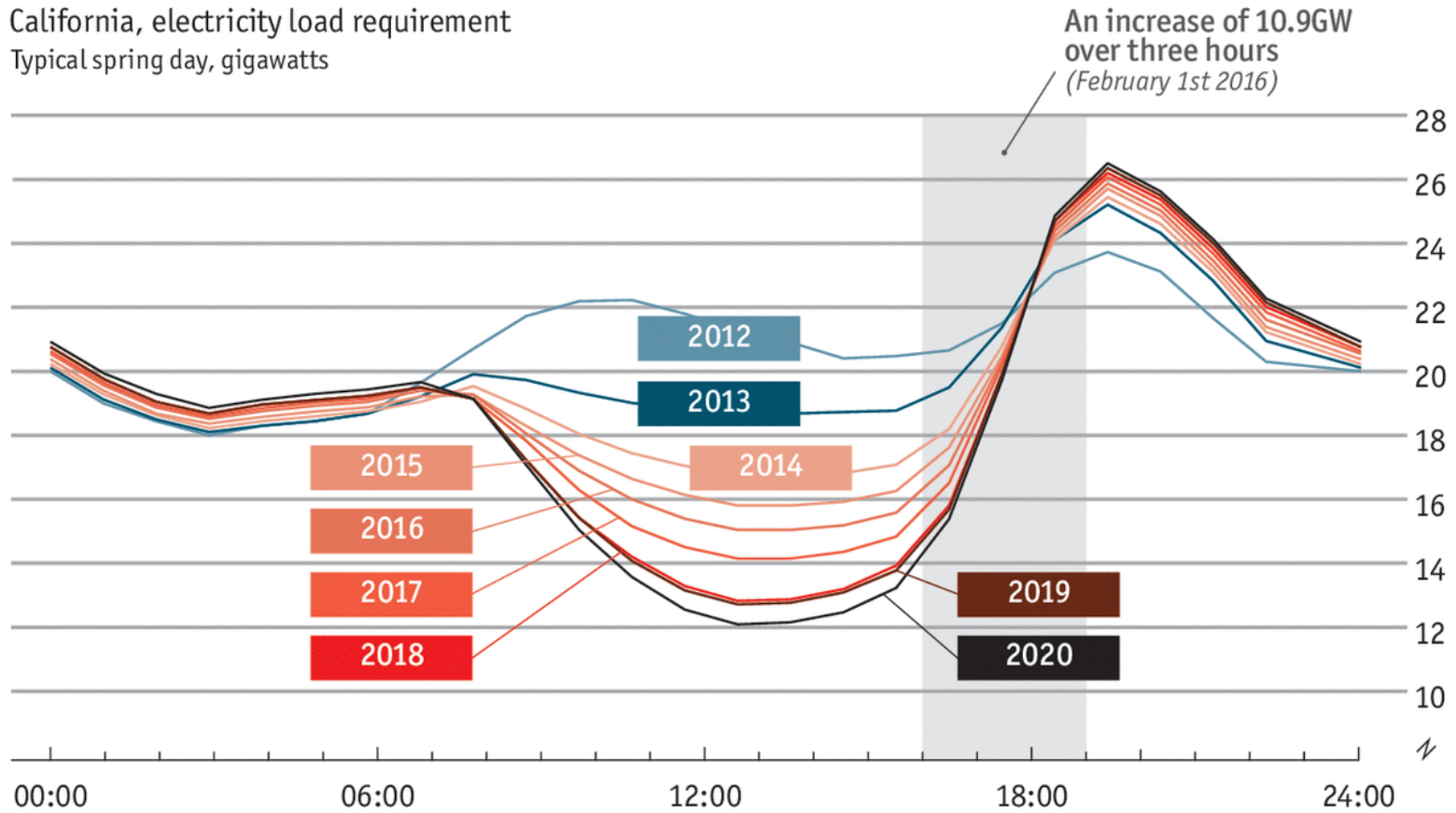
Avoid Price Spikes



Aim for a flatter load

Who gets the bill?

California, electricity load requirement
Typical spring day, gigawatts



Source: California ISO

Observations on load shapes

- Time of day and weather drive peak usage
- Not all end use measures are equal
- Avoid “stacking” measures (turning everything on at once)
- “Cooling” measures should be prioritized
- Do most customers understand this? Should they?

Part IV: The Utility Bill

Ameren Missouri Energy Statement

Current Charge Detail for Statement 08/07/2018

Electric Energy Charge - Residential	\$60.78
Electric Customer Charge - Residential	\$9.04
Fuel Adjustment Charge	\$1.11
Energy Efficiency Investment Charge	\$1.78
St Louis Co Municipal Charge - Service	\$3.80
Federal Tax Rate Reduction	-\$0.48
Current Charge	\$76.03
Budget Bill Adjustment	-\$26.03
Budget Bill Amount	\$50.00
Amount Due	\$50.00

Current Charge Details

AMOUNT DUE \$50.00 ← Total Amount Due

Due Date: 08/28/2018

Account Number: 123456789
 Customer Name: JOHN DOE
 Service Address: 1234 MAIN STREET

Previous Statement: \$50.00
 Last Payment - 07/31/2018: \$50.00

Your Budget Billing balance is behind \$12.73 after paying this bill.

Billed Amount

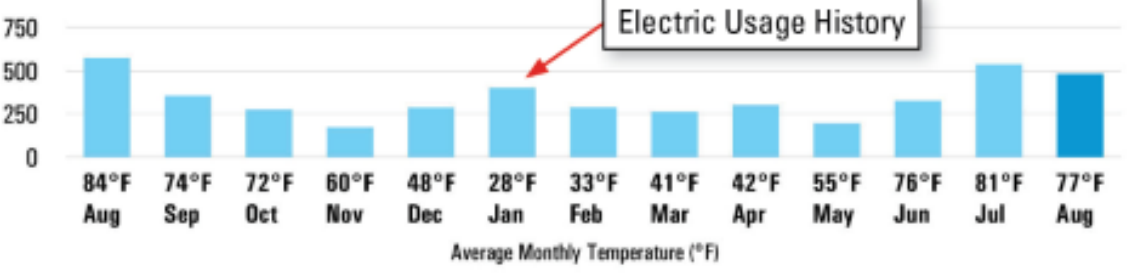
Electric Service from 07/05/2018 - 08/05/2018 31 Days

	Meter Number	Current Reading	Previous Reading	Current Usage	Reading Type
E	52639623	061500	061018	482 kWh	Actual

Service

Electric Service Details August Statement

Electric Usage in Kilowatt Hours (kWh)



Electric Usage Summary (kWh)

So far this year, you're using **16.6% more** than last year



Usage from Jan-Aug for 2017 & 2018

Electric Usage Summary

13073
 02611 2355449 002612 005223 0001/0001
 INTERNAL USE ONLY

Usage Amount
Fixed Amount

Surcharges

Taxes

Budget Billing

Actual usage

Historic usage

MEEIA



Timing Is Everything.

If your HVAC system is more than 10 years old, it might be time to replace it. Get cash back for upgrading to a high-efficiency system.

- Up to \$500 — Central Air Conditioner
- Up to \$900 — Air Source Heat Pump
- Up to \$2,000 — Geothermal Heat Pump

Visit AmerenMissouri.com/hvac to find a participating contractor today.

Energy Saving Tips

Payment options



Account Messages

A late payment charge of 1.5% will be added for any unpaid balance on all accounts after the due date.

SPEEDPAY offers customers convenient payment options. You can pay your bill using MasterCard, VISA or American Express 24/7 - just call 1.866.268.3729. For recurring payments visit us at AmerenMissouri.com.

Direct Pay Makes Paying Bills Easier. To enroll, go to AmerenMissouri.com or call 1.800.552.7583 to request an enrollment form.

Pure Power lets your home or business support wind power and other forms of renewable energy in Missouri and the Midwest. Learn more at AmerenMissouri.com/purepower.

Account Messages

Payment Alerts

Stay Aware From Anywhere.

It's easier than ever to manage your account by receiving important information via email or text, anytime and anywhere.

THAT'S THE POWER OF THE PING



Visit AmerenMissouri.com/ping to sign up for alerts and notifications today.

KCPL-GMO Bill Statement



CONFIDENTIAL

For billing and service information : 816-471-5275 (816-471-KCPL)
or toll-free : 1-888-471-5275 (1-888-471-KCPL)
For emergencies or lights out : 1-888-544-4852 (1-888-LIGHT-KC)

Customer Name :
Account Number :

Page 1 of 2
Billing Date: 07/26/2018

MESSAGE BOARD

KCP&L's Budget Billing option allows you to make consistent monthly bill payments. For more information, visit www.kcpl.com/budgetbilling.

To join KCP&L Budget Billing, pay \$190.00 before 08/16/2018.

You live in KCP&L Greater Missouri Operations – GMO service area. Rates and available programs can vary based on your service area. For more information visit www.kcpl.com/ServiceArea.

You live in KCP&L – MO service area. Rates and available programs can vary based on your service area. For more information visit www.kcpl.com/ServiceArea.

Beat the heat. If you don't have air conditioning, go to places such as a mall or a movie theater during the warmest part of the day for relief from the heat. Visit www.kcpl.com/summer for more heat-related safety tips.

Never touch or attempt to pick up a fallen power line. Always assume any downed power line is energized, and stay at least 10 feet away from it. If you see a downed power line, call KCP&L immediately at 1-888-LIGHT-KC (1-888-544-4852).

Account Summary

Previously Billed.....	\$291.49
Utility	\$291.49
Payment Received 07/18/2018 - Thank you.....	-\$292.95
Current Charges (details on back)	\$300.58
Utility	\$300.58
Due Upon Receipt.....	\$299.12
Please pay by August 16, 2018	\$299.12
Pay \$300.62 after August 16, 2018	

Other Responsible Customers
[Redacted]

Please return this portion with your payment. Thank you.



**Messages:
Budget
Billing &
Rates (URL)**

Safety

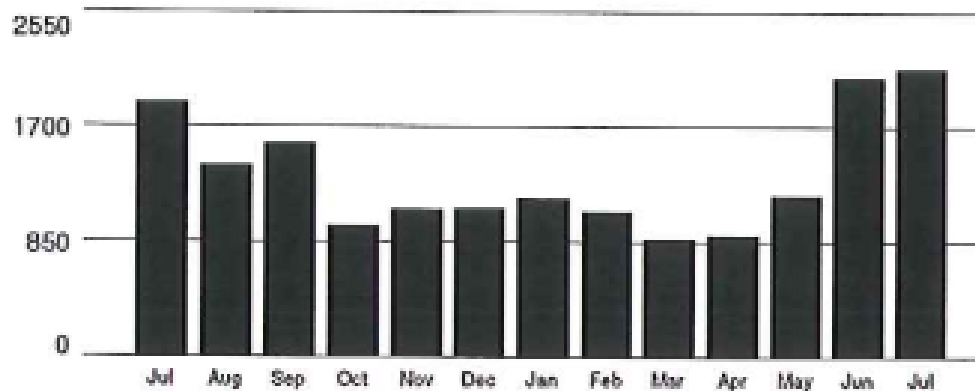
Safety

Billed Amount

GMO Residential General - MORG

Billing Details - service from 06/25/2018 to 07/26/2018

kWh Energy Use



Comparative Usage Information

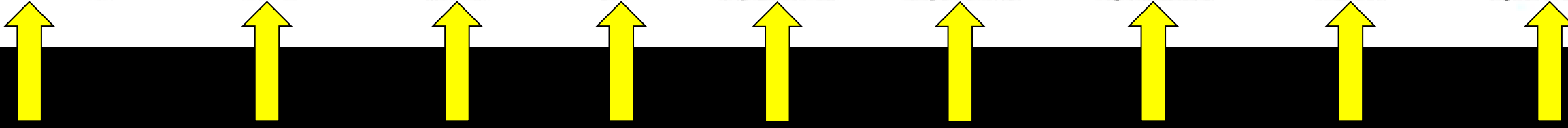
Period	kWh	Days	kWh / day	Avg Temp
Current	2,133	31	68.8	80°
Previous	2,066	32	64.6	77°
Last Year	1,874	30	62.5	82°

Customer Chg	\$10.43
Energy Chg 600.0000 kWh at \$0.1205 per kWh	\$72.30
Energy Chg 400.0000 kWh at \$0.1205 per kWh	\$48.20
Energy Chg 1,133.0000 kWh at \$0.1205 per kWh	\$136.53
DSIM Chg 06-26-2018-07-26-2018 for 2,133.0000 kWh at \$0.00394 per kWh	\$8.40
FAC Chg 06-26-2018-07-26-2018 for 2,133.0000 kWh at \$0.00126 per kWh	\$2.69
RESRAM Chg 06-26-2018-07-26-2018 for 2,133.0000 kWh at \$0.00085 per kWh	\$1.81
Subtotal	\$280.36
Clinton Franchise Fee	\$14.76
Henry County Sales Tax @ 0.95%	\$2.66
Clinton City Sales Tax @ 1%	\$2.80
Current Charges	\$300.58



Meter	Start Read Date	End Read Date	Days	End Read (-)	Start Read (-)	Read Difference (x)	Meter Multiplier (=)	kWh Used
3224894905626	06/25	07/26	31	43,867.0000	41,734.0000	2,133.0000	1.0000	2,133.0000

Meter	Start Read Date	End Read Date	Days	End Read (-)	Start Read (=)	Read Difference (x)	Meter Multiplier (=)	kWh Used
3224894905626	06/25	07/26	31	43,867.0000	41,734.0000	2,133.0000	1.0000	2,133.0000



Billing Details - service from 06/25/2018 to 07/26/2018

Customer Chg	\$10.43
Energy Chg 600.0000 kWh at \$0.1205 per kWh	\$72.30
Energy Chg 400.0000 kWh at \$0.1205 per kWh	\$48.20
Energy Chg 1,133.0000 kWh at \$0.1205 per kWh	\$136.53
DSIM Chg 06-26-2018-07-26-2018 for 2,133.0000 kWh at \$0.00394 per kWh	\$8.40
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Subtotal	\$280.36
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Henry County Sales Tax @ 0.95%	\$2.66
Clinton City Sales Tax @ 1%	\$2.80
Current Charges	\$300.58

Fixed Charge Amount

Usage Charges

Surcharges

Taxes

Billed Amount

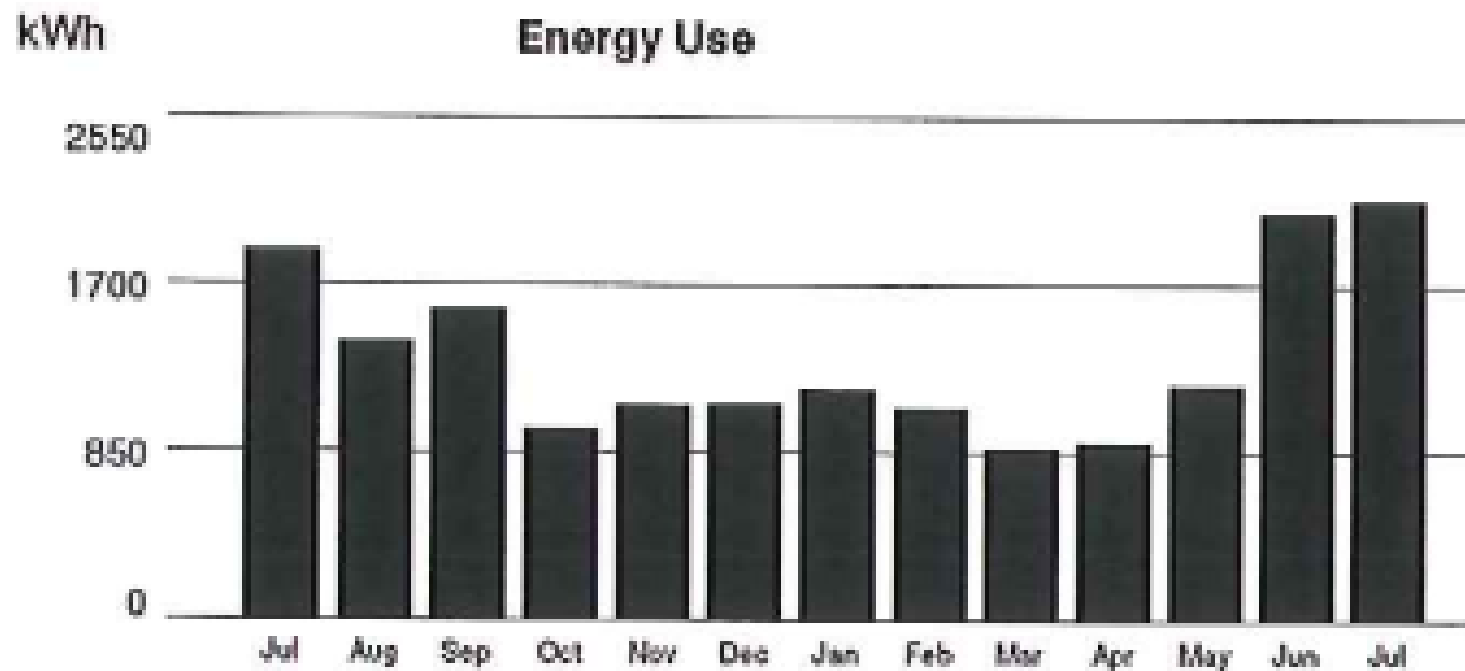
1.) @ 600 kWh = \$72.30
 2.) @ 400 kWh = \$48.20
 3.) @ 1,133 kWh = \$136.53

All billed at \$0.1205 per kWh

1.) DSIM = \$8.40
 2.) FAC = \$2.69
 3.) RESRAM = \$1.81

Billed at various amounts

GMO Residential General - MORG



Comparative Usage Information

Period	kWh	Days	kWh / day	Avg Temp
Current	2,133	31	68.8	90°
Previous	2,066	32	64.6	77°
Last Year	1,874	30	62.5	82°



**Empire District Electric
Company Electric Bill**



Empire District
A Liberty Utilities Company

Date Mailed: 02/09/18

1 Account Number: 000011-11-0



TOTAL AMOUNT DUE

\$135.00

Delinquent after 2/27/18, add late fee of

\$0.73

After 2/27/18, Pay

\$135.73

TOTAL AMOUNT ENCLOSED

\$ _____



2 JOHN A. CUSTOMER
101 MAIN STREET
ANYWHERE, MO 11111

Remit to:

3 EMPIRE DISTRICT
PO BOX 219239
KANSAS CITY, MO 64121-9239

1294820394000000880000000088441

For account questions, call 800-206-2300. To pay your bill by phone, call 888-631-8973.

Empire District (www.empiredistrict.com)
602 S. Joplin Avenue
Joplin, MO 64801-2337

4 Account Number: 000011-11-0

Summary as of 02/08/18:

5	Previous Bill	01/08/18		\$135.00	
	Payment Received	01/24/18	Check	(\$135.00)	Thank you
	Balance Forward			\$0.00	
	Electric			\$135.00	***

6 **TOTAL AMOUNT DUE** **\$135.00**



Account Detail

8	Electric 000011-11-001	9 For Service at 101 Main Street, Anywhere, MO 11111	Rate: RG-Residential
10	Read for: 00118237 From 01/05/18 to 01/30/18 (25 Days), Curr Read - 13701 Prev Read - 12701. Totalling 1,000 kWh		
11	02/05/18	Customer Charge	1 x 13.00 \$13.00
12	02/05/18	Usage Charge	600kWh x .13006 \$78.04
13	02/05/18	Usage Charge	400kWh x .10574 \$42.30
14	02/05/18	Energy Efficiency Program Cost	1000kWh x .00039 \$0.39
15	02/05/18	Fuel Adjust Charge	1000kWh x .00184 \$1.84
	02/05/18	Anywhere County Tax	111.18 x .00875 \$0.97
		16 Current Months Charges:	\$136.54
	02/05/18	17 APP Installment	\$135.00
18	Billed Charges:		\$135.00
19	Status before payment is \$136.54, after payment in full \$1.54. This account will be reevaluated in October.		

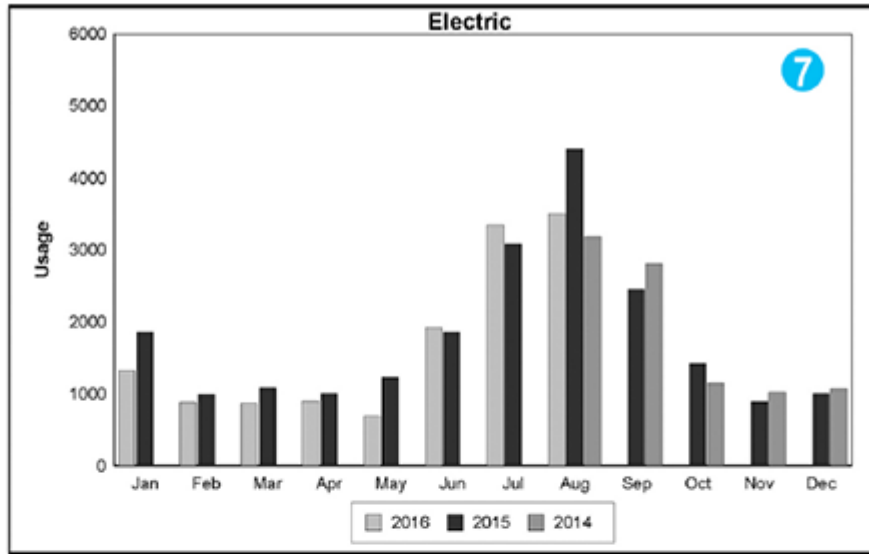
Usage decline

Billed Amount

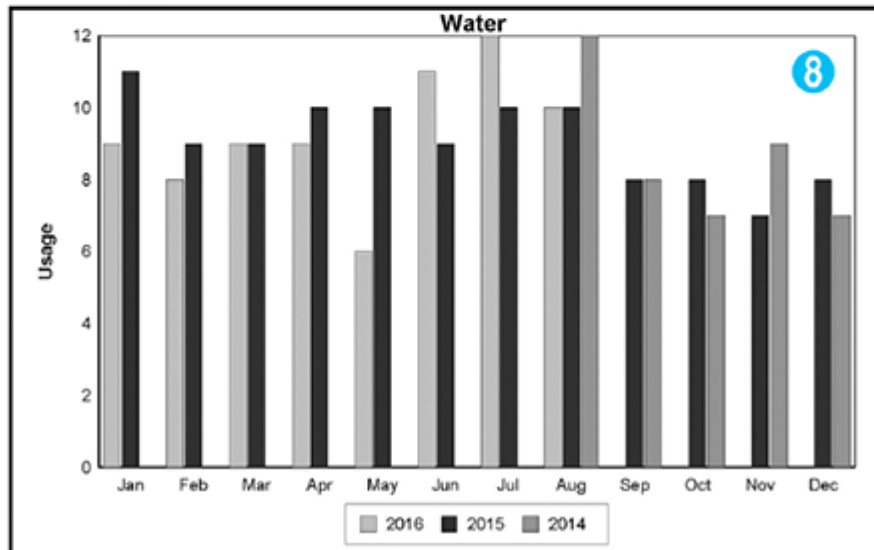
Contract Update
APP

Usage Charge:
 600 kWh x 0.13006
 400 kWh x 0.10574

**City of Columbia, Water &
Light
Electric Bill**



(7) The previous 24 months of your electric usage, measured in kWh, is shown on a graph. You can use this information how weather patterns, energy efficiency upgrades and your habits impact your bill.



	Usage	Rate	Charge
Electric Customer Base Charge			\$15.60
Electric Consumption Tier 1	300.00	\$0.0752	\$22.56
9 Electric Consumption Tier 2	450.00	\$0.0980	\$44.10
Electric Consumption Tier 3	1,250.00	\$0.1336	\$167.00
Electric Consumption Tier 4	1,500.00	\$0.1445	\$216.75
10 Electric - PILOT Fee			\$35.08
Electric Tax 11			\$39.96
Electric Total			\$541.05

Energy Charge	Usage	Rate
Summer	first 300 kWh	7.86 cents per kWh
	next 450 kWh	10.25 cents per kWh
	next 1,250 kWh	13.97 cents per kWh
	all remaining kWh	15.11 cents per kWh
Non-summer	first 300 kWh	7.86 cents per kWh
	next 450 kWh	10.25 cents per kWh
	all remaining kWh	11.84 cents per kWh

Usage incline ←

Usage incline ←

Summer months: June through September

Non-summer months: October through May

Minimum Monthly Bill ← **Fixed Charge Amount**

The minimum monthly bill/customer charge shall be \$16.31 for a standard meter and \$21.54 for a non-standard meter.

Rate Discount Adjustments

ELECTRIC SPACE HEATING: When the customer has permanently installed a minimum of 5 kilowatts approved electric space heating equipment which is the sole source of comfort heating — decorative fireplaces excluded — for the areas to be heated, the rate per kWh for the non-summer season will be:

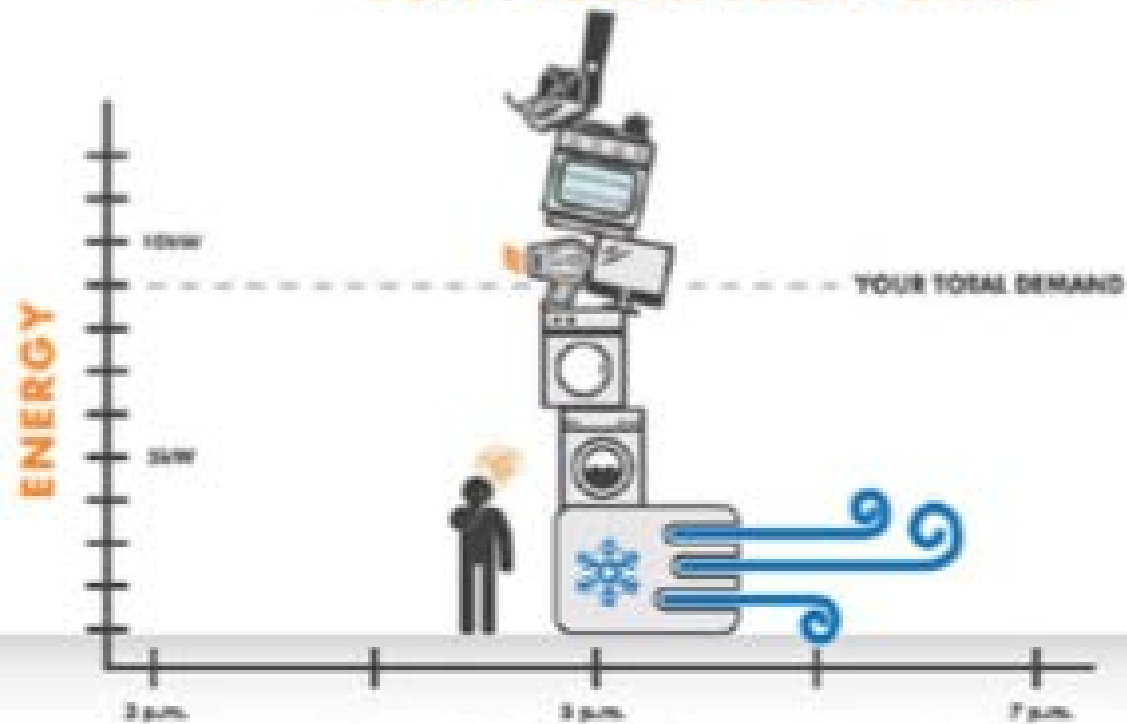
- 7.86 cents per kWh for the first 300 kWh
- 10.25 cents per kWh for the next 450 kWh
- 9.85 cents per kWh for all remaining kWh

HEAT PUMP: For customers having a permanently installed heat pump, which is the primary source of comfort heating and which conforms to the special rules and regulations outlined in the Department Rules entitled "[Heat Pump Rules and Regulations](#)," the monthly rate per kilowatt hour billed during the non-summer season shall be:

- 7.86 cents per kWh for the first 300 kWh
- 10.25 cents per kWh for the next 450 kWh
- 9.34 cents per kWh for all remaining kWh

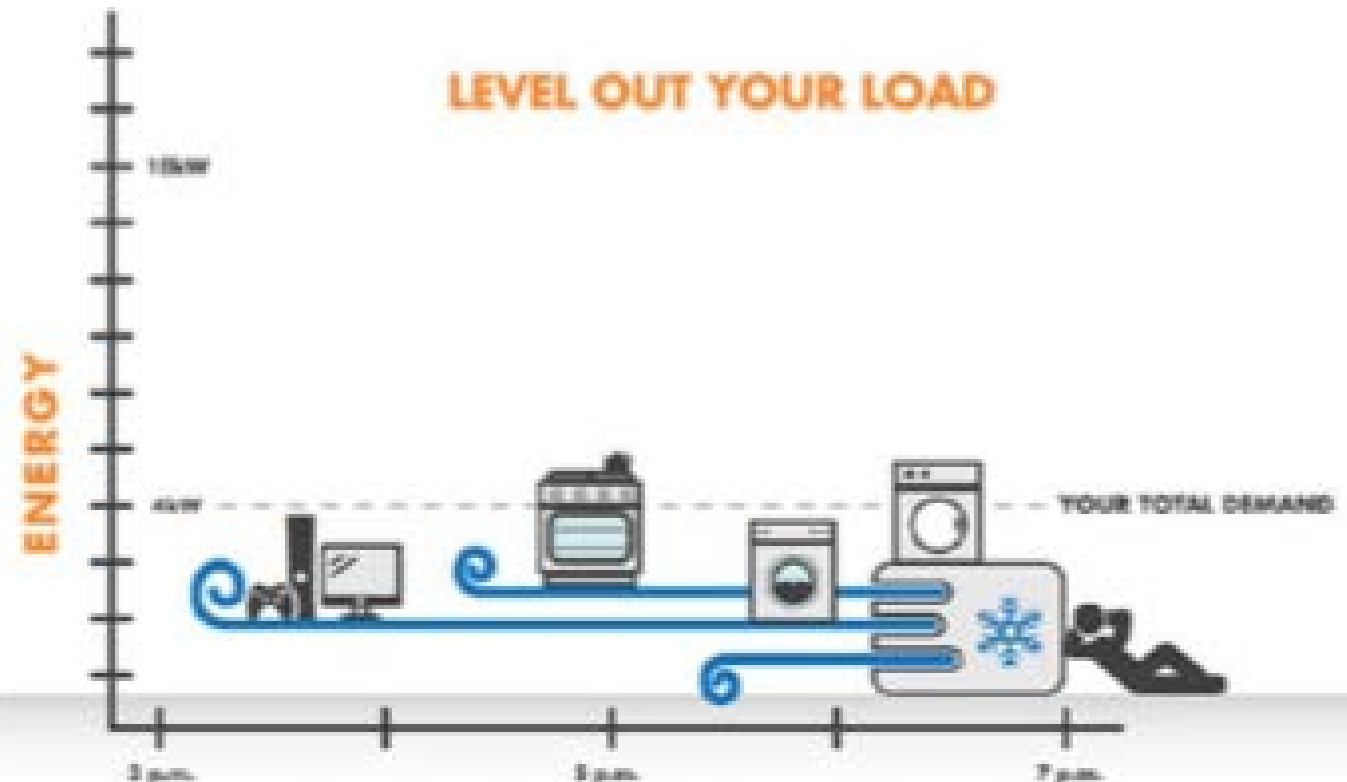
How do we message going forward?

DON'T TOWER YOUR POWER



Using multiple electric coolances at the same time during

LEVEL OUT YOUR LOAD



Staggering out your use of coolances during on-peak hours

Alternative Bill Arrangements

MY ACCOUNT
INSTANT, SECURE ONLINE
ACCESS TO YOUR ACCOUNT
ANYTIME, ANYWHERE

empiredistrict.com



Energy Analyzer

Analyze your home energy usage. Find opportunities for efficiency. Build a customized plan. Save energy.



Finding your biggest opportunities for home energy savings starts with identifying what uses the most energy in your house. Our energy analyzer can help. Simply log in to your [online account](#) and complete a brief questionnaire to begin.

After logging in to your account,

DIRECT PAY

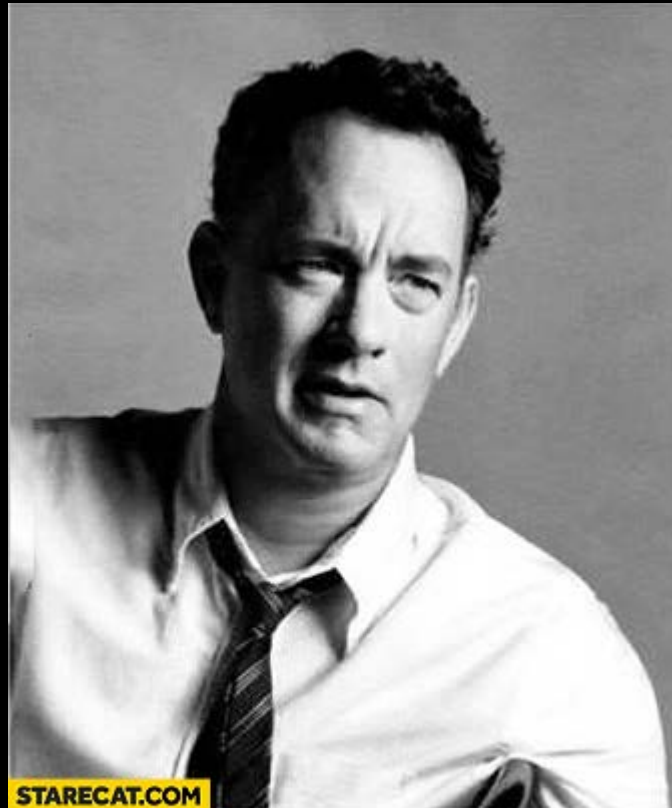
MAKES PAYING BILLS EASIER

START TODAY

Observations on the utility bill

- Lots of information
- Variations between utilities
- Focus on energy not demand
- Even though energy pricing is not very clear
- Is the bill still relevant?
- What is seen online? Text? Etc...
- Should the utility bill be used as a tool to achieve energy and demand savings?
- Should this be a priority?
- Next steps?

Questions?



T.HANKS



T.hanks a lot

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Missouri Office of the Public Counsel

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10/30/2018