



## Take Charge: Switching to Electric Yard Tools

# Webinar Logistics

- All attendees are in “listen only” mode.
- We will answer questions after the presentation.
- Please send questions using the Q&A or chat box at any time.
- The webinar is being recorded and will be shared after the webinar.

# SCP's Mission

Sonoma Clean Power is turning the tide on the climate crisis, through bold ideas and practical programs.

- Provide higher percentages of renewable energy and reduce greenhouse gas emissions.
- Help solve the climate crisis at a local level.
- React and respond to local needs.
- Deliver customer programs that make a difference.



# CleanStart

- SCP's default electricity service
- Competitive rates — mix of renewables, carbon-free energy, and general system power.

49% Renewable

93% Carbon-Free



# EverGreen

- Optional program available to residential and commercial customers
- Premium of \$0.025/kWh (about \$13 more per month than CleanStart for avg. home)

24/7 Renewable

100% Local

Solar & Geothermal





## Sonoma Clean Power Advanced Energy Center

- Explore how to power more of your life with renewable energy, instead of gas.
- Browse a large demonstration area with the best all-electric technologies and home systems.
- Learn about the many benefits of electrification: health, safety, climate action, etc.
- Attend classes and events.
- Take advantage of exclusive SCP customer discounts and incentives.





## Customer Benefits

- The latest and greatest energy-saving technologies all under one roof.
- Get connected with certified local contractors to perform installations.
- Access unbeatable vendor discounts and pricing.
- SCP's zero-interest loan program allows you to avoid huge upfront costs and pay over time.



# Speakers



**Jukka Kukkonen**

Chief EV Educator and Strategist for Shift2Electric and has over 10 years of experience within the EV market.



**Lisa Thurstin**

Lisa Thurstin is a director at the American Lung Association and coordinator of the Minnesota Clean Cities Coalition.



# Take Charge: Switching to Electric Yard Tools



Jukka Kukkonen

Chief EV Educator and Strategist

Shift2Electric

[www.Shift2Electric.com](http://www.Shift2Electric.com)

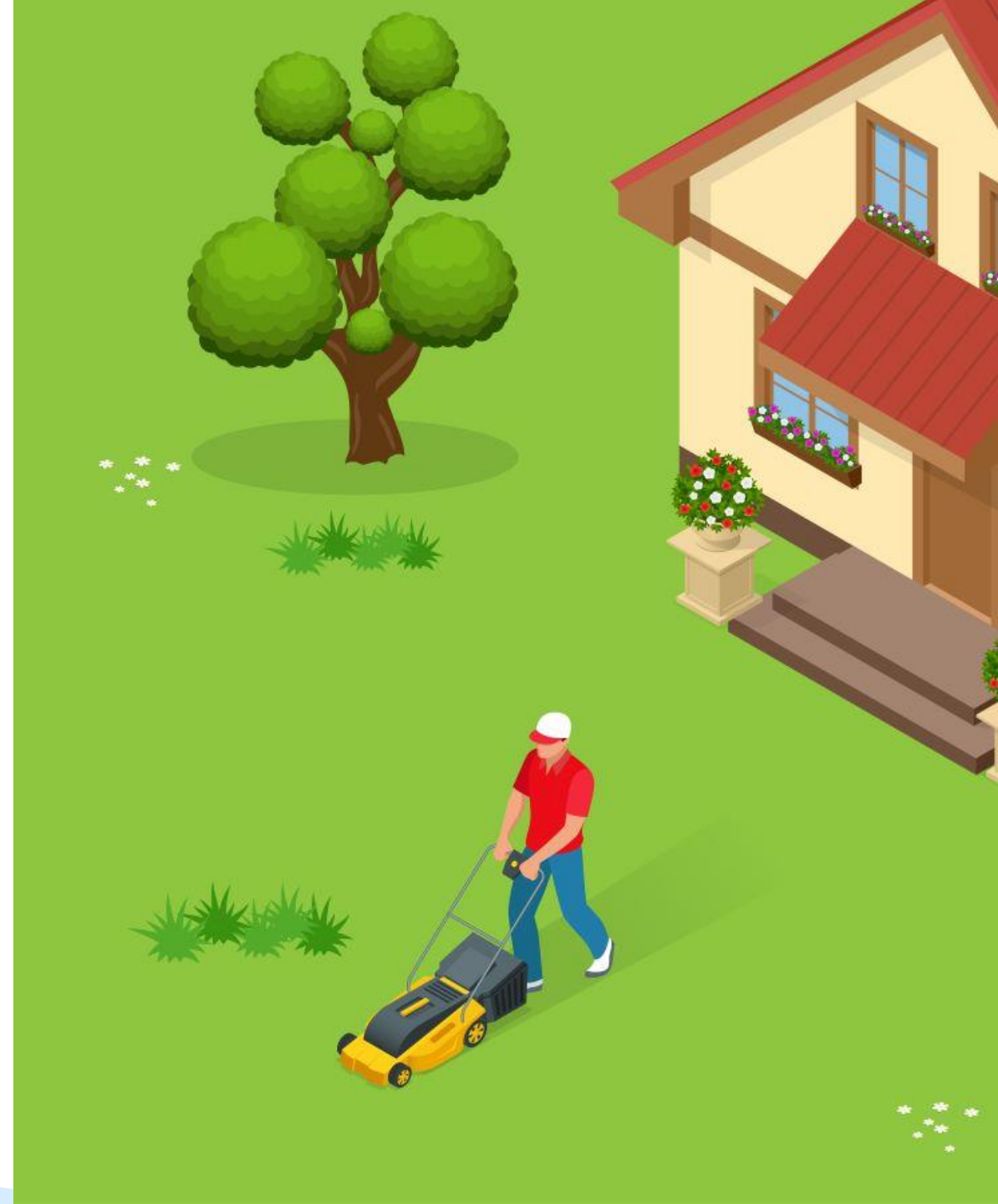


Lisa Thurstin

Senior Manager

American Lung Association

[www.cleanairchoice.org](http://www.cleanairchoice.org)



# Topics Covered

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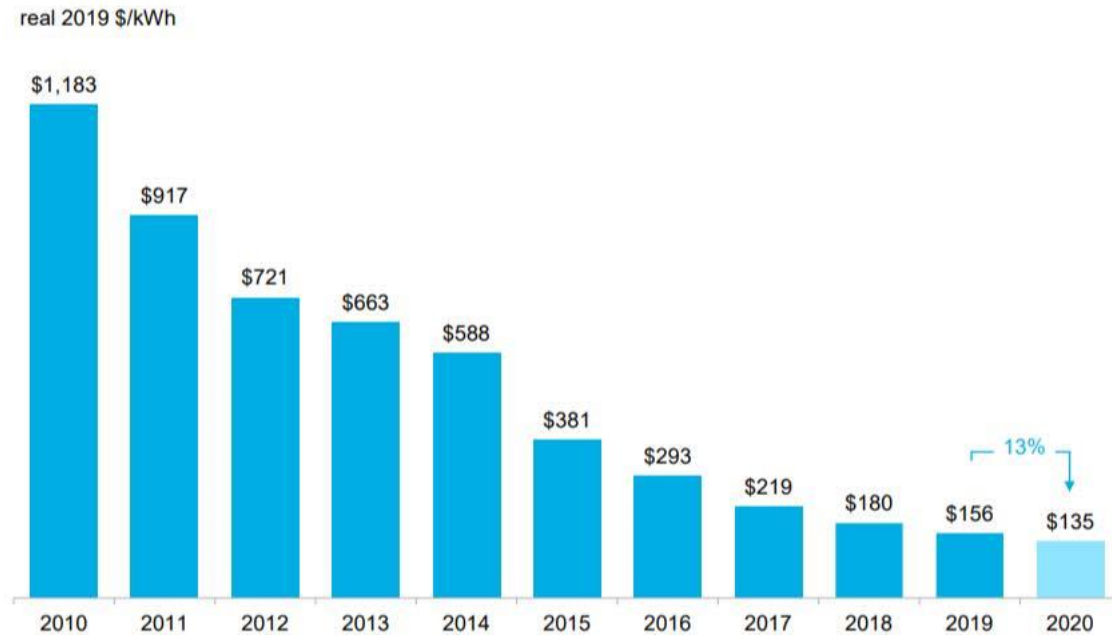
- Electric technology advances
- Clean air and health benefits
- Other benefits
- Info about equipment on the market
- What to consider
- Battery capacity and electricity costs
- Care and maintenance
- Q&A



# Technology advancements

## Battery tech advancement

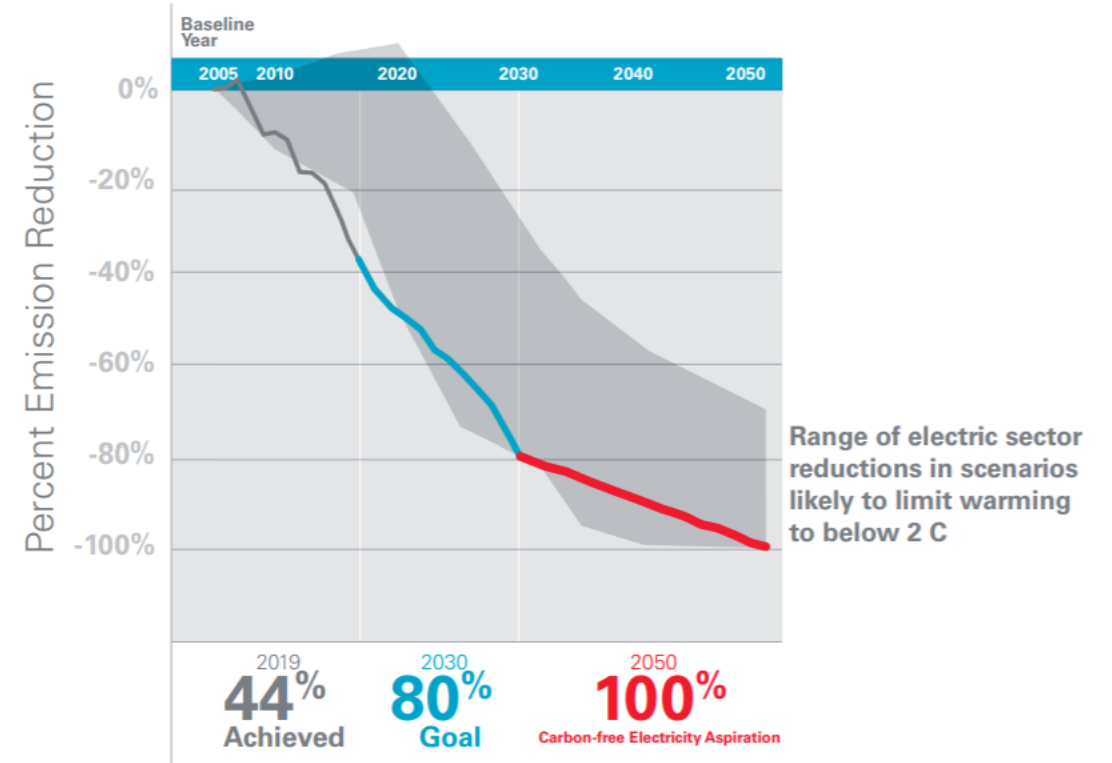
Lithium-ion battery price survey results (volume-weighted average)



BloombergNEF

## Shift to renewable electricity

Xcel Energy's carbon emissions



# The American Lung Association and air pollution

## American Lung Association

- Mission: To save lives by improving lung health and preventing lung disease.
- Improve the air we breathe so it will not cause or worsen lung disease.



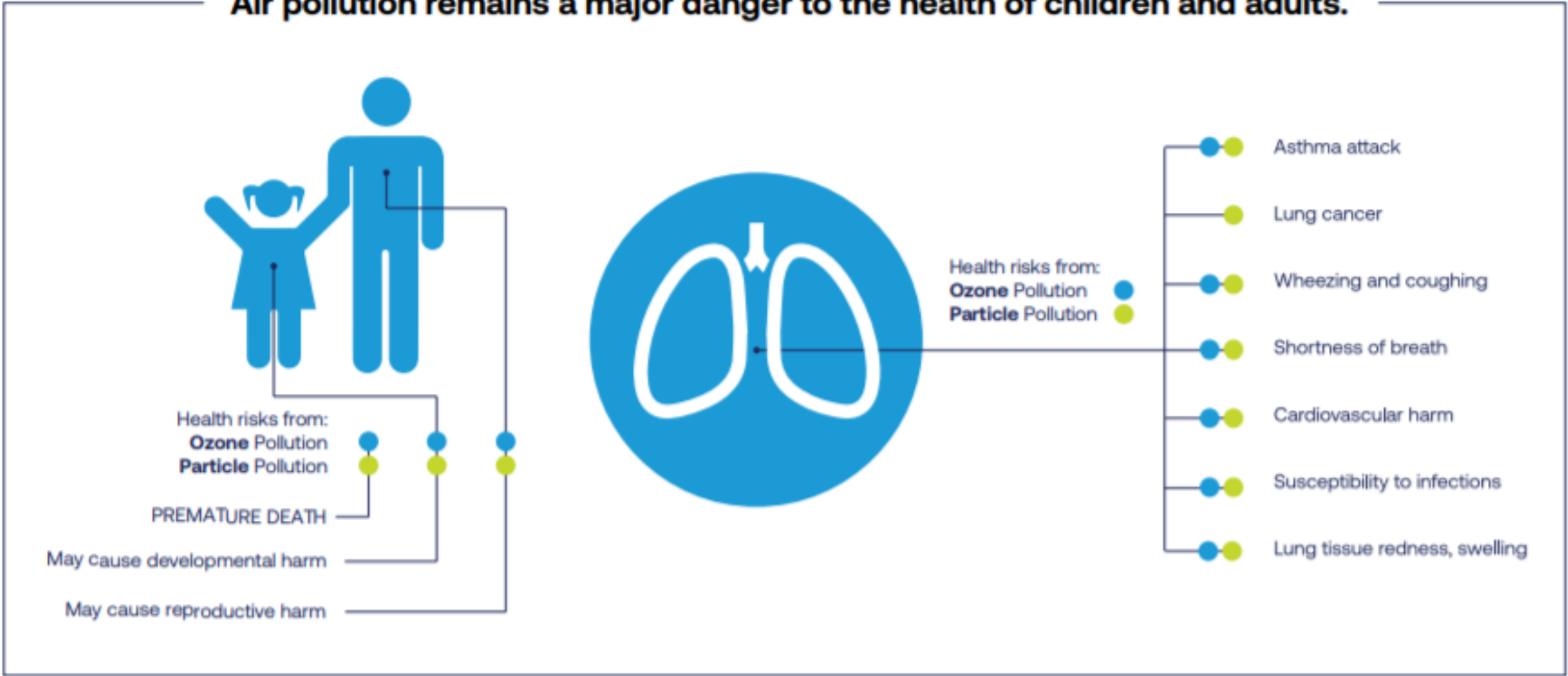
## Clean Cities Coalition

- Mission: the U.S Department of Energy's Clean Cities program foster the nation's economic, environmental, and energy security by working locally to advance affordable, domestic transportation fuels, energy efficient mobility systems, and other fuel-saving technologies and practices.



# Air Pollution & Health

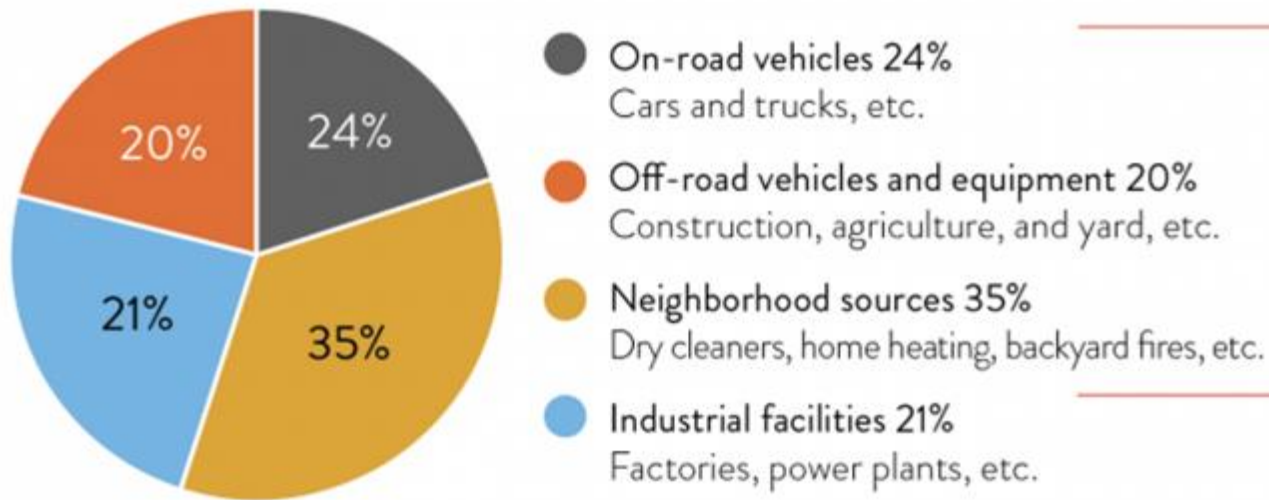
**Air pollution remains a major danger to the health of children and adults.**



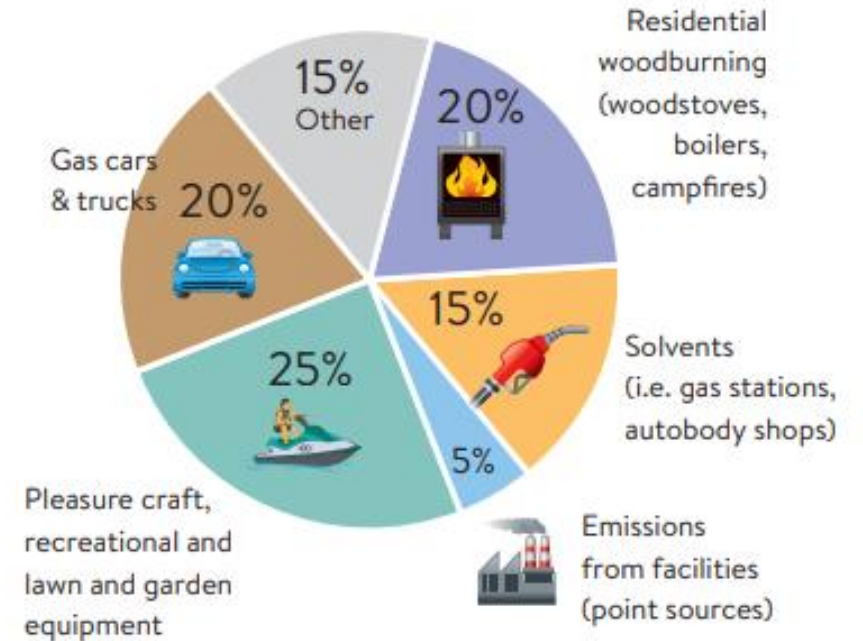
[Road to Clean Air Report – Click here](#)

# Pollution from gasoline equipment

- Each weekend, about 54 million Americans mow their lawns, amounting to approximately 800 million gallons of gas per year.
- At least 17 million gallons of gasoline are spilled annually just filling these lawnmowers.



## Volatile Organic Compounds (VOCs)



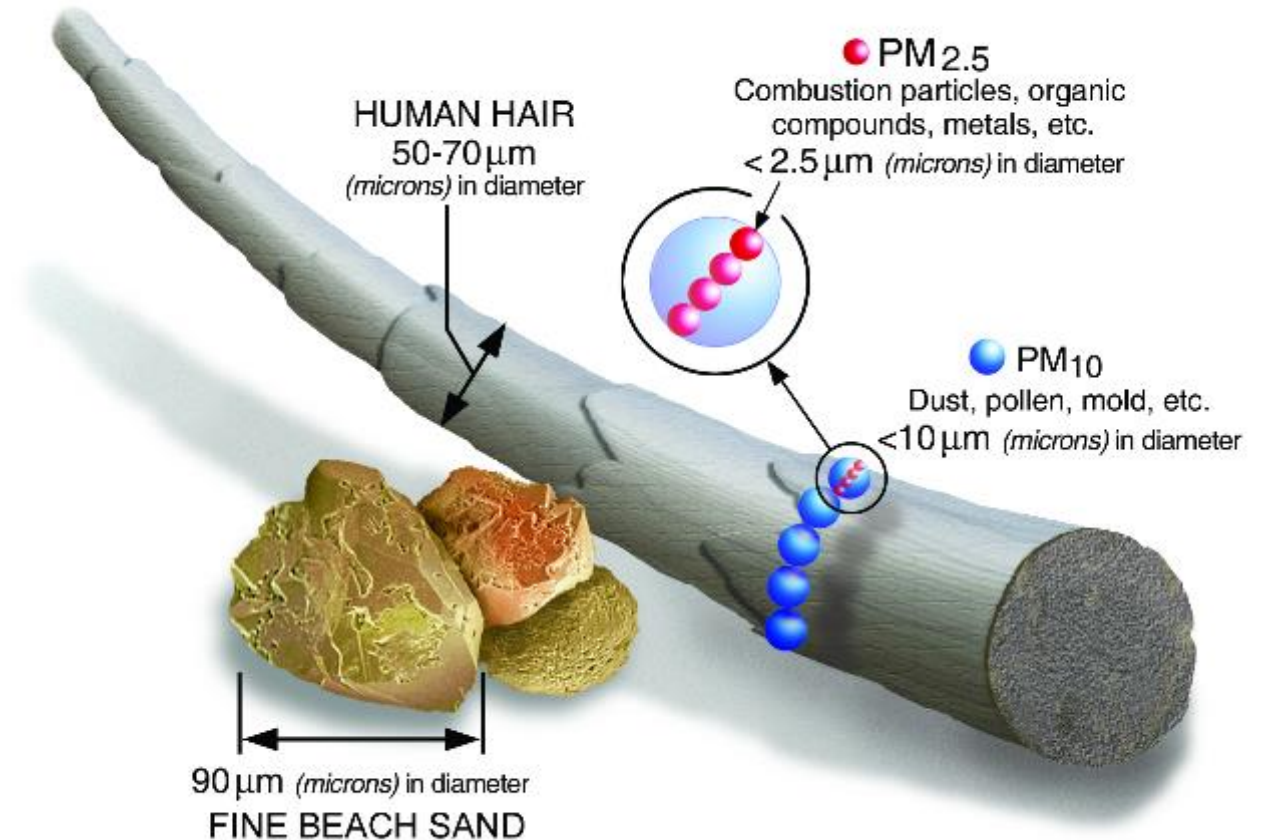
# Pollution from gasoline lawn equipment

- Gasoline powered lawn equipment annually emits a variety of pollutants
  - Carbon Monoxide (CO) – 5,793,200 tons
  - Nitrogen Oxides (NOx) – 68,500 tons
  - Particulate Matter (PM10 and PM2.5) – 20,700 tons
  - Carbon Dioxide (CO2) – 20,382,400 tons
  - Volatile Organic Compounds (VOC) – 461,800 tons
- This accounts for 24%-45% of all nonroad gasoline emissions



# Particulate matter

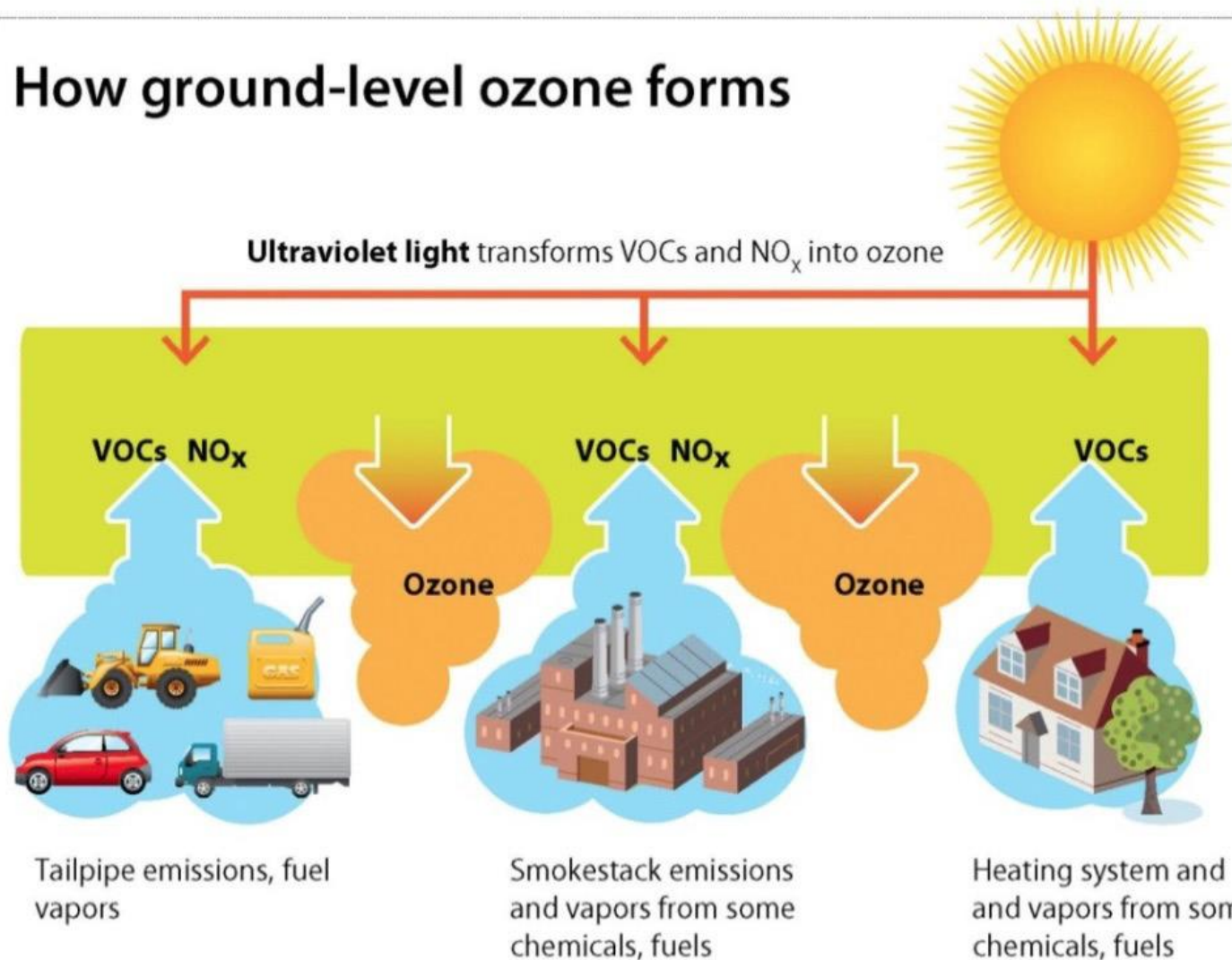
- Health impacts of fine particles
  - Coughing
  - Wheezing
  - Asthma attacks
  - Heart attacks
  - COPD
  - Lung cancer
- People at increased risk
  - Children
  - Teenagers
  - Older adults
  - People with lung or heart disease

















# VOCs, NO<sub>x</sub>, and Ozone

## How ground-level ozone forms



Pollutants called VOCs and NO<sub>x</sub> mix in the air and then are transformed by UV light into ground-level ozone. High levels of ozone are harmful to humans, especially those with respiratory health issues. Temperature, wind and amount of sunshine are important variables: hot, sunny days often produce higher levels of ground-level ozone.

# Electric mowers available today

Manufacturer			Performance									Purchasing		
Make	Model	Photo	Cutting Width (Inches)	Maximum Cutting Height (Inches)	Weight (Pounds)	Battery Size (Ah)	System Voltage	Battery Capacity (Wh)	Self-Propelled	Collection Bag	Advertised Run Time	MSRP	Other Equipment	Warranty
Black and Decker	MTC220		12	2.4	10	2 (2x)	20	80	No	No	*	\$149.99	AL, CS, HT, LB, PS, ST	2 year
Black and Decker	CM1640		16	3.2	38	2 (2x)	40	160	No	Yes	30 minutes	\$329.99	CS, HT, LB, ST	2 year
Black and Decker	CM2043C		20	4	47	2 (2x)	40	160	No	Yes	*	\$349.00	CS, HT, LB, ST	3 year
Black and Decker	CM2060C		20	4	50	2.5 (2x)	60	240	No	Yes	*	\$399.99	HT, LB, ST	3 year
Black and Decker	CM220F2		22	4	55	2 (2x)	20	80	No	Yes	*	\$399.99	CS, HT, LB, PS, ST	3 year
Black and Decker	CM220K		22	4	55	2 (2x)	20	80	No	Yes	*	\$419.99	CS, HT, LB, PS, ST	3 year
Dr Power	CE73016KEND		16	3	37	2.5	62	155	No	Yes	75 minutes	\$419.99	CS, HT, LB, PS, ST	2 year
Dr Power	CE75021KEND		21	3.5	58	5	62	310	No	Yes	60 minutes	\$649.99	CS, HT, LB, PS, ST	2 year
Dr Power	CE77021KEND		21	3.5	62	5	62	310	Yes	Yes	45 minutes	\$659.00	CS, HT, LB, PS, ST	2 year
Echo	CLM-58V4AH		21	4	57	4	58	232	No	Yes	40 minutes	\$549.99	CS, HT, LB, ST	5 year
Ego	LM2100		21	4	55	5	56	280	No	Yes	45 minutes	\$349.99	CS, HT, LB, SB, ST	5 year
Ego	LM2100SP		21	4	68	7.5	56	420	Yes	Yes	60 minutes	\$429.00	CS, HT, LB, SB, ST	5 year

# Snapshot of List

[www.ElectricLawnInfo.org](http://www.ElectricLawnInfo.org)

# Electric Info Lists

## Electric lawn mowers

Manufacturer			Performance						Purchasing			
Make	Model	Photo	Cutting Width (inches)	Maximum Cutting Height (inches)	Weight (pounds)	Battery Capacity (Ah)	Voltage	Self-propelled	Collection Bag	MSRP	Other Equipment	Where to Buy
WORK	WG758		18	3.5	53.6	4 (2x connected in series)	40	No	Yes	379.99	(2) 4 Ah batteries, charger, multi-plug	online
WORK	WG744		16	3.5	38.1	8 (2x connected in series)	40	No	Yes	339.99	(2) 4 Ah batteries, charger	online
Yard	Y0847		20	3.75	64	8	54-60					
Yard	Y0843		22	4	83	6	54-60					

Battery

Corded

American Lung Association.  
Clean Air Choice.

5 pages  
59 units

2 pages  
20 units

[www.ElectricLawnInfo.org](http://www.ElectricLawnInfo.org)

## Chainsaws, leaf blowers, trimmers, etc.

Manufacturer			Performance								
Make	Model	Photo	Bar Length (inches)	Maximum Chain Speed (RPM)	Weight (pounds)	Total Battery Size (Ah)	System Voltage	Total Battery Capacity (Ah)	Additional Motor Run Time	MSRP	Other
Husqvarna	550E XP		24	65.00	5	2.1	36	75.0	2 hour	\$299.00	
Husqvarna	710E XP		22	65.00	5.25	2.1	36	75.0	8 hours	\$249.00	
Husqvarna	515E XP		18	65.00	5.75	2.1	36	75.0	2 hour	\$429.00	
Husqvarna	340E XP		14	65.00	6.00	2.1	36	75.0	*	\$289.00	
Husqvarna	710E XP		22	65.00	5.25	2.1	36	75.0	*	\$429.00	
Husqvarna	320		14	67.00	6.5	2.1	36	75.0	80 minutes	\$249.00	
Greenworks	GG180		18	33.6	13.24	2.5	82	120	20 minutes	\$299.00	
Greenworks	GG180		18	47.2	13.3	2.5	82	120	20 minutes	\$249.00	
Greenworks	GG140		14	34	8.01	4	80	120	*	\$209.00	

10 pages  
108 units

## Commercial lawn mowers

Make	Model	Photo	Cutting Width (inches)	Maximum Cutting Height (inches)	Weight (pounds)	Deck Material (inches)	System Voltage	Total Battery Capacity (Ah)	Additional Motor Run Time	MSRP	Where to Buy
Ego	EM200		20	4.5	60	100%	36	2,000	2 hours	\$1,299.00	online
Ego	EM240		24	4	100	75%	72	3,000	2 hours	\$1,699.00	online
Ego	EM260		26	4.5	110	75%	36	2,000	2 hours	\$1,299.00	online
Ego	EM280		28	4	120	100%	36	2,000	2 hours	\$1,299.00	online
Ego	EM300		30	4	130	100%	36	2,000	2 hours	\$1,299.00	online
Ego	EM320		32	4	140	100%	36	2,000	2 hours	\$1,299.00	online
Ego	EM340		34	4	150	100%	36	2,000	2 hours	\$1,299.00	online
Ego	EM360		36	4	160	100%	36	2,000	2 hours	\$1,299.00	online
Ego	EM380		38	4	170	100%	36	2,000	2 hours	\$1,299.00	online
Ego	EM400		40	4	180	100%	36	2,000	2 hours	\$1,299.00	online
Ego	EM420		42	4	190	100%	36	2,000	2 hours	\$1,299.00	online
Ego	EM440		44	4	200	100%	36	2,000	2 hours	\$1,299.00	online
Ego	EM460		46	4	210	100%	36	2,000	2 hours	\$1,299.00	online
Ego	EM480		48	4	220	100%	36	2,000	2 hours	\$1,299.00	online
Ego	EM500		50	4	230	100%	36	2,000	2 hours	\$1,299.00	online

4 pages  
27 units

## Snow blowers

Make	Model	Photo	Clearing Width (inches)	Clearing Depth (inches)	Weight (pounds)	Total Battery Size (Ah)	System Voltage	Total Battery Capacity (Ah)	Additional Motor Run Time	MSRP	Where to Buy
Ego	EM200		20	10	60	2,000	36	2,000	2 hours	\$1,299.00	online
Ego	EM240		24	10	100	3,000	72	3,000	2 hours	\$1,699.00	online
Ego	EM260		26	10	110	3,000	36	2,000	2 hours	\$1,299.00	online
Ego	EM280		28	10	120	3,000	36	2,000	2 hours	\$1,299.00	online
Ego	EM300		30	10	130	3,000	36	2,000	2 hours	\$1,299.00	online
Ego	EM320		32	10	140	3,000	36	2,000	2 hours	\$1,299.00	online
Ego	EM340		34	10	150	3,000	36	2,000	2 hours	\$1,299.00	online
Ego	EM360		36	10	160	3,000	36	2,000	2 hours	\$1,299.00	online
Ego	EM380		38	10	170	3,000	36	2,000	2 hours	\$1,299.00	online
Ego	EM400		40	10	180	3,000	36	2,000	2 hours	\$1,299.00	online
Ego	EM420		42	10	190	3,000	36	2,000	2 hours	\$1,299.00	online
Ego	EM440		44	10	200	3,000	36	2,000	2 hours	\$1,299.00	online
Ego	EM460		46	10	210	3,000	36	2,000	2 hours	\$1,299.00	online
Ego	EM480		48	10	220	3,000	36	2,000	2 hours	\$1,299.00	online
Ego	EM500		50	10	230	3,000	36	2,000	2 hours	\$1,299.00	online

2 pages  
23 units

Total:  
23 pages  
237 units  
over 2800 data points

# Electric lawn mower benefits:

- ▶ Less energy used (mowing average city lot takes the same amount of electricity as boiling half a gallon of water)
- ▶ No emissions (user, neighborhood, city, planet)
- ▶ Much quieter (user, neighborhood)
- ▶ Less vibration
- ▶ No need to mess with gas (buy, store, off-gas)
- ▶ Always starts
- ▶ Cheaper to use (dollars and time)
- ▶ Easy maintenance
- ▶ Lighter weight
- ▶ Easier storage (can be stored upright)



# Corded or Cordless?

## Choose corded mower if you:

- want a very affordable mower (\$100–200)
- want a very lighter mower
- have accessible outside outlets
- don't mind dealing with the cord



## Choose battery mower if you

- don't want to deal with the cord
- are looking for a self-propelled mower
- want to use same batteries with other yard equipment.



# How to choose a lawn mower

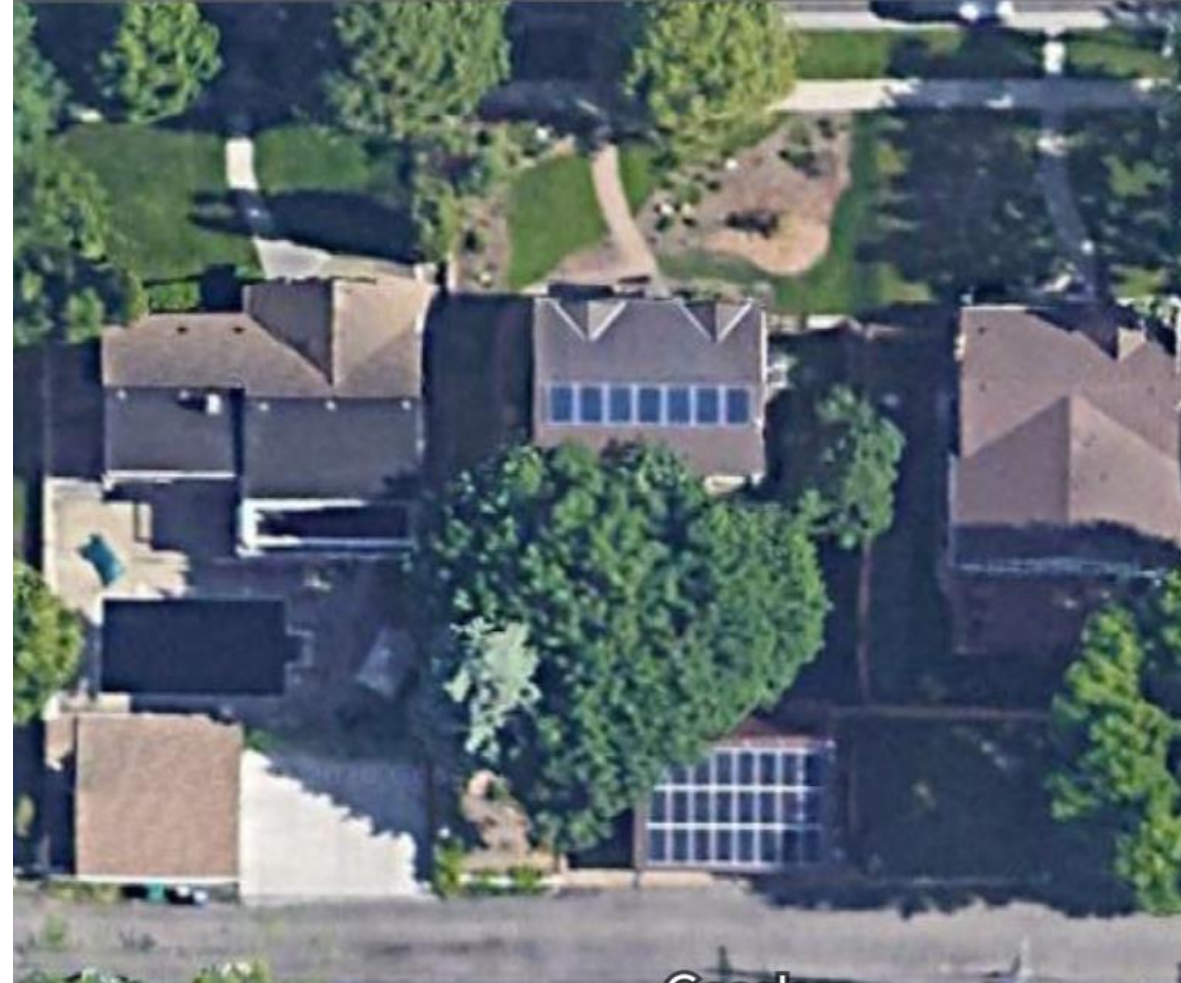
- ▶ **Size of your lawn**

Standard city lot is 40'\*120' = 4800 sqr feet  
minus: house 800, garage 400, driveway 200,  
sidewalks and paths 200, landscaping 200 =  
3000 square feet

- ▶ **How often do you mow and how much do you cut each time**

- ▶ **Consider:**

- Battery capacity 100–400Wh (1500–6000sqr feet)
- Deck diameter 16"–22"
- If you cut rarely and long grass, choose higher voltage



# Battery capacity and electricity costs:

- ▶ How to calculate the battery capacity:
- ▶ Volts x Amp hours = Watt hours
- ▶ Example: 56V x 5Ah = 280Wh
- ▶ Battery capacity range 100–400Wh (1500–6000sq feet, non self-propelling)
- ▶ Add capacity by buying a second battery 1000Wh is 1kWh. 1kWh of electricity costs 12 cents.

If average city lawn is 3000 square feet and it takes about 200Wh to mow it. If we assume some charging inefficiencies and say that you need 250Wh to charge. This means that if you mow your lawn four times you use 1kWh of energy so it costs you 12 cents.

- ▶ You can mow average city lot 33 times for a dollar.



# Other considerations:

- ▶ Self-propelled or not?
- ▶ Collecting or mulching (or both)?
- ▶ Automatic blade speed adjustment
- ▶ Cutting height adjustment (1.5" – 4")
- ▶ Weight (35–90 pounds)
- ▶ Warranty (2–5 years)
  
- ▶ Other equipment using the same batteries:
  - Trimmer
  - Hedge trimmer
  - Leaf blower
  - Chain saw
  - Snow blower
  - Hand tools...





# Care and maintenance:

- ▶ Clean extra clippings after the use (remove battery before doing this)
- ▶ Check the blade at the same time and sharpen if needed
- ▶ Leave battery  $\frac{3}{4}$  charged in fall. Check the charge level once or twice in the winter time and charge if needed



# Robot mower option:

- ▶ Lives outside
- ▶ Keeps grass mowed all the time
- ▶ Charges automatically
- ▶ Convenient
- ▶ Can work on hills
- ▶ More expensive



# Riding mowers



<https://todaysmower.com/going-green-2020-electric-riding-mowers-and-ztrs/>

# Q&A



# Resources

1. Action Sports Power Equipment in Santa Rosa



2. Home Depot

3. Lowes

# Thank you

