



# SOLAR PANELS

Madeline Clair, Elizabeth Skourlis, Jay Tamilio, Tysaun Blevins, Joseph Klucznik, Olivia Rodriguez, Dr. Distler

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## Ohio's Energy Resources

- 47% of the electricity in Ohio is produced by coal
- 37% is produced by natural gas
- 15% is produced by nuclear energy
- Majority of Ohio energy comes from non-renewable resources that are in a limited supply and take a long time to reform



# Impact of Ohio Dependence on Fossil Fuels

- One-third of carbon dioxide emissions are from coal fire plants making it one of the main contributors for global warming.
- Clevelanders have experienced (as of 2018) 114 days of continuously decreasing air quality due to fossil fuels and other air pollution ([environmentohio.org](http://environmentohio.org)).
- Even low levels of smog and pollution can be very dangerous.
- Health risks include respiratory and heart complications and even premature death in extreme cases ([environmentohio.org](http://environmentohio.org))



# Benefits Of Solar Panels

- Reduce or eliminate energy bills.
  - Although sunny days will produce more solar energy, solar panels will continue to draw energy even when the weather is cloudy.
- Earn tax credits and rebates.
  - 30% of total system costs can come back as a federal income tax credit. This means you would save \$7,500 on a solar system worth \$25,000.
- Low Maintenance
  - Solar panels are long lasting and little repair work is necessary.
  - Solar panels stay relatively clean, which is very important for them to collect energy (Cleaning services are around \$150 according to [homeadvisor.com](http://homeadvisor.com)).
  - On average solar panels last for 20-25 years ([greenmatch.co.uk](http://greenmatch.co.uk)).



## Benefits of Solar Panels (Con't)



- Several Options/Styles
  - Grid-tied systems (that tie into existing energy grid)
  - Off-grid systems (that do not tie into existing energy grid and must have storage system to store energy)
  - Transparent solar energy windows (that can be used on anything with windows)
  - ([greenmatch.co.uk](http://greenmatch.co.uk) and [energysage.com](http://energysage.com))
- Environmental Benefit
  - Decrease in greenhouse gas emissions.
    - Toxic emissions from solar panels are 300 times lower than coal power plants ([livescience.com](http://livescience.com))
  - The lack of pollution from fossil fuels means less respiratory and heart health issues ([energysage.com](http://energysage.com))



# Solar Panels Can Benefit Cleveland

- Solar panels save money on the municipal electrical bills
- Investing in solar panel production creates jobs (~ 200,000 people working in the solar industry in the U.S. currently)
- Solar panels can help lower income families save money by cutting the cost of the electric bill.
- Solar energy can improve resiliency because energy coming from the sun is created locally and will not be impacted by power outages.
- Solar panels can meet environmental, economic, and energy needs.
- (<https://www.nlc.org/article/five-ways-your-city-can-benefit-from-the-solar-in-your-community-challenge>)



# How Do Solar Panels Reduce Pollution?

- Solar Panels:
  - Reduce water pollution
  - Reduce water consumption
  - Reduce air pollution
  - Reduce Carbon emissions
  - Conserve resources (like coal, petroleum since there is no need to burn fossil fuels)
  - Reduce health problems linked to cancer, heart attacks and brain damage.



## Construction of Solar Panels

As a part of this project, the Westshore Campus Environmental Club would purchase commercial solar panel charging station. Additionally, the club will build a similar charging station to compare and test the functionality of the customized system to the commercial system. A system created by the club could be later optimized as the needs of the campus change and is also a more cost-effective option.

# Items Needed for Construction of Solar Panels

- Renogy 100 Watts 12 Volts Monocrystalline Solar Starter Kit
  - This solar kit comes with the tools necessary for a new system: a Renogy 100W 12V Monocrystalline Solar Panel, a 30A PWM Wanderer Charge Controller, a 20ft 10AWG MC4 Adaptor Kit, an 8ft 10AWG Tray Cable, and a set of Z-brackets.
  - Cost: \$196.99
  - [https://www.amazon.com/dp/B00BFCNFRM/ref=dp\\_cr\\_wdg\\_tit\\_nw\\_mr](https://www.amazon.com/dp/B00BFCNFRM/ref=dp_cr_wdg_tit_nw_mr)





# Items Needed for Construction of Solar Panels

- 10 Gauge Silicone Wire, 10 Feet
  - <https://www.amazon.com/10-Gauge-Silicone-Wire-Feet/dp/B007DMW3IU>
  - \$13.99
- Powerstar 12V 33AH Group U1 Deep Cycle Sealed Battery
  - [https://www.amazon.com/dp/B0006VCCMW/ref=sspa\\_dk\\_detail\\_0?psc=1](https://www.amazon.com/dp/B0006VCCMW/ref=sspa_dk_detail_0?psc=1)
  - \$94.23



# Items Needed for Construction of Solar Panels

- Power Inverter
  - <https://www.walmart.com/ip/Cobra-CPI1575-1500W-12V-DC-to-120V-AC-Car-Power-Inverter-3-Outlets-and-USB/10746776>
  - \$100.99



# Commercial Solar Panel Unit

- GOAL ZERO YETI 400 POWER STATION + BOULDER 100 SOLAR KIT
  - <https://www.goalzero.com/shop/kits/goal-zero-yeti-400-power-station-boulder-100-solar-kit/>
  - \$699.90





# Energy Output From Solar Panels

- Based on the reported output for the Yeti system, when fully charged you can expect the following output:
  - Smartphone 20+ Recharges
  - Tablet 10+ Recharges
  - Laptop 3-5 Recharges
  - 32 LCD TV 3 hours
- The Yeti system fully recharges in 8-16 hours in the sun.



## What It Means For Tri-C

- Portable solar charging stations can bring power to locations where students do not have access to electricity to charge their devices.
- These charging stations are eco-friendly and more cost-effective than running power to locations where there is none.
- Solar charging stations are also visible reminders to students, faculty, and staff about the importance of sustainable energy sources.



# Misconceptions of Solar Panels

- Solar panels are too expensive to install. This is a false statement, paneling cost between \$5,000-\$40,000, but it can drop by \$30,000 if self-installed.
- The solar systems can decrease a home's value. False for every \$1,000 a home saves on energy, the home increases in value by \$20,000.
- You can only live in a warm and sunny climate for the system to work. The solar systems work off of the sun's energy and not its heat. Meaning that the paneling can work anywhere in the world. (A surplus of energy is what keeps the power running at night and on cloudy days).
- The panels are high maintenance. The solar panels only require little work to keep them protected. This can be as simple as removing debris from them and washing them down with water.
- Solar power can not work globally. The sun is very powerful and can create enough energy to sustain the whole world in an hour. This means that solar power is a positive future.



## **Cleveland Leads the Way**

Tri-c should should set an example for other communities and cleveland. By giving the effort to use renewable energy, we will inspire other communities and people to make changes for themselves and live more sustainably.



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