Objective:

Do Now:

**Solar Energy**

Solar Thermal Systems

* Collects sunlight to boil water🡪\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Photovoltaic Cells

* Use sunlight to produce electricity
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Advantages

* Low emission of CO2 and other pollutants
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Disadvantages

* Panels contain toxic materials
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* High cost for older systems

**Wind Energy:**

**What is wind?**

* Air in motion!
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Wind Turbines**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Power a generator
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Electricity sent through a cable to a transmission line

**Wind Energy**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Advantages:**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* More jobs!
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* No air pollution
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Disadvantages:**

* Need wind
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Affects landscape scenery

**Turbines Popping Up on New York Roofs, Along With Questions of Efficiency**

The New York Times

By Matt Chavan

May 26, 2014

A dozen construction workers gathered around a flatbed truck in Long Island City, Queens, one recent Tuesday, marveling at the final piece of a new 15-story apartment building they had just finished assembling. As a mobile crane hoisted the 20-foot-long black contraption over Pearson Street, many of the workers used their phones to film its ascent.

What looked like a huge carbon-fiber strand of DNA strung around a 10-foot mast was the last of three [wind turbines](http://topics.nytimes.com/top/news/business/energy-environment/wind-power/index.html) being installed atop the [Pearson Court Square](http://www.thepearsoncourtsquare.com/), a 197-unit luxury apartment building.

In an industry, a city and a society obsessed with being green, wind turbines remain scarce — only two apartment buildings in New York City harvest the skies for energy, with limited yields.

But in the past few weeks, two new installations have popped up, the one on Pearson Street and another atop what is now Brooklyn’s tallest building, 388 Bridge Street. At least half a dozen more are on the horizon.

“I don’t know if it’s Generation X or Generation Y, but we anticipated a lot of our tenants would be drawn to something different,” said Ron Moelis, principal of L&M Development, which is developing the Pearson Court Square.

Windmills have always been at the heart of the city’s identity, including the earliest recorded image, a 1626 engraving by Joost Hartgers, and one appeared at the center of the city’s official seal when the five boroughs incorporated in 1898.

L&M is picking up where the city founders left off. The developer has had a longstanding commitment to sustainable design, using solar panels, insulated glass, super-efficient boilers and the like. But it has never found the right place to install wind turbines until now.

New York is indeed a windy city, often too much so. Typical turbines require a steady breeze of 10 miles per hour or more, whereas winds in New York can jerk from 3 to 30 miles per hour and come from all directions. Developers have taken to helix-shaped turbines, which can capture winds from any direction and at lower speeds than the propeller style, in addition to being quieter and safer for birds.

1) What are some advantages of the New York City wind turbines?

As with most green innovations, L&M also had the government on its side. The New York State Energy Research and Development Authority helped pay about half the $100,000 installation cost and will study the turbines’ efficacy.

For many sustainability advocates, that is precisely the issue. “A tiny windmill on a big building is just silly — it might as well be a pinwheel,” said Russell Unger, executive director of the Urban Green Council. “It’s a lovely idea, if people want to pay for it and test it out, but as far as return on investment goes, it’s a waste compared to more insulation and efficient building systems.”

L&M actually agrees. “We’re doing all we can to green the building, but it’s kind of hard to sell an apartment by showing people your high-tech boiler,” Mr. Dishy said. The three turbines should provide enough power, 12 kilowatts, to keep the lights on in all common areas, including the lobby, the hallways, the gym and a roof lounge from which the whirligigs can be seen.

2) Do you believe that the state government should be subsidizing (paying for part of) wind turbines for apartment buildings? Why or why not?

**Homework:**

**Write down one question you still have about solar or wind power and research the answer to it. Cite your source!**