



“KILL-A-WATT”

MARCH NEWSLETTER

-ADAM MURDAUGH

JBSA ENERGY PROGRAM



Even though I like size, sometimes something small is very effective. And when it comes to photovoltaic solar there is nothing better than, for instance, the smartflower. I mean what a brilliant idea, you put this in front of the house, you plug it in – no installation, nothing – just plug & play.”

- Arnold Schwarzenegger

THE SMARTFLOWER IS IN BLOOM!

SMARTFLOWER

After almost 3 years, the SmartFlowers have finally left the yard behind the Ops building 5495. Two of them have permanent locations at Fort Sam and Wilford Hall parking garage. The third SmartFlower has been retrofitted with an inverter, battery charger and 16 electrical outlets (8 USB and 8 regular outlets). The purpose is to make that SmartFlower a mobile, working demonstration.

If you're not familiar with what these SmartFlowers are, a SmartFlower is an All-in-One solar system. There are 12 petal-shaped solar panels that will bloom at sunrise and close at sunset. The technology involved is solar tracking. The SmartFlower will keep the sun at a 90° angle throughout the day. After the sun goes down, the petals fold up and wait till the sun comes up the next day.

Other features include self-cleaning technology and weather protection. Every petal is fitted with a brush. That way, whenever the SmartFlower opens or closes it brushes itself. Also, every SmartFlower unit comes with a wind sensor. If the wind speed exceeds 32 mph, the unit will override the solar tracking and the petals will move to a horizontal position; however, if the wind speeds up to 38 mph or above the flower will fold up and move back to its home position. The SmartFlower resumes operation after 15 minutes of continuous wind speed below 32 mph.



SmartFlower set up at JBSA Earth Day



Fort Sam location



Wilford Hall location



SmartFlower retrofit



16 outlets in a weather-proof case



Battery charger, inverter and GND rod



To reiterate, the SmartFlower is the innovative sculptural solar flower with photovoltaic solar panels that open and close to cleaning itself for maximum efficiency. Solar energy is a popular renewable energy source but what exactly is renewable energy? Renewable Energy is energy that has been derived from the earth's natural resources that are not finite or exhaustible. Along with that, this type of energy is an alternative to traditional energy that relies on fossil fuels and is less harmful to the environment. Listed are the seven types of renewable resources with benefits and limitations.

Solar Energy: Radiant energy captured from sunlight and converting it into electricity. Photovoltaic systems convert sunlight into electricity using solar cells	
Benefits	Limitations
Functionally endless	Unrealistic expenses and significant upfront cost
Could render fossil fuels obsolete	
Improve public health and environmental conditions	Homeowners also need to have ample sunlight and space to arrange their solar panels
Eliminate energy costs	
Rebates or tax credits on solar energy investments	

Wind Energy: Energy of wind flow by using turbines and converting it into electricity	
Benefits	Limitations
Clean Energy source	Built in remote areas, away from cities where electricity is needed.
No production of CO ₂ or other harmful products	
Wind energy technology can create jobs and training	High transportation costs
	Dominate skylines and generate noise
	Threaten local wildlife, i.e. birds

Geothermal Heat: Heat trapped beneath the earth's crust from the formation of the Earth; 4.5 billion years ago and radioactive decay	
Benefits	Limitations
Significant potential for energy supply	Very high cost for infrastructure
Can be built underground	Vulnerable to earthquakes in certain regions
Naturally replenished and no risk of depletion	

Hydrogen: Fuel and electricity can be created when Hydrogen is removed from another element	
Benefits	Limitations
Hydrogen burns clean, less pollution; cleaner environment	Hydrogen needs to be produced, pollution prevention is very inefficient

Can be used at hydrogen fuel cells to power electric motors	
Hydroelectric Energy: Water flows through the dam's turbines to produce electricity; pumped-storage hydropower	
Benefits	Limitations
Versatile and can be used in large and small scale projects	Most facilities use more energy than they produce for consumption
Doesn't generate pollution	May need fossil fuels to pump water
	Disrupts waterways and affects the animals living in them

Ocean: The ocean can produce thermal and mechanical energy. Ocean thermal energy relies on warm water surface temperatures to generate energy. Ocean mechanical energy uses ebbs and flows of the tides to generate energy	
Benefits	Limitations
Wave energy is predictable and easy to estimate the amount of energy produced	Landlocked states cannot benefit
Much more consistent than sun or wind	Large machinery is needed; it can disrupt the ocean floor and inhabitants
Very abundant	
Untapped energy resource with an estimated ability to produce power for 247M average U.S. homes annually	Rough weather can change wave consistency

Biomass: Organic matter that comes from recently living plants and organisms	
Benefits	Limitations
Biomass can be used for personal and business use	New plant life needs time to grow.
In 2017, biomass energy made 5% of the total energy used in the United States	
	There is no technology that can use biomass instead of fossil fuels