Solar Powered Trike

by **dpearce1** on May 7, 2008

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intro: Solar Powered Trike

Travel for free with the power of the sun!

How to build a Solar Powered Trike

The purpose of this project is to build a vehicle that:

-Provides free, 'green' transportation for short distances (<10 miles), thus it must never plug into a wall socket, or emit any pollutants.

-Charges while at work

-Is cheap, simple, and low maintenance.

-Draws attention to the practical application of green energies, and promotes Fossil Fuel alternatives.

-Reduces excess automobile wear and pollution from cold driving / short, in town trips.

-This is a is a project for Dr. Reza Toosi's 'Energy and the Environment, a global perspective' class at California State University, Long Beach. We look at the sources, technologies, and impacts of energy on our environment.

Link to other class projects, some of Dr. Toosi's ENG-302i lectures, and other interesting videos.

http://www.csulb.edu/~rtoossi/engr302i

Short video:

http://www.youtube.com/watch?v=sIiJp4aKDHM

step 1: Acquire a vehicle

Find a lightweight vehicle with low rolling resistance. A two, three or four wheeler will do, depending on how much work you want to do, but the concept is the same. Four wheeled vehicles may be regulated under different laws. Of course the best vehicle is one that you already have, if you happen to have a three or four wheeled pedal powered vehicle. In the interest of simplicity, a three wheeler was chosen for my project. This Schwinn Meridian Trike was $250 new, readily available locally, and the basket provides a convenient location for batteries and solar panels with minimal fabrication.

The first thing to be done was completely disassemble the trike and paint it a bright 'fern' green. This step may not be necessary, but I felt that it was in my case since this is a school project that is supposed to grab your attention, and let you know that it is a true green vehicle. It is a vehicle that does not use gas, and does not plug in to a wall socket, which would defeat the purpose since electricity from the grid likely comes from a non-renewable energy source. It runs on pure solar energy.

Before painting the frame, I used this stage as an opportunity to reinforce the frame where the Batteries were going to mount. Lead acid Batteries are heavy, but they are relatively cheap.
One tube was welded in to distribute the load over 4 points on the axle carrier instead of two.
It also ties the rear sub-frame together, which makes the tube the load bearer rather than the weld beads, which may eventually fatigue and fail.

High pressure (65psi) tubes were equipped and the Trike was meticulously assembled in order to minimize rolling resistance.

While the welder was out a battery mount was fabricated, and bolts welded to the basket to be used as battery mount studs making removal easier. 12 volt LED's were put in the reflectors and wired as brake lights through the brake levers that cut the motor when you brake. They are wired through only one of the three 12 volt batteries.

step 2: Drivetrain / Running Gear

The drivetrain consists of your electrical system and electric motor. The Electric Hub Motor kit was purchased from (www.Goldenmotor.com), costs $259 and consists of a front wheel with an integrated brushless 36 Volt electric motor as part of the hub, along with the necessary components such as a twist grip throttle, brake levers that are wired to cut power to the motor, battery level indicator, and the motor-speed controller, 36V battery charger and a battery pack connector. Not sure if the kit is still available but they still sell everything needed. The customer service is basically an owners forum, which did prove useful in diagnosing a bent pin in on of the electrical connections.

The motor install requires a simple front wheel change, and routing the wires back to the controller which will be mounted under the rear basket. Slack must be left in the wires around the steering tube / fork juncture so they will not be in tension even at the maximum steering angle. The grips and brake levers are replaced with the new ones, and their wires also routed back to the controller.

Choosing the right battery is a compromise between price, weight, and range vs. charge time. Lots of money can be spent on batteries, but since I was on a budget, I had to take what I could get. I took a multi-meter to a local industrial liquidation warehouse and found 3 batteries for $20 each, and have worked good so far. (3) -12 volt, 20 Amp/hour batteries are run in series to make 36 volts. 20A/hr provides long range, with the trade-off being a longer charge time. Abattery cut of switch was added so the rider does not have to unplug the battery pack to shut the electrical system off.

step 3: Charging System / Solar Panels

The solar panels need to be as large as possible to maximize the available wattage, but they also must provide the right voltage. Solar panels produce a range of voltages, which peak and drop, but the nominal voltage of the panel is what matters for selecting the right charge controller. I purchased 3 Q-cell brand mono-crystalline solar panels that I found on Ebay for $110 each. They produce 21.8 Volts peak and 17 volts nominal, at about 1.2 amps nominal. With the 3 panels wired in series, this makes around 66 volts peak and 51 Volts nominal, which is plenty over the 42V needed to charge the batteries. a basket was added in the front to accommodate the third solar panel.

From Ohm's law Power (P) is equal to voltage (V) times current (I), (P=V*I), so the panels produce ((17Volts*3)*1.2 Amps)= 61.2 Watts nominal, and over 80 Watts peak. A Maximum power point tracking (MPPT) charge controller tricks the panels by hiding the battery load from them and allowing them to operate at their peak power when conditions allow.

A charge controller was purchased from www.solarsellers.com, where Mr John Drake was very helpful in assisting me and ordering a custom charge controller for my application. The controller basically takes the varying voltage / amperage input from the solar panel array and converts it into a constant voltage (42V) or current, to optimize charging the 36 volt source. Maximum input voltage to the controller is 100 Volts, so the peak of 66 Volts will not harm the controller. The controller is a Maximum power point tracking (MPPT) type, which charges faster as more sun is available, rather than at a set rate as most controllers do.

In order to charge the batteries in a practical amount of time, they need to charge about as fast or faster than the provided 110V wall socket to 36V charger/converter, which charges at a rate of 1.5 amps. At 1.2 amps the panels do not quite achieve this, but with the MPPT Controller it takes right around the same amount of time for a charge. The bike is stored in a location that gets a few hours of sun every day (where I live the sun is pretty reliable), which keeps the batteries topped off and ready to go whenever needed.

And for those of you wondering, the electric motor draws up to 20 Amps, and the 1.2+ Amps added by the solar panels do not make it go faster, since the 1.2 amps are routed through the controller and only serve to charge the batteries. The motor speed controller does not see this extra Amperage, and outputs just the same as without panels, except the batteries will stay charged slightly longer, (extending your range) with the net drain being (20-1.2)A= 18.8A rather than 20A without the panels. The motor only pulls 20 Amps when taking off though, so the draw is much less when at cruising speed. The motor speed controller cuts the voltage off at 32V to keep the batteries from going below 10.5V, but I monitor the voltage and try not to discharge the batteries below 36V.

step 4: Solar panel mounts

Now you have to figure out how your going to mount the panels on your vehicle. Hinges were welded on the baskets to mount the panels and allow them to tilt for access to the basket, with rubber hold-downs on the other side to keep them from opening while riding.

Once your wires are all routed and zip tied, your batteries and panels held securely down, double check every thing and you are ready to go.

Performance:
This Solar Powered Trike does about 15-18 mph depending on the weight of the rider. The furthest I have gone is a little over 10 miles with small hills and little pedaling, and the battery meter still read full (green) at the end of the trips.

At ten miles, the voltage drops to around 36V, safely above the controller's cut-off voltage. If the batteries are kept from discharging too low the panels take about the same amount of time as the plug in charger, since both the plug in charger and the solar charge controller charge with constant wattage. With constant wattage charging, Power, (P), and Ohm's law again (P=V*I), the charging current goes down as the voltage goes up, as the batteries near their fully charged state.

What this means is if you keep the voltage from dropping too low, the panels provide adequate current to match the charging speed of the plug-in charger, but if it drops below a certain point the panels are slower at charging. This is easily avoided since my typical trip range is around 3 miles or less, semi daily at most, so low voltage not an issue, but on longer trips I bring the multi-meter.

Cost Breakdown:
The Trike cost a little over $910 to build

Schwinn Meridian Trike
$250.00 www.K-Mart.com

Q-cell Mono-crystalline Solar panels:
$330.00 www.Ebay.com....

Charge Controller:
$ 95.00 www.solarseller.com

Electric Hub Motor Kit
$260.00 www.goldenmotor.com- also sells regenerative braking motor speed controllers

Batteries
$ 60.00 Earl's industrial liquidation, Hawthorne, CA

High pressure tubes $ 15.00 Any bicycle store

Total $910.00

Other solar trikes / information

http://www.solartrike.com

http://www.therapyproducts.com/products_sunnybike.html

http://www.csulb.edu/~rtoossi/engr302i

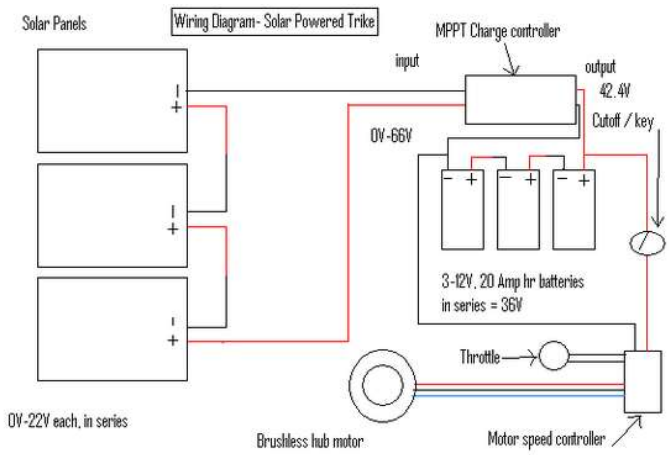
http://www.kyosemi.co.jp/product/pro_ene_sun_e.html

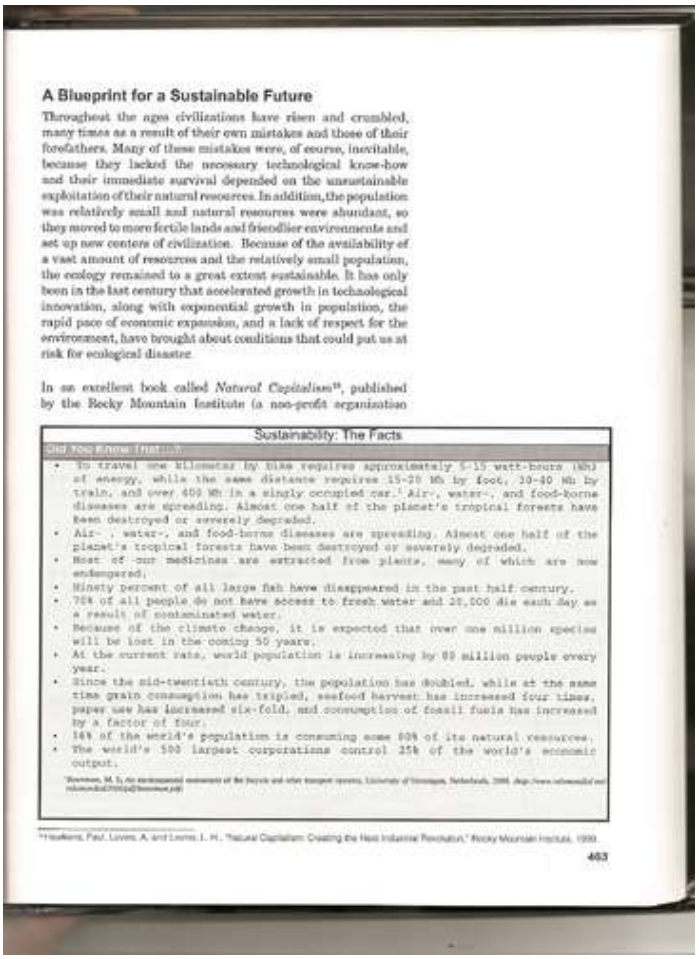
http://www.nanosolar.com/

The last picture is a scan of a page straight out of Dr Reza Toossi's book, Energy and the Environment, Sources, Technologies, and Impacts.

Book information / purchase

http://www.vervepublishers.com/





A Blueprint for a Sustainable Future

Throughout the ages civilizations have risen and crumbled, many times as a result of their own mistakes and those of their forefathers. Many of these mistakes were, of course, inevitable, because they lacked the necessary technological know-how and their immediate survival depended on the unsustainable exploitation of their natural resources. In addition, the population was relatively small and natural resources were abundant, so they moved to more fertile lands and friendlier environments and set up new centers of civilization. Because of the availability of a vast amount of resources and the relatively small population, the ecology remained to a great extent sustainable. It has only been in the last century that accelerated growth in technological innovation, along with exponential growth in population, the rapid pace of economic expansion, and a lack of respect for the environment, have brought about conditions that could put us at risk for ecological disaster.

In an excellent book called *Natural Capitalism*[1], published by the Rocky Mountain Institute (a non-profit organization

Sustainability: The Facts

Did You Know That...?

- To travel one kilometer by bike requires approximately 5-15 watt-hours (Wh) of energy, while the same distance requires 15-20 Wh by foot, 30-40 Wh by train, and over 600 Wh in a single occupied car.[1] Air-, water-, and food-borne diseases are spreading. Almost one half of the planet's tropical forests have been destroyed or severely degraded.
- Air- , water-, and food-borne diseases are spreading. Almost one half of the planet's tropical forests have been destroyed or severely degraded.
- Most of our medicines are extracted from plants, many of which are now endangered.
- Ninety percent of all large fish have disappeared in the past half century.
- 70% of all people do not have access to fresh water and 20,000 die each day as a result of contaminated water.
- Because of the climate change, it is expected that over one million species will be lost in the coming 50 years.
- At the current rate, world population is increasing by 80 million people every year.
- Since the mid-twentieth century, the population has doubled, while at the same time grain consumption has tripled, seafood harvest has increased four times, paper use has increased six-fold, and consumption of fossil fuels has increased by a factor of four.
- 14% of the world's population is consuming some 86% of its natural resources.
- The world's 500 largest corporations control 25% of the world's economic output.

463

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Comments

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erosser says: Mar 28, 2009. 2:43 PM REPLY
Most impressive!
And it's a relief to see an Instructable not riddled with typos and grammar monstrosities for once...

WayneVT says: May 8, 2009. 6:24 AM REPLY
I assume you mean "typographical errors" and "grammatical monstrosities", correct?

Paturnus Prime says: May 9, 2009. 4:56 PM REPLY
Picky, picky,picky! ;-)

ElectricMan1 says: May 2, 2009. 10:10 PM **REPLY**
What is the amperage of your batteries?

xerxesx20 says: May 6, 2009. 4:56 PM **REPLY**
I'm not the author, but... read it and you'll find out this:

"(3) -12 volt, 20 Amp/hour batteries are run in series to make 36 volts."

8-)

canno says: Mar 28, 2009. 11:11 PM **REPLY**
would adding on a wind turbine sort of thing work, as you move the air pushes on the turbine
great idea not very original though
is there a way to collect some energy from the wheels while they spin using magnets to add to more energy gain.
4/5

all_athlete11 says: Apr 23, 2009. 4:17 PM **REPLY**
A better idea to get more power from the existing set-up would be to have a way to pivot the solar panel so that is perpendicular to the sun. This would take a minimum weight and would provide substantially more power to the battery. This would mean faster charging time.

velcro2 says: Apr 23, 2009. 8:18 AM **REPLY**
Canno:
I think you're on to something with your comment. If the magnets were in counter position on each side of the wheel, wouldn't the steel spokes break the magnetic field and produce electrical current??? Surely someone has thought of this already but what if.....? I get a kick out of these experts who continue to say "there's no free lunch in science" but there are many energy sources that are FREE already, e.g., the sun's heat and light energy for one.

Technochicken says: Apr 26, 2009. 12:58 PM **REPLY**
You can't do that, because the magnets would cause more resistance to the spinning wheel because of their attraction to the metal, so you still lose more energy than you generate.

kent1956 says: Apr 19, 2009. 8:19 PM **REPLY**
As mcpguru said you can't power the bike by a wind generator while it is running. BUT, you could have the wind generator working while the bike is parked to help recharge the batteries. This would work if you are in a windy enough area. But any wind would help. You would have to consider the added weight of the generator, because you would have to move it with the bike, unless you just had it mounted at home, or work to plug into your bike.

Kent Secor

In Cape Coral, FL USA

mcpguru says: Apr 2, 2009. 9:28 PM **REPLY**
Sorry - no free lunch on energy, so the magnets would pull more energy out of the system than they put back in (unless you had a perfect system, then it would break even). The wind turbine might work to the the extent the wind is from nature, not the movement of the bike -- again, no free lunch on energy -- but if you were going to do that, just put up a sail and skip the weight and translation of kinetic to chemical to electric to kinetic.

Bobert190 says: Apr 21, 2009. 8:00 PM **REPLY**
I just started thinking about building a bike that would charge the battery, then power a motor to make my bike go much faster. I like speed and I thought it would be fun to give this a try. Do you think this will work? and Thanks this gave me some good ideas. Sometimes I just go the hard way.

fearfactor says: Apr 19, 2009. 1:46 AM **REPLY**
Wow! What a terrific project. Thanks very much for this well documented instructable. I'm busy pricing components to build my own solar trike right now ;-)

Lucky for me, I get plenty of of sunny skies for the solar panels here in South Africa!

atb1991 says: Mar 2, 2009. 9:05 PM **REPLY**
My friend and I are building a similar bicycle as a project for our school, but I'm having a very hard time finding the correct solar panels. Could anybody help me out? I have looked at these: http://www.northerntool.com/webapp/wcs/stores/servlet/product_6970_200328565_200328565
And the Q-Cell website offers no hint as to where to purchase their panels. Oh and one last thing, and ideas as to where to purchase the best batteries? Money is an issue.... Thanks.

liongold says: Apr 4, 2009. 8:53 PM **REPLY**
I bought some solar panels at Harbor Freight. Might try there. Also, I think Northern Tools Catalog may have had some too. Hope this helps.
Donna Long

MikeHill says: Jun 14, 2008. 7:48 PM **REPLY**

Can anyone fill me in on how the hub motors work? Would the project work the same if all the wheels had hub motors?

homba says: Jul 21, 2008. 7:14 PM **REPLY**

You're range will go down b/c of the weight and inefficiencies of using 3 wheels to get to speed instead of one. Controlling all three motors will also be tricky.

You will want to check into the legality of using 3 hubs. Often there is a watt/hp cutoff where your bicycle is now a motorcycle and subject to motorcycle laws regarding lighting and licensing. A 750-1000ish watt motor will pull you along nice with only a little pedaling up hills.

lukej says: Jan 29, 2009. 2:29 AM **REPLY**

In victoria we're not allowed to have more then 200 watts

dpearce1 says: Jun 16, 2008. 10:34 AM **REPLY**

The hub motor works the same as a normal electric motor, except the motor's shaft is fixed to the front fork and the motor spins, along with the wheel, rather than the motor being fixed and the shaft spinning.

lupinesoul says: Jul 22, 2008. 6:22 AM **REPLY**

Okay, thanks. That's what I wanted to know!

ronaldino says: Jul 21, 2008. 12:03 AM **REPLY**

I'm having trouble with a couple things.
1) Finding Panels like the ones in the demo
and
2) Understanding the correlation between Panel Charge output and Battery Voltage/Amp

What should I look for when it comes to batteries and Solar Panels. Is it necessary to have 12V batteries with 20A/hour outputs?

dpearce1 says: Jul 21, 2008. 8:18 AM **REPLY**

Do a search on the goldenmotor.com forum, you can find out anything you need from people who are using this hub motor setup. The 12 volt batteries are necessary to achieve the 36v needed to power the motor, but the capacity rating will determine your range. Some people on the forum use 10 or 12 A/hr batteries, they are lighter and cheaper but will not have as long a range as 20A/hr.
The Panels are made by a brand called Q-cell, I got them off Ebay, but in general, you should not have to pay more than 3 or 4 dollars per watt.

As for panel / battery voltage / amperage, the requirement of your panels is determined by your battery voltage. If you have a 36v battery, (or 3 - 12v batteries in series), you need a solar panel (or panels) that will be able to charge these batteries using the nominal voltage rating of the panels. For example:
A 12 volt battery charges at around 13.8V, with 12v being the nominal voltage. Now with 3 of these in series, gives you 36 volts nominal and around 42.4 volts needed to charge the battery/batteries. This means you need a solar panel or solar panels that will give you **at least** 42.4v nominal. A little higher voltage output from the panels is desired since the nominal rating is given for high noon on a sunny day, and you don't want your batteries charging from only 12:00pm to 12:01pm. So a panel with a little higher voltage
will be fine, since it will give the needed output voltage to charge the batteries throughout the day rather than only during a short time when the solar output is greatest. It is the solar charge converters job to regulate this varying voltage coming from the panels, so even if your panels are making up to 100v it will still charge your batteries at the proper charging voltage.

Check out the forum, if you search around on there you can find answers to any questions you might have regarding the electric motor kit / battery setups.
Thanks- David
golden motor forum

ronaldino says: Jul 21, 2008. 1:08 PM **REPLY**

I really want to solarize my trike for Burningman this year. Last year I modified the trike to fit two people by building a wooden box with a padded top and mounted it to the back. I also added a shadey rooftop with pvc & canvas but they didn't hold up to the wind at all.

My thought for this year is to modify it with solar panels as the rooftop with a frame built out of angle iron from old bedframes that attaches to the frame of the bike. The frame will be tall enough that two people can comfortably sit on the trike with a solar roof that acts as shade while charging up the battery pack that will most likely be positioned inside the Box/passenger seat.

Is this a crazy idea? The winds out there are intense so I think I'd have to be able to take the panels off the top to prevent the whole thing from tipping over
and remove them at night too since they won't be charging the batteries.

I really want to make this idea come to life and I could use a good deal of advice from the forum.

I've included pictures of the two of us on the trike and a picture of the trike with it's canvas shade "roof top"

Any opinions rear vs. front?

What are your thoughts on the added weight load of an extra person?

Anyone's input on this idea would be very much appreciated... Thanks

awang8 says: Jan 20, 2009. 10:56 PM **REPLY**
you don't need to take the panels off at night. All you need id a prodection diode to stopthe batteries returning the power.

fma321 says: Aug 9, 2008. 12:31 PM **REPLY**
you ever think of trying wind power at burning man? Try a vertical wind generator. Make your weakness you strength.

dpearce1 says: Jul 22, 2008. 9:17 AM **REPLY**
That sounds like it would be fun. My advice would be to keep it as light weight as possible, without compromising durability of course. Make sure the trike will hold up to the weight of your passenger + batteries. Since you are hauling two people you cannot afford to add too much more weight to the vehicle, so keep to the bare necessities. You might also consider using a front hub motor with a smaller wheel, like a 20", to give you more torque, but lower top speed.

awang8 says: Jan 6, 2009. 9:37 PM **REPLY**
Great work! I'm very impressed.

However, I'm pretty sure I heard somewhere that while charging the batteries does not emit pollutants, using the batteriessdoes. I think a nice variation would be to use a DPDT switch to switch between solar and battery so if the sun's solar and can fully rely on solar energy.

(My solar panel supplies 200mA and I've been drawing 2 amps from it no problems so I think 1.2 amps and 20 amps wouldn't be too much of a issue.)

dpearce1 says: Jan 7, 2009. 9:13 AM **REPLY**
They are sealed lead acid batteries, so I don't think this is true, even for ones that are not sealed. Using the batteries does not make them emit pollutants, the pollutants are a result of the manufacture and disposal of the batteries.

2 amps from a 200mA panel, at what voltage? For a given operating voltage, that would be a 10 orders of magnitude power increase, over the rated power. This would give you a panel efficiency of over 100%, which is not possible. Are you sure your ammeter was on the right range setting?

awang8 says: Jan 7, 2009. 2:02 PM **REPLY**
Umm... Err.... It said 200mA in the catalouge...

woodfinery says: Jan 7, 2009. 12:16 PM **REPLY**
This is very excellent! You should submit this to Mother Earth News magazine they'd love it. Huge readership.

T0BY says: Jan 6, 2009. 4:01 PM **REPLY**
I'm waaaay impressed!

registerpal says: Jun 11, 2008. 8:05 PM **REPLY**
Can I use only one panel?

dpearce1 says: Jul 18, 2008. 7:15 PM **REPLY**
If it is large enough to supply the power you need, and at the right voltage for your battery setup you can. A Solar panel is just an array of solar cells, wired in series / parallel to achieve a desired output voltage / amperage, but obviously the power is limited to the size of the panel. Just one of these particular panels would not do anything for you, unless your power source was around 12v.

TFrosty says: Dec 22, 2008. 2:01 PM **REPLY**
I live in the area. Where did you get your batteries?

dpearce1 says: Dec 23, 2008. 8:03 AM **REPLY**

Earls industrial liquidators, 14611Hawthorne blvd, Hawthorne, Ca

slapoutz says: Sep 22, 2008. 5:45 PM **REPLY**

by the way could you add charge things to the back wheels like what the guy said about the pedals but with the wheels would be better =p

iovitanc says: Dec 20, 2008. 8:34 AM **REPLY**

i love your project and i would like to make it too, but do u store it outside? i do not have a garage and i am afraid of thieves. did u ever have this kind of problems?

dpearce1 says: Dec 23, 2008. 8:00 AM **REPLY**

I store it outside in the sun, in the backyard though.

Lego man says: Nov 14, 2008. 12:04 PM **REPLY**

Look what I found.

mr wo says: Oct 4, 2008. 3:32 PM **REPLY**

hi there, good job my friends, i just wanted to ask you if it is possible to use one panel instead of two and what would be the implication regarding the power generation, the other ting how can we get some of your panel, many thanks, may god shine more wisdom upon you to carry on working on projects like this

mr wo says: Oct 4, 2008. 3:27 PM **REPLY**

very good

phildavi says: Oct 3, 2008. 5:47 AM **REPLY**

good

bombersss27 says: Sep 27, 2008. 2:30 PM **REPLY**

Hi, I'm getting really interested in solar power, and I was planning on building a solar powered go cart. I was going to take an electric go cart (probably the razor ground force go cart), and put some solar panels on it to charge it and maybe even increase the run time. I was wondering if this is possible. I believe this go cart has 2-12volt batteries, so it seems like it would be fairly simple. I wouldn't want to modify the go cart too much. Please give me some input on this idea. Thanks.

chrwei says: May 15, 2008. 5:52 PM **REPLY**

it's better for the batteries to have a consistent draw on all at once. you'll either need to regularly switch the LED's to a different battery or get a transformer so they can run off all batteries. if you don't, after a while one battery will wear out faster and take longer to charge and cause run time to diminish prematurely or even damage the other batteries.

dpearce1 says: Jul 18, 2008. 7:10 PM **REPLY**

Since it is only 2 LED's that barely draw a few milliamps, and only when you are on the brakes, the draw is insignificant and all battery voltages remain roughly equal. I charge each battery individually once in a while to even out the voltages. If they were incandescent bulbs I might have to worry about 1 of the batteries going into deep discharge before the others, and dropping the 36v to 12v would be the way to go.

slapoutz says: Sep 22, 2008. 5:29 PM **REPLY**

now try 9 solar panels and 3 engines =p youd go sorta fast for a trycicle but nice idea =p. might try it when i get the money =p

downgrade says: Sep 8, 2008. 12:52 PM **REPLY**

Did no one mention the idea of putting a generator on the pedals so when the batteries are low, you spend a little more energy and boost the power going back to the batteries while still moving the bike? I know it would be more weight and bulk but has it been considered.

And PS to everyone... Common Scenario:
Wow I'm lazy and I need to go 5 blocks away, I could walk but it would take time, I could ride my bike but thats a bit more work, oh well, I can afford gas...

I have been looking at bikes like this for a while now because I don't HAVE to do all that much work, just let it pull me along, and I wouldn't be wasting gas (economic AND green).

And about the "not green" comments... Nothing is green, you can't live and be green because there are too many people. Farming (we are talking produce not meat) takes up a LOT of land, more destroyed land than livestock... but without that we could not make enough food to supply every one with food AND housing. And the sad fact is we polluted the planet so much already we can't go back to primitive housing (which still took resources) because there are too many environmental factors (such as storms)

Sad fact, we still have to use the environment, hopeful thinking, we can use it less and less so that we can hopefully hit a median (if not better) where our

consumption is matched by regeneration.

And even if this is a baby step, its still in the right direction.

downgrade says: Sep 8, 2008. 12:47 PM **REPLY**

PS I said "nothing is green" as to point out the fact that this is in fact green, because it won't ever be perfect, so why have a word reserved that will never be used? For instance the word perfect is used a lot to mean "that's the best I was hoping for", and perfect is supposed to mean... well... perfect.

neodiehl says: Aug 20, 2008. 3:23 PM **REPLY**

I think this is a fantastic project. While I agree it's not practical for all, I have to wonder if the various factors of the trike were optimized (within reason) perhaps it could become a *very* efficient vehicle.

For example:

If the bulk of the frame were made from aluminum to save weight. Steel forks would likely still be needed, but high strength aluminum frames have dropped from high end bikes to Walmart bikes in recent years. It could save a lot of weight.

Lighter and more efficient batteries are still pricey, but destined to drop in the next few years. LiFePO4 or similar chemistries could provide lower weight and extended range, and many are 'greener' than Lead Acid.

The hub motor itself could probably be improved. A high efficiency brushless motor could add range and be kinder to the batteries.

More efficient solar cells could boast charging performance. Once again pricey today, but as the cost of medium efficiency solar cells approaches a dollar a Watt, the cost of their more efficient cousins are likely to drop as well.

In addition if anyone ever designed such a trike from the ground up, I'm betting that more area for solar cells could be found and aerodynamics could also be improved somewhat.

A bit 'pie in the sky' at the moment I suppose, however if all these tweaks were done as well as the many I'm likely missing you could end up with a great little vehicle for short trips, that would fall somewhere between a Segway and a golf cart.

stevezone says: Aug 8, 2008. 1:56 PM **REPLY**

I am building a similar project: a recycled 3 wheeled bike with a motor/reduction box/controller from a junked senior citizen 3 wheeler. I'm buying "blem" solar cells from a vendor on ebay (fred480v) and the cost of the completed solar panels is under a dollar a watt, plus I'm making them in the size/configuration that fits my needs.
I saw a very basic electric trike built by a guy in India several years ago... he used a discarded battery powered electric drill motor and several car batteries, but no solar panels at the time, he mentioned it but was hampered by the high price of the panels.

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