SOLAR PV AND PLUG-IN EV'S

An analysis of the costs and benefits

AGENDA

- Solar PhotoVoltaic (PV)
- Electric Vehicles (EV)
- E-bikes
- Solar and RV vehicles

$450

This is my TOTAL energy bill for one year.

- All electric house
- 2400 sq feet
- Heating and Airconditioning
- Hot Tub 8 months
- Seasonal Guest Suite Downstairs
- 6 months charging EV, Tesla Model 3

SPECIFICATIONS

Install completed by Argon Solar.

1 844 765 2796

Argonsolar.ca

Bettered the other three bids by $2000 minimum

- 29, 340W, 72 cell Qantum Solar Panels
- Solaredge Optimizers
- 7.6kW Solaredge EV Inverter
- 12,000 units (kWh) of electricity generated
- 4,800kg of CO_2 not put into the atmosphere
- Equivalent of 16 trees planted
- Cost of install $24,000

THE SOLAR NUMBERS

My son generated this spreadsheet to do a side by side comparison from the 4 quotes.

Argon Solar was cheaper for the install

Cost less per watt

Rate of return greater

Table 1

	Swiss solar tech	Argon Solar	IPS	Terratek	IPS
Extended Warranty on inverters	$648.00				
Solar Installation			$2,500	$4,176.00	
Utility Permit			$929	$385.00	
Fortis Disconnect	$750				
Cost of installation including GST	$28245.00	$22850.00	$28981.80	$25064.55	
Time horizon (years)	20	20	20	20	
Cost per kWh	$0.11	$0.11	$0.11	$0.11	
Latitude (deg)	49.17678	49.17678	49.17678	49.17678	
Longitude (deg)	-119.560543	-119.560543	-119.560543	-119.560543	
Roof tilt (degrees from horizontal)	18	18	18	18	
Roof azimuth (degrees from North clockwise)	130	130	130	130	
Daily insolation (kWh/m^2/day) horizontal	3.62	3.62	3.62	3.62	
Annual Insolation (kWh/m^2/year) horizontal	1322	1322	1322	1322	
tilt and orientation factor from horizontal	104.5%	104.5%	104.5%	104.5%	
TOF adjusted daily insolation (kWh/m^2/day)	3.78	3.78	3.78	3.78	
Annual Insolation (kWh/m^2/year) at roof tilt and azimuth	1381	1381	1381	1381	
Company reported energy generation	12294	10500	14886	97400	
Gross energy generation (kWh/year)	15739	13254	15581	13441	
Net energy generation (kWh/year)	15109	12989	15269	13105	
Annual value of generated electricity	$1661.99	$1428.8	$1679.6	$1441.6	
Annual rate of return	1.059	1.063	1.058	1.058	
Company stated rate of return - levelized cost of energy		5-7%		1.0892	
Company stated cost per watt		2.48		2.45	
Cost per watt	$2.48	$2.38	$2.57	$2.57	
Return on investment (years)	17	16	17.3	17.4	
Profit/loss after time horizon	$4994.80	$5725.80	$4610.00	$3766.45	

PANORAMA CRESCENT SE FACING

PANELS PUT ON REAR SIDE OF HOUSE

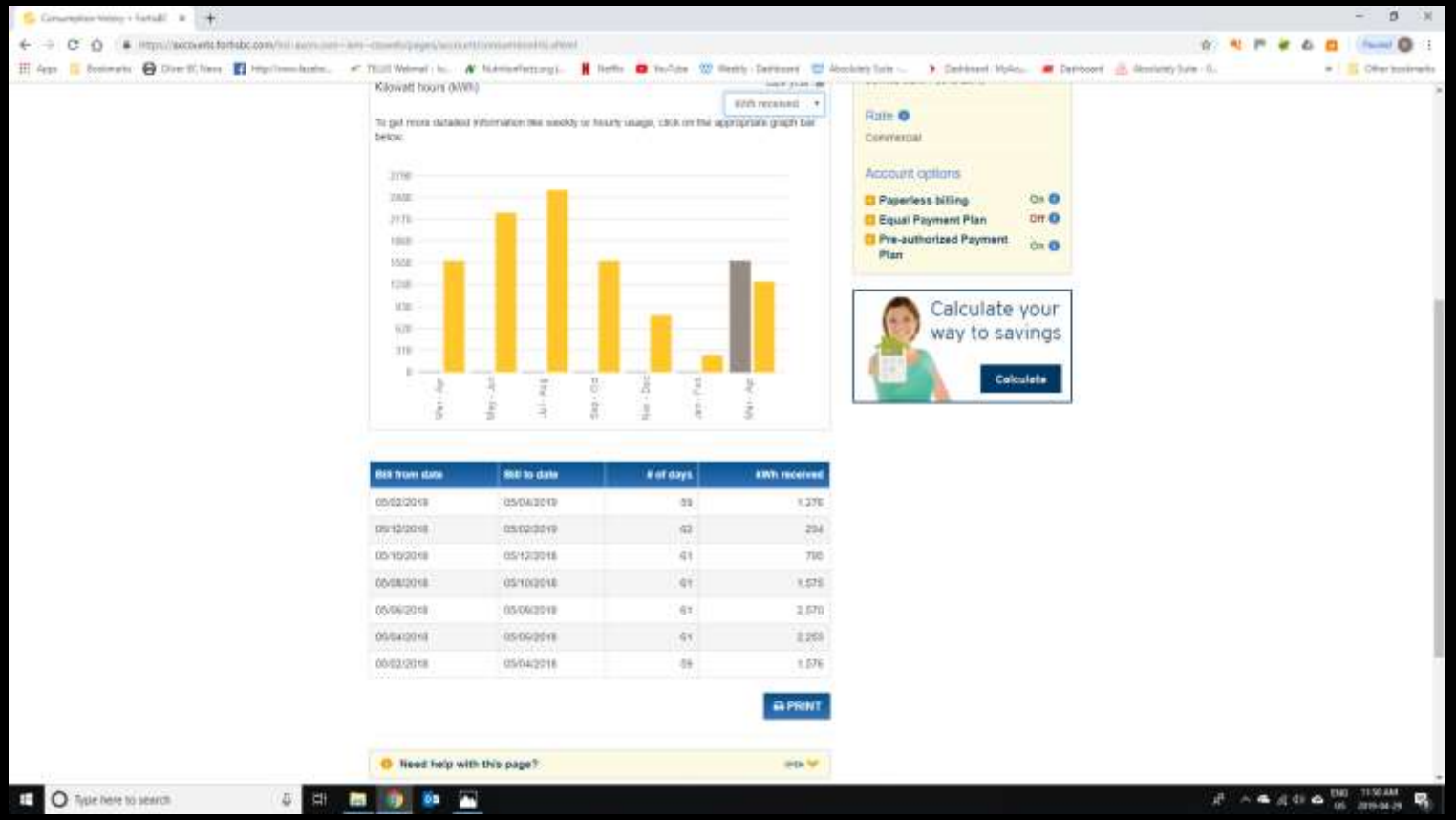
Fortis determines total solar production permitted, so you are ‘NET NEUTRAL’ over the year. Any excess is paid out at the end of March.

WHAT AND WHEN IS THE PAYBACK

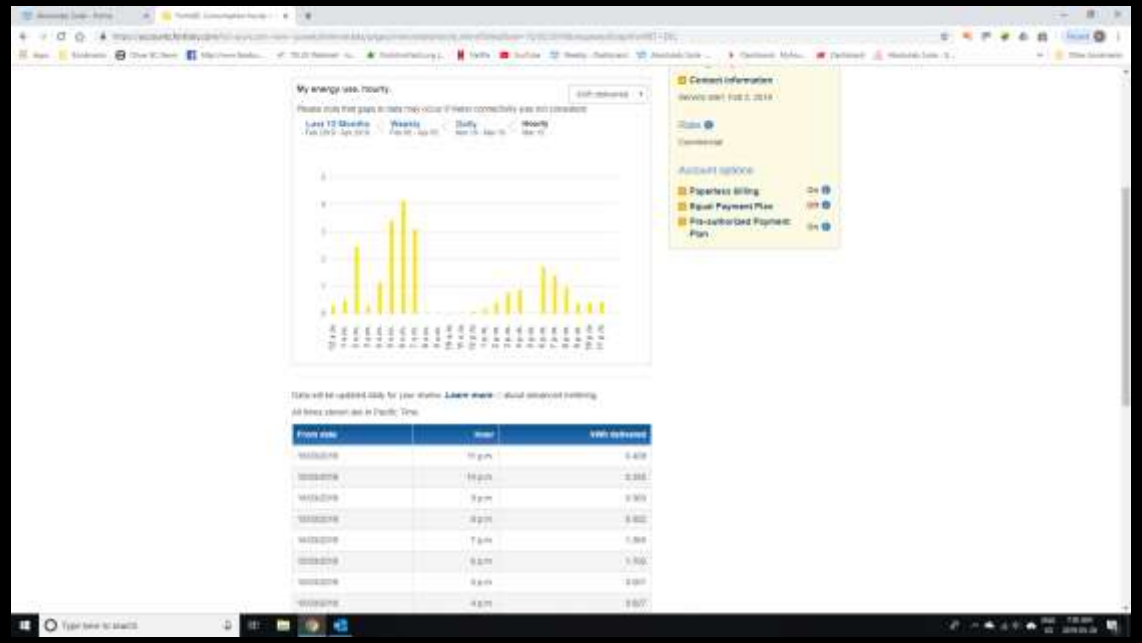
When I sell my house. I will get my $24,000 back compared with

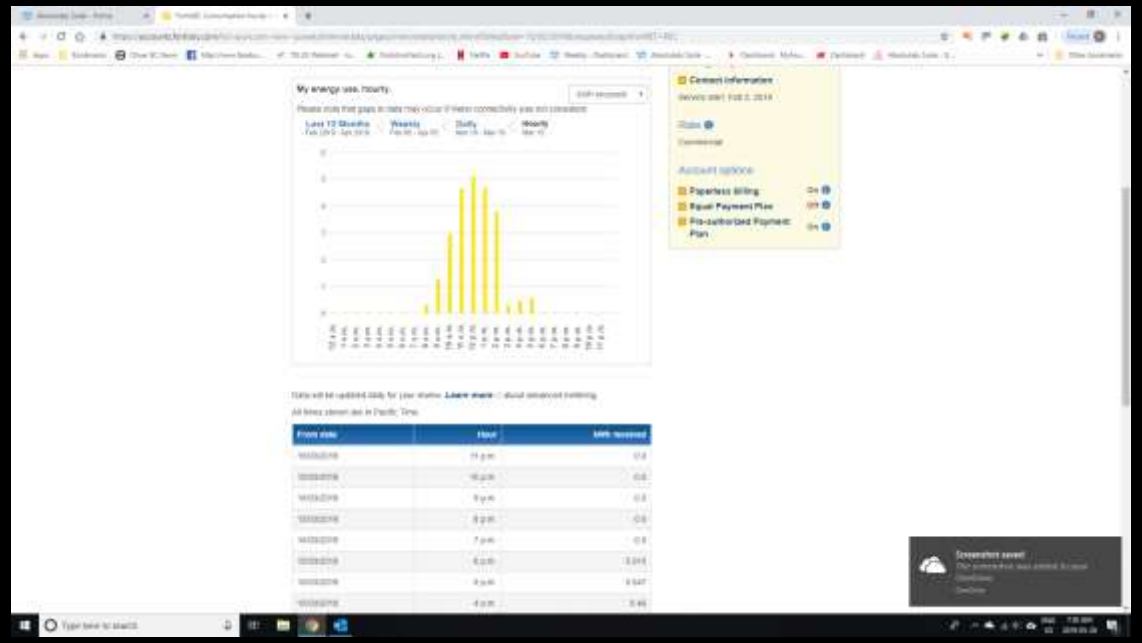
My next door neighbour who doesn't have solar.

FOR THE YEAR


Kilowatt hours (kWh)
kWh received
To get more detailed information like weekly or hourly usage, click on the appropriate graph bar below.
Rate
Commercial
Account options
Paperless billing On
Equal Payment Plan Off
Pre-authorized Payment Plan On
Calculate your way to savings
Calculate
Bill from date
Bill to date
# of days
kWh received
PRINT
Need help with this page?

DELIVERED V/S RECEIVED BY FORMS
HOURLY ANALYSIS





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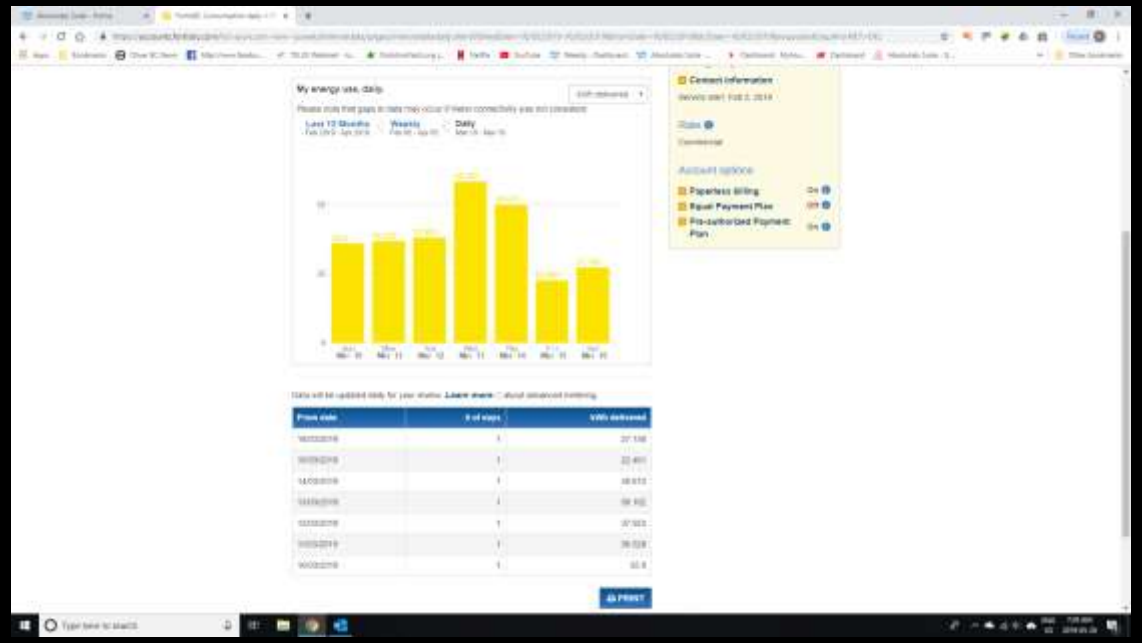
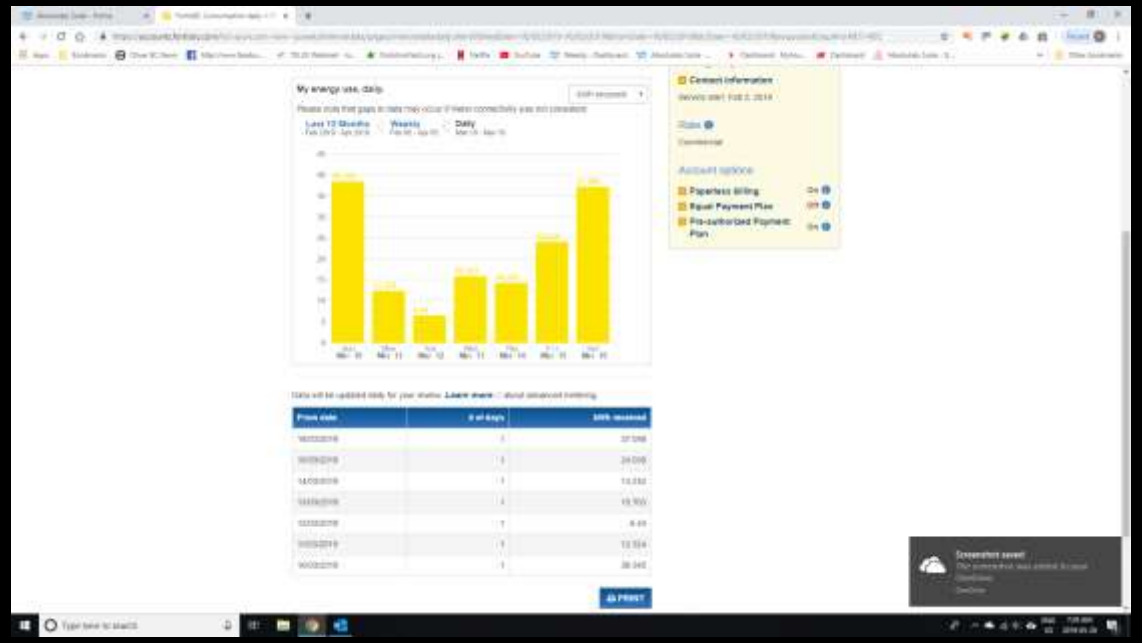
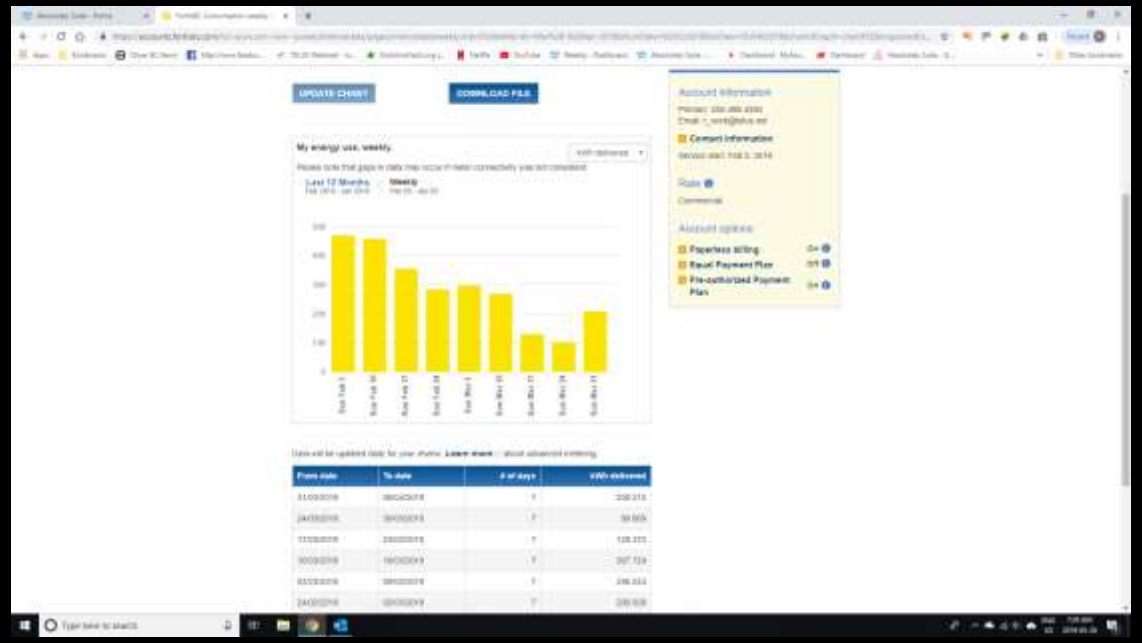


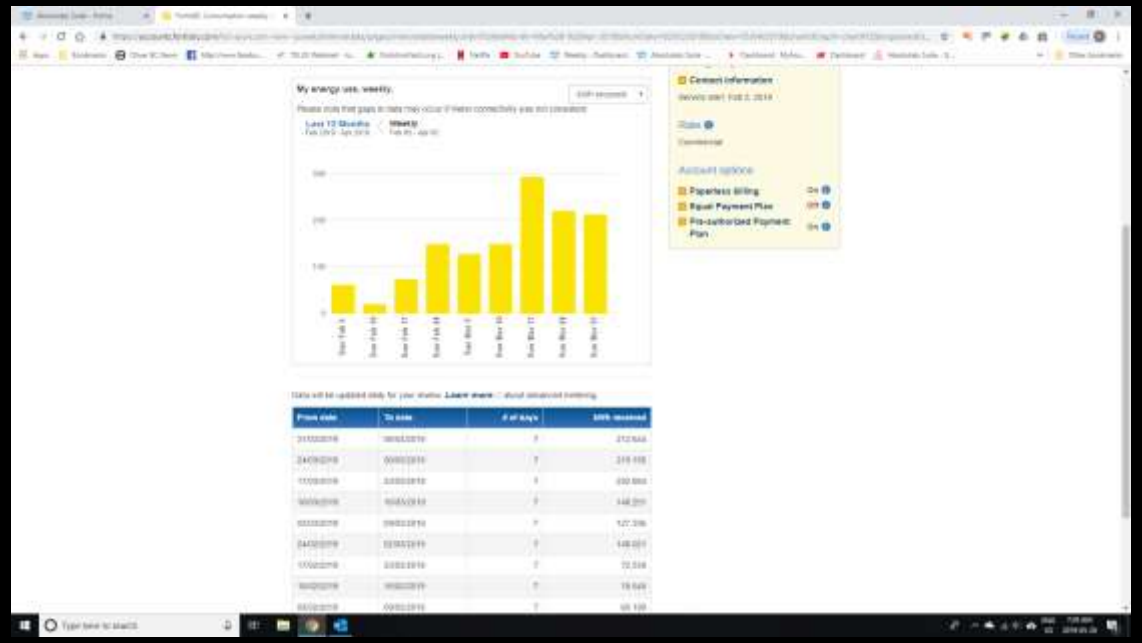
RECEIVED



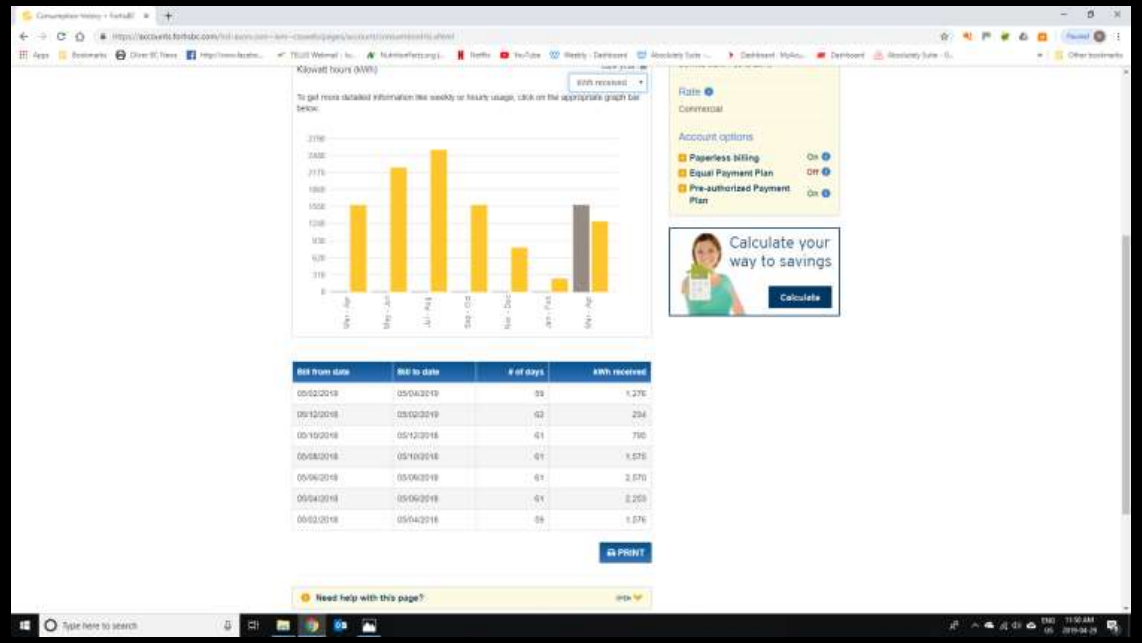
WEEKLY ENERGY USE

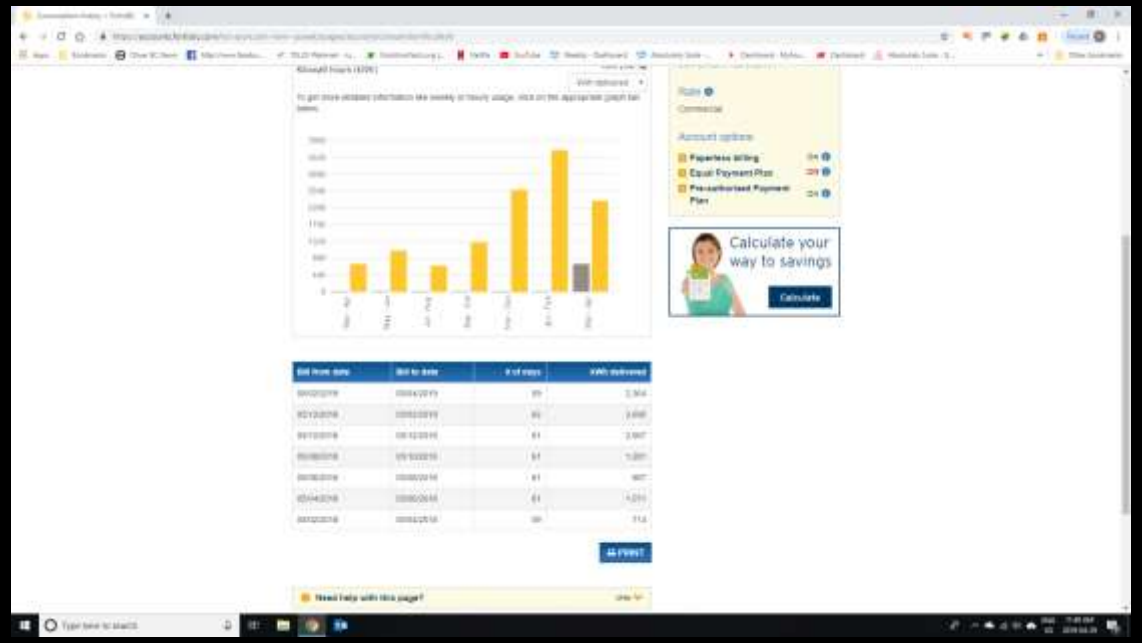
DELIVERED TO RECEIVED FROM





BIMONTHLY ENERGY IN AND OUT



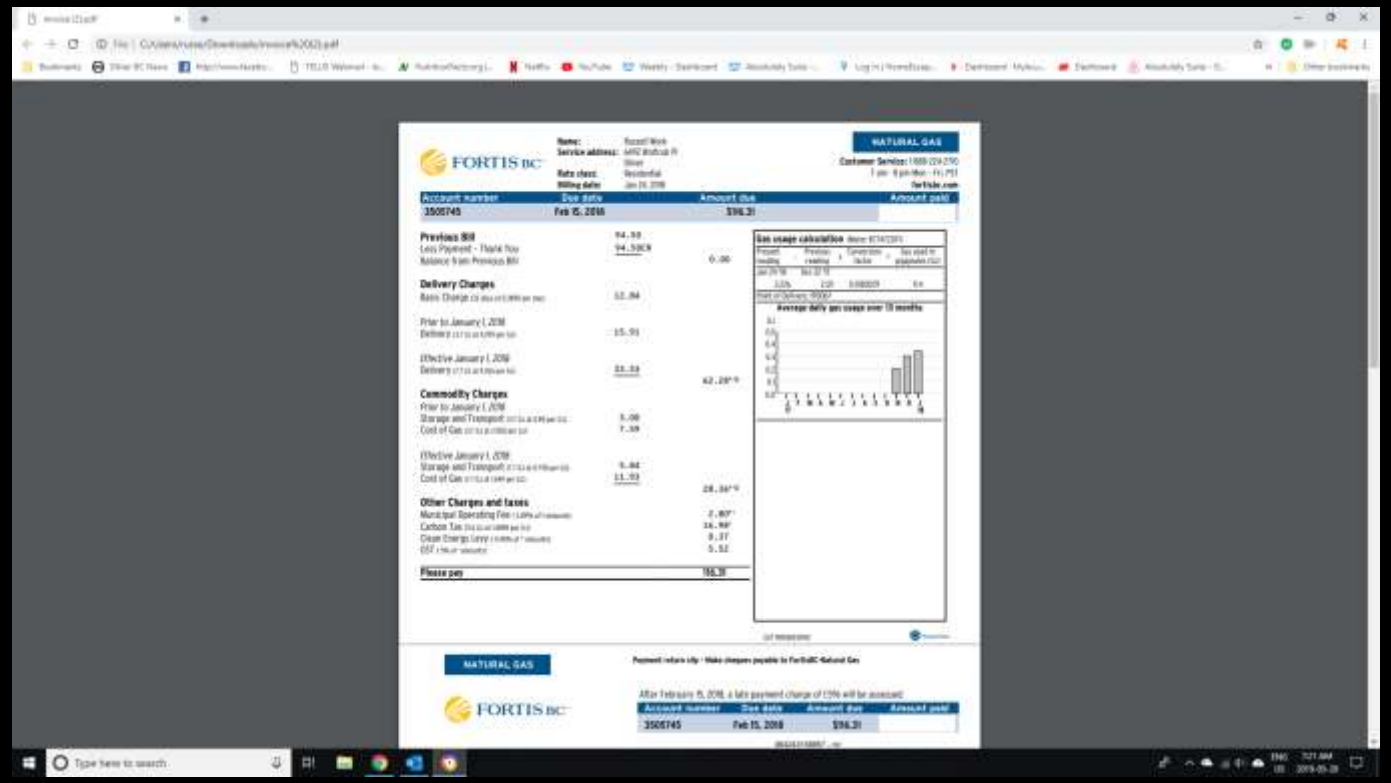


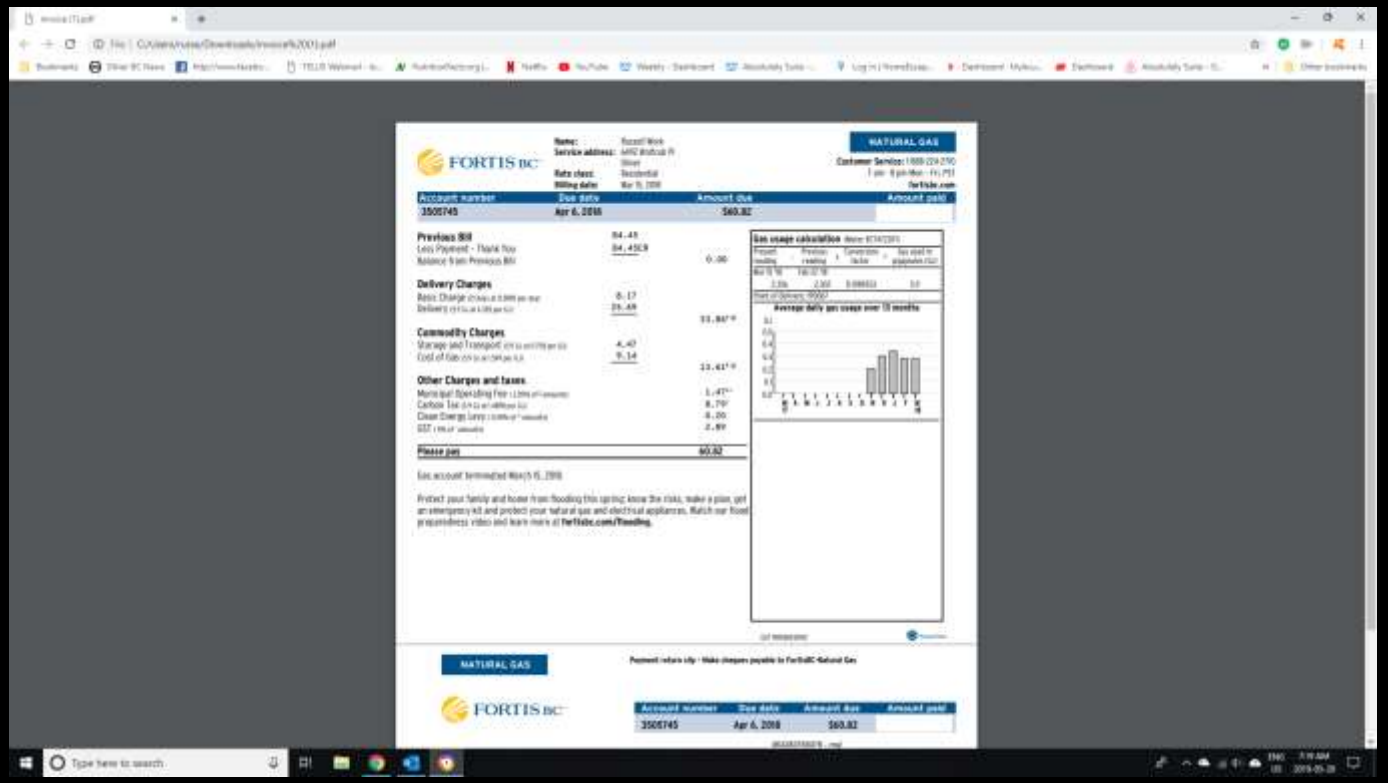
WHAT ABOUT GAS?

Rental house, thermostat at 12° C

Used virtually no gas cost of gas $20, but bill was $62.

Not used in the summer, but still paying the fixed charges.




FORTIS BC
NATURAL GAS
Account number
Due date
Amount due
Amount paid
3505745
Apr 6, 2018
$60.82
Previous Bill
Delivery Charges
Commodity Charges
Other Charges and taxes
Please pay
$60.82
Gas usage calculation
Average daily gas usage over 15 months
Type here to search

PANELS ARRANGED IN PORTRAIT MODE

ROOF NEEDS TO BE RELATIVELY NEW. 12YRS OR LESS.

Filled in the gap with two 150W panels

FINISHED ARRAY

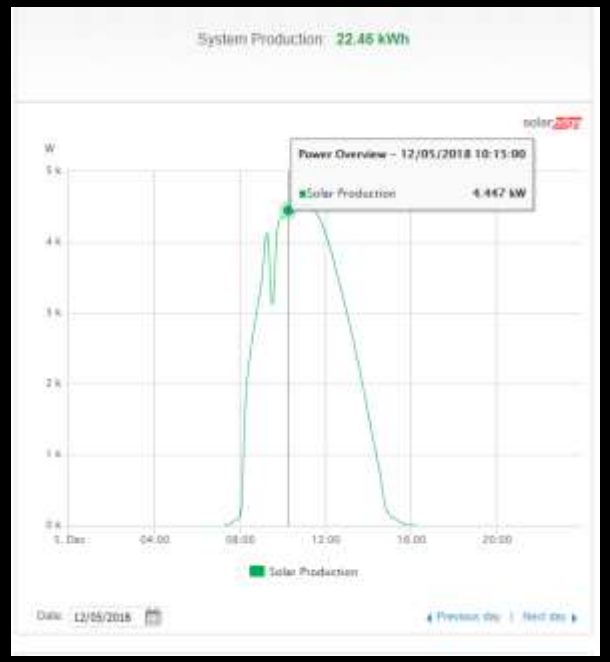
Note the two smaller panels

Nothing visible from the street.

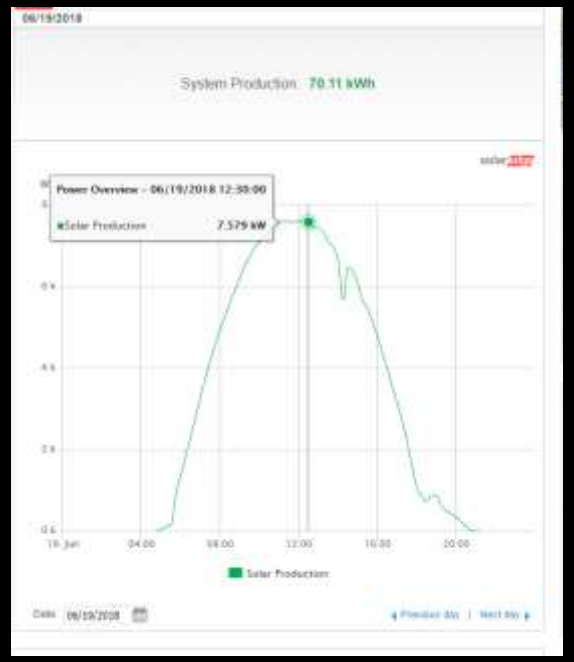
Roof will never need replacing

WINTER V S SUMMER PRODUCTION

Maximum Winter Production



Maximum Summer Production



NO POWER WITH SNOW ON THE PANELS

THE SOLAR EDGE INVERTER PROVIDES POWER DIRECTLY TO THE TESLA

This integrated inverter can dirvert power to the car if it needs charging and is plugged in.

Sends power to the panel inside and supplies the house.

Any excess is sent back to the grid at current prices.

Fortis is my ‘piggy bank’. No need to have storage cells and be off the grid.

SMALL LIGHTWEIGHT DIGITAL 7.6KW INVERTER

Power from the roof comes as direct current. DC

The inverter changes it to Alternating Current AC, which is what the grid works on.

This inverter is 99.8% efficient.

The DC charge cable comes out the bottom.

There is no energy loss when you plug in and use power directly off the roof, as it is DC – DC which is what the car uses.

THE CABLE FROM THE ROOF ARRAY IS FED DOWN TO THE INVERTER

The charge cable is 20 feet long.

It charges at 38amps.

It is called a J1772.

Telsa provides the adapter to convert to the tesla plug configuration.

Other electric cars CANNOT use tesla charging stations.

ALL TESLAS ARE ORDERED ON LINE

No dealers.

Car configured on line.

Once deposit of $3200 is made by credit car the car is assembled to order

Tesla has no inventory.

Full payment on delivery

READY TO ROLL

Delivery spot is on Powell Street, Vancouver.

TIME FOR A COFFEE.

WAYS TO CHARGE

Tesla superchargers. 80kW, 135kW and being rolled out now, the mark3, 350kW chargers. The cars condition the batteries, either heating them up or cooling down in preparation to take this charge.

Plugshare sites. Oliver has a tesla and a generic charge station

Plug into a dryer outlet 40amps

Plug into a 120V 15amp outlet

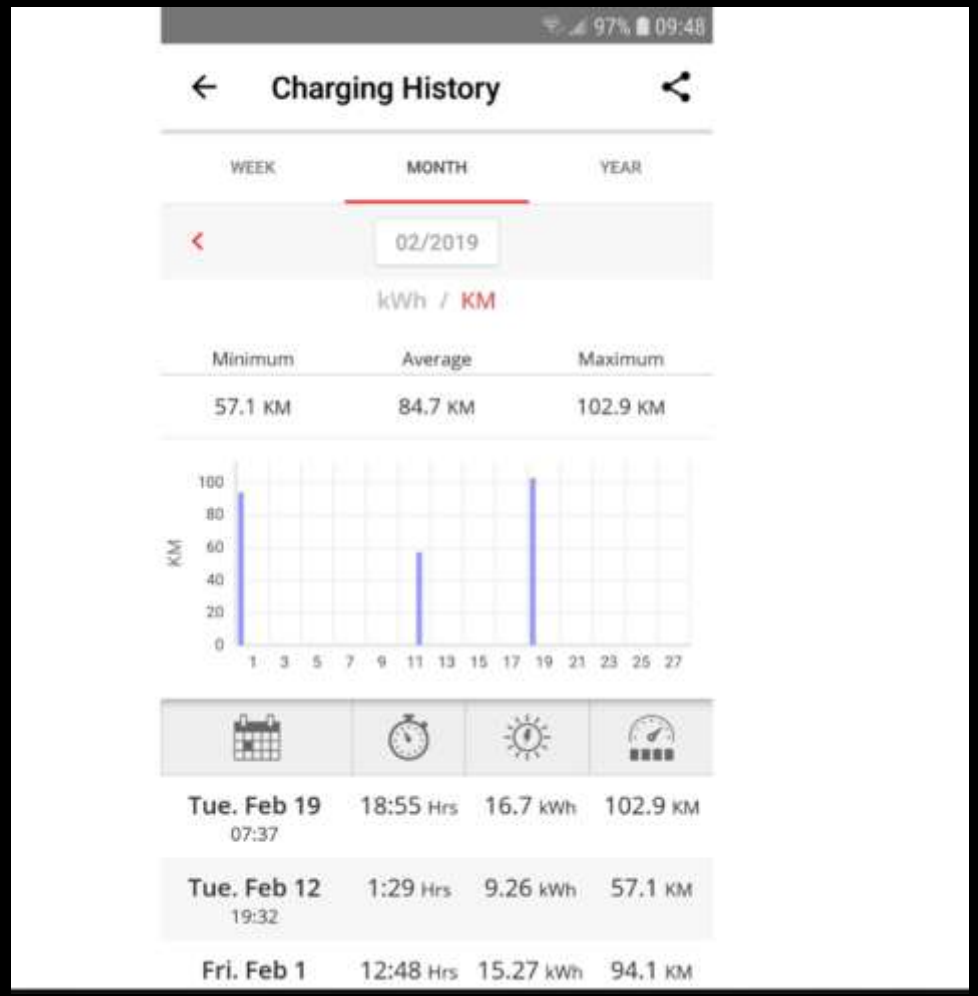
THE MODEL THREE IS SMART

8 cameras

12 sensors

1 LIDAR radar sensor.

YOUR PHONE SHOWS WHEN AND HOW MUCH YOU CHARGED YOUR CAR



COST BEFORE TAXES AND REBATES

Serial:RN107176585-00-20180917002448

TESLA

Motor Vehicle Purchase Agreement
Vehicle Configuration

Customer Information

RUSSELL JAMES WORK
CHRISTINE ELIZABETH WORK
949 PANORAMA CRESCENT,
OLIVER, BC V0H 1T6

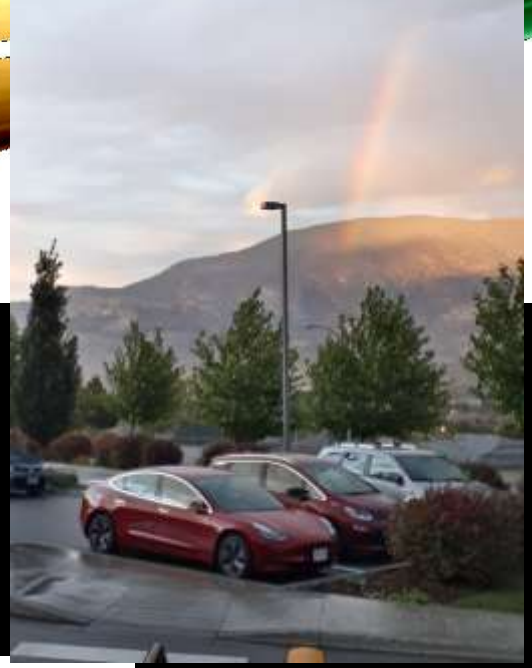
(250) 485-2660
r_work@telus.net

VIN	5YJ3E1EA9JF075692
Reservation	RN107176585
Deposit paid	4,200.00
Accepted by Customer on	9/6/2018

Price indicated does not include taxes and governmental fees, which will be calculated as your delivery date nears. You will be responsible for these additional taxes and fees.

Description	Total in CAD
Model 3	-
Model 3 Long Range RWD	$64,100.00
Rear-Wheel Drive	-
Premium Black	-
Red Multi-Coat	$1,300.00
18" Aero Wheels	-
Premium Interior	-
Enhanced Autopilot	$6,600.00
Subtotal	**$72,000.00**
Delivery & Final Inspection Fee	$1,300.00
Transportation Fee	$0.00
Order Modification Fee	$0.00
Total	**$73,300.00**

WHAT DOES IT COST THE LEAST EXPENSIVE MODEL 3 386 KM RANGE



Gasoline Savings

The average person drives between 15,000 and 25,000 kilometers and spends between $1,300 and $2,300 on gasoline per year. In comparison, the cost of electricity to power Model 3 over the same distance is up to three times lower. Over the six year average length of car ownership, that's between $6,700 and $11,200 in gasoline savings.

We've assumed a fuel economy of 11.9 kilometers per litre for a comparable gasoline powered sedan, for example, the 2017 BMW 3 series. We've also assumed the national average of $0.12 per kilowatt-hour for electricity and $1.10 per litre for premium gasoline over the next six years.

Electric Vehicle Incentives

Model 3 qualifies for electric vehicle incentives in Quebec and British Columbia. Standard Range Plus is eligible for a $5,000 Federal Incentive. Learn more about incentives or visit the program's website for details on eligibility and availability.

Pricing Details

Model 3 Standard Plus Rear-Wheel Drive	$53,700
Solid Black Paint	Included
18" Aero Wheels	Included
All Black Partial Premium Interior	Included
Autopilot	Included
Destination & doc fee	$1,280
OMVIC fee	$10
Purchase Price	**$54,990**
Federal incentive	- $5,000
British Columbia EV rebate	- $5,000
Est. 6-year gas savings	- $6,700
Estimated Savings	**- $16,700**
Price after Est. Savings	$38,290

All savings are experienced after purchase.

See how our savings are calculated

AUTODRIVE

Currently version 2.5 selfdrive.

You have to keep you hands resting on the steering wheel.

It will self drive.

Basically all controls are made via the touch screen.

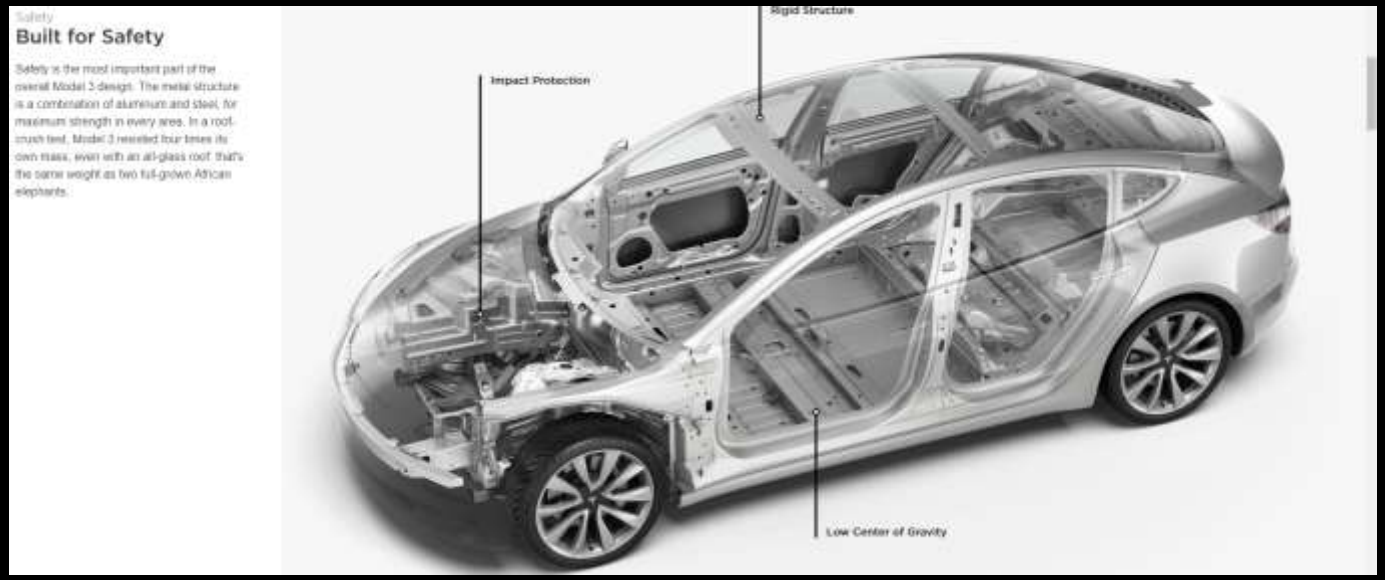
SEE, IT WILL DRIVE BY ITSELF.

Version three self drive, once it has undergone regulatory approval will be 3 times better than a human driver.

It has a new FSD dedicated chip on the computer board. Uses a neural network and artificial intelligence to operate the car.

Not yet here in BC yet.

THE DESIGN WORKED PERFECTLY



THE SAFEST CAR IN THE WORLD

The tesla model 3 has received the NTSA highest rating on all categories.

I have ‘walked the walk’ so can ‘talk the talk’.

We walked away with bruising and some soft tissue damage.

THIS IS WHAT WE AVOIDED

This set of rear wheels became detached from the rear of a semi trailer.

This is where they ended up at the bottom of Waterman's Hill in the ditch in our lane.

5 YR COST COMPARISON

- Tesla Model 3
- Transport Canada ratings
- 20,000km /yr @ 13c/kWh = $425

- 5 Years = $2125

- With solar roof on the house, the cost will be zero.

- Honda Civic LX. Costs as posted by Harmony Honda
- Gas 20,000km at 7l/100km = 1400 litres
- Cost @ $1.40/l = $1960
- 5 years = $9800
- Type A oil changes 5 x $66.88 = $334.40
- Type B service 5 x $224.88 = $1124.40
- Adjust drive belt $108.88
- Transmission fluid service $160.88
- Spark plugs $448.88
- Timing Belt $1293.88
- Coolant 2 x$114.88 = $229.76
- Taxes on above $444

- Total running and service costs 5 years $14,000

10 REASONS TO BUY A TESLA MODEL 3

- The man – Elon Musk. Thinking outside the box. A Visionary.
- Over the air updates. The car keeps getting better
- Supercharger network. 14,000 stations WW
- Best in industry battery pack. Type 2170 cell 75kW giving 500 km range. 4416 cells
- Superb audio system. 1 sub, 15 speakers
- Enhanced autopilot with Full Self Drive coming upon regularity control
- Minimalist design – 15 inch screen
- Unmatched safety Lowest probability of injury of any car they had tested.
- Road holding. Low Centre of Gravity
- Pure EV manufacturer. No legacy ICE
- Best HVAC system controlled by touch screen
- Attention to detail

TESLA SUPERCHARGING STATIONS

Red operating

Grey – planned.

14,000 world wide.

ELECTRIC BIKES
WE BOUGHT STEP THROUGH VERSIONS

We own two Pedego City Commuter bikes.

48V lithium ion rechargeable battery.

They have pedal assist – up to 6 levels of assist. You have to pedal before the electric assist kicks in.

There is a throttle for 'instantaneous' electric assist. Great at lights.

Disc brakes, lights, bell, 6 gears

$3500 each.

At least 40km range. Depends on assist

YOU DON'T HAVE TO USE ASSIST IF YOU WANT A WORK OUT.

We own two Pedego City Commuter bikes.

48V lithium ion rechargeable battery.

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$3500 each.

At least 40km range. Depends on assist

A GREAT ALTERNATIVE TO A SECOND VEHICLE

We own two Pedego City Commuter bikes.

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Disc brakes, lights, bell, 6 gears

$3500 each.

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VERY COMFY TO RIDE. GREAT SEAT

We own two Pedego City Commuter bikes.

48V lithium ion rechargeable battery.

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WHY H[illegible]

SECOND VEHICLE WHEN YOU CAN EASILY CYCLE TO TOWN?

SOLAR RV KITS

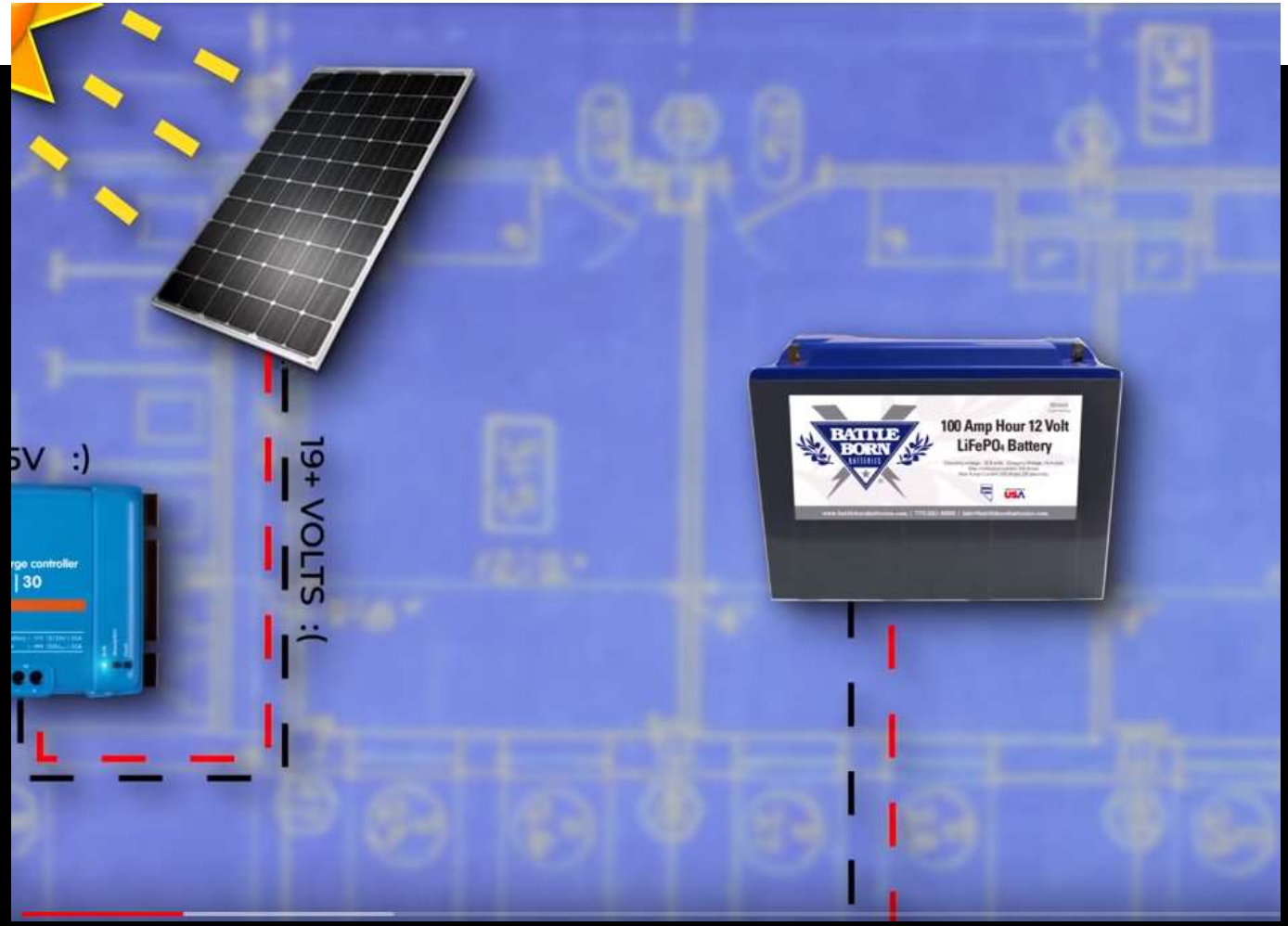
These are the bits you need for an install.

Solar Panels. Usually 100W each

Charge controller to moderate the voltage.

The power goes to the batteries.

Best are lithium ion batteries. You can get AGM batteries.

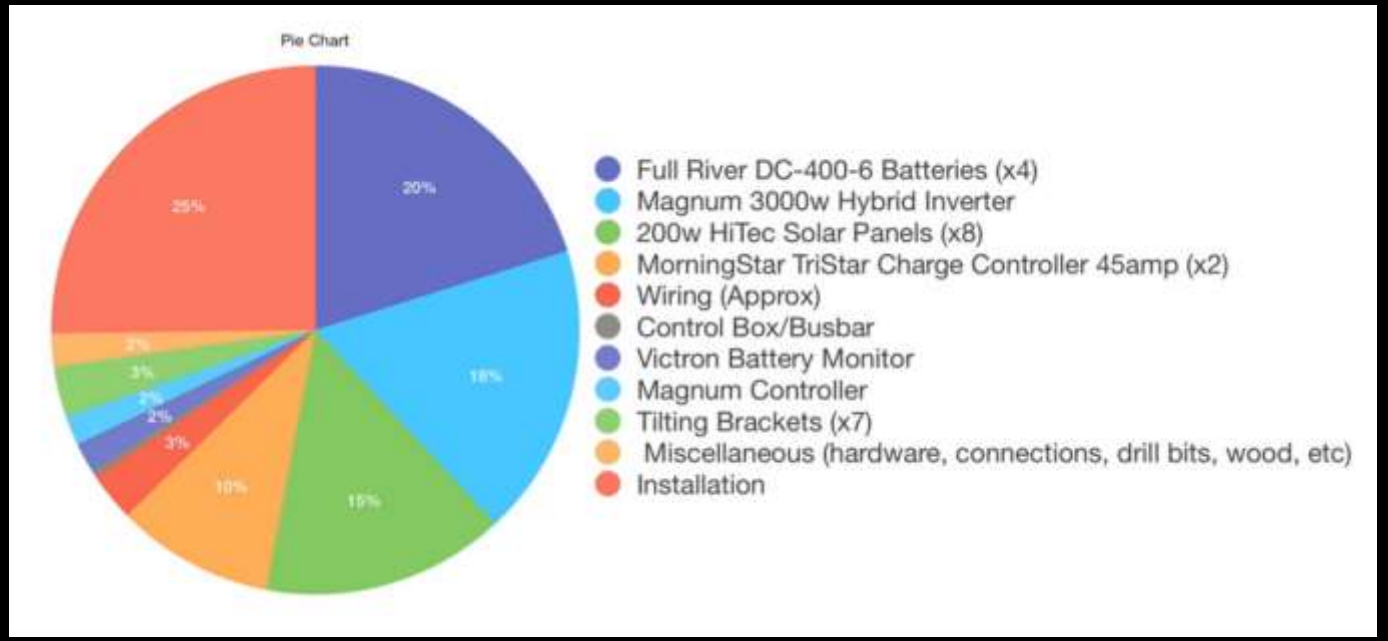


YOU HAVE TWO POWER OUT OPTIONS

12 volt wired directly to battery

110 volt. Must go through an inverter. (blue)

THIS IS THE BREAKDOWN OF THE COMPONENTS FOR A CAMPER RV INSTALL



WHAT DOES IT COST FOR A 5TH WHEEL INSTALL?

$10,000 US

WE MAY NOT BE ABLE TO CHANGE THE WORLD, BUT WE CAN LEAVE OUR OWN MARK BY DOING SMALL THINGS

- "The time is right for electric cars - in fact the time is critical."
- **Carlos Ghosn Nissan CEO**

- **Thanks for your interest.**

There are no pockets in shrouds

Joan Work