Quartzsite Solar Discussion

Hosted By

LivinLite.net

Pau Hana TRAVELS

Erik & Kala – Livinlite.net

Gary & Stacey – Pau Hana Travels

Solar Talk Objectives - Questions Answered

- Basics of Solar
- How Much Do I Need?
- Can I Afford It?
- Can I Install It Myself?
- Am I Getting A Good Deal?
- What Should I watch out for? (Installers, quality etc.)
- Who Can Help Me Learn More?
- ?? What Questions Can We ADD?

Quartzsite Solar Discussion
High Level Summary

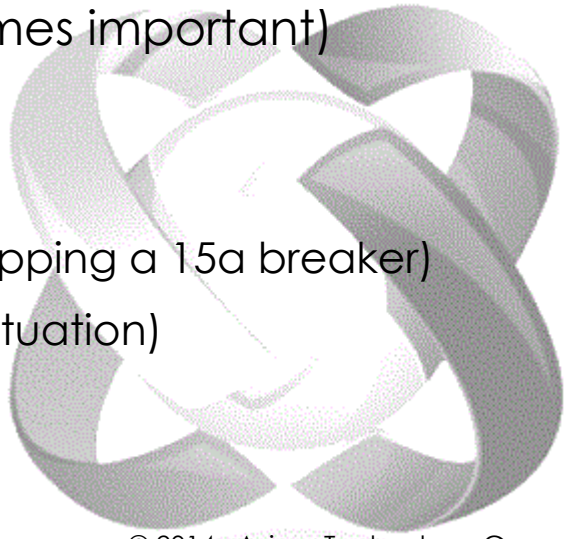
- *Getting to Know Each other*
- *Power Basics*
- *Solar Basics*
- *Sizing Batteries & Solar Arrays*
- *Lets Talk $$$*
- *Determining Next Steps*

Who are We?

- Erik & Kala – Livinlite.net
  - Day Job – Founder – Axiom Technology Group
  - Got started early with 12 volt power systems in car stereo competitions
  - Moving into IT but have had a passion for vehicles and travel my whole live
  - Full time for 2 years, solar for just over 18 months
- Gary & Stacey - Pau Hana Travels
  - Tell us more
- Everyone – Please Introduce Yourselves
  - What are you goals here today?

Power Basics

- VOLTS – Potential for Entergy to Move – Think Water Pressure
- WATTS – Standard Unit of Electrical Measurement
- AMPS – Unit of Measurement useful across different voltages (WATTS/VOLTS=AMPS)
- OHMS – Resistance (we wont cover this today but you'll hear a lot about wire sizing which is where this becomes important)
- EXAMPLE: Hair Dryer is states it is 1500Watts
  - 1500Watts/120V = 12.5 AMP (in home, think tripping a 15a breaker)
  - 1500Watts/12V = 125 AMPS (in an off-grid/rv situation)



Power Basics – What about AMP HOURS (AH)

AH used to measure Battery Bank Capacity

Lets skip techie talk and talk real world examples..

- Lets say a Residential Refrigerator Pulls 120 watts when the compressor is running.
- 120Watts/12Volts = 10 AMPS
- But Compressor only runs 50% of the time 10A X 50% = 5AH

Power Basics – What about AMP HOURS (AH)

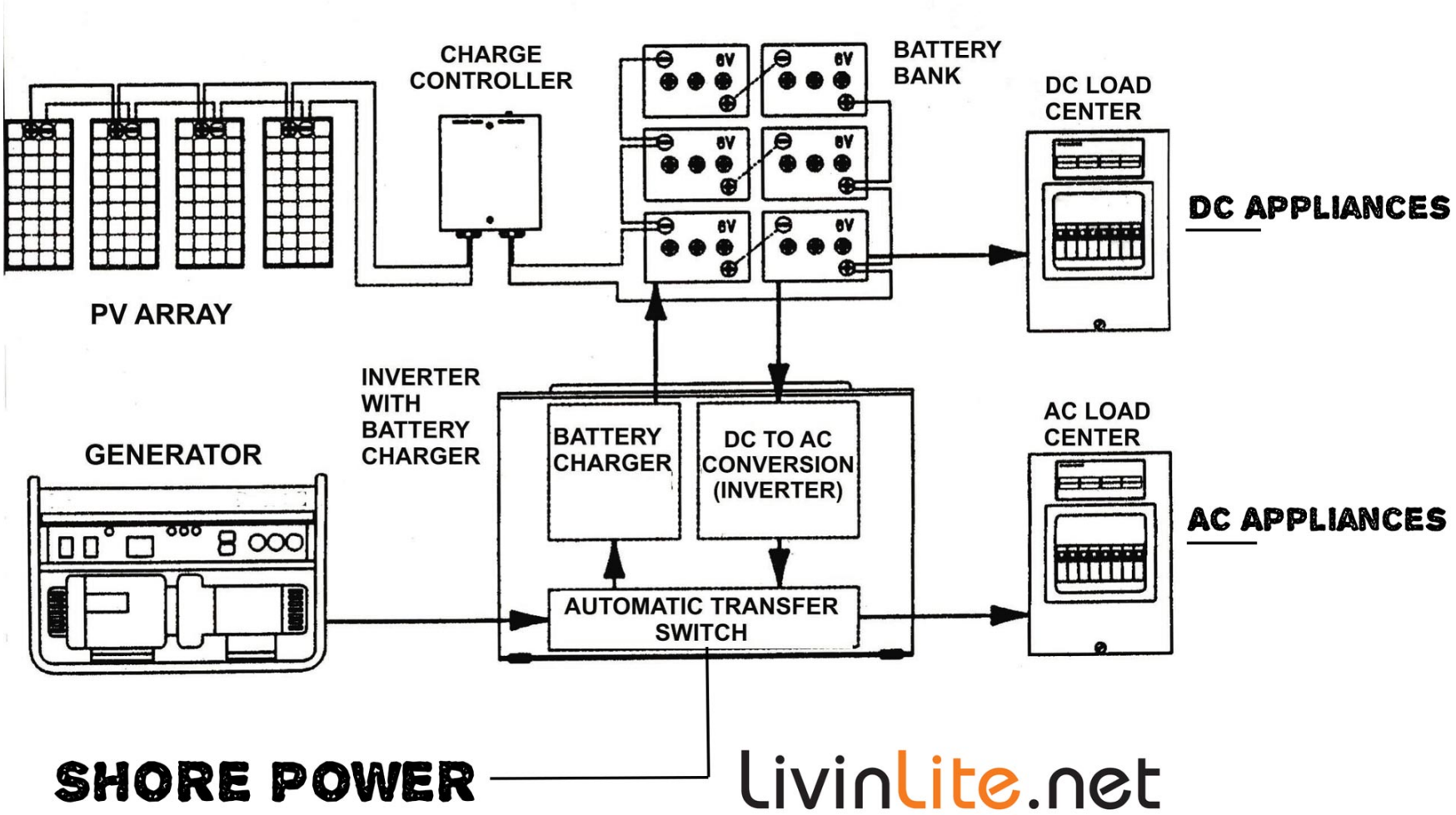
Lets Go One Step Further

- Fridge uses 5AH, runs 24 hours a day = 124AH = If you had a 12 volt, 300AH battery bank, running that fridge for 24 hours would leave you with approx 159 AH in your bank or 59% battery

What Does this Have to Do with Solar???

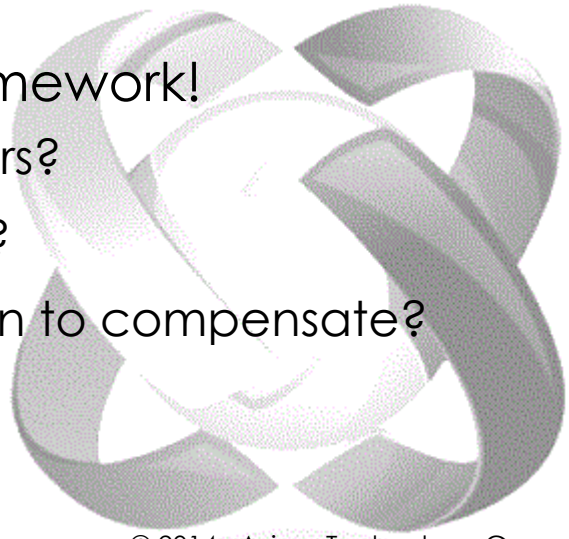
- Understanding Power will help you:
  - Move quickly between watts & amps
  - Understand How Much Power You Use
  - Size your solar array
  - Size your battery bank

Solar Basics – Components of a RV Electrical Setup



OK This is a lot of Info – Just Tell me What I Need!

- What Size Solar Array Do I Need?
- What Battery Bank Do I Need?
- What Solar Charge Controller Do I Need?
- Do I Need an Inverter/Bigger Inverter?
- Before We Can Answer, You Have Homework!
  - What is your average AH Draw in 24 hours?
  - How much of that is while your sleeping?
  - How much do you want the genny to run to compensate?

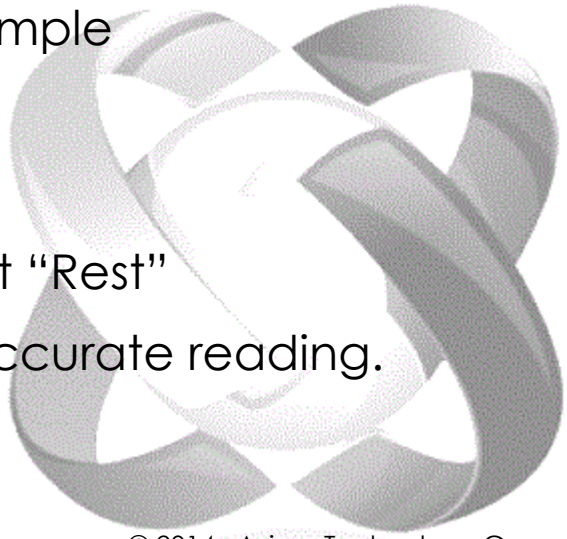


Figuring Out Consumption

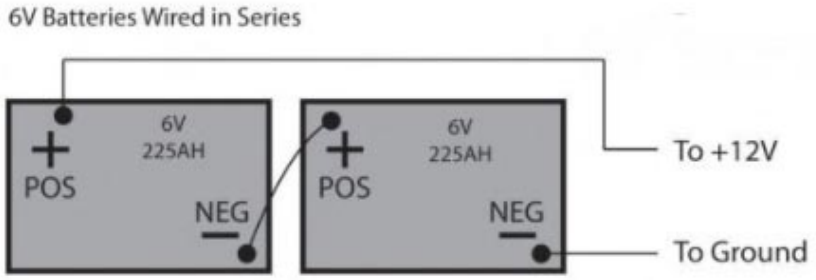
- LED Lights Coach Wide 5amps running 12 hours a day = 60AH
- Nice Computer with monitor 7amps running 8 (we work!) = 56AH
- Microwave running 10 minutes a day at 100 amps = 16.6AH
- TV Running for 3 hours a day @ 4 amps = 12AH
- Total of 145 AH of Power Consumed in Example
- Highly Recommend a Battery Meter

Batteries Level Can Only Be Measured at "Rest"

Battery Meters Use Shunt to give more accurate reading.

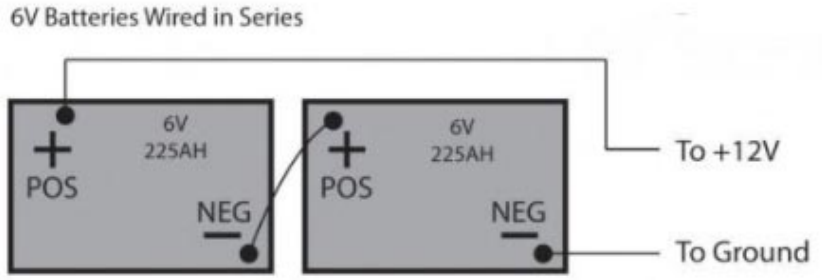


Sizing Battery Bank



- Different Battery Types: Flooded, AGM, Lithium (another day)
- Most RV run on 12v, Most RV Batteries 6v (easier to charge 6v, remember volts like water pressure)
- Wiring combinations allow 6 volt batteries to be combined to 12v
- Lets assume we have 2 6v 225AH batteries
- Wohoo! 450AH of usable battery! (nope!)
- So I have 225AH of usable battery capacity right?? (nope!)
- You have 112AH of Usable Capacity. Lets see why…

Sizing Battery Bank



- Connecting batteries in "Series" will double voltage while maintaining 225AH capacity (not double capacity)
- Batteries Don't Like to Be Used Below 50% or their lifespan or "cycles" will be dramatically shortened.
- This leave 112.5 AH of usable capacity in the above diagram

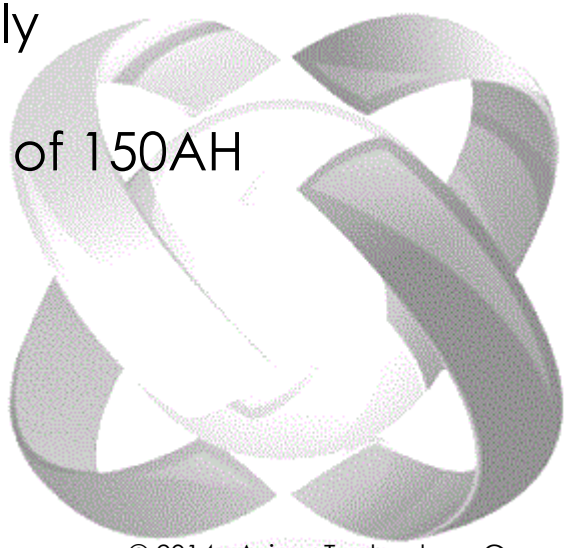
FINALLY – LETS TALK SOLAR!!

- Lets stick with AMPS to keep things simple
- 160Watt Solar Panel in direct sun for 1 hour produces 8-9AH (Per hour)
- Lets assume 5AH across 8 hours of daylight (clouds, low sun etc)
- Each Panel Created 40AH of Power Daily
- Go Back to Power Needs from Example of 150AH
- How Many Panels Do We Need?

  4 Panels = 160AH

  6 Panels = 240AH

  8 Panels = 320AH



SOLAR IN THE REAL WORLD

- Livinlite 10 Panels – 400AH capacity in normal conditions
- Today 150AH
- Yesterday 400AH, tilting & moderate clouds
- No Magic Bullet
- Recommending 30-50% over spec'ing your system if you rely on it heavily

Lets Talk $$$$ - How Much is Solar

- $160-$225 Per Panel for good panels
- Batteries – $150-$1000 per battery depending on size and technology
- Solar Controller - $35 – $800 depending on amps and voltage (MPPT)
- Battery Meter – $125 - $250
- Installation – $80/hr – 125/hr

Next Steps?

- Does Anyone Want to Try Installing Themselves?

  Get Your Plan Checked By a Certified Electrician

  Schedule a time to talk to us one on one

- What if I Want to Pay Someone To Install?
  - We Have a List of Installers We've Found are Good
  - Get at Least 3 Quotes
  - (Installers Bake Labor into Product Pricing Often)
  - Never Pay more than 8—120hr for installation services and 20% margin on parts/accessories.

Lets Talk!

- Questions?