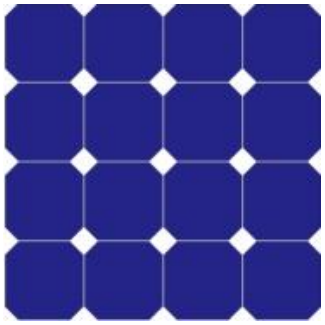
Gas – electricity – solar

Household fuel choice in the 21st century



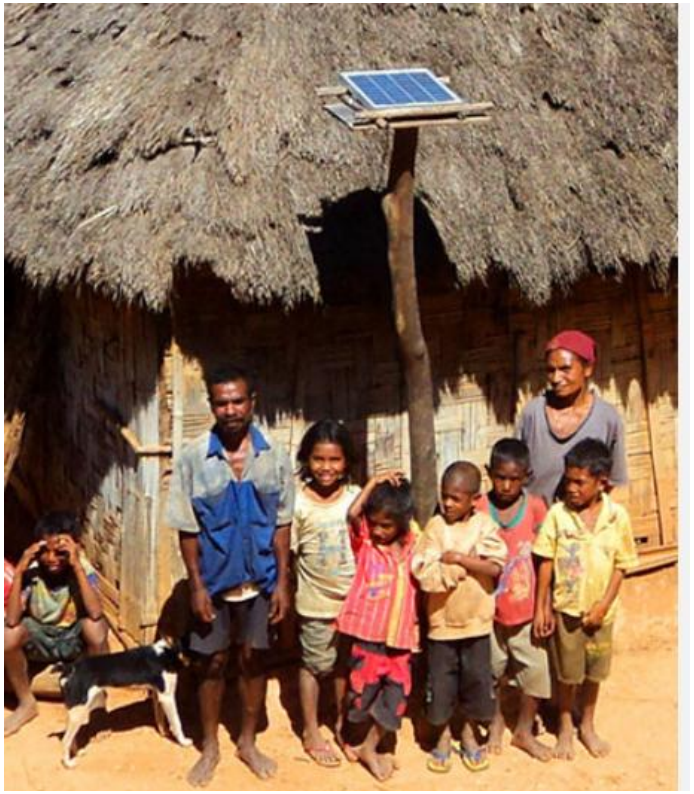
Dean Lombard, Damien Moyse
Alternative Technology Association
September 2017

Agenda

- What is the ATA?
- The household fuel choice project
- Preliminary findings
- ATA advice service

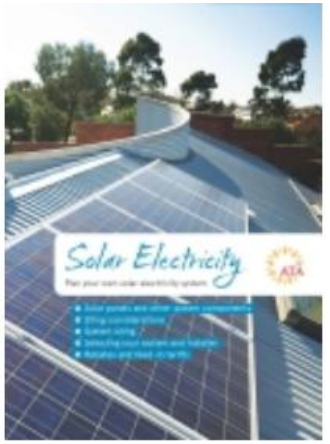
What is the ATA?

- Help people to make sustainable choices
- Membership base, branches around Australia
- Independent, not-for-profit
- Policy and research team
- Advice and consultancies
- International projects



Publications

- Published since 1980
- Energy efficiency, renewable energy, electric cars, retrofitting homes, recycling and reusing
- DIY projects



- Published since 2005
- Sustainable homes case studies including house plans and spec sheets

Household Fuel Choice Project

- Funded by Energy Consumers Australia
- Understand the *economics* of fuel choice
  - Other factors affect fuel choice; but understanding the economics is necessary for any choice to be fully informed.
- Gas or electricity…
- …for heating, hot water, and/or cooking…
- …with or without existing or new solar

The household fuel choice project was funded by Energy Consumers Australia as part of its grants process for consumer advocacy projects and research projects for the benefit of consumers of electricity and natural gas. The views expressed in this presentation do not necessarily reflect the views of ECA.

The Question

When replacing a gas appliance (heater, hot water, cooker), what's the economic benefit (or cost) of:

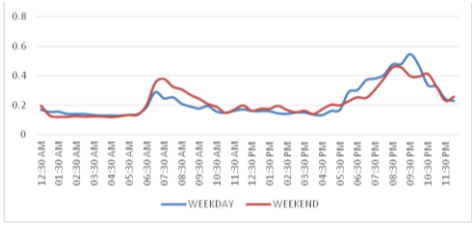
- choosing electric rather than gas?
- also replacing other gas appliances with electric equivalents?
- how does having (or installing) solar PV help?

Reverse-cycle aircon *vs.* *gas ducted or wall furnace*

Heat pump hot water *vs.* *gas instantaneous or storage*

Induction cooktop/elec. oven *vs.* *gas cooktop/gas oven*

The Question

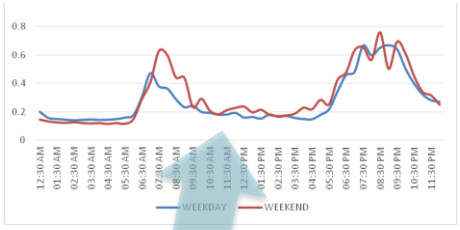


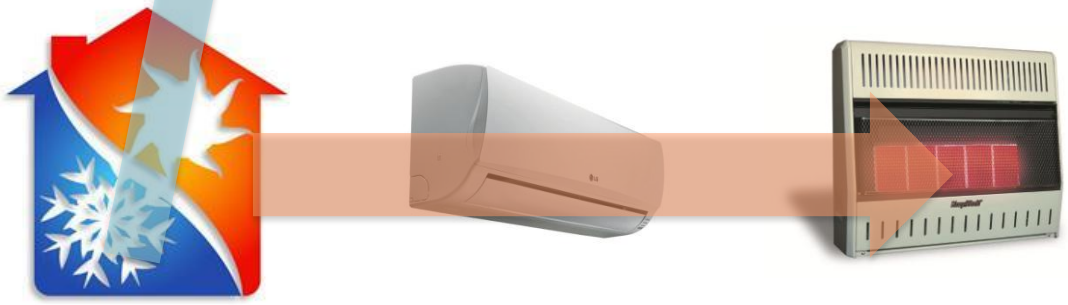
5 different household types:

1. *Couple, frugal, small house*
2. *Medium family, consistent daytime usage, medium house*
3. *Medium family, low daytime usage, medium house*
4. *Large family, large house*
5. *Large family, large newish (6-star) house*

18 locations

The Approach





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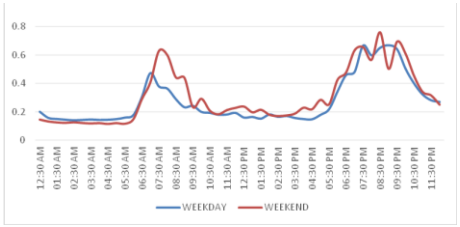

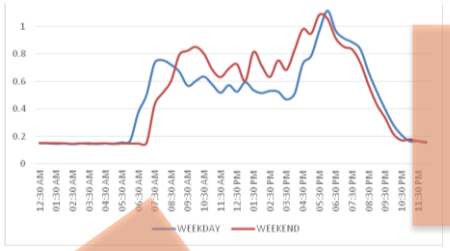

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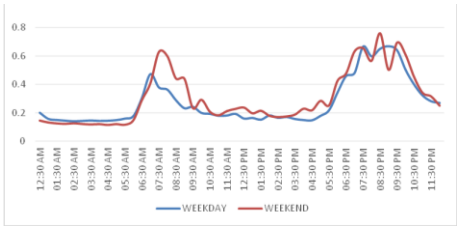
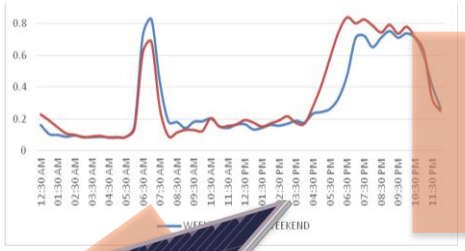
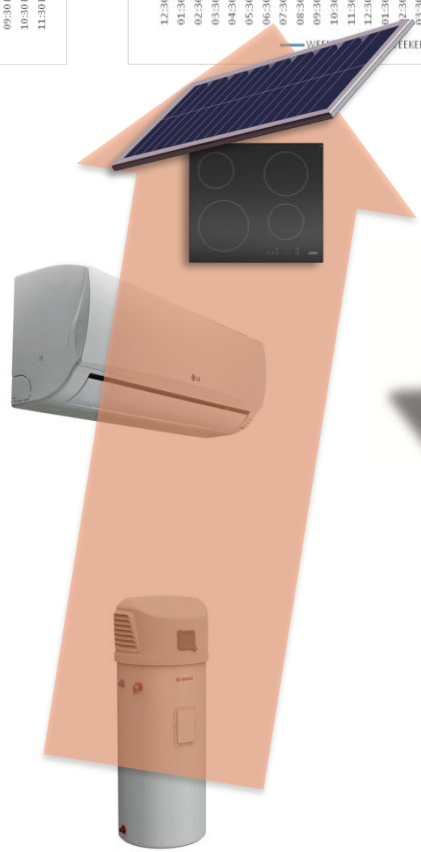






The Approach

Year 0

Year 10

Year 20

The Results

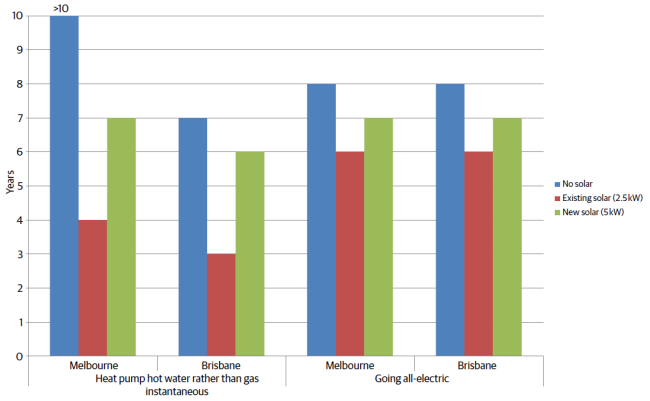
2014 findings:

- New homes
  - all-electric is always more economical unless heat pumps can't be installed or gas appliances are heavily subsidised
- Existing dual-fuel homes
  - RCACs are always more economical than gas heating
  - complete switch to all-electric usually more economical in warmer climates
  - heat pump hot water is more cost-effective than gas in warmer climates and where gas is expensive, and less so elsewhere
  - switching to electric cooking is only more cost-effective when it removes the gas connection entirely

The Results

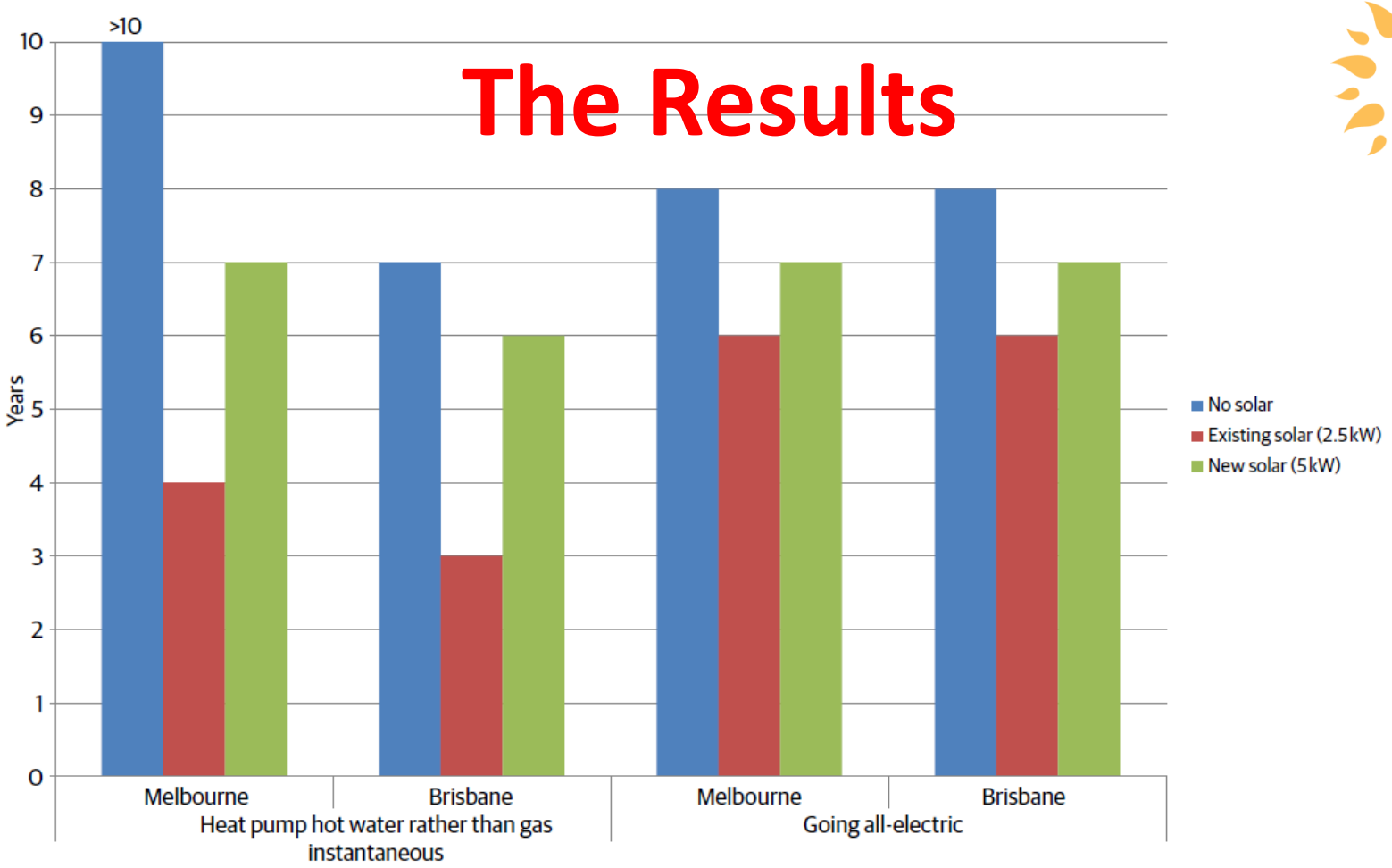
2017 findings:

- We expect similar results overall
  - increased efficiency of heat pumps may change results for some locations
  - higher unit charges will probably improve cost-effectiveness for electric appliances for high-consumption households
- Solar is a game-changer
  - New or existing solar systems reduce electricity costs so much that heat pump hot water becomes cost-effective in colder climates and cheaper gas zones



↑ Figure 1. Payback times in years for a small and frugal home in Melbourne and Brisbane when replacing an end-of-life gas water heater with a heat pump unit instead of a new instantaneous gas unit, or going off gas entirely (going electric for all appliances). The payback time is the time to recoup the cost premium of the efficient electric options over efficient gas alternatives via savings in running costs; e.g. the cost premium to purchase a heat pump hot water over efficient instantaneous gas is around $2000 to $2400. A payback of less than 10 years (the assumed life of the electric appliances) is considered to be economically favourable. A quicker payback—i.e. shorter column on graph—gives a better financial return.

The Results



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ATA Advice Service

History

- ATA has always provided advice
- Part of Membership
  - and non-members!
- 10-15 minute phone chat/email

Information Overload

Advice Service

1. Free, online advice:
   - solar-batteries
   - system sizing
   - project economics
   - now and in 4 years!
2. Energy Consult:
   - 1 hour consult
   - analysis of meter data, bill & appliance stock
   - written report & rec's

Your Email Address *

What State are you in? *
- ACT
- NSW
- NT
- QLD
- SA
- TAS
- VIC
- WA

This service only works in Australia for now.

What type of household? *
- Small electricity user
- Medium – out during the day
- Medium – stay-at-home
- Large electricity user

What kind of tariff (plan) are you on? *
- Don't Know
- Flat Tariff
- Time Of Use tariff

You can find this on your electricity bill. With a Time-of-Use tariff, electricity cost varies at different times during the day.

Is there already a solar system on this house? *
- Yes
- No

What's your rough budget for a solar and/or battery system? *
- Up to $5,000
- $5,000 – $10,000
- $10,000 – $15,000
- $15,000 – $20,000
- $20,000 – $25,000
- $25,000 – $30,000

If unsure, you can always re-run with a different budget range.

- Answers 2 key questions:
  - are solar / batteries worth it?
  - what size should I install?
- Results to your email immediately

http://www.ata.org.au/ata-solar-advice

Basic Solar & Battery Advice

- Results drawn from 180,000 pre-simulations
  - reviewed every 3 months
- Tailored – differentiates between households types :
  - Location
  - Home Type
  - Consumption Profiles
  - Tariff Type
  - Budget Bracket
  - Installation Year (now or in future)
  - Solar-Battery Configurations
- Useful for:
  - refine their quotation process with a solar installer; or
  - seek more detailed advice re energy management (ATA Consult)

ATA Basic Solar Results for Damien Moyse

Dear Damien,

Thanks for using our Basic Solar Advice Service for your home in or near Bendigo VIC.

You've indicated that your home type is medium - out during the day, you consume about 15-20 kilowatt-hours per day of electricity, on a flat tariff.

You don't yet have a solar system.

You mentioned that you're interested in solar or solar/battery systems within the price range of $5,000-$10,000.

Based on these inputs, industry-standard price benchmarks, typical consumption profiles and other assumptions, we've prepared a rough indication of some possible systems for you.

If you were to install a system today

Solar Power in kilowatts	Battery capacity in kilowatt-hours	System Cost	Annual Bill Saving	Equivalent Cars Off The Road	Years to Pay Back	Annual return on investment
4	0	$5,394	$917	1.7	6	18%
5	0	$6,418	$1,099	2.1	6	18%
6	0	$7,368	$1,276	2.5	6	18%

If you were to install a system four years time

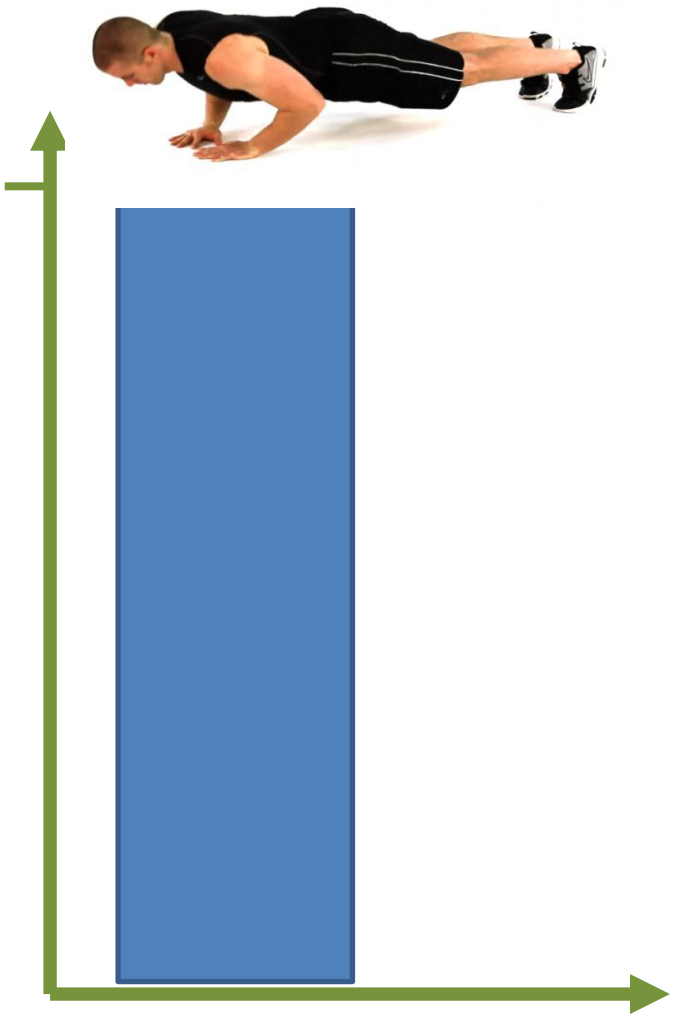
Based on forecasted electricity tariffs and technology costs, we've also predicted a future scenario:

Solar Power in kilowatts	Battery capacity in kilowatt-hours	System Cost	Annual Bill Saving	Equivalent Cars Off The Road	Years to Pay Back	Annual return on investment
4	0	$5,534	$1,107	1.7	6	18%
5	0	$6,614	$1,301	2.1	6	18%
2	3	$7,411	$861	0.8	10	7%
6	0	$7,623	$1,486	2.5	6	17%
3	3	$8,198	$1,123	1.2	8	10%
4	3	$8,777	$1,338	1.7	8	12%
5	3	$9,739	$1,533	2.1	7	12%

ATA Energy Consults

- **What's it all about?**

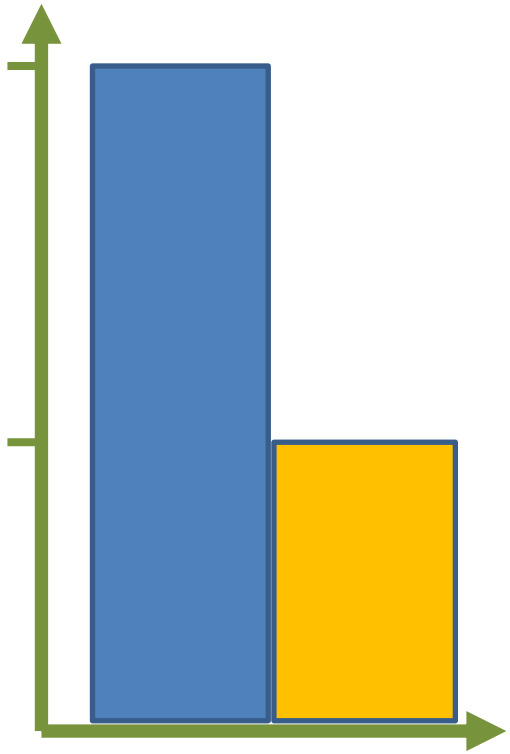
$3,000/yr



ATA Energy Consults

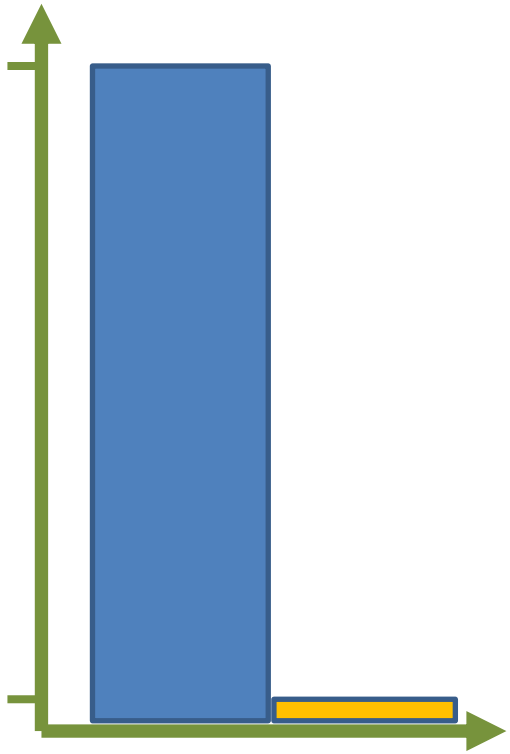
- with:
  - solar PV
  - efficient electric appliances
  - thoughtful energy management
- existing homes:

$1-1,500/yr



ATA Energy Consults

- with:
  - solar PV
  - efficient electric appliances
  - thoughtful energy management
- new homes:

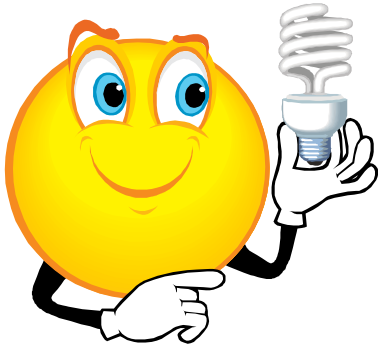


~$0/yr

ATA Energy Consults

- Not only about appliances, solar PV
- Also about linking green builders/architects to consumers
  - Speed Date a Sustainable Designer (http://sdse.ata.org.au/)
- Using the Gas v Electric v Solar models to forecasts energy usage and bills

Questions, Comments?



Dean Lombard
Senior Energy Analyst
dean@ata.org.au

Damien Moyse
Policy & Research Manager
damien@ata.org.au