



AccuRate

energy simulation software
for residential buildings



www.csiro.au

The Latest in Software Innovation

Update on AccuRate Development

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30th August 2008



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Congratulations on 27 years of dedication to house energy modelling

The AccuRate Development Team

- **Mingwei Zhou:** Integrated Sustainability Assessment Platform
- **Dong Chen, Zhengen Ren:** Building Thermal Modelling and Sustainability
- **Yong Bing Khoo, Lan Ding, Wan Yee Chan, Stephen Egan, Kevin McDonald, Melissa James:** Software Development

Some New Developments in AccuRate

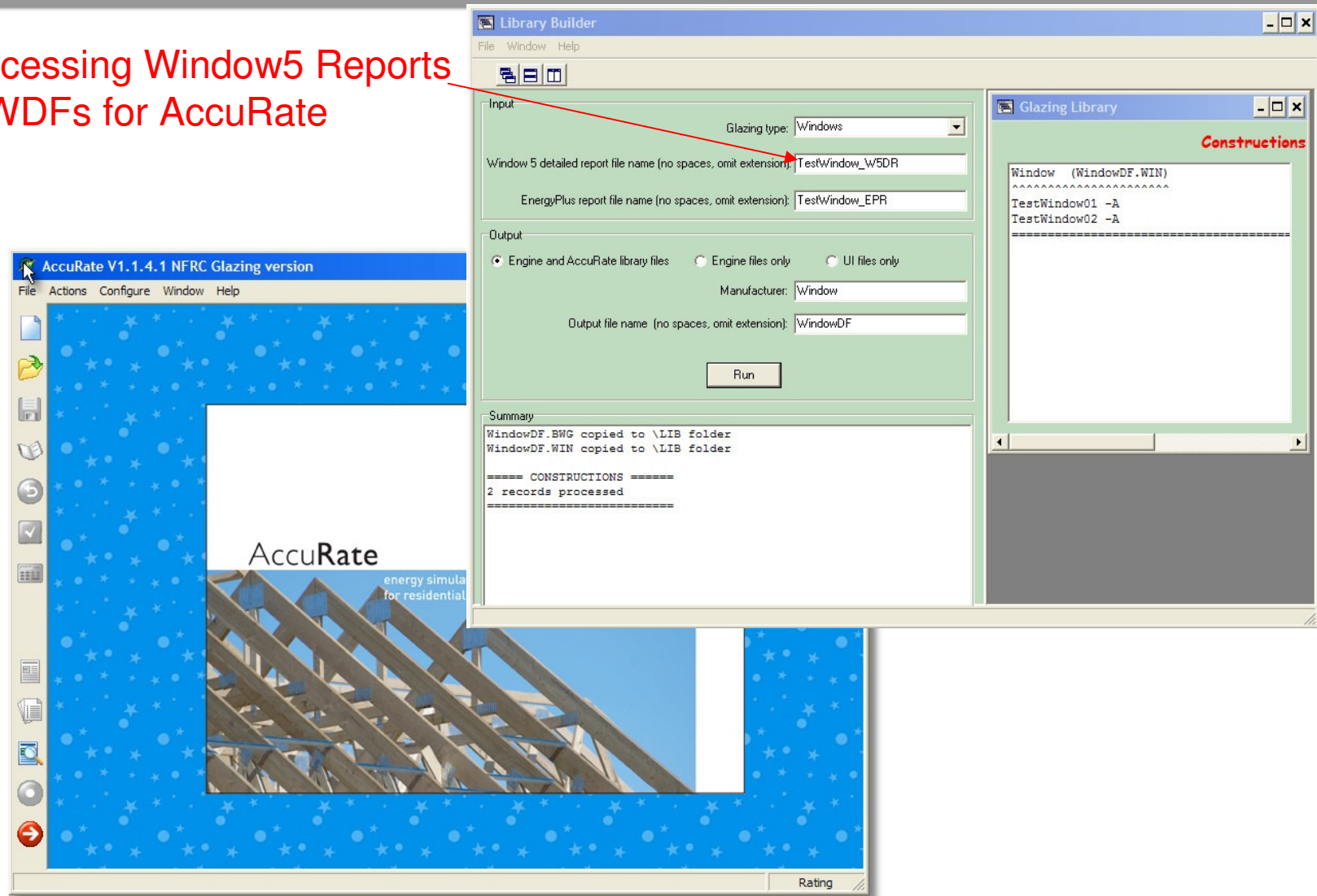
- Implementation of NFRC window data in AccuRate
- Improvement of the stability and accuracy of air flow modelling
- Validation against measurements from houses
- AccuRateNZ
 - NFRC window system
 - Implementation of the effect of downlights on ceiling insulation
 - Implementation of thermal bridging
- AccuRate Sustainability Tool
- New improvements and features in considerations

Using NFRC Window Data in AccuRate

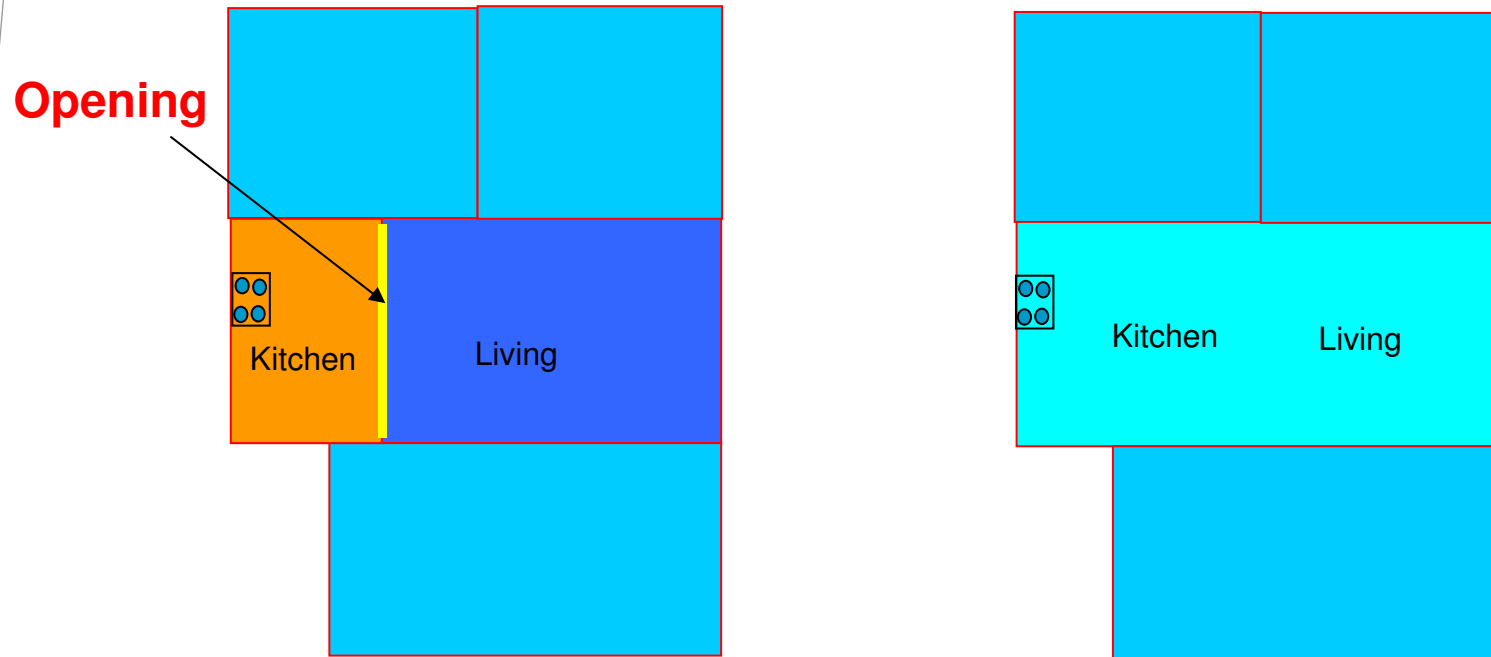
- NFRC-compliant product ratings introduced in 2006. All window energy ratings will be carried out according to NFRC procedures
 - Products rated at NFRC 100-2001:
 - U-value: -18°C outdoors, 21°C indoors, 5.5 m/s wind speed
 - SHGC: 32°C outdoors, 24°C indoors, incident solar 780 W/m^2 normal to glass
- NFRC 100-2001 winter conditions are extreme compared with the ANAC conditions used for AccuRate's current window data files:
 - 16.4°C outdoors, 20°C indoors, 3.1 m/s wind speed, 100 W/m^2 incident solar
- Therefore at each hour AccuRate must be able to convert NFRC U-values for glazing and frame to U-values at prevailing conditions

Using NFRC Window Data in AccuRate

Processing Window5 Reports to WDFs for AccuRate



Improvement in Air Flow Modelling

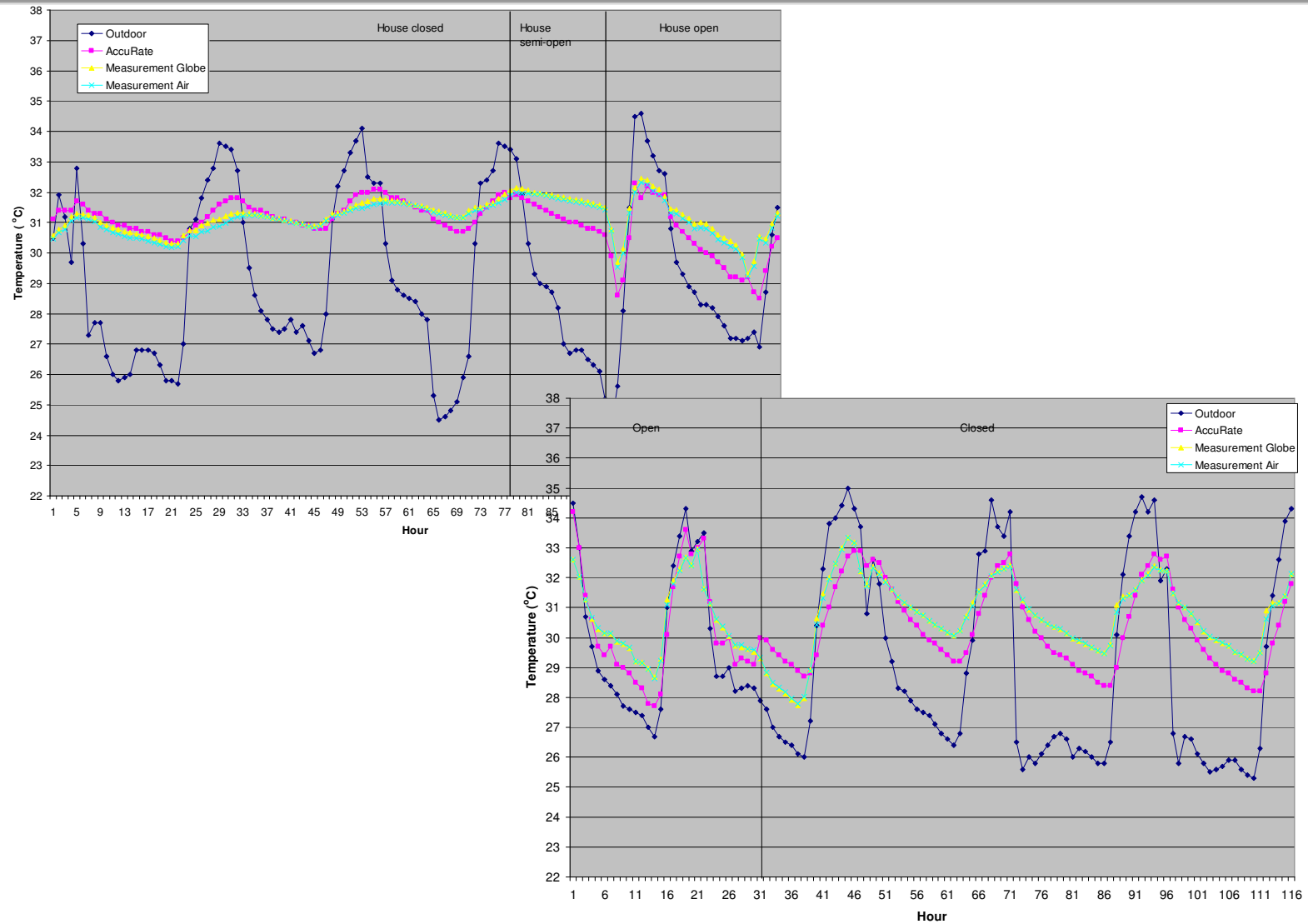


2-zone model of kitchen and living

1-zone model of kitchen and living

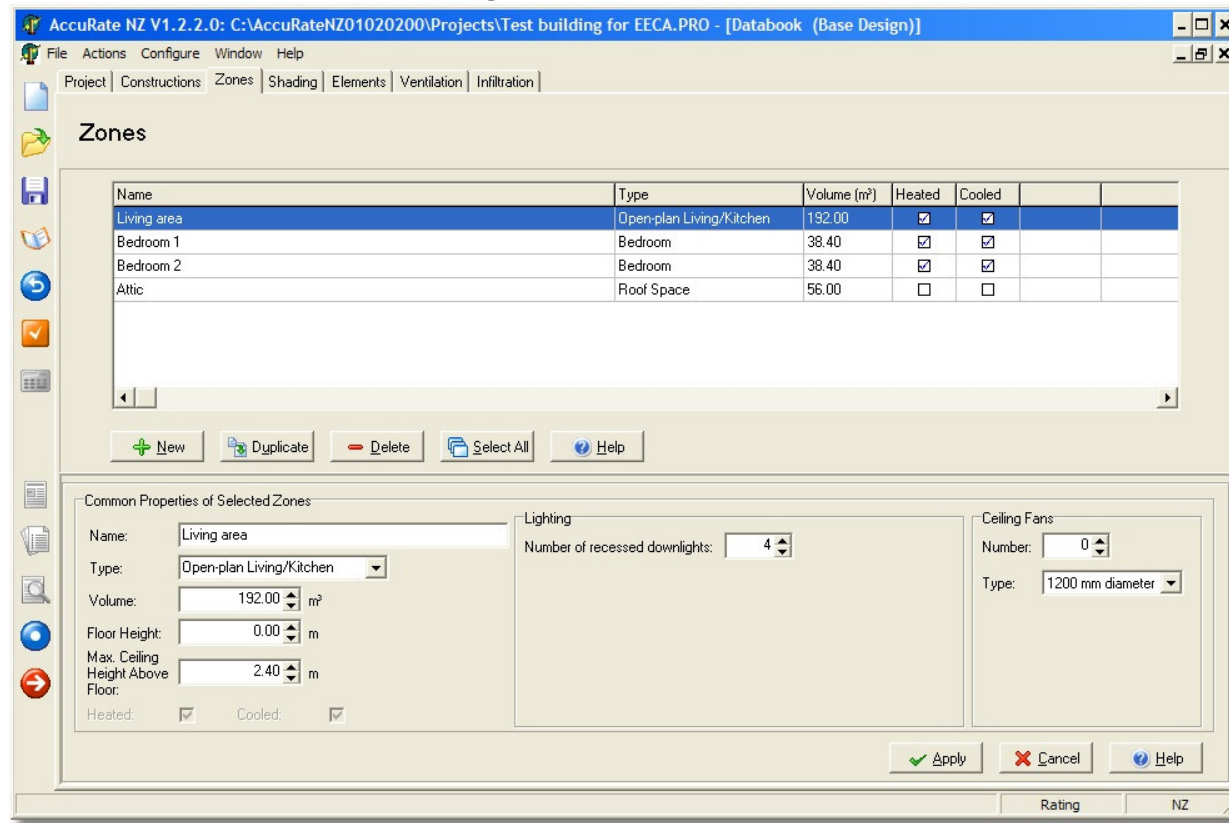
- **There is potentially a star rating difference of 1 star with the current commercial version**
- **The new engine with improved air flow modelling eliminates this problem**

Validation with House Test Results from Darwin



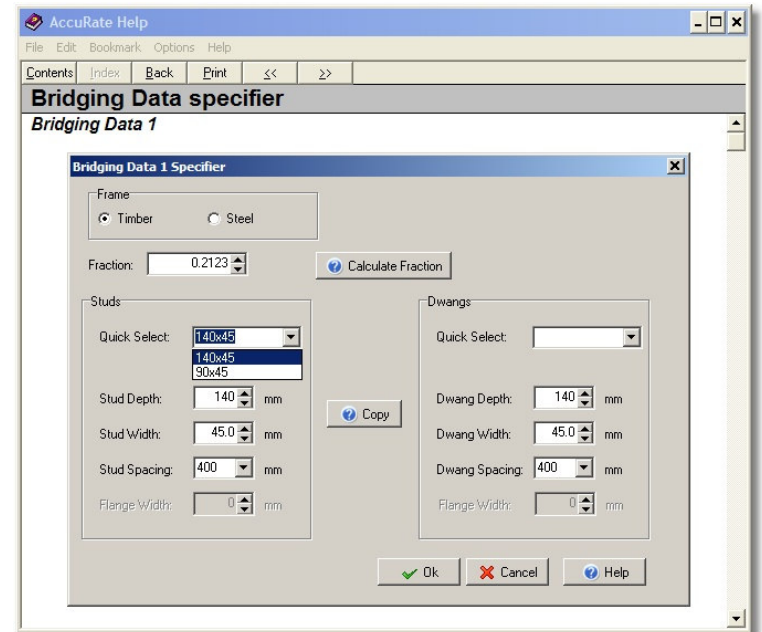
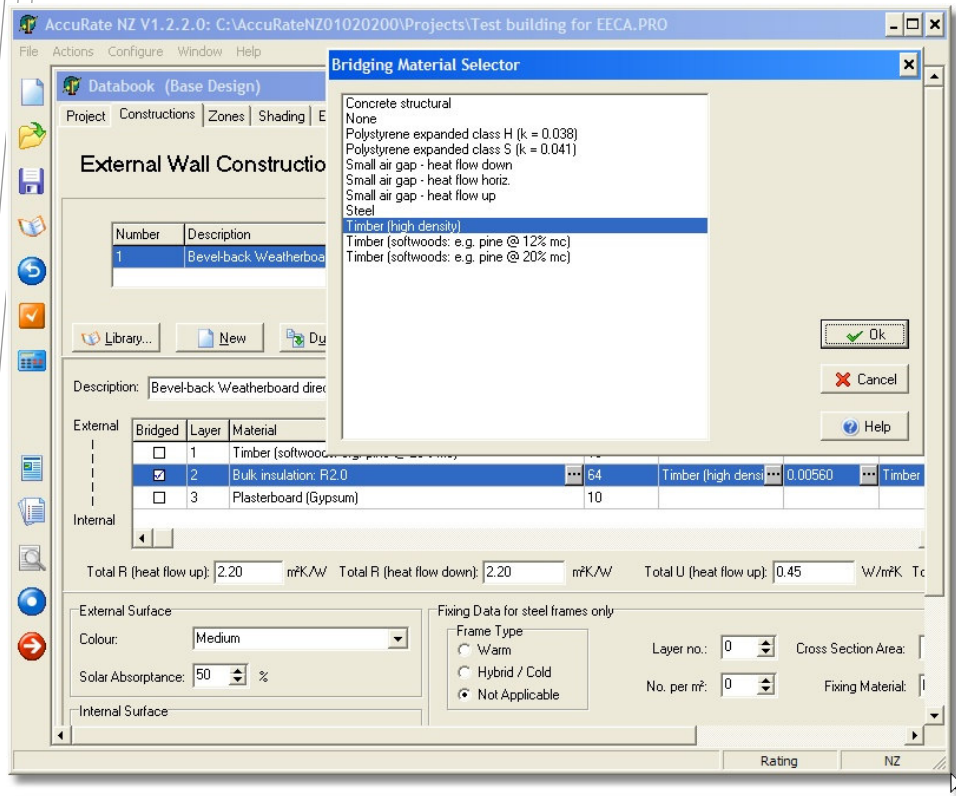
AccuRateNZ

- NFRC window system
 - NFRC-rated generic windows
- Implementation of downlights
 - Reduces R-value of ceiling insulation



AccuRateNZ

- Thermal bridging implementation



AccuRate Sustainability Tool

- Thermal Modelling
- Lighting

The screenshot displays the AccuRate V1.1.4.1 software interface. The main window is titled "AccuRate V1.1.4.1 Research version - not for rating: E:\nathers4\Projects\Lighting\Example 1-storey house.PRO". The "Databook (Base Design)" window is open, showing the "Electric Lighting" section. A table lists various zones with their respective consumption, type, and dimensions. Below the table, the "Detail" section shows configuration options for a selected zone (Bedroom). The "Calculations" section displays the total home annual energy consumed by lighting as 1726.45 kWh and the total home average illumination power density as 9.50 W/m².

Zone Name	Consumption	Type	Length	Width	Height	Surf. Refl.	Lum. Type	No. Lum.	Le
Bed 1	175.20	Bedroom	3.81	3.81	2.40	Light	Direct	2	In
Walk in Robe	109.50	Bedroom	2.16	2.16	2.40	Light	Direct	2	In
Ensuite	109.50	Bedroom	2.76	2.76	2.40	Light	Direct	2	In
Study	0.00	Other (daytime usage)	3.36	3.36	2.40	Light	Direct	2	In
Bed 2	109.50	Bedroom	3.20	3.20	2.40	Light	Direct	2	In
Bath	0.00	Other (daytime usage)	2.83	2.83	2.40	Light	Direct	2	In
WC	0.00	Other (daytime usage)	1.69	1.69	2.40	Light	Direct	2	In
Laundry	0.00	Other (daytime usage)	2.42	2.42	2.40	Light	Direct	2	In
Bed 3	142.35	Bedroom	3.52	3.52	2.40	Light	Direct	2	In
Rumpus	0.00	Other (daytime usage)	4.66	4.66	2.40	Light	Direct	2	In
Family / Meals	613.20	Living	5.56	5.56	2.40	Light	Direct	2	In

Detail

Zone Type: Bedroom
Surface Reflection: Light
Lumination Type: Direct
Lamp Type: Incandescent GLS
Dimming: None
Switching: Manual

No. Luminations: 2
Lamp Wattage: 25
No. Lamps: 4
Length: 3.81 m
Width: 3.81 m
Height: 2.40 m

Energy Consumed | Calculations

Total Home Annual Energy Consumed by Lighting (kWh)

1726.45

Total Home Average Illumination Power Density (W/ m²)

9.50

AccuRate Sustainability Tool

Hot-Water

The screenshot displays the AccuRate V1.1.4.1 software interface, specifically the 'Hot Water Systems' configuration window. The window title is 'AccuRate V1.1.4.1 Research version - not for rating: E:\nathers4\Projects\Lighting\Example 1-storey house.PRO'. The interface includes a menu bar (File, Actions, Configure, Window, Help) and a toolbar with various icons. The main area is titled 'Hot Water Systems' and contains a table with the following data:

Heater	Type	Shower	Solid Fuel	Solar
1	Gas Instantaneous	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Below the table are buttons for '+ New', '- Delete', and '? Help'. The 'Detail' tab is active, showing configuration options for the selected heater. The 'Main Heater' section includes: Main Heater Type (Gas Instantaneous), Distribution Type (Non-circulating (normal)), Grade of Insulation (Insulated), Conversion Efficiency (85), Control System Wattage (5), and Fuel Source (Natural Gas). The 'Shower' section includes: Has a Shower (checked), System Pressure (Medium), Flow Rate (10.600), Heat Recovery System (unchecked), and Tepid Water Return (unchecked). The 'Solar System' section includes: Has a Solar System (checked), Collector Area (2), Circulation (Thermosiphon), Collector Plate (Plate), Storage Volume (150), Location (Outdoors), and Control System Wattage (5). At the bottom of the detail panel are 'Apply', 'Cancel', and 'Help' buttons.

New improvements and features in consideration

- ABSA's report on AccuRate Input Streamlining - fast input of project in AccuRate and better reporting of results
- Feedback loop for better design alternatives
- AccuRate Batch – multiple projects simulations for research, auditing purposes
- Improvements in AccuRate engine: skylights, new construction materials, blinds ...
- BIM interface
- Integrated Sustainability Assessment Platform

CSIRO Sustainable Ecosystems

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Thank you

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