



# Australian energy market update

**October 2009**



## Outline

- **Renewable Energy Drivers**
  - **Renewable energy target**
  - **Emissions Trading / CPRS (Carbon pollution reduction scheme)**
  - **Interaction between the schemes**
  
- **Electricity Market**
  
- **Renewable energy development**
  - **Wind Energy**
  - **Solar Energy**
  
- **Community Values**



## The Policy Setting

## Fundamental drivers for renewable energy in Australia

### 1. Greenhouse gas emissions are continuing to soar

- Federal government is targeting a 60% reduction on 2000 levels by 2050

### 2. Growth in energy consumption requires new generation

- 2050 energy consumption is expected to be ~ triple 1990 levels

### 3. Greenhouse intensity (CO<sub>2</sub> per MWh) must therefore drop to ~15% of current levels

- Could be even higher requirement, other sectors more difficult to manage
- We have 40 years to achieve this
- Plant we are building today will still be operating then

### 4. To meet this target, all low and zero emissions options will be required

- Renewable energy
- Highly efficient combined-cycle gas
- “Clean” black coal (i.e. zero emission coal through emissions capture and offsets)

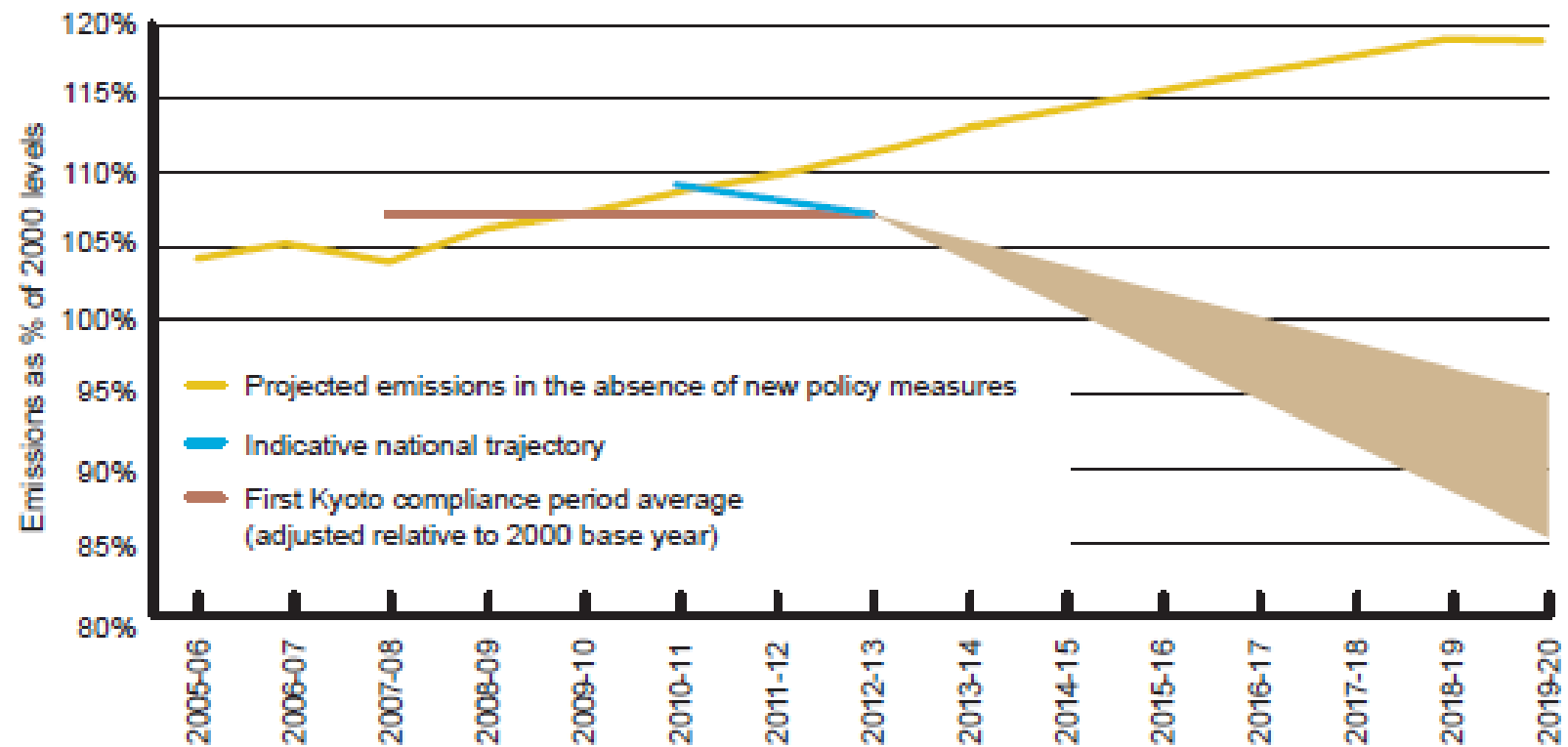
*Even a complete transition to “best-available” fossil fuel technology (e.g. 0.25T/MWh) will not meet greenhouse gas targets without at least 50% of electricity coming from zero emission sources*

## Government Response: Carbon Pollution Reduction Scheme (CPRS)

- **Government White Paper sets out the following core policy position:**
  - CPRS will be a Cap and Trade system
  - 2050 target GHG emissions cap 60% below 2000 levels
  - 2020 target GHG emissions cap between 5% and 15% below 2000 levels
  - Indicative trajectory has been outlined resulting in ~1% reduction per annum
  - CPRS will cover emissions from stationary energy, transport, industrial processes, waste, and fugitive emissions from oil and gas production (~75% of emissions and ~1,000 entities) from the start of the scheme. Agriculture expected in 2013.
  - Trade-exposed industries and fossil-fired power generators will receive special treatment through partial issue of free permits for an interim period
- **Current emissions are around 10% above 2000 levels, therefore this scheme proposes ~15-25% reduction from existing emissions levels**
- **CPRS is not currently supported by opposition parties and has not yet passed into legislation**

## CPRS Trajectory 2010 to 2020

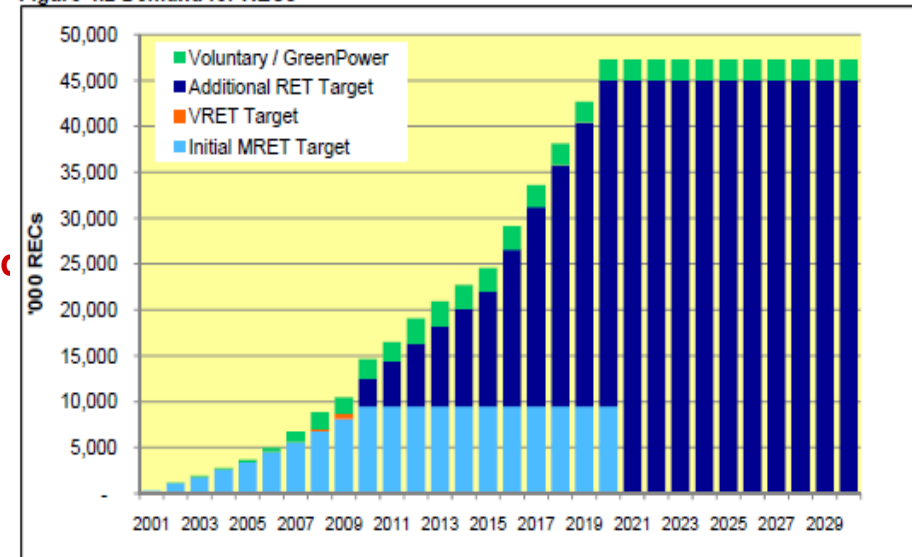
The 2020 target range and the indicative trajectory compared to projected future emissions



## Government Response: 20% Renewable Energy Target

- **20% renewable energy by 2020:**
  - AUD 25Bn in capital investment delivering generation of 45,000GWh
    - 15% of 2019/20 generation from new (300,000 GWh predicted by ABARE)
  - Entire net energy growth to come from renewables (mostly wind)
  - Estimate 8,000 – 10,000MW of wind energy required
  - Annual targets ramp up from 2010 to 2020
  - Banking of RECs gives an early mover advantage
  
- **The previous NRET target using the same model resulted in the target being met 5 years early**
  
- **Epuron predicts the 2020 target will be committed by ~2012 and operating by ~2015:**
  - Geothermal and solar thermal power can only play a small part in this timeframe (R&D status)
  - Domestic solar (PV, solar water heating) likely to be significant due to preferential treatment

Figure 4.2 Demand for RECs



## Epuron perspective: Interaction of RET and CPRS

- **RET is clearly the strongest short to medium term driver for renewable energy**
  - RET has already been legislated with defined renewable energy targets
  - These targets are fixed and likely to be met early (e.g. by 2015)
- **Political drivers mean that CPRS is likely to be introduced slowly with low impact for renewables**
  - Gradual reduction in greenhouse gas emissions (GHG) over 20 – 50 years
  - Small initial GHG reductions mean small initial cost of GHG abatement
    - *e.g. if 10% of emissions need to be eliminated at \$40/T, this increases coal fired generation costs by \$4/MWh from say \$50 to \$54/MWh*
  - As emissions targets bit more strongly the cost of abatement will increase, and the amount of generation requiring abatement increases
    - *e.g. if 50% of emissions need to be eliminated at \$80/T, this increases coal fired generation costs by \$40/MWh from say \$50 to \$90/MWh*
- **Epuron expects that somewhere in the period 2020 – 2030 the cost of generating electricity from coal will be similar to the cost of wind energy**
- **In the interim period, between 2015 and 2025 (say), Epuron expects that a further increase in the renewable energy target is likely to continue growth of the industry**

## Private Sector Response: MRET investment

- **20% renewable energy by 2020**
  - \$30 Billion in capital investment delivering generation of 45,000GWh
  - At 35% capacity factor, ~15,000MW of new renewable energy
- **Epuron therefore expects 5-10,000MW of new wind energy projects as a result of the target**
- **NSW is ~1/3<sup>rd</sup> of total Australian energy consumption**
- **NSW should therefore benefit from 1/3<sup>rd</sup> of the capital investment → \$10 Billion**
  - Jobs in rural NSW
  - Private sector investment in power industry
  - Upgrades to electricity transmission infrastructure → avoided draw on Treasury funds
  - Increased power generation base in NSW → diversity maintaining energy security
- **This comes at no additional cost to NSW consumers**



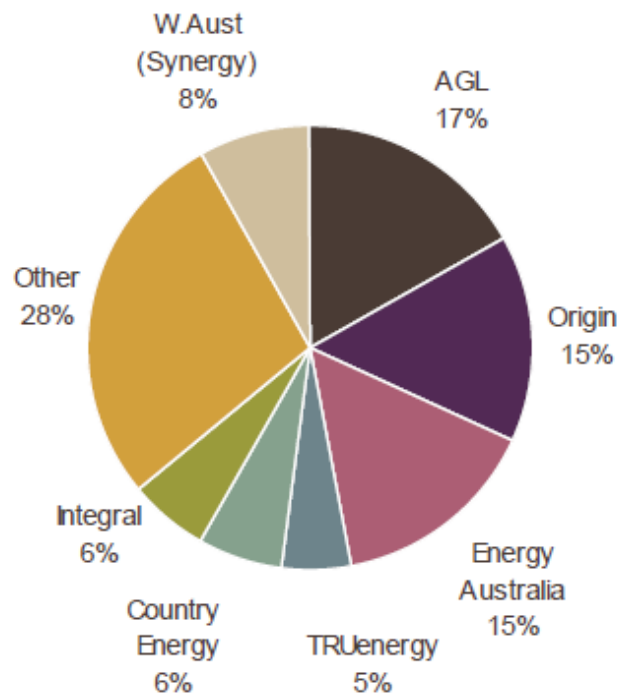
## The Market

## Market Dynamics

- **Privatisation of electricity sector is ongoing**
  - Role of government diminishing in both retail and generation
  - Government generally maintaining ownership of transmission / distribution
- **New generation capacity is required**
  - Strong growth in gas peaking plant
  - Proposals for new baseload, particularly in NSW
  - Strong growth in large scale renewable energy driven by government policy
- **While ownership of generation capacity is diverse, the retail market is concentrating over time into a small number of key players**
  - Market is therefore moving towards private sector integrated generator/retailer companies (“gentailers”)
- **Market wholesale pricing is done on a state by state basis**
  - Retailers want to purchase/generate electricity in the same state as their customers to minimise risk

## Electricity Retail Businesses

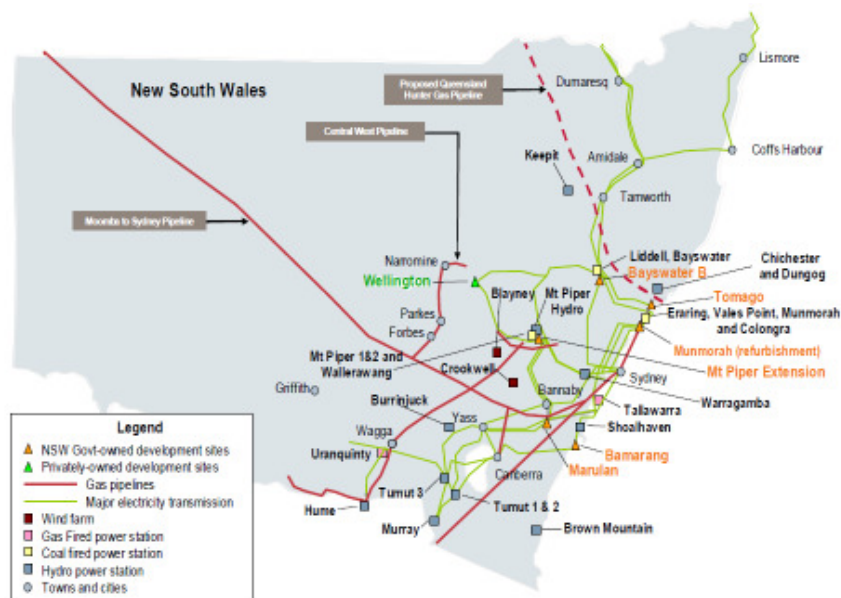
Estimated allocation of REC liabilities - 2009



Source: Roam Consulting

- **NSW government owned retailers hold ~30% market share. These businesses do not hold significant generation assets.**
  - Energy Australia
  - Country Energy
  - Integral Energy
- **WA, Tas, NT dominated by government owned retailers in each state**
- **Private sector retail is dominated by 3 generator/retailers:**
  - AGL Energy (ASX: AGK)
  - Origin Energy (ASX:ORG)
  - TruEnergy (owned by CLP Holdings)

## NSW Power System



- Majority of NSW power system remains owned by NSW Government
- Private sector generators and retailers are active but have limited capacity
- Around 90% of NSW power generation is based on black coal, 5-10% on hydro with smaller amounts from gas (peaking).
- NSW has extensive coal reserves but limited gas reserves, most gas is purchased from SA, Vic and (soon) Qld.
- installed wind energy capacity is 47MW with an 132MW under construction.



## Impacts of privatisation

- **NSW retailers are in transaction mode**
  - Not entering into long term REC off-take agreements
  - Appear to have REC liability covered for next few years (2010 target)
  - Appear uncovered for subsequent years (2020 target)
- **NSW government has expressed interest (though not commitment) in ensuring an additional retail company as a result of the privatisation**
- **Privatisation should therefore be positive for NSW wind energy companies:**
  - Re-entry of ~26% of the retail market into longer term REC negotiations
    - *Existing shortfall of REC cover of NSW retailers*
  - Possible establishment of additional retail company to increase competitive tension in selling sites / output

## Market impact on renewable energy development

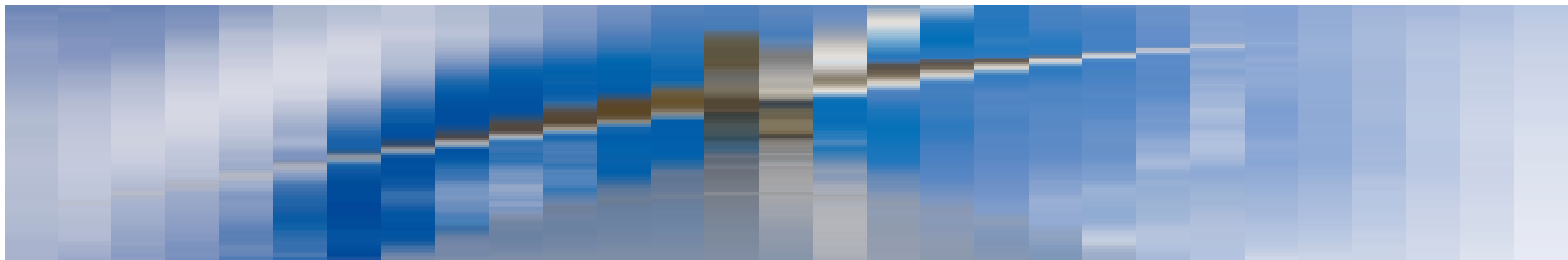
- **PPA / long term off-take market closed**
  - 3<sup>rd</sup> party finance therefore difficult
  
- **AGL / Origin are dominant players...for now**
  - AGL financing model is suspect
    - *Short term profitable, long term concerns expressed by ratings agencies*
    - *AGL is short of capital: need to raise new equity for NSW transactions*
  - Origin's development model is still not transparent
    - *Capital focussed on up-stream gas market*
  - NSW Government "absent"
  
- **Significant commercial uncertainty**
  - REC, electricity, GHG pricing
  - Privatisation / market players
  - AUD vs EUR; AUD vs USD
  - Recovery of debt and equity markets



## Renewable energy development

## Wind Energy is able to deliver

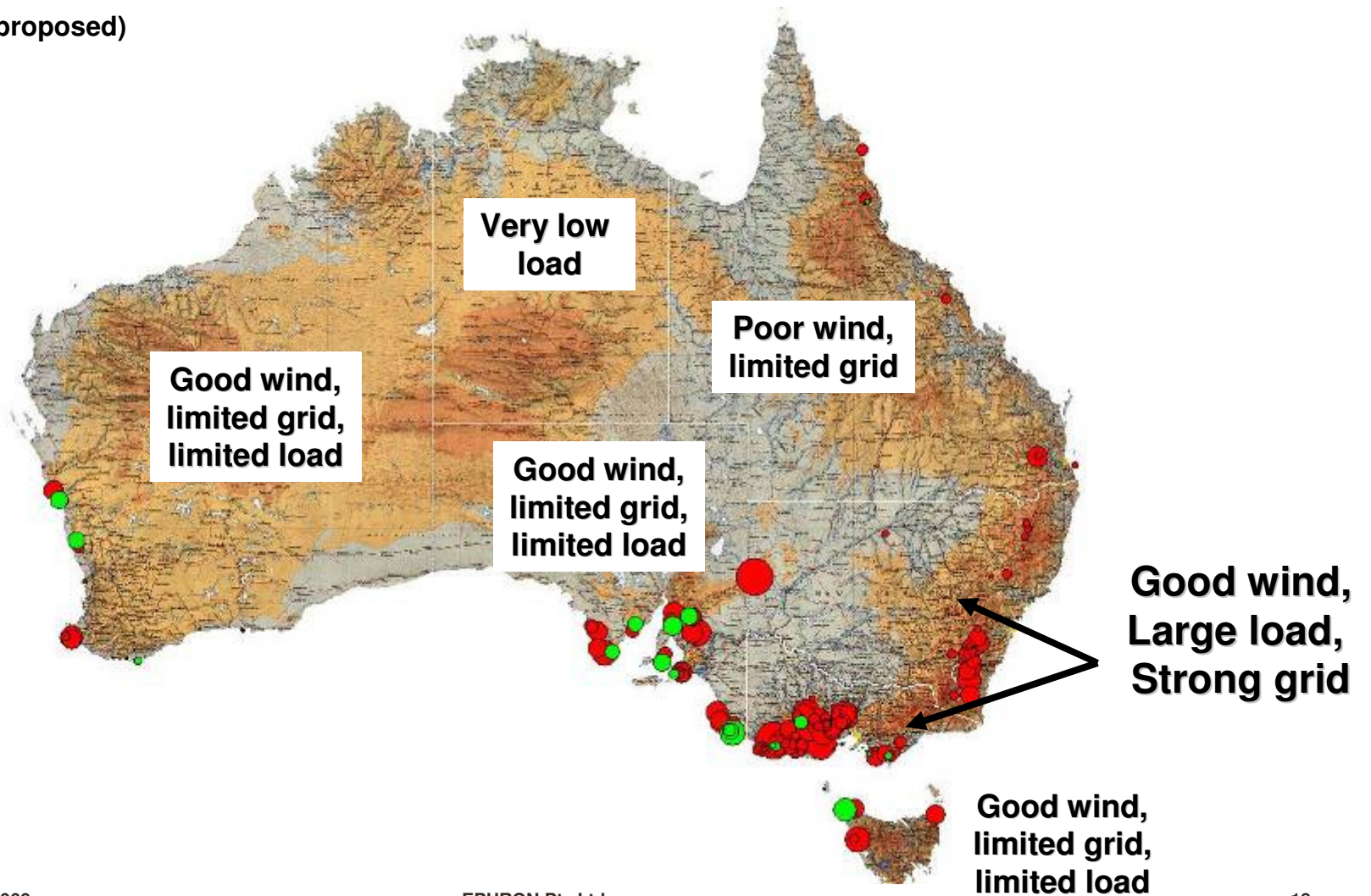
- **Proven technology with long term market experience**
  - >100,000 MW installed world-wide
  
- **Vast energy resources within Australia**
  - >>10,000 MW in NSW alone at excellent wind speeds (7.5 – 8.5m/s)
  - Generally close to existing grid
  - Inexhaustable resource → long term infrastructure
  
- **Predictable, reliable energy flows**
  - Forecasting on 1hr, 3hr, 6hr, 24hr basis....



## Proposed wind farms

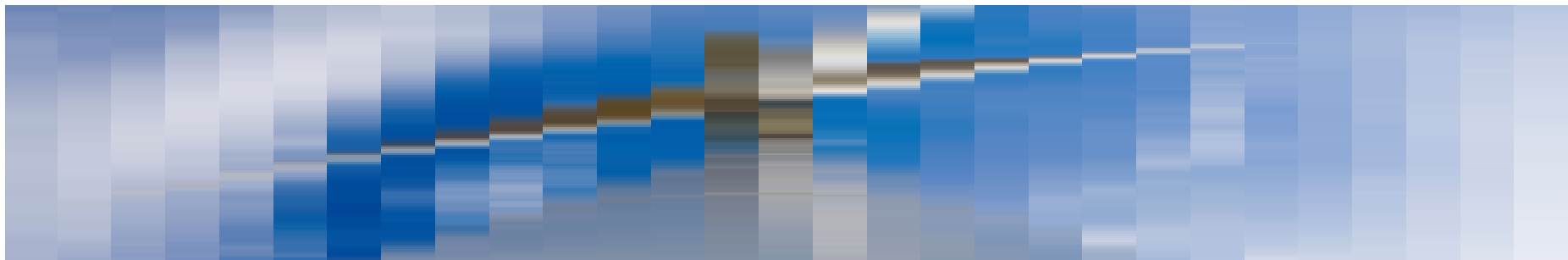
(dot size denotes project scale)

( ● = existing, ● = proposed)



## Solar Energy is a proven resource is able to deliver

- Proven technology with proven long term market experience
  - Photovoltaic (flat plate, tracking)
  - Solar thermal (trough)
  
- Vast energy resources within NSW
  - Excellent solar energy resource in regional locations
  - Inexhaustable resource → long term infrastructure
  
- Predictable, reliable energy flows
  - Forecasting on 1hr, 3hr, 6hr, 24hr basis....



## Options for large scale solar investment

- Large scale solar (e.g. 50 – 250MW solar thermal plants)
  - Demonstrate solar thermal technology
  - Benefits due to summer peaking
  - Benefits to regional transmission system → avoided upgrades
- Medium scale solar (e.g. multiple 5 – 10MW photovoltaic plants)
  - Reliable, dependable technology
  - Spread benefits / jobs / investments to multiple regional communities
- Off-grid solar (1-20MW photovoltaic plants) providing low cost electricity in remote towns, mine sites operating on diesel gensets
- \$1.5Bn Federal grant funding announced → “Solar Flagships Program”
  - Details not yet available, appears likely to be split into two funding rounds for existing and up and coming technologies



## Community Values

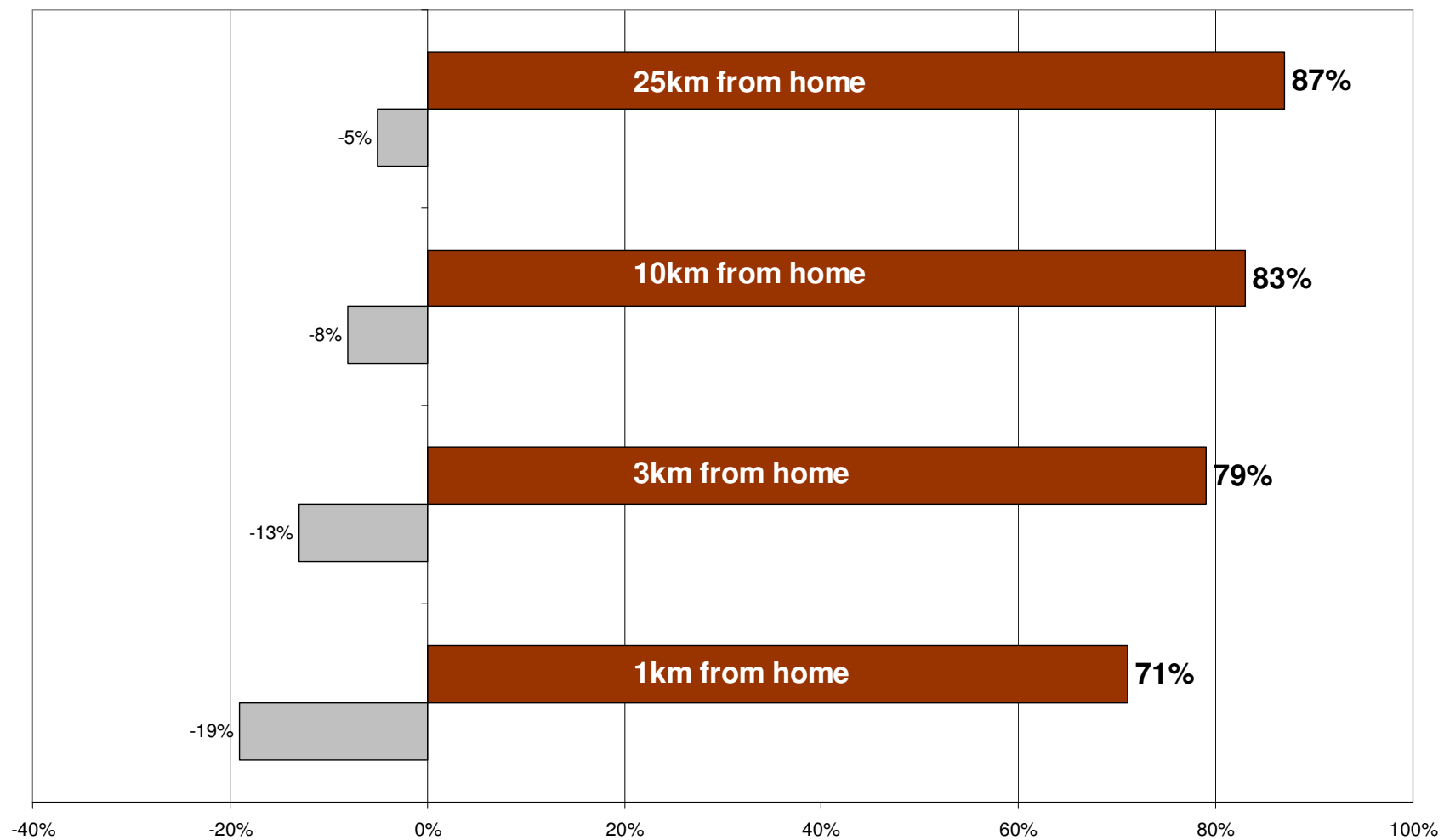
## Community Survey

- Research consultants REARK Research undertook a community perception survey on behalf of EPURON
- The survey targeted residents of the Goulburn – Crookwell – Yass region of the Southern Tablelands where there is an existing wind farm and where the majority of current wind farms are planned in NSW
- The research included 300 telephone surveys of randomly selected adults living in this region
- Questions were developed by REARK Research with input from EPURON and its visual impact consultant ERM
- The surveys were carried out during evenings and on the weekend over a 1 week period from 27 July 2007 to 2 August 2007

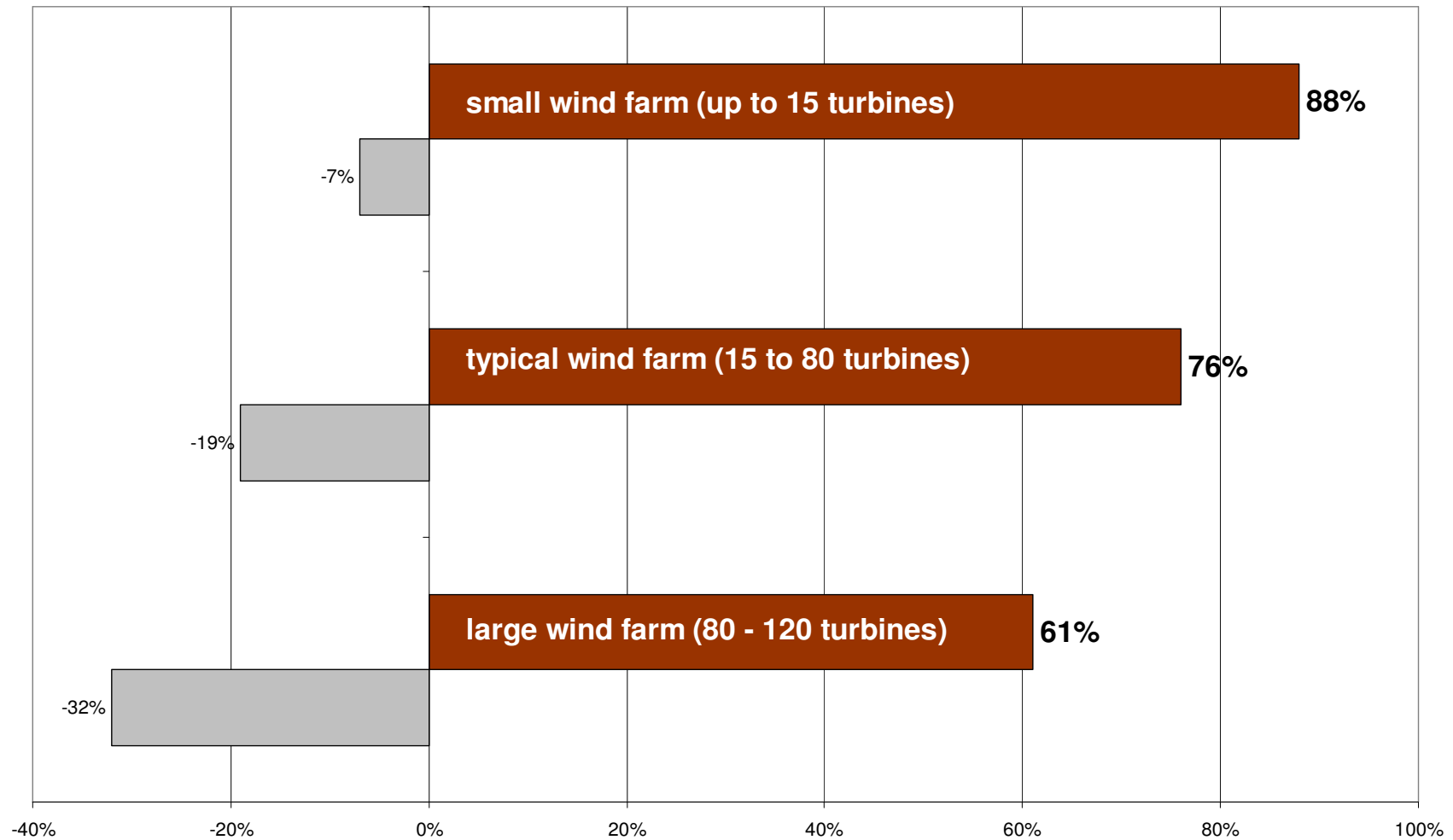
## Survey Results: Attitude to Climate Change

- 90% of respondents were aware of announcements of wind farms to be built in the Southern Tablelands and 90% of respondents had seen a wind farm.
- 80% of respondents are **concerned, right now, with the threat of global warming**
- 50% of respondents felt **“Global Warming is a serious and pressing problem and we should be taking steps now even if this involves significant costs”**
- 91% agreed **“We need to use wind power as a source of clean energy even if it means changing the appearance of some landscapes”**
- 89% of respondents were **in favour of wind farm projects being developed in the Southern Tablelands**. Of this, 51% were strongly in favour. 5% were opposed.
- 83% agreed **“I would be happy to see a wind farm built on land near where I live”**

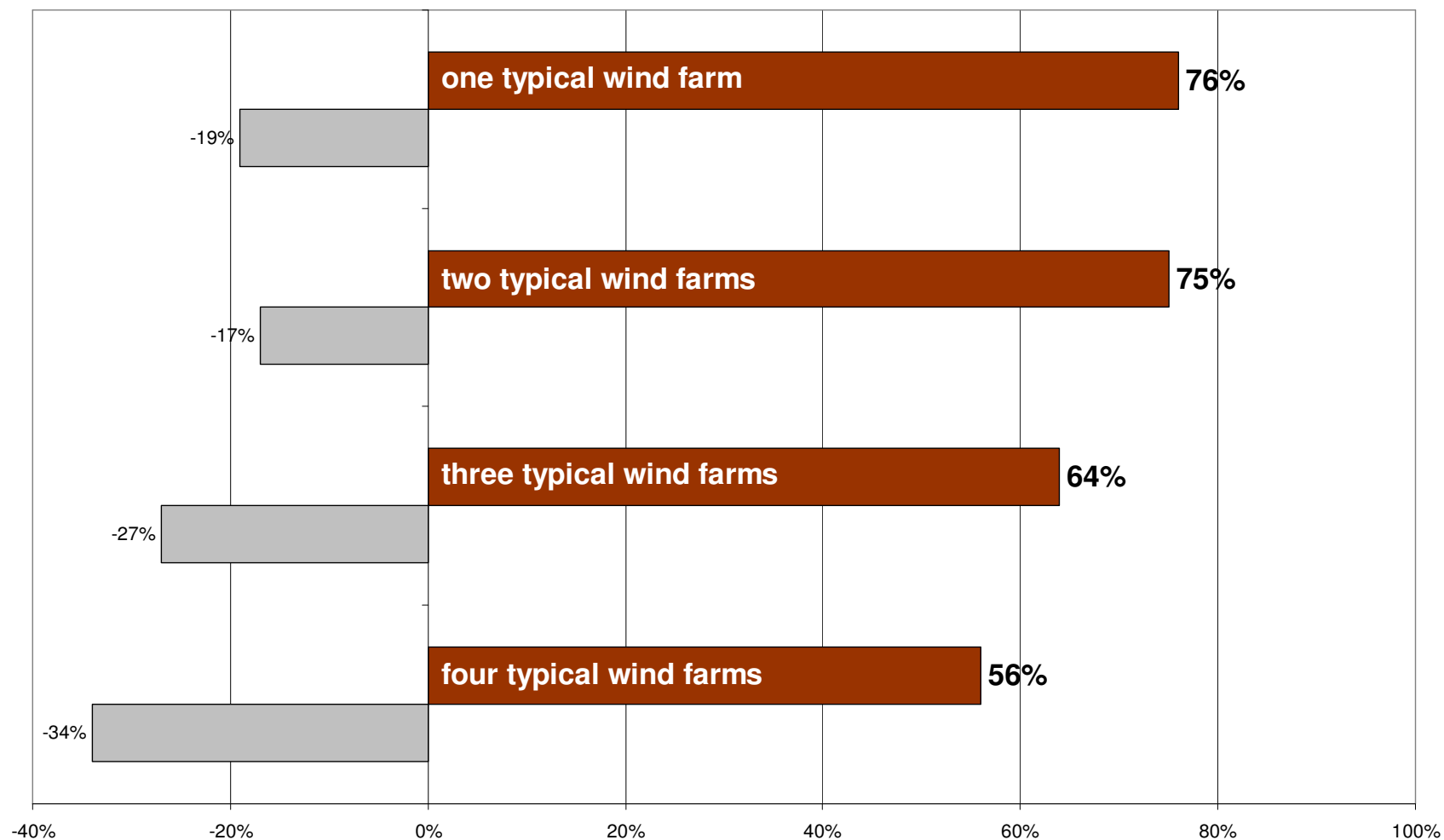
**Favour or oppose a wind farm located x km from your home**



**Favour or oppose a wind farm of various sizes**



**Favour or oppose a number of typical wind farms within your local rural area**



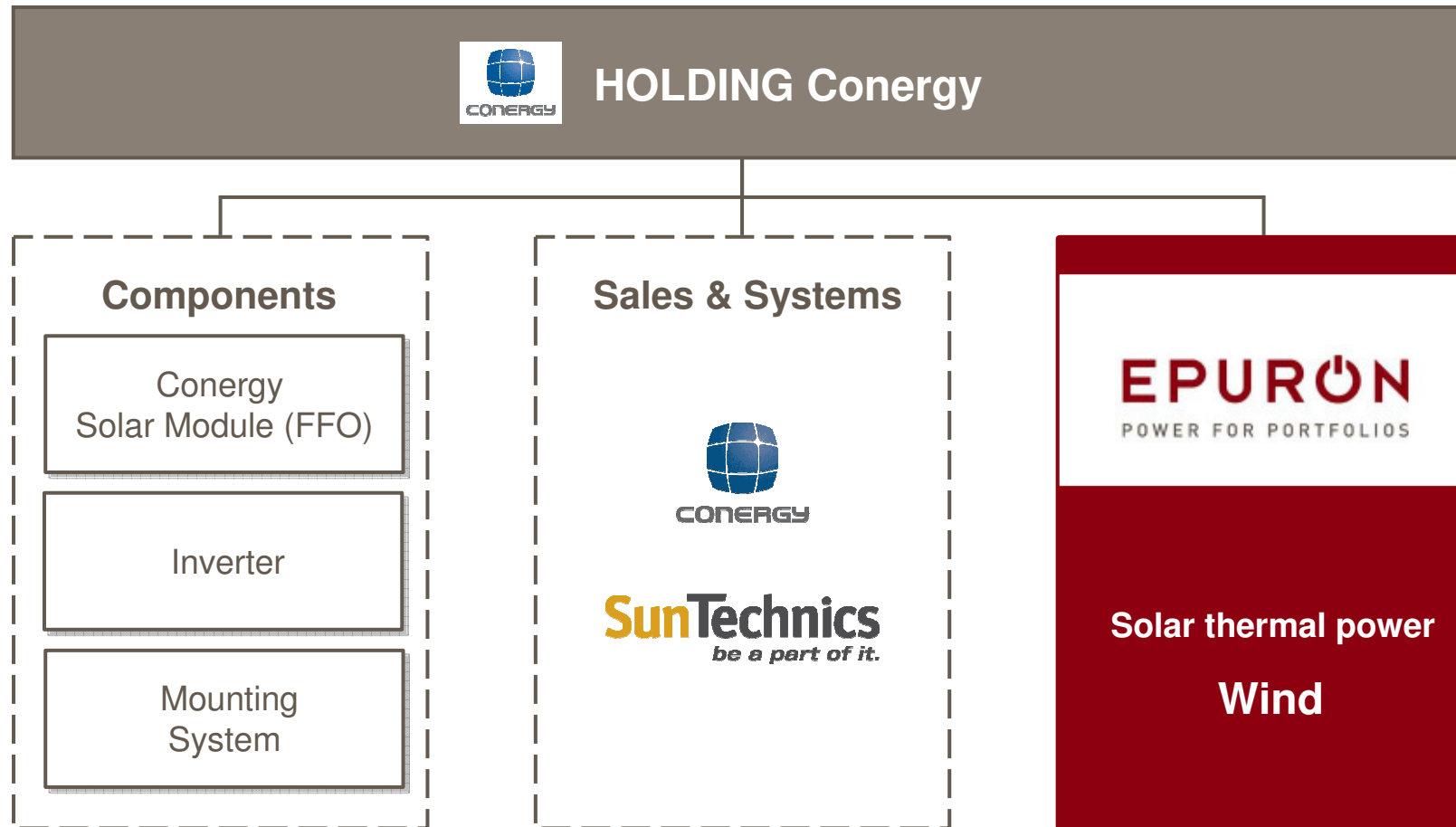
## In conclusion...

- *“Given the size and geographic scope of the Southern Tablelands, the five prospective wind farm developments in the area run across many ‘local rural areas’ and judging from the 89% who favour these developments in the Southern Tablelands they should attract nothing other than the full endorsement of a clear majority of residents in the Southern Tablelands”*

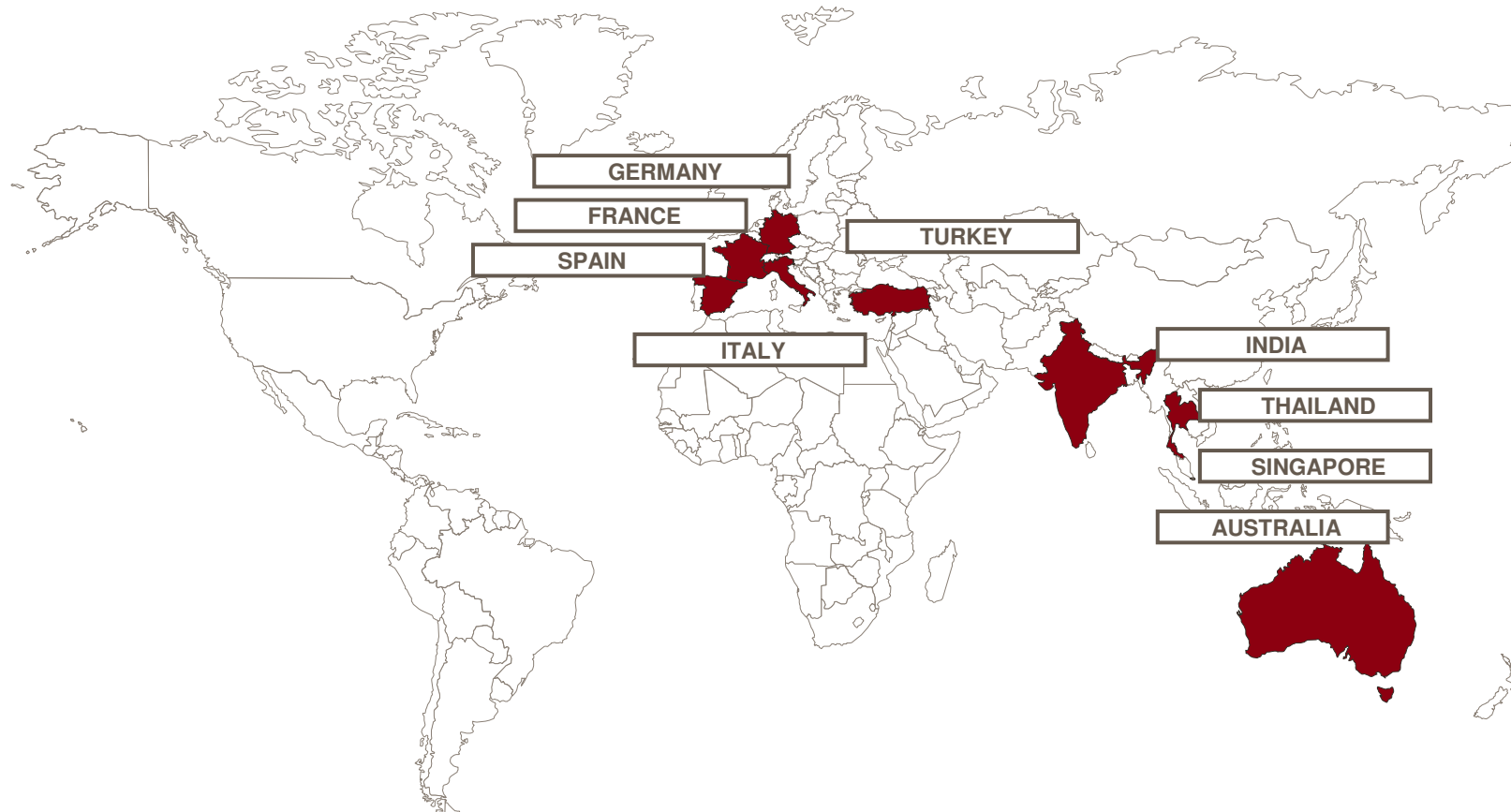


## Epuron's NSW Developments

## EPURON is a division of Conergy AG



## EPURON GmbH has subsidiaries in 8 countries



## EPURON Australia focuses on low risk technology with strong commercial markets

### Wind Energy



- Leading wind energy developer in NSW
- Pipeline exceeding 2000 Megawatts
  - ➔ Expanding to >4000 Megawatts
- Technology neutral

### Solar Energy



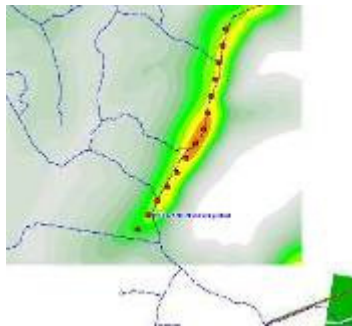
- On-grid and off-grid market, utility scale
- Solar photovoltaic and solar thermal
- Technology neutral

## Epuron has sold 3 wind farm developments to utility Origin Energy



### Projects sold in 2007 to Origin Energy

- **Cullerin Range Wind Farm (Commissioned Q2 2009)**
  - 30 MW near Goulburn, planning consent Feb 07
- **Conroys Gap Wind Farm**
  - 30 MW near Yass, planning consent May 07
- **Snowy Plains Wind Farm**
  - 30 MW near Berridale, planning consent Dec 05
- **First option for additional 500MW projects**

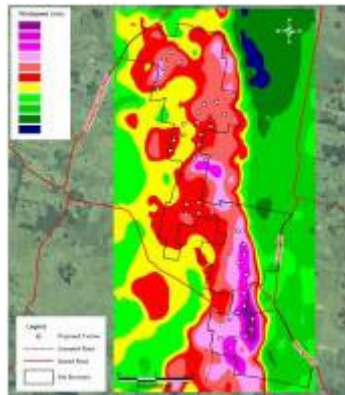


## ...with more projects under development

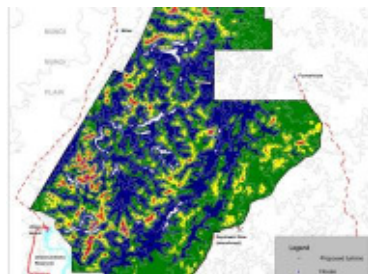


### Gullen Range Wind Farm

- o 73 - 89 turbines, 200-250MW near Goulburn, NSW
- o Annual Generation: 500-600GWh
- o 330kV transmission line on site
- o Development consent received Q2 2009
- o Grid Connection application underway
- o Estimated Capital: \$400 – 500M



## ...with more projects under development



### Silverton Wind Farm

- o Joint Venture with Maquarie Capital
- o Located near Broken Hill, western NSW
- o Australia's largest wind farm
- o 598 wind turbines, >1000MW
- o 4.5% of NSW energy consumption



## ...with more projects under development



### Yass Wind Farm Development

- o 182 turbines, 400 - 500MW near Yass, NSW
- o 3 precincts with separate connections
- o 132kV transmission lines on site
- o Development application lodged April 09
- o Estimated Capital: \$1.0 – 1.5Bn





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