

Supplying Power to Australia's Wireless Networks

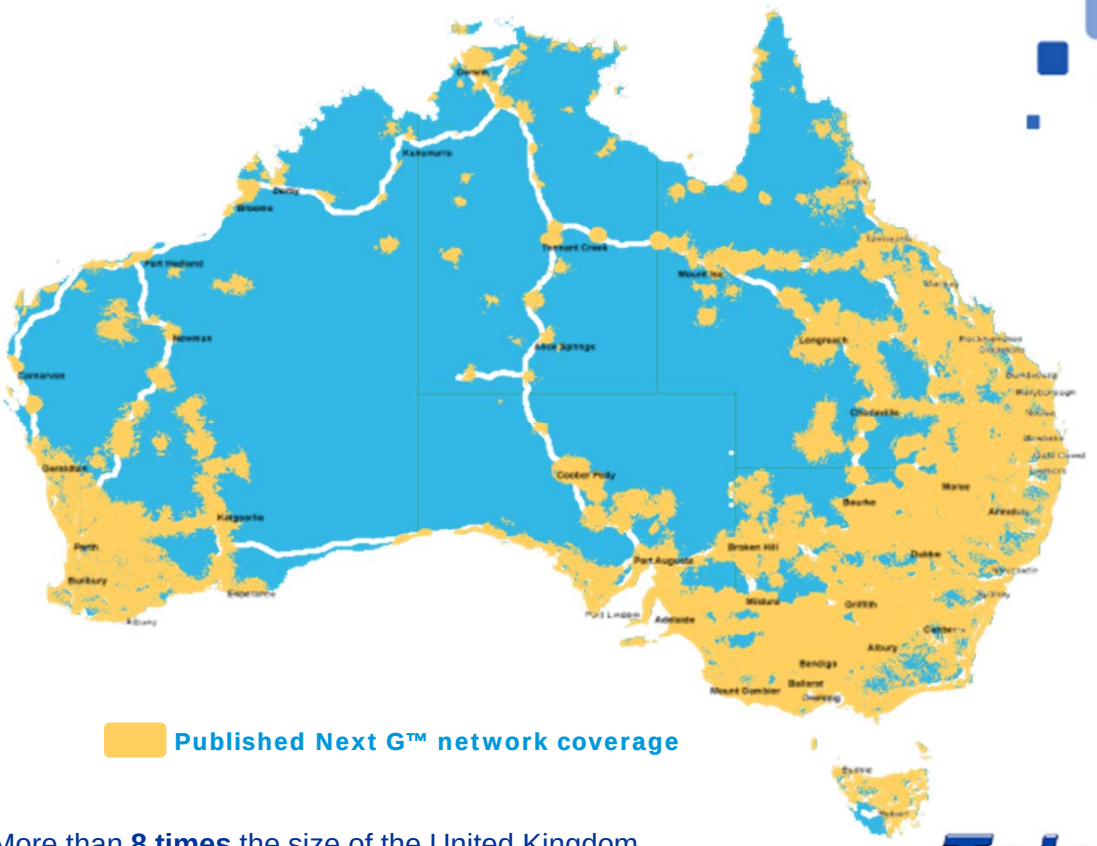
John Romano,

Director Wireless Operations

Telstra Corporation Ltd

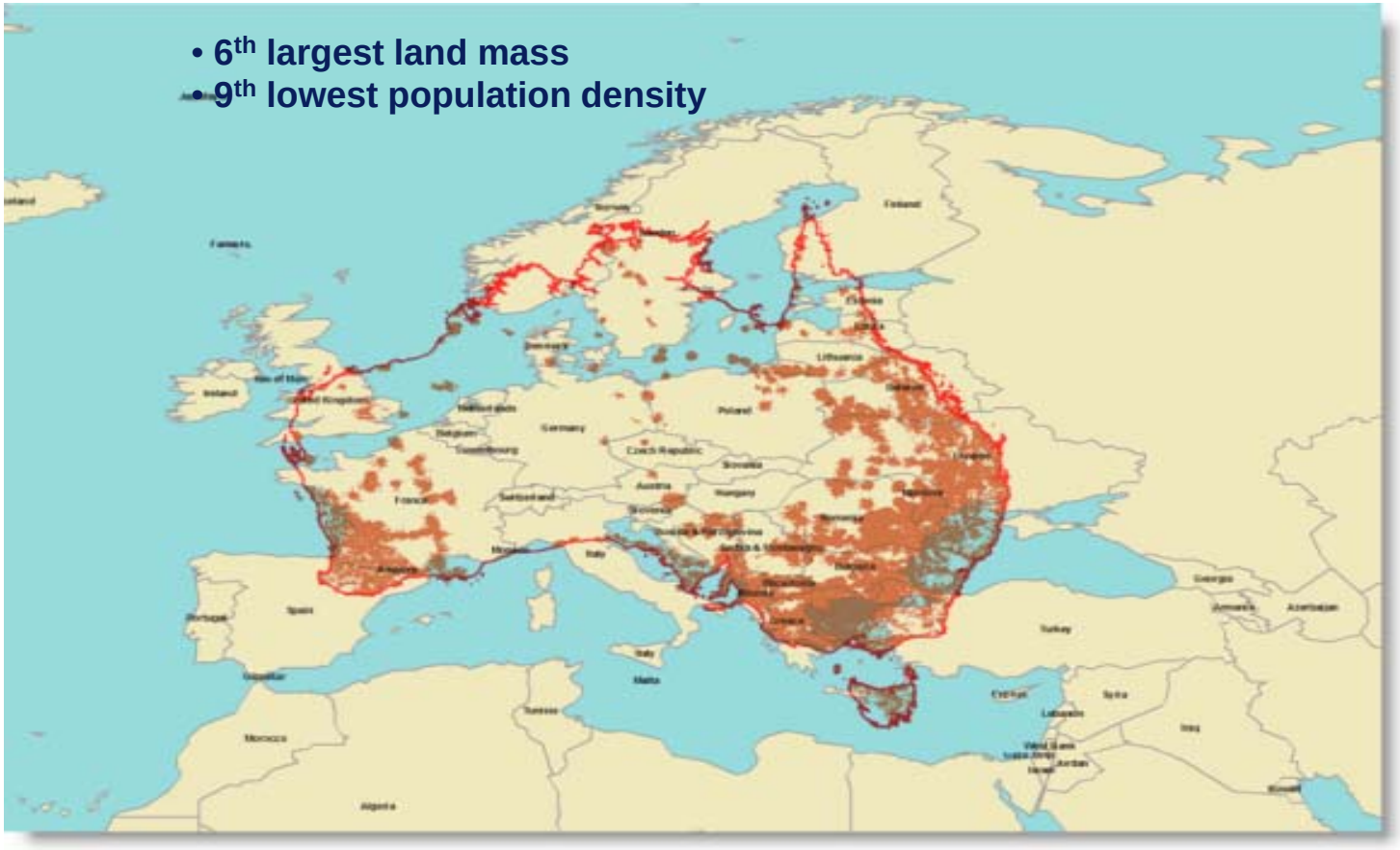
Next G™ network coverage footprint

- Coverage to 99% of Australians at 850MHz
- More than 6,500 base stations
- More than two million square kilometres*
- 14.4/1.9 HSDPA/HSUPA today
  - 21/5.9 by end 08
  - 42Mbps by end 09
- More than 80 devices, including iPhone, BlackBerry Bold, HTC Touch Diamond & Palm Treo Pro



*More than **8 times** the size of the United Kingdom
*More than **6 times** the reach of our nearest 3GSM competitor

The Telstra Challenge



Telstra's wireless transformation



- Single, national city to country network
- 850 MHz spectrum, 100% HSPA
- Built on a new, lower unit cost platform and globally-dominant technology roadmap
- National standard designs used for simplicity, cost benefit and fast deployment

Solar Deployment in Australia

- More than 10,000 solar deployments.
- Deployments include:
  - Fixed radio terminals
  - Small repeater stations
  - Payphones
  - Wireless sites
  - Small network exchanges.
- Majority of deployments are in remote locations.



Solar Wireless Network Deployment



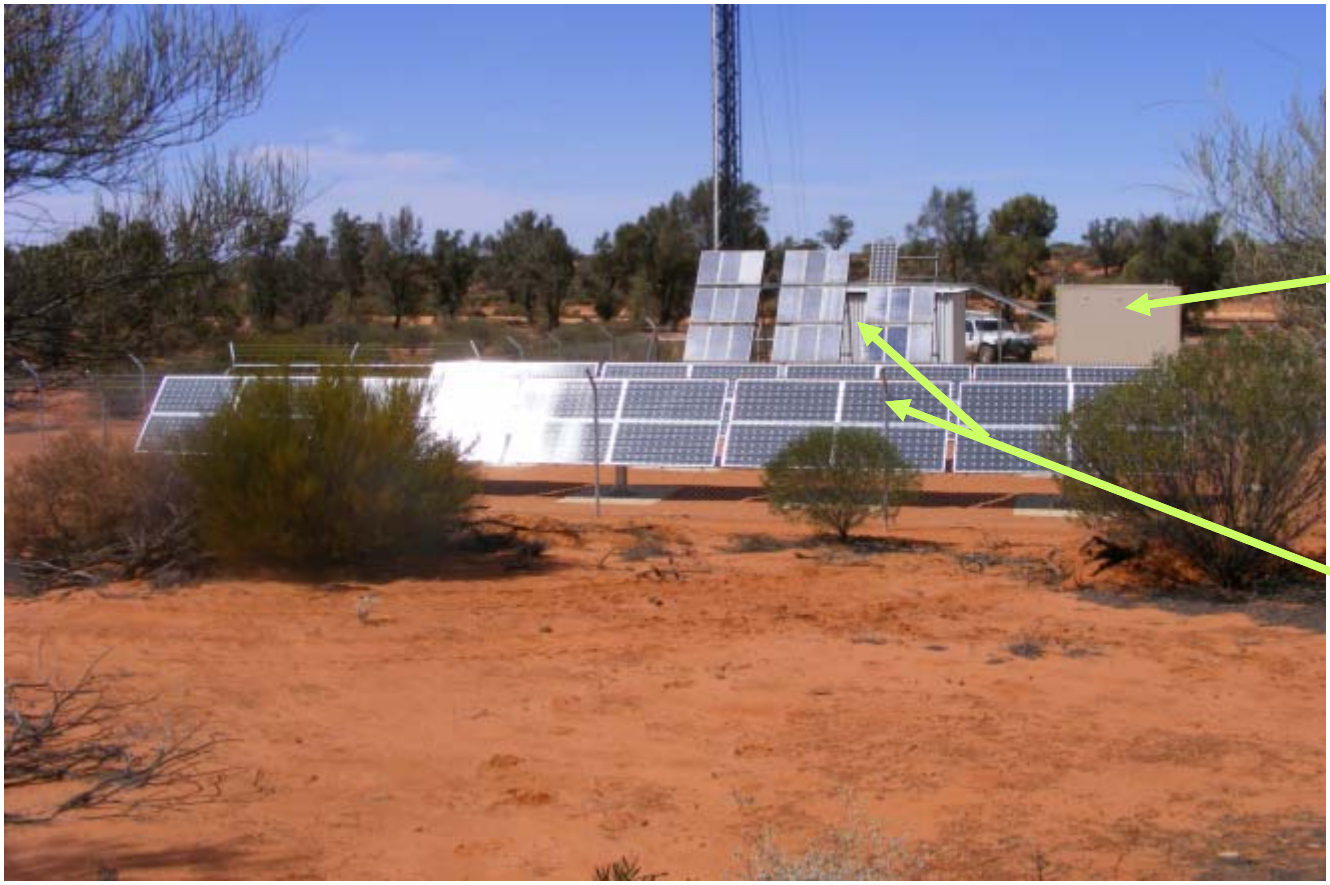
BENEFITS

- Provides Wireless network coverage in locations where no mains power exists.
- Enables coverage to remote locations and towns throughout Australia.

ISSUES

- Wireless Networks Sites require high energy requirements in comparison to Fixed Radio/ Repeater/Small Network Sites.
- Solar deployments are costly:
  - Requires high number of solar panels
  - Significant investment in batteries to support solar panels
  - Ongoing battery maintenance required
  - High cost of construction

Solar in Remote Australia



Battery investment required for backup to solar panels

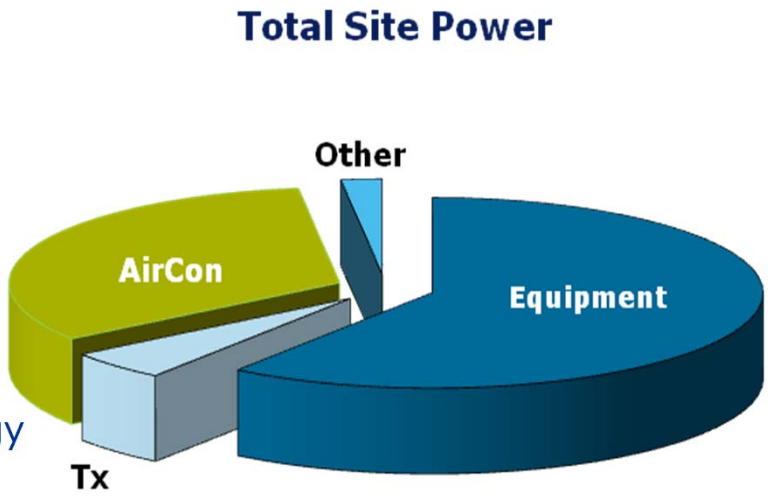
Solar panels to support basic BTS design

Utilising Alternative Energy Sources

Encouraging further use of alternative energy sources involves two key elements:

1. Reducing the energy required to operate a wireless BTS.
   - *As the energy required is reduced, the application of an alternative energy source becomes viable.*

2. Reducing the unit cost of supplying alternative energy
   - *Current costs to provide energy sources like Solar, Hydrogen cells, etc are costly*



Reducing Energy Consumption



WHAT'S HAPPENING IN TELSTRA'S NETWORK NOW

- Reducing the energy consumed in cooling a wireless network BTS.
- Exploring and introducing new BTS technologies and site designs.
- Reducing power consumed during low traffic periods

Reducing Energy Consumed in Cooling

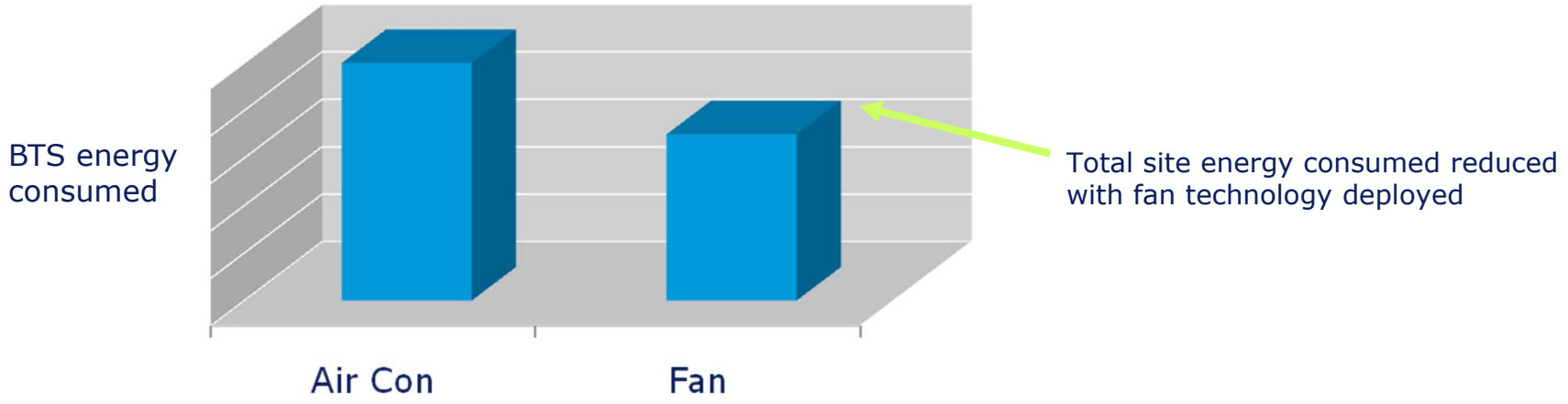
- Integrating fan technology with air conditioning cooling.
  - Included in **all** new base station deployments
  - Exploring retrofit options for existing sites
- Utilises outside fresh air to cool site.
- Removes requirement for extensive air conditioner use.
- Switches in air conditioner if temperature levels increase.
- Increase site thermostat temperature by 3-5 degrees.



Telstra

Achieving the Benefits – Fan Technology

Current deployments indicating a reduction in energy consumption by around **24%.**



Air conditioner was switching in/out **2000** times a week. Now it switches in/out **30** times.

Air conditioner lifecycle will increase significantly.

New BTS Technologies



- Radio units external to hut
- Requires less cooling and minimises feeder loss
- Trials indicate less power is consumed to provide required performance levels

New BTS technologies with improved design:

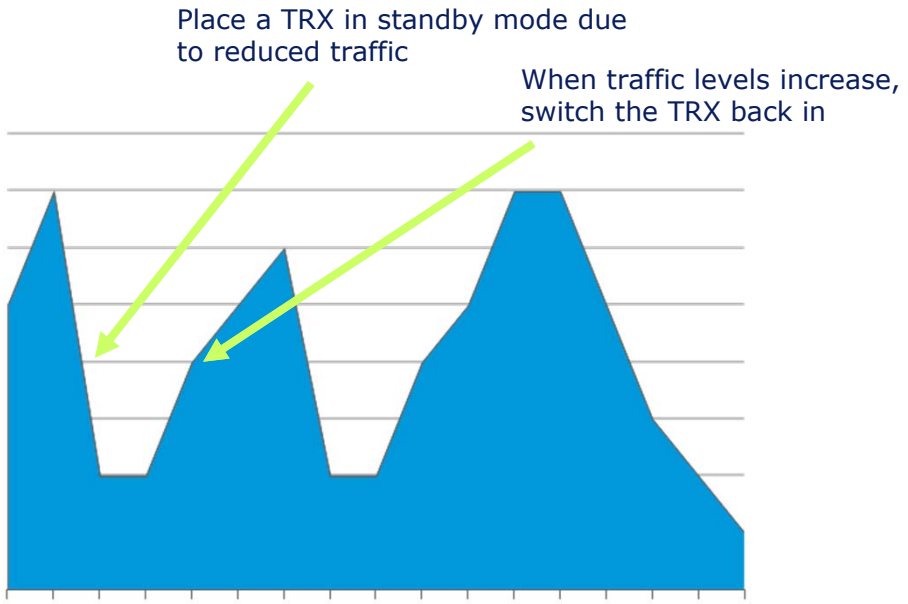
- Less power consumption to operate against existing technologies.
- Less cooling required as remote units are passively cooled.
- Less RF power loss to achieve performance criteria.

✓ Total energy reduction **>30%** compared with traditional BTS

✓ **10%** reduction in construction cost

Saving Energy – Low GSM Traffic Periods

- During low GSM traffic periods not all TRX equipment is required.
- Place certain equipment into standby mode during low traffic periods.
- If traffic levels increase, switch required equipment into operation.
- Some vendors providing this capability.
- Telstra currently assessing benefits and risks associated with this.



Summary



- Decreasing the power required to operate a Wireless BTS will:
  - *Provide opportunity for further deployment of Solar Power and other alternative energy sources.*
  - *Reduce today's Wireless networks energy consumption levels per BTS.*

- Telstra Wireless is reducing energy consumption now through a series of initiatives.
  - *Improving Cooling capability*
  - *New BTS technologies & designs*
  - *Power reductions through improving equipment efficiencies.*

- Further work is required with vendors to reduce the unit cost of providing alternative energy sources.
  - *This will further promote the utilisation of alternative energy sources including solar, wind, hydrogen cells, etc.*


Telstra