Global decline in world electricity demand – efficient smart cities need less energy.

Prof Ray Wills

Director and Partner Duda&Wills

Chief Adviser Sustainable Energy Association of Australia

Adjunct Professor The University of Western Australia



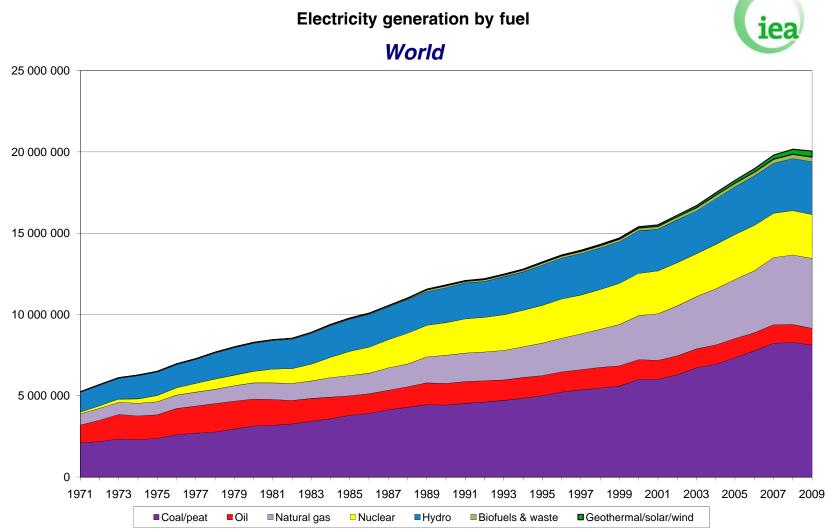




Global electricity ...

IEA Energy Statistics

Statistics on the Web: http://www.iea.org/stats/index.asp

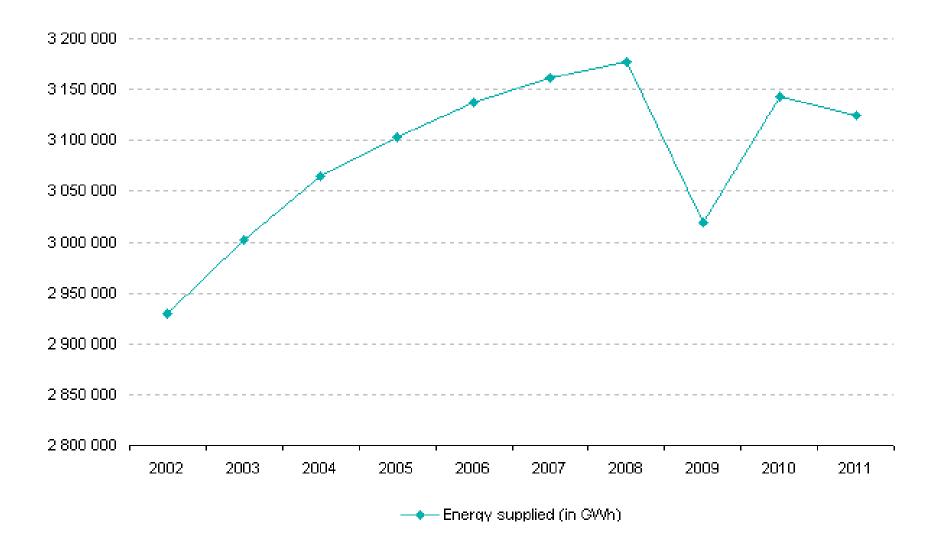


© OECD/IEA 2011

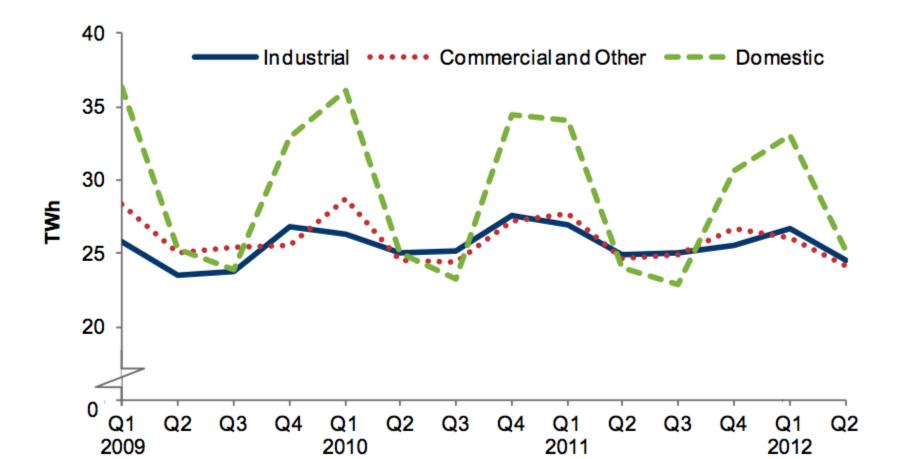
GWh

For more detailed data, please consult our on-line data service at http://data.iea.org.

Global electricity growth - Europe

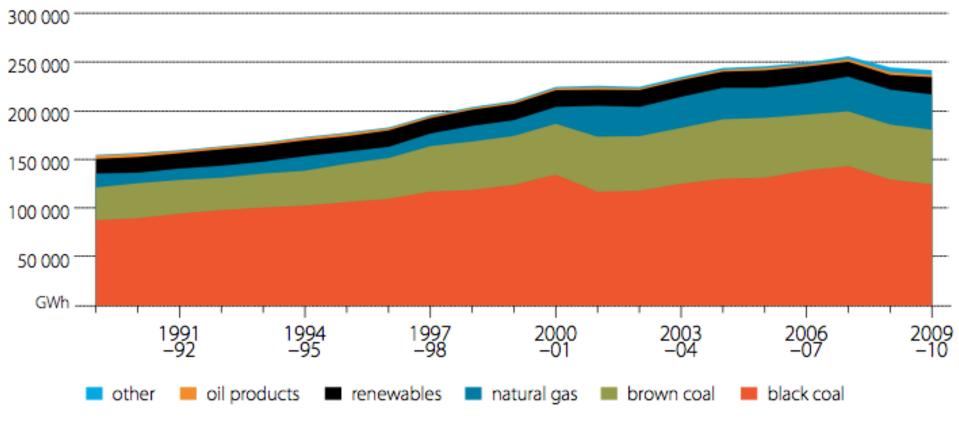


Global electricity growth - UK Chart 5.4 Electricity Final Consumption



Australian electricity ...

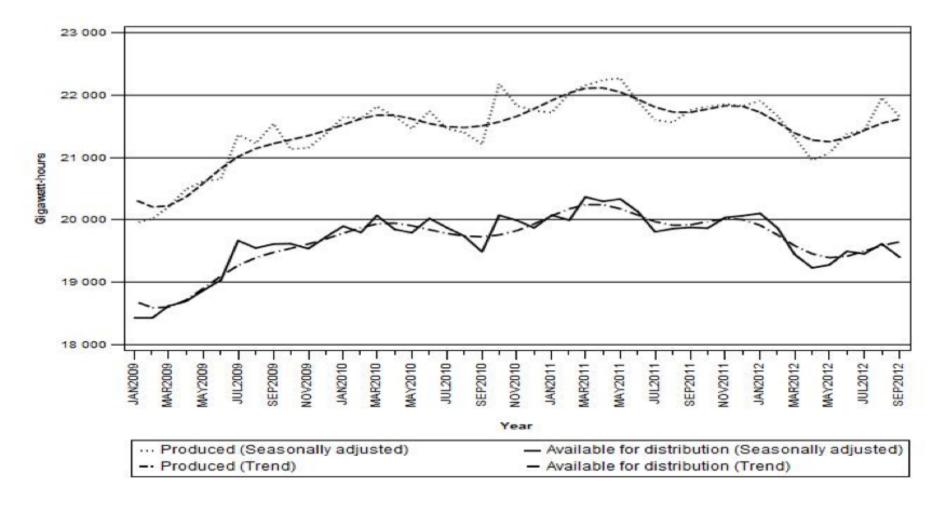
Australian electricity production, by fuel



Data ABARES

South Africa electricity 2012...

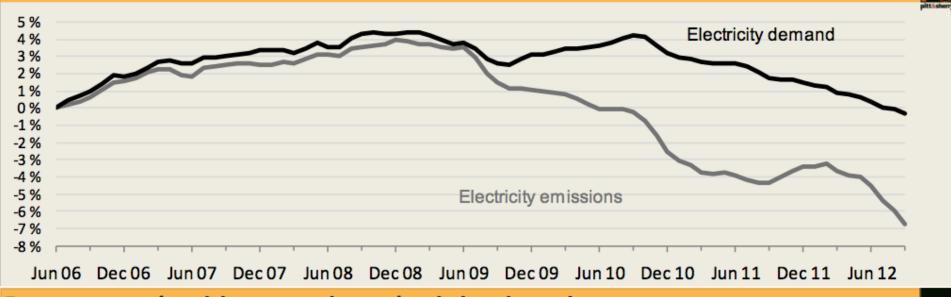
Figure 1 – Electricity produced and available for distribution in South Africa, seasonally adjusted and trend



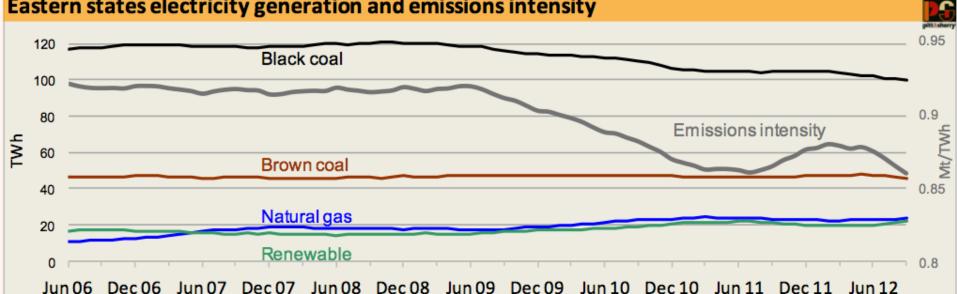
PJ Lehohla Statistician-General, Statistics SA Sep 2012

Australian electricity consumption 2012...

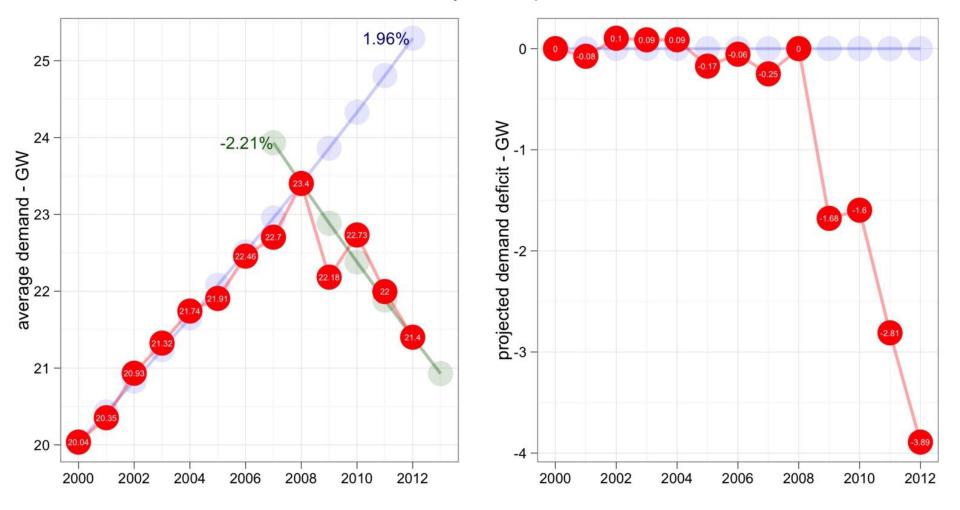
Changes in electricity generation and emissions



Eastern states electricity generation and emissions intensity



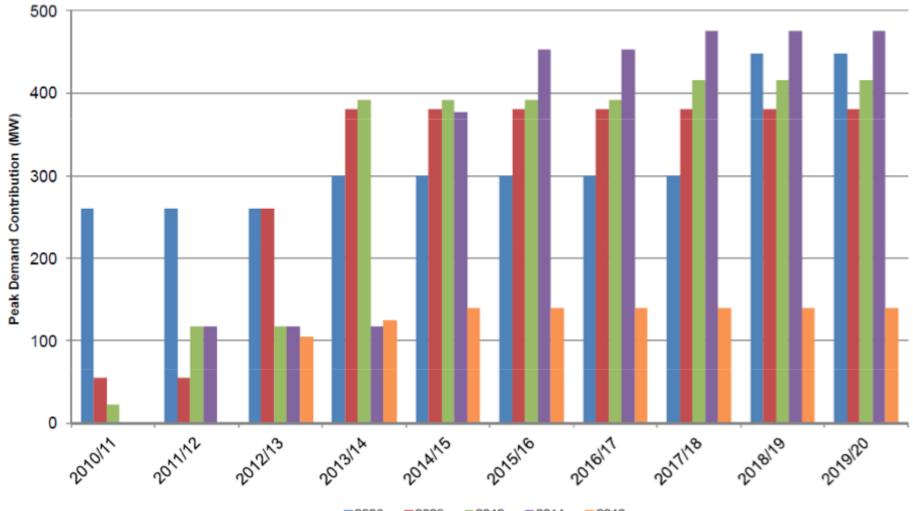
Australian electricity demand 2012...



NEM : 1-July to 30-September

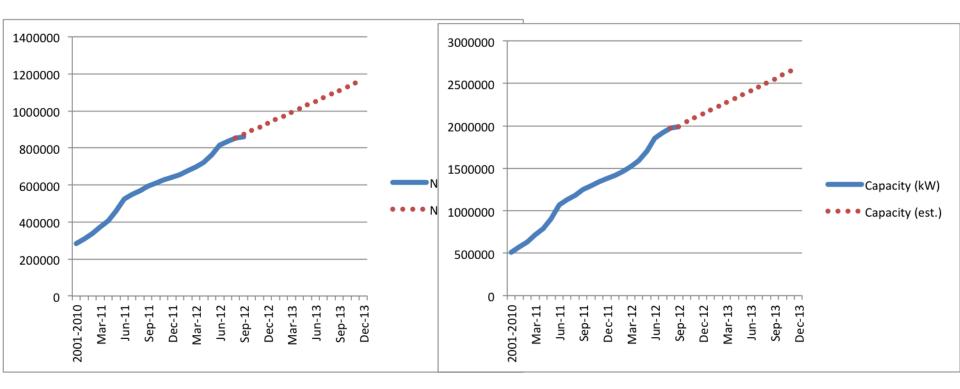
Data AEMO

Electricity market projections – WA



■2008 ■2009 ■2010 ■2011 ■2012

Solar on Australian homes

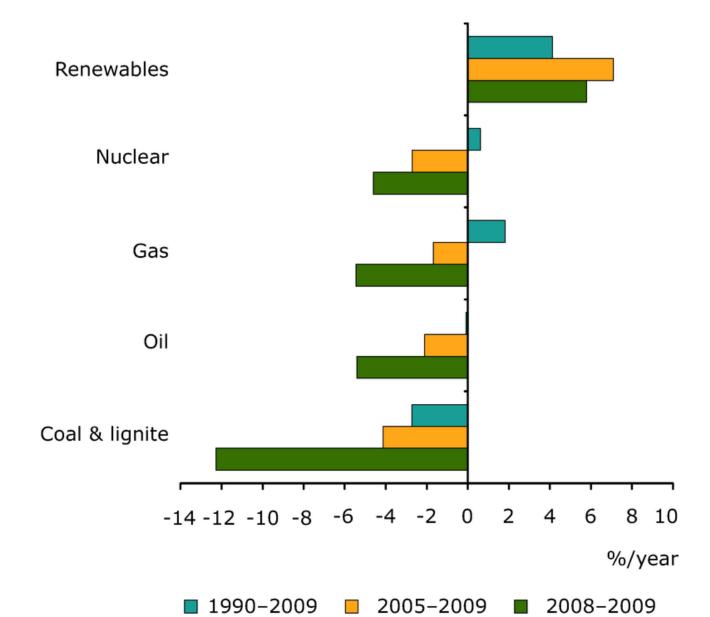


Technology energy use

Annual Electricity Energy Consumption (in kWh)



Global electricity growth



Rapid change - - - - - - Personal mobility





Private transport

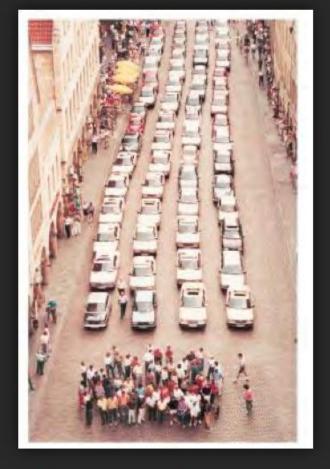
- Fuel efficiency, other energy sources
- Transport
- Energy storage key
- New technologies may be disruptive





City of Münster, Planning Department Comparison of amount of space required to transport 72 people







72 bicycles = 90sqm Based on 1 person per bike 60 cars = 1000sqm Based on 1.2 people per car 1 bus = 30sqm Based on 72 people per bus

Commercial vehicles

Smith Newton electric truck Mega electric diesel hybrids •London Bus •Haul Pak + Earthmover •Mitsubishi Fuso •Honda prime mover

















Flying and floating fuels

- February 25, 2008 –
 Virgin Atlantic Stages the First Biofuel Flight
- October 30, 2007 U.S.A.F. Tests New Synthetic Fuel on Plane
- February 14, 2011 Qantas follows US Military to algae biofuels
- September 13, 2011 US Navy announces by 2016 Green Strike Group, powered by renewable diesel-electric engines, nuclear power and aviation biofuels, is able to operate independent of fossil fuel supply line threat or disruption





Smart grids, smart houses (and farms)

- Integrated energy planning
- Smart grids to coordinate the actions of devices such as loads & generators



Green cities

Global

- Tianjin Eco-City China
- Ulsan Ecocity Korea
- Masdar City UAE

Australia

- City of Sydney 70% CO2 reduction by 2030
- City of Melbourne
- Stirling City Centre, Perth
- City of Cockburn
- City of Fremantle
- Yanchep 2 x 100 000
- Local government critical









www.seaaus.com.au

The Sustainable Energy Association of Australia thanks all SEA members for their support including our sponsoring members acknowledged below:

Platinum Members NISSAN Jackson McDonald HYUNDAI **First Class Legal Service Corporate Members** Careers BGC ALL- ENERGY Australia OLLGAR **BrightGeneration** bhpbilliton **Education and Training** ronius **Curtin University** DUDA&WILLS HORT70 **Business Government Sustainability** HYPERION SHIFTING THE LIMITS POWER ENERGY Infinite energy NEXTPOWER **RioTinto** LGF LANDFILL GAS & POWER screentech perthenergy (2) SUNPOWER westernpower W **WorleyParsons** THE UNIVERSITY OF **Swan Energy** WESTERN AUSTRALIA resources & energy Wesfarmers

Probono legal advice provided by Jackson McDonald Lawyers

understand energy global de g Prime Minister 🤕 🖬 principled develop and moperate honesty experiencepotential -Western Australia Western Australia ing greenhouse regulation reputation trusted_{recycle} respect^{Wills} markets briefing construction Construction ct resources 0 Duda ar Estakeholder nad te Government productivity ly commerci ederal Government Parliament *+*Premier JOVERnment Premier e-based advocacy consult rofessional opportunity obligations pport respected B. prepare f attain rategica build pattain ground alignment comenetwork bureaucracy ion represent H. B. Constituents vrelationships a eputable facts 2 2 3 echevidence 83 cLocal Government 💐 dership valued urgent minimise investment environment Australia

understand energy global accessapproval Prime Minister consultation initiate science principled reformoperate honesty quality experience potential education effective mining safety specialist finance lobby facilitate education effective mining safety specialist finance lobby facilitate effective mining safety specialist finance lobby facilitate effective mining safety finance lobby facilitate finance lobby facilitate effective mining specialist finance lobby facilitate finance lobby facilitate finance lobby facilitate effective specialist finance lobby facilitate finance lobby facilitate finance lobby facilitate effective finance lobby facilitate finance lobby finance lobby facilitate finance lobby finance lob facilitate D trusted 9 important 9 detail critical usines briefing gconstruction monitorprotect resources a' competitive ar Estakeholder <u>ustainabilit</u> State Government F productivity comply commercia Federal Government Parliament engage engage contract Correct ministerial positive Government Premier evidence-based advocacy consult educate professional opportunity obligations measure support respected 5. SUCCESS analytics strategic build build build attain granter achieve build preparation represent 2.80 constituents hospitality relationships reputable facts D. 2 cleantechevidence 2 4 electric Local Government leadershipvalued urgent minimise investment environment Australia

understand accessapprovals Prime Minister 📿 🧧 consultation initiate develop an, reformoperate.honesty experiencepotential -Western Australia effective mining renewables safety specialist finance lobby facilitate safety specialist finance lobby specialist finance lobby specialist finance lobby specialist facilitate specialist finance lobby financ education detail critical monitorprotect resources ustainabilit Rest State Government roc comply commercia Federal Government Parlia engage positive Government ministerial positive evidence-based advocacy cor educate professional opportunity of procurement measure support respected in support analytics strategica parley negotiate business networks navigate bureau Outcomenetwork hospitality relationships réputable facts DE cleantech evidence electric Local Government 💐

DUDA&WILLS Business Government Sustainability