Building Local Innovation Systems

Innovation!!!!

- **Innovation is not just about research**
- **Much more complex path between vision and realisation, between idea and product**
- **Involves**
  - **the creation and discovery of ideas,**
  - **application of business skills**
  - **sourcing of investment money,**
  - **acquisition of customer and market knowledge**
  - **improving time to market**
  - **commitment of key resources and personnel**
  - **taking risk, both personal and financial**
  - **nurturing strong partnerships**

An innovation policy must deal with ALL these issues.

A Reality Check

Australia has a strong local economy, an innovative socio-economic structure, and a market-oriented economy. It has :

- **GDP of US$800M (PPP) (about 50% of Mexico's)**
- **GDP/capita on par with the 4 dominant Western economies**

However:

- **Australia ranks globally 19th in size of economy**
  - **only about 5% of the size of the economies we like to compare ourselves with**
- **Australia ranks barely in the top 20 of nations in innovative activity**
- **In the OECD, Australia is:**
  - **in the second highest quartile in researchers per 1000 employment**
  - **in the middle quartile for venture capital investment as % GDP**
  - **in the bottom quartile of trade intensity**
- **97% of R&D output occurs outside Australia**

Smarter, focussed, cohesive

Key Elements of an Innovation System

- Development of an innovative workforce
- Supporting entrepreneurial firms
- Creation of an innovative society, with strong networks and collaborations
- Providing structures for free information exchange
- Enhancing research capability and platforms
- Providing strong international linkages across business and innovation sectors
- Provide supportive taxation and regulatory regimes
- Sustained framework over a long period of time

Role of Governments

- Development of national innovation priorities
- Establishment of national priorities for research and development
- Funding research and development
- Providing leading-edge research infrastructure
- Educating and training of the community and workforce
- Facilitating collaboration nationally and internationally
- Intervention in market failure areas
  - Proof of concept funding
  - Funding of demonstration activities
- Facilitating the development of networks
- Providing data and information to support innovation
- Providing incentives and regulatory frameworks which encourage innovation
- Providing appropriate governance and evaluation structures

Key Drivers of Policy

- **Creation/capture/protection of ideas**
- **Capital: the shortage (absence) of venture capital at the pre-seed, seed and start-up phases**
- **Business skills: limited skills for entrepreneurial activity**
- **Size: the market for our innovations will almost certainly be driven by global demands**
- **Partnership formation**
- **Consistency over innovation time periods**

Hunt as a pack, support early stage development, consistency over long time periods, international context

National Innovation Priorities

1. Public research funding supports high-quality research that addresses national challenges and opens up new opportunities
2. Australia has a strong base of skilled researchers to support the national research effort in both the public and private sectors
3. The innovation system fosters industries of the future, securing value from the commercialisation of Australian research and development
4. More effective dissemination of new technologies, processes, and ideas across the economy, with a particular focus on small and medium-sized businesses
5. The innovation system encourages a culture of collaboration within the research sector and between researchers and industry
6. Australian researchers and businesses are involved in more international collaborations on research and development
7. The public and community sectors work with others in the innovation system to improve policy development and service delivery

National Research Priority Goals

- **An Environmentally Sustainable Australia**
  Transforming the way we utilise our land, water, mineral and energy resources through a better understanding of human and environmental systems and the use of new technologies.
- ***Priority goals:***
  - Water a critical resource
  - Transforming existing industries
  - Overcoming soil loss, salinity and acidity
  - Reducing and capturing emissions in transport and energy generation
  - Sustainable use of Australian biodiversity
  - Developing deep earth resources
  - Responding to climate change and variability

- **Promoting and Maintaining Good Health**
  Promoting good health and well being for all Australians.
- ***Priority goals:***
  - A healthy start to life
  - Ageing well, ageing productively
  - Preventive healthcare
  - Strengthening Australia's social and economic fabric

- **Frontier Technologies for Building and Transforming Australian Industries**
  Stimulating the growth of world-class Australian industries using innovative technologies developed from cutting-edge research.
- ***Priority goals:***
  - Breakthrough science
  - Frontier technologies
  - Advanced materials
  - Smart information use
  - Promoting an innovation culture and economy

- **Safeguarding Australia**
  Safeguarding Australia from terrorism, crime, invasive diseases and pests; strengthening our understanding of Australia place in the region and the world; and securing our infrastructure, particularly with respect to our digital systems.
- ***Priority goals:***
  - Critical infrastructure
  - Understanding our region and the world
  - Protecting Australia from invasive diseases and pests
  - Protecting Australia from terrorism and crime
  - Transformational defence technologies

Governance

- **Prime Minister's Science, Engineering and Innovation Council**
  - **provides linkage between Government Ministers and expert adisors**
- **New Coordinating Committee on Innovation**
  - **provides a coordinating mechanism for Australian Government Departments and Agencies**
- **Commonwealth State and Territory Advisory Council proposed**
  - **needs to be charged with effective coordination between States, Territories and Commonwealth**
  - **seems to lack an avenue for effective action**
- **Policy creating entities are no substitute for cohesive program structure**

Need to establish an action-oriented structure for coordination between States and the Australian Government, and a process for coordination between research institutions.

The Changing Face of Research

• Research	Discipline		Multi-Discipline Trans-Discipline Inter-Discipline
• Researcher	Individual		Large Teams
• Environment	Competitive		Collaborative
• Data	Constrained		Limitless
• Fundamentals	Synthesis		Analysis

The capabilities of modern research infrastructure to produce, manage and analyse data

Creation of Ideas

- Access to large research infrastructure across the sector
  - collaborative investment, eg NCRIS program, and its successor through EIF and Super Science program
  - integrate Commonwealth and various State programs
- Increased collaboration between researchers
  - change balance between competitive processes and the strategic intervention to shift emphasis to teams of critical mass in a globally competitive context
  - collaboration driven by access to quality infrastructure
- Increased collaboration between research institutions
  - need to change incentive mix - currently biassed towards competitive outcomes

Capital for Development

- Address market failure by provision of funds for pre-seed and seed investments in innovations
  - failure is in structure, so new innovative structures are needed - not just simply more money into existing structures
  - will require different instruments and structures for each stage
  - will require government investment - time to payback/risk profile is typically outside the acceptable zone for most investors
- For example, in Australia taxation-based incentives include
  - VC and early stage VC partnership programs
  - some industry-specific programs
  - a Tax-Credit scheme (replacing a number of tax concession schemes)
- Equity-based schemes include:
  - Innovation Investment Fund
  - Commercialising Emerging Technologies program

Entrepreneurial Skills

- **Nurturing framework**
  - **more than simply education and training**
  - **key is the environment in which skills are exercised**
- **Globally innovation development centres (eg incubators, science parks) have been successfully deployed**
  - **need to develop this structure, and associate it with the structure of pre-seed funds**

Regional Innovation Capability

- The development of regional innovation capability provides a number of benefits to the region and to the country as a whole:
  - increased research focussed on regional industry capability and needs
  - improved retention of qualified people in the region
  - improved economic activity in the region
  - improved linkages between regional universities, regional government, local communities and local industry
- Limited resources demand:
  - relevance
  - focus
  - strategy
  - collaboration

The Importance of Information and Communication Technologies

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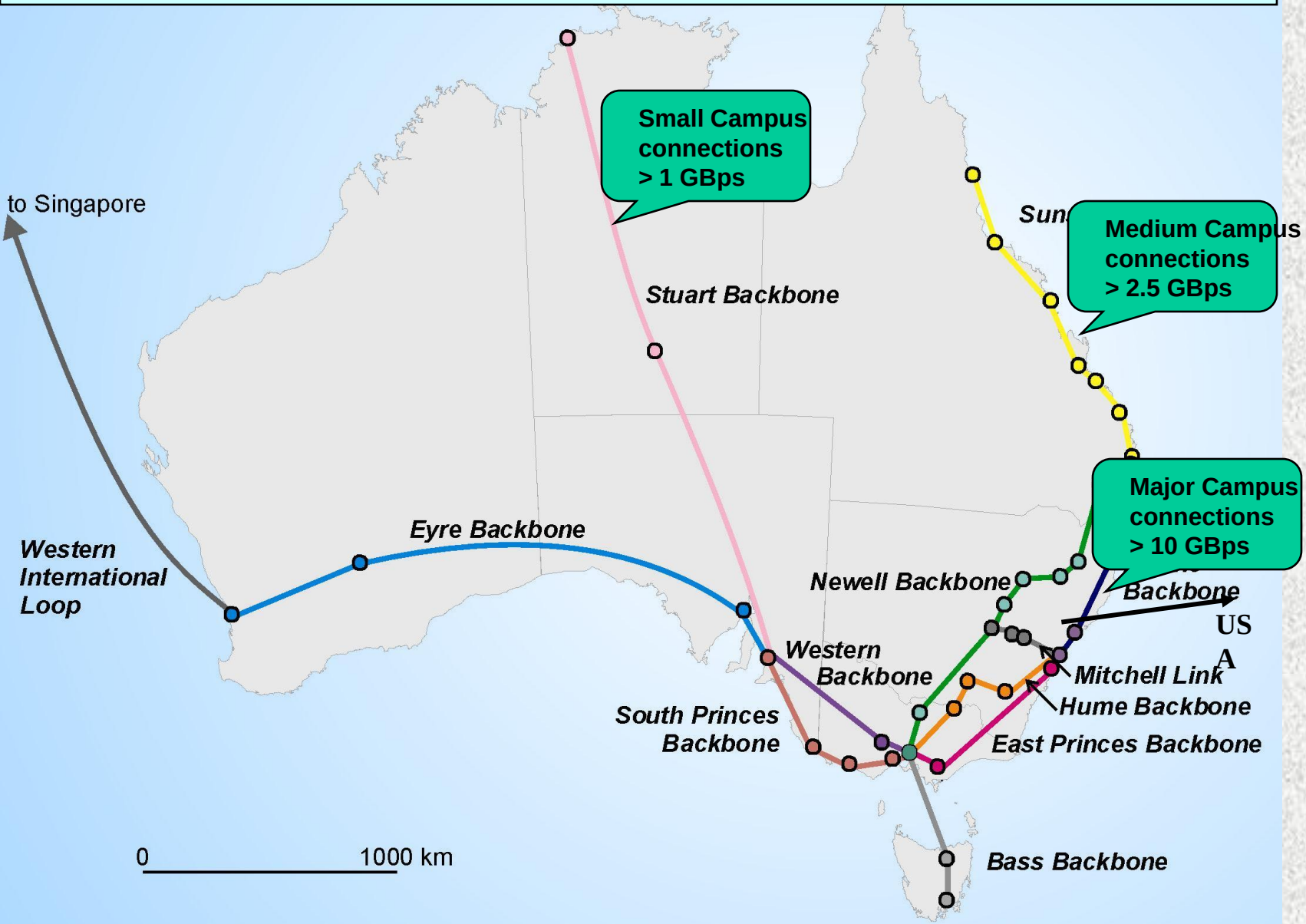
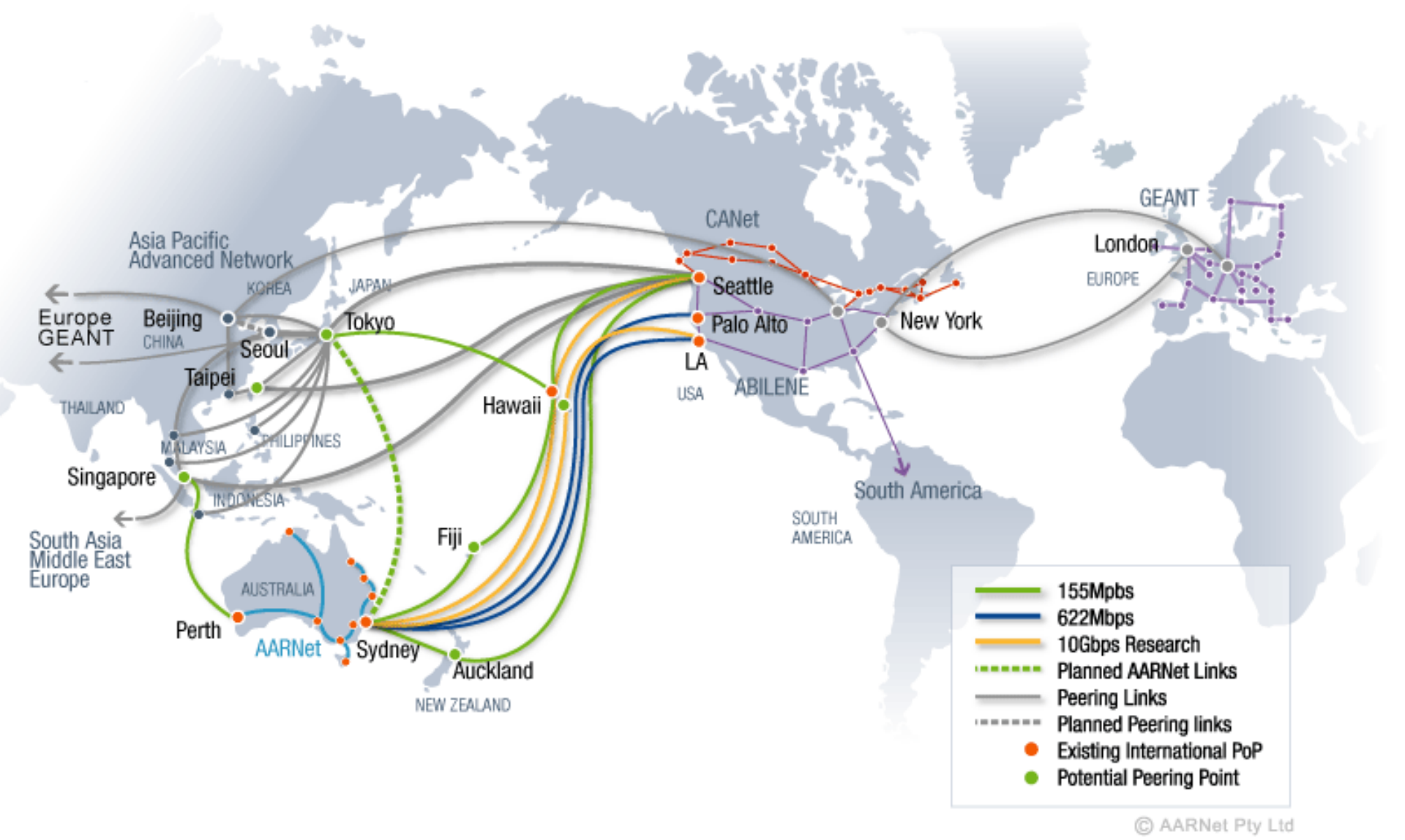


ralian Research and Education Network - International Links



High Performance Computing

HPC Nodes