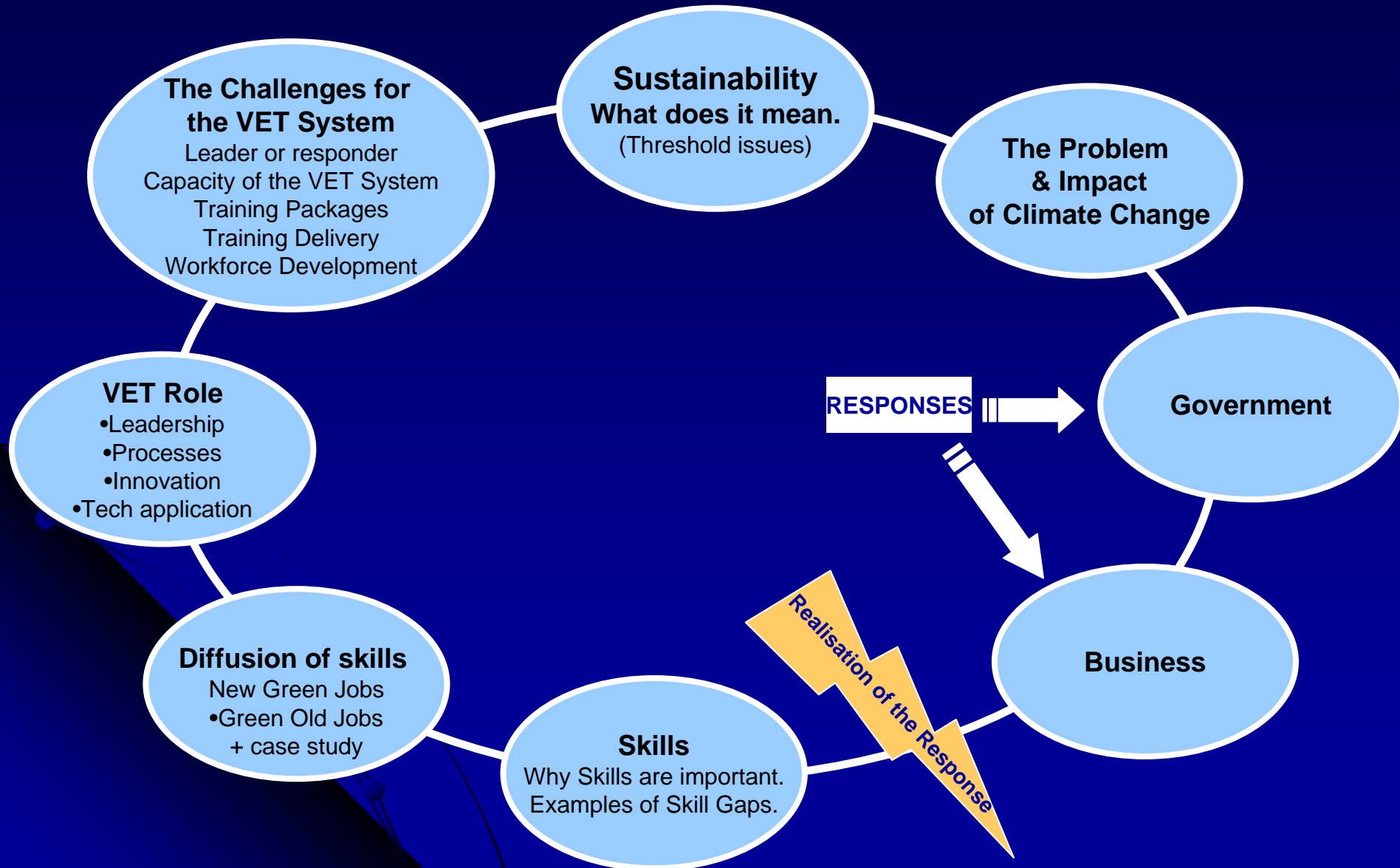


Skills for Sustainability

The role of the VET sector in responding to
the issues of climate change

Lynnette Dorn
NSW Department of Education & Training
23 July 2007

Skills for Sustainability: Role of VET Sector in Response to Climate Change.



What is Sustainability?

“Meeting the needs of the present without compromising the ability of future generations to meet their needs”

Source: Bruntland Report, 1987, World Commission on Environment and Development

*“As the future ripens in the past,
so the past rots in the future”*

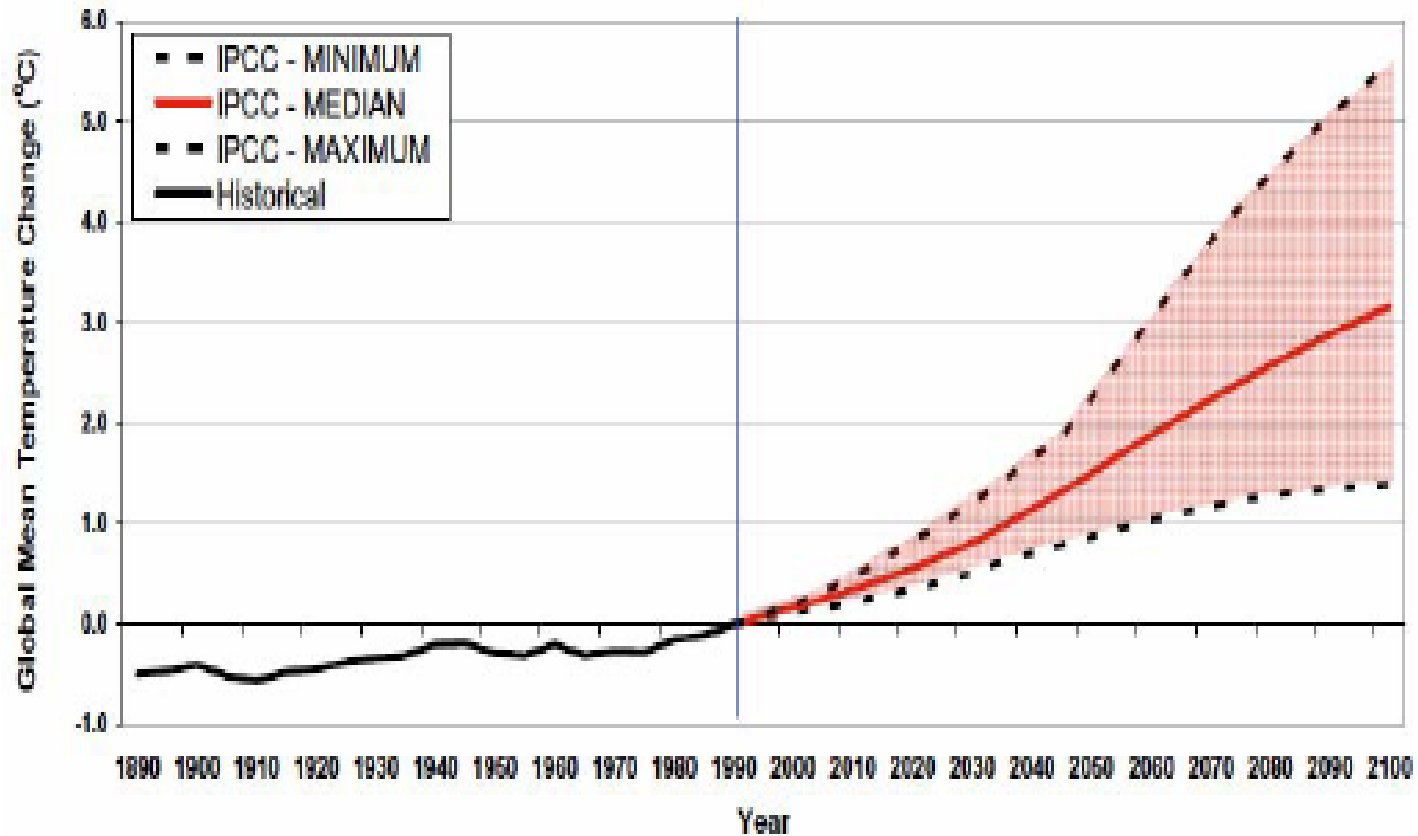
Poem Without a Hero – Anna Akhmatova

Threshold Issue

Is climate change a reality that needs to be addressed?

Global Warming Scenarios

Temperature Predictions



Source: CSIRO data as in Citigroup Equity Strategy in Depth, 2006

Impact on Australia from Global Temperature Rises

Australian Business Roundtable on Climate Change

Temp rise	Tourism	Water and Primary Industries	Infrastructure and Insurance
>4°C	<ul style="list-style-type: none"> Most Australian vertebrates lose 90 to 100% of their core habitat 	<ul style="list-style-type: none"> Extreme rainfall in Victoria increases by 25% 	<ul style="list-style-type: none"> Peak electricity demand in Adelaide, Brisbane and Melbourne increases by 9 to 25% 180 days a year above 35°C in SA and NT '100-year' storm tides along Victoria's east coast 30% more frequent
>3°C	<ul style="list-style-type: none"> Distribution of Great Barrier Reef species shrinks by 95% 65% of Reef species lost in Cairns region Snow-covered alpine area shrinks by 20 to 85% '60 day' snow cover declines by 40 to 95% 	<ul style="list-style-type: none"> 55% loss of Eucalyptus core habitat Timber yields in southern Australia rise by 25 to 50%, but fall by same margin in North Qld and the Top End Australian net primary production falls by 6% Flow in the Murray-Darling falls by 16 to 48% 	<ul style="list-style-type: none"> Dengue fever transmission zone reaches Brisbane and possibly Sydney Temperature-related deaths of people over 65 rise by 144 to 200% Oceania experiences a net loss of GDP
>2°C	<ul style="list-style-type: none"> 97% of the Great Barrier Reef bleached 80% of Kakadu freshwater wetlands lost 	<ul style="list-style-type: none"> Pasture growth slows by 31% Macquarie River Basin (NSW) flows fall by 5 to 35% Livestock carrying capacity in native pasture systems falls by 40% 	<ul style="list-style-type: none"> Temperature-related deaths of people over 65 rises by 89 to 123% Road maintenance costs in Australia rise by 17%, despite a decline in South Australia '100-year' storm tides along Victoria's east coast 15% more frequent Tropical cyclone rainfall increases 20 to 30%, as wind speed increases 5 to 10% Forest fire danger rises 10% across Australia
>1°C	<ul style="list-style-type: none"> 81% of the Great Barrier Reef bleached Vertebrates in the World Heritage Wet Tropics lose 90% of their core habitat. 	<ul style="list-style-type: none"> Melbourne's water supply falls 7 to 35% Murray-Darling flows fall 12 to 25% Queensland fruit fly spreads south 40% loss of Eucalyptus core habitat 	<ul style="list-style-type: none"> Height of '100-year' storm surge at Cairns rises 22%, doubling the flooded area Storm surge rises 25% along Victoria's east coast Double the people exposed to flooding in Australia and New Zealand
<1°C	<ul style="list-style-type: none"> Snow-covered alpine areas shrink by 10 to 40% Vertebrates in the World Heritage Wet Tropics lose half their habitat 	<ul style="list-style-type: none"> 14% of Victoria's marine invertebrates lose habitat Droughts in NSW 70% more frequent and more widespread Wheat production increases with temperature rises up to 3 to 4°C, if precipitation also increases; but export value declines. 	<ul style="list-style-type: none"> Melbourne's water supply falls 3 to 11% 18% more days above 35°C in SA Extreme rainfall 10 to 20% more intense in NSW Electricity infrastructure suffers 3% decrease in transmission efficiency Demand for natural gas heating in Melbourne falls Peak electricity demand in Melbourne and Sydney falls by up to 1%, and rises in Adelaide and Brisbane by 2 to 5%

NSW Government response to climate change

Policy Framework

- State Plan
- NSW Greenhouse Plan

Key Targets

- Reduce emissions to 2000 levels by 2025 and by 60% by 2050
- 15% renewable energy consumption by 2020

Opportunities in responding to climate change

“Action on climate change will also create significant business opportunities, as new markets are created in low-carbon energy technologies and other low-carbon goods and services. These markets could grow to be worth hundreds of billions of dollars each year, and employment in these sectors will expand accordingly.”

Opportunities for Business

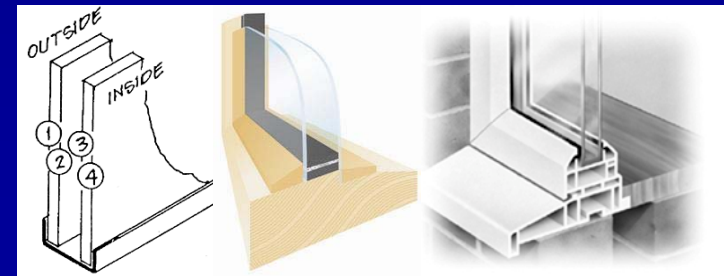
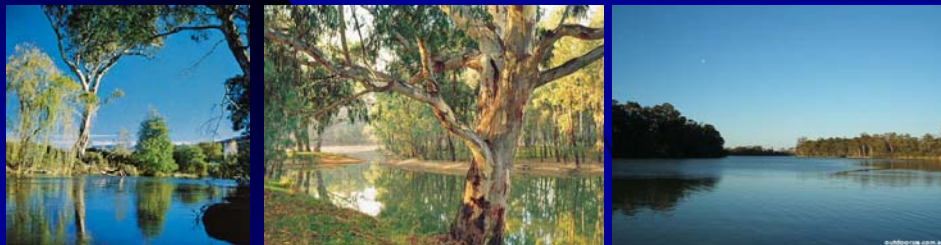
- New products and new markets
- Focus on innovation
- Investment in emerging technologies
- Greater efficiencies in production processes
- Improving business reputation
- Lower exposure to risks
- First mover advantage
- Attracting high quality employees

Expected impacts on workforce skills by reducing greenhouse emissions

Greenhouse intervention	Expected skill impact
<i>Economy-wide/multi-sector energy efficiency</i>	Upgrading or additional audit and engineering consultancy skills
<i>Renewable energy generation (primarily electricity)</i>	Significant increase in number and levels of technical design, assessment and installation skills
<i>Reduced greenhouse intensity of fossil fuel generation</i>	Significant increase likely in gas turbine generation skills. Also significant increase in geo-sequestration system skills (petroleum and chemical engineering) if technology is proven commercially.
<i>Residential scale renewable energy</i>	Significant upgrading of existing electrician and plumbing skills required, but limited numbers unless the scale of funding for the measures is increased.
<i>Retail appliance and commercial equipment energy efficiency</i>	Specialised skills at design stage but fall within skill range of existing designers. Limited number of manufacturers with design in Australia
<i>Improved residential housing energy/greenhouse performance</i>	Upgrading of design, building and rating skills to meet increasingly stringent requirements.
<i>Improved commercial building energy/greenhouse performance</i>	Significant increase in skill levels across all building disciplines but currently low activity
<i>Biofuels (bio-ethanol, biodiesel)</i>	Significant additional chemical engineering skills. Limited number of manufacturers
<i>Fuel efficient vehicle technologies</i>	Significant upgrade of mechanic skills for conversions and CNG buses but low level of activity. Potential increase in new auto-electrical skills with increased hybrid –electric vehicle uptake
<i>Carbon sinks (reforestation)</i>	LowSupply chain managers

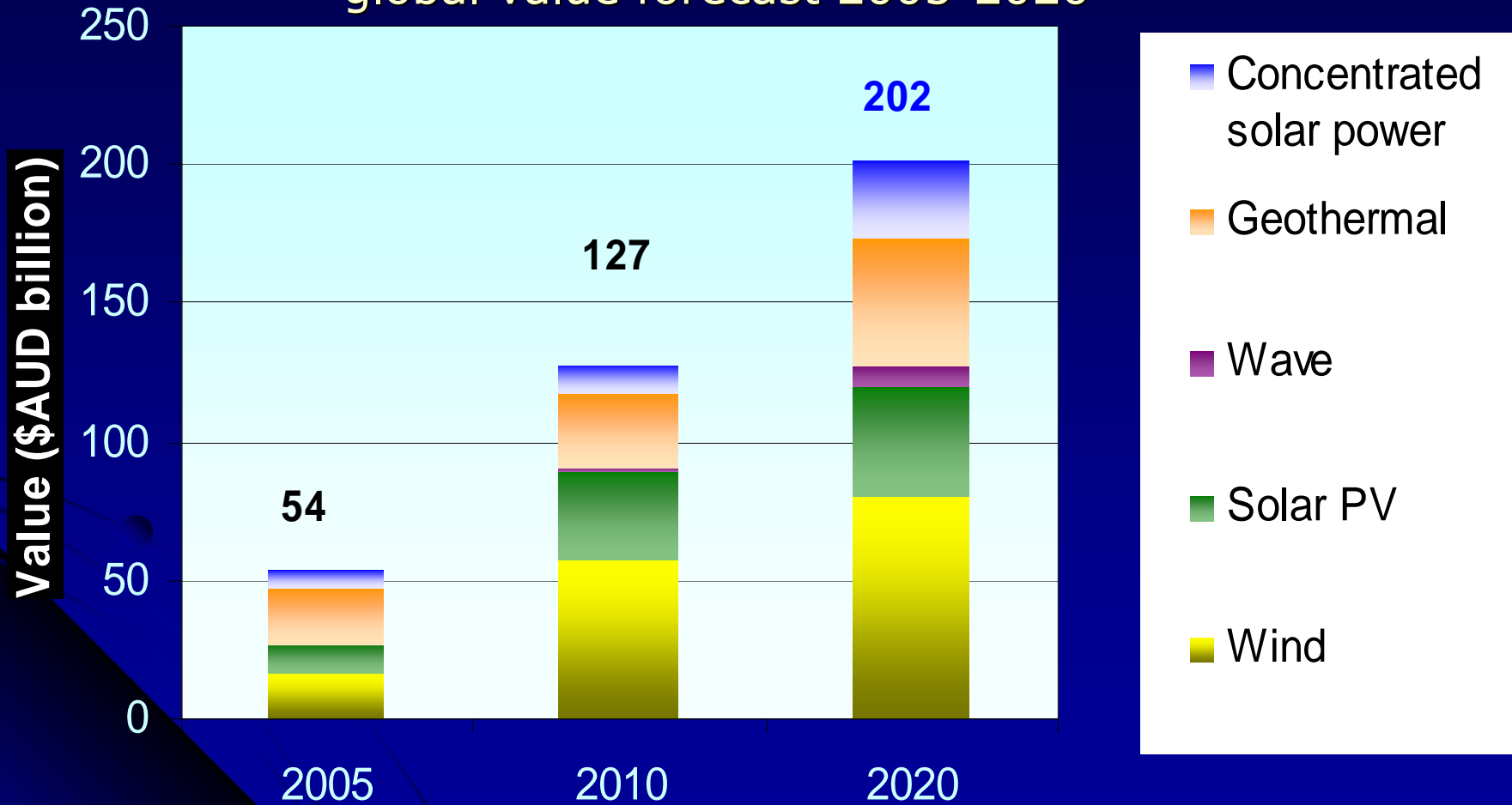
Examples of sustainability skills gaps

- Solar hot water heaters
- LPG conversion
- Double glazed windows
- Mandatory disclosure of energy performance
- Murray River



New Green Jobs: Growth in renewable energies market

global value forecast 2005-2020



Source: Final report to Renewable Energy Generators Australia June 2006

Greening 'Old' Jobs: Potential Opportunities in Every Sector

- Built Environment
- Agriculture
- Manufacturing
- Energy production
- Transport & Logistics
- Resources

Skills development across the workforce, not just in research laboratories

“ In order to be effective, implementation of climate change strategies requires a broad skill set and mechanisms to diffuse knowledge about sustainability technologies and practices across the economy. Up-front investment in R&D is necessary although not sufficient. More emphasis needs to be given at all levels of the economy , not only in research laboratories” (Workplace Research Centre, 2007, p. 304)

The Built Environment

Cutting emissions means new skills are needed across old & new jobs

SKILL DOMAINS

- Building design, drafting
- Compliance
- Knowledge of new building products and proper use
- Sustainable construction techniques
- Installation & maintenance of new tech
- Effective management of complex facilities & infrastructure
- Sales promotion of green options
- Resource management (e.g., waste minimisation, recycling)

SAMPLE OCCUPATIONS

- Construction & building trades
- Site and project managers for QA, environmental management
- Supply chain managers
- Building designers, engineers
- Builders
- Surveyors, Planners
- Ecologists
- Industrial and interior designers
- Financial and marketing professionals
- HVAC, solar water etc. installation and maintenance

The Role of VET

- **Leadership**
- **Innovation**
- **Processes**
- **Technical application**

The Challenges for the VET sector

- **VET as leader or responder: the Innovation Challenge**
- **Training package development**
- **Capability of the VET system**
- **Training delivery issues**
- **Moving towards a model of workforce development**

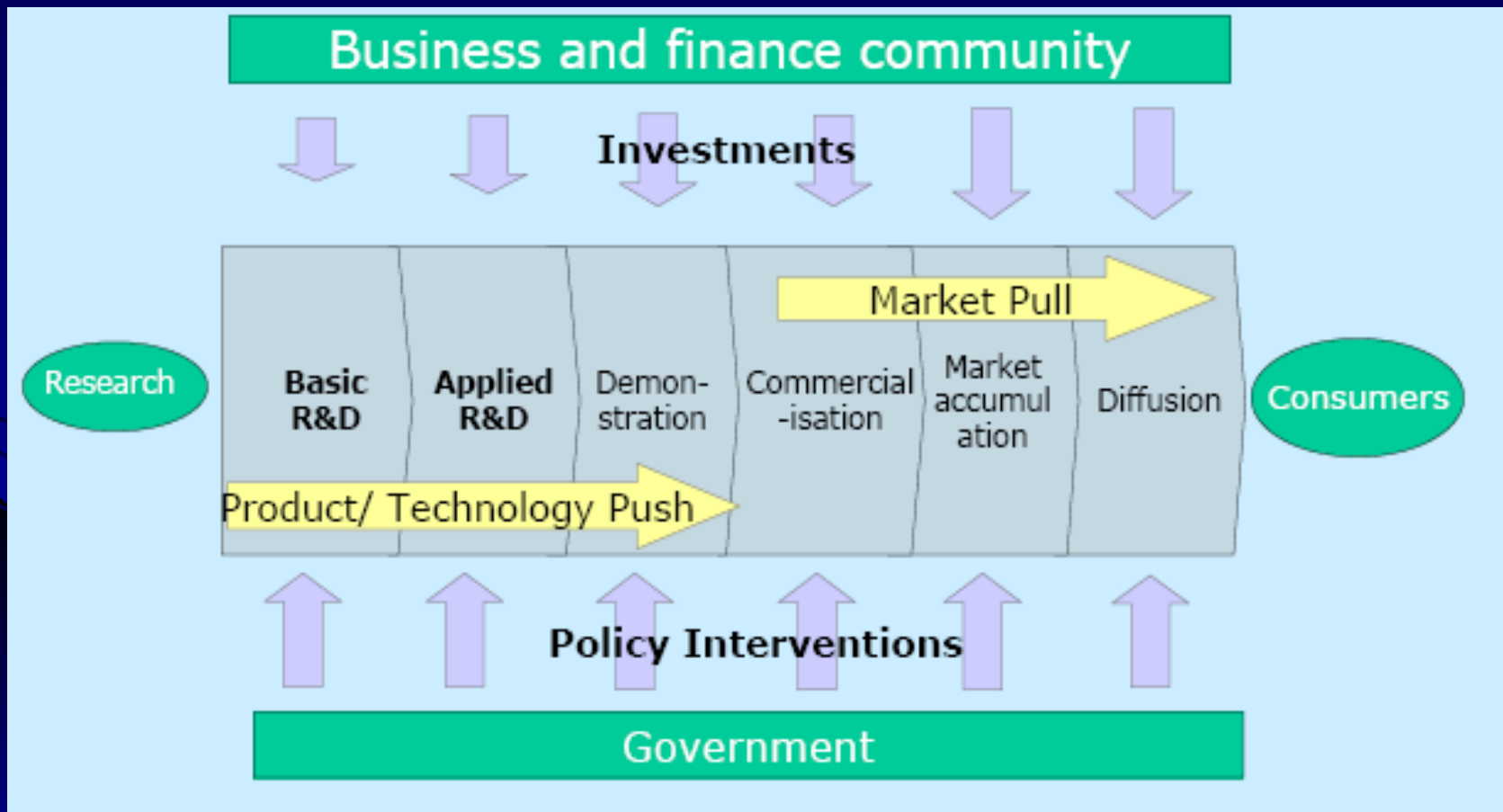
What is Innovation?

"...innovation describes not merely the creation of new ideas, processes and technologies, but also their uptake, application and use to yield new value."

Source: DEST submission in Pathways to Technological Innovation,
House of Representatives Standing Cmte on Science & Innovation, 2006

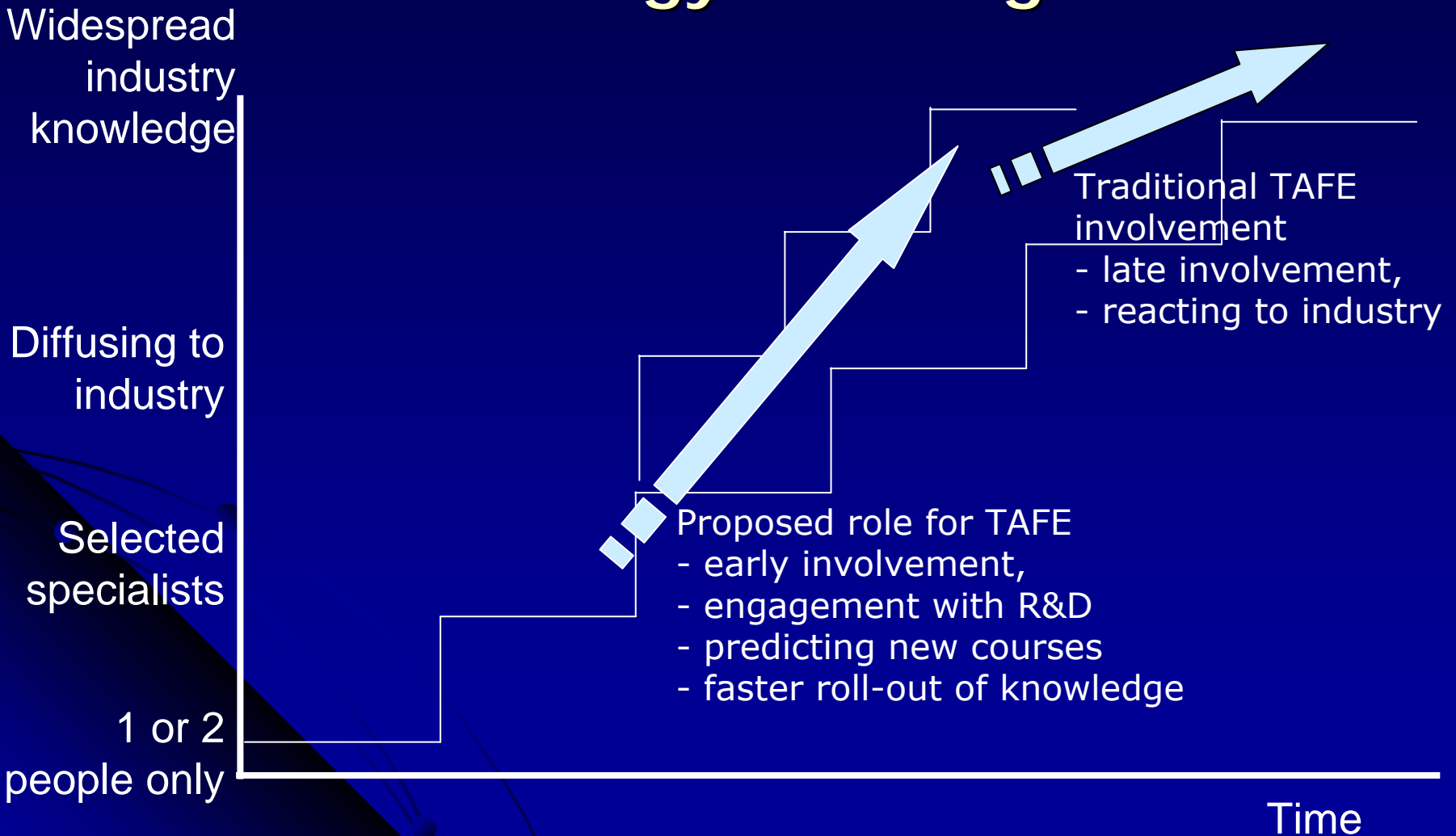
The Basic Innovation Story

Invention, Application, Diffusion
Technology Push, Market Pull



Source: Stern Review, 2006

Early Involvement by Skills Sector can accelerate innovation and cut technology 'learning cost'



Moving towards a model of workforce development

- Moving beyond technical training solutions
- Focusing on the demand for skills – ensuring skills supplied are used and applied effectively by industry
- Improving skill eco-systems – “clusters of competencies in regions or industries shaped by interlocking networks of firms, markets and institutions”
- Building workforce capacity to reduce emissions and improve environmental performance

Where to from here?

- **Ongoing programs and projects eg. development of resources, research funding for skills audits, Strategic Skills Program**
- **Development of future policy options for the VET system**
- **Elevating sustainability skills as a state and national priority in VET planning, program funding, training package development, professional development.**
- **DET reports to the next NSW Skills Council meeting**