

Chairs' Summary: WRF Asia-Pacific 2015

1. The inaugural World Resources Forum Asia-Pacific attracted 300 participants from government, industry, research and non-government organisations from Australia and the Asia-Pacific including China, India, Japan, South Korea as well as participants from Europe and North America.
2. The forum was hosted by the Institute for Sustainable Futures (ISF) at the University of Technology Sydney (UTS) and the Centre for Sustainable Materials Research and Technology (SMaRT@UNSW) at UNSW Australia, together with the World Resources Forum.
3. The key themes of the conference were Resource Productivity in the Asia-Pacific, Enabling Transition Pathways and Innovation through Collaboration.
Action in these themes requires Knowing, Wanting and Being Able.

RESOURCE PRODUCTIVITY

4. **More from less** – sustaining growth with less input from resources is one of the megatrends of this century. *“In the 21st century, one of the - if not the - most important challenges we have to solve is how we can bring prosperity to an ever-growing population of our planet and do that in a sustainable way.”* – Dr Alex Wonhas (WRF Asia-Pacific Keynote) Executive Director Energy and Resources, CSIRO
5. Humanity needs to understand and shape future resource use to make sure there are enough resources available for future generations. Unless we address **equity in distribution of resources** material resource use will butt up against social impacts and how we use our resources will become a political issue for civil society.
6. There is little effective **governance at a global level** to secure long-term security of important resources. When key global resources have a price spike, this shows the vulnerability of our systems and economies and our dependence on key resources. For example the spike in phosphorus prices in 2008 showed vulnerability of food system as global food prices increased.
7. As a whole, Asia-Pacific regions use 53% of the world's resources yet only generate 25% of the world's GDP. A goal of the 10 year Framework Programmes on Sustainable Consumption and Production is to “improve progressively through 2030 global resource efficiency in consumption and production and endeavour to **decouple economic growth from environmental degradation**”. Countries in the region, especially Australia, should look to more efficient and intelligent use of resources in areas such as infrastructure and technology in order to remain agile and prosper.
8. **The Asia-Pacific is driving future resource consumption.** Population is growing and the global middle class is expected to double, with people who will want comparable opportunities as for developed countries. Global citizens need to reimagine and reconfigure lifestyles suitable for all which are consistent with responsible prosperity.
9. Clear indicators are needed to **‘measure what we treasure’**, so we can understand the problem and inform action. The United Nations Environment Program (UNEP) has developed a set of indicators for materials, energy, water and greenhouse gas emissions. These include:
 - Resource productivity
 - Consumption
 - Natural resource use
 - Trade dependency
 - Eco-efficiency of production

10. According to recent research from UNEP, **Australia uses four times more resources than Japan** to deliver the same output in the economy; Australia uses 1.13kg per dollar and Japan uses 0.26kg per dollar. On a per capita basis Japan uses 9.1 tonnes per capita per year and Australia uses 44 tonnes.
“Australia extracts 77 tonnes of materials per person from mining and agriculture per year. Part of that is for export, but 44 out of the 77 tonnes of materials per capita per years stays within Australia’s borders. This is high compared to other countries in the region that on average, use approximately 9 tonnes per capita per year and represents an opportunity for resource efficiency and creating wealth from waste.” – Janet Salem, (WRF Asia-Pacific Keynote), UNEP Regional Office for Asia-Pacific.
11. The growing volume of waste presents a significant threat to the environment and human health. The objective of **zero waste** is a huge challenge but can catalyse opportunities to recover resources from waste and provide a better balance between primary and secondary production. Work towards this goal requires realising it’s not just a waste and recycling problem but that products and infrastructures must be designed and developed to consider the whole cycle of resource use and indeed multiple use cycles.
12. The growing importance and opportunity for resource productivity were highlighted throughout the conference. As a country with abundant natural resources, a strong economy and technical know-how, **Australia can improve its own resource productivity** as well as help economies in the Asia-Pacific. Australia is in a strategic position to build a resilient, competitive economy and **promote responsible prosperity within the Asia-Pacific region**.
13. *“It is possible to grow our economy in a sustainable and prosperous way, as long as we focus on three things; make sure we are developing the capability to understand the possible resource use trajectories. Second, put the market and other mechanisms in place to guide our investment. And third, keep working on new and novel solutions and sustainable business,”* – Dr Alex Wonhas, (WRF Asia-Pacific Keynote), CSIRO.

TRANSITION PATHWAYS

Circular Economy

14. The concept of a circular economy is that we should be using resources so they are cycled through the economy in a ‘take-make-recreate’ system rather than the prevailing economic system of ‘take-make-dispose’. The concept of Circular Economy builds on established schools of thought. Additional research, to reconcile and evolve theoretical foundations, will enhance its application. Its innovation-focussed systems view, provides a **vision and a simple framework for engaging action**.
15. Circular economy presents an **opportunity for countries that are not endowed with natural resources**. For example Japan now has as much gold held within existing technology as is deposited in South Africa, so with appropriate systems it can recycle and reduce the need to import it.
16. Parts of the Asia-Pacific are already embracing the idea of a Circular Economy. *“We are seeing changes in the region, China has already introduced policy framework for a Circular Economy by implementing price and regulatory instruments at a government level, private enterprise has followed suit and introduced the technology to support the circular economy,”* – Janet Salem, (WRF Asia-Pacific Keynote), UNEP Regional Office for Asia-Pacific.
17. The **critical mass for Circular Economy is growing** – through conferences like the World Resources Forum and organisations around the world synthesising info and translating the concept of circular economy in accessible ways. The concept of sufficiency (over ever-continuing growth) in relation to consumption also needs to be introduced and elaborated.

18. Transitioning to a circular economy is a **matter of social change**. New conditions such as high-density areas make circular economy solutions very attractive in terms of convenience and reduced cost. Whilst there are some people interested in buying ethically sourced products, decisions often come down to cost. Circular economy products will become mainstream when accounting for externalities leads to greener products becoming better value than others.
19. Circular economy is not a new concept but it is one that resonates with business beyond “green leaners”. **Youth too are engaged with the circular economy concept** – providing them with a tangible framework to generate ideas and innovate and creates sense of collaboration and sharing. Many young people don’t want to own a car and prefer other ways to commute and stay mobile and connected.

Business models

20. Business models are starting to shift focus on how to manage resources as valuable across multiple use cycles. The Global Financial Crisis weakened unsustainable business models, including those reliant on linear flows. Many businesses had to re-evaluate and re-question their structures and revenue streams. **“Wealth from waste”** thinking and using renewable materials and energy, offers opportunities for new value in Australia and the Asia-Pacific region.
21. We have gone beyond the three “R’s” of reduce, reuse and recycle, to rent products, reinvent material range, repack and take responsibility. Businesses need to think about what happens to products after they leave the store and take responsibility for products, there needs to be collaboration for this to happen.
22. The only way for businesses to survive and compete with businesses that only look at economic imperative is to innovate radically, but existing business models hinder innovation and collaboration. Circular economy business models require **stronger and sophisticated relationships with customers**, and **across the supply chain**. They require collaboration to really understand where the pockets of value exist and access these.
23. Businesses need to think **beyond problem solving to innovation** – are companies only able to develop a solution to a problem they are given or able to examine everything that's going on and develop new ideas? For circular economy we can look at the three **drivers of innovation**:
 - a. Technology – through the internet and big data we know much more about resources, and are able to track them
 - b. Market – we are now readily able to monetise resources that we were difficult to access before, but this also requires updating of regulatory mechanisms to allow the creation of new markets, as well as harnessing complementary innovations in areas such as digital technology to create opportunities for entrepreneurs to access niches in global markets (e.g. Airbnb)
 - c. Institutional factors – circular economy allows us to create templates of business models to make money out of waste
24. Circular economy involves the business, supply chain and the market. Delegates heard that the best place to start is with a strategy that thrives in the circular economy – even if it needs to be changed later, be brave and front the market – look for market potential, lead the supply chain from the front and redefine supply so it is no longer linear. By working closely with suppliers and making sure they share their vision, businesses can set up long-term agreements that benefit both parties. Lastly redefine the customer so it is no longer a linear relationship, for example a leasing service.
25. Businesses have the **power to influence their supply chain**. For example for metals there is demand for sustainable and responsibly sourced materials from the market, particularly the

green building sector. There are business opportunities to develop **new markets through promoting responsibly sourced materials**, such as Responsible Steel being developed in Australia by the Steel Stewardship Forum. However, often individual business interest is misaligned with industry-wide initiatives and some companies are more willing than others to join.

26. **Financing remains a challenge** for new businesses: a lot of businesses have relied on self-funding and small amounts for starting up, but changes in innovation and collaboration are also changing funding. If you can monetise pieces of value that didn't have a value before, this can create a useful new revenue stream. In addition to traditional bank and risk financing, crowd-sourcing and government 'challenge' funding can also assist.
27. There is **high vulnerability for corporate entities** when they are dependent on a major input resource (such as phosphorus, rare earth elements). Organisations need to **responsibly manage their supply chain** as there are increasing problems and complexities in supply chains requiring attention from investors and customers. If companies don't address these challenges, there will be global community action in response.
28. There is a **strong business case for materials efficiency**, however most businesses are only focusing on energy efficiency, indicating a need to extend the focus and also to materials efficiency.
29. Decision makers need to consider not just the straight return on investment numbers associated with a project proposal, but also these related items: **materiality**, value at risk and de-risking that ROI. These co-benefits are where the case for energy efficiency projects is really won. Materiality can be thought of as **"if there was more at risk, the decision would be different"**. Risks include regulatory risk, for example a future carbon price, or the effect of divestment campaign. Designing for energy and material efficiency up front can make large changes to the profitability of the project.
30. Drivers for **industrial symbiosis** are strong business networks, industry champions, government policies and understanding the full range of benefits. Current barriers are that sustainability is not perceived as core to business, a lack of resources, and prioritising short term rather than long term benefits. The development of eco-industrial parks is a proven concept, but each is unique so there is a need for personalised approaches.
31. Business models can **create more than economic value: social enterprises are emerging** across Australia that are using waste in new ways to create jobs in regional areas, improve social outcomes and help the environment.

Technology

32. New disruptive technologies and materials (e.g. graphene) are being developed in the carbon-age to allow us to use resources more efficiently, manage greenhouse gas emissions and solve future problems. For example we can create a carbon sponge that cleans up oil spills or artificial hip joints that are more durable to help an ageing population.
33. In order to make better decisions about how we reuse and recycle resources above ground we need to be able to understand how much of a resource is contained and its location. Technical solutions can help us **understand resources above ground**, such as to know where metals are contained, e.g. in buildings, vehicles or equipment.
34. In designing for recycling, there are certain materials that are difficult to take out to reuse and not everything can be recovered. In order to innovate and design products so they can be recycled we need a complex understanding of materials and how they are connected to really innovate. We need to understand where each element is going in the system, and compare this looking at different designs. In all design we need to weigh up **simplicity versus complexity**. New products are designed to be more efficient and better for the environment

(for example using less energy) but are so complex that they are difficult to breakdown, recycle or reuse. **A recyclability index should be introduced.**

35. We need to **consider the energy used by a product** at the same time as the materials and its recyclability. When we consider an incandescent globe versus an LED lamp, the LED is more energy efficient but also harder to recycle. If we use renewable energy for electricity, is the incandescent globe a better choice?
36. The **complex characteristics of e-waste need to be further studied.** Major challenges include variation in composition, lack of fundamental knowledge, the modification of existing processes/adoption of new technologies in plant, extensive processing. There is a large potential for processing e-waste; technical challenges slow down its adoption of this resource in industry. This needs a comprehensive approach including innovation and development in all sectors, especially fundamental science and technology.
37. There are important emission reduction strategies that consider recycling carbon in energy and material systems powered by renewable energy. There is valuable potential to offset carbon that is currently supplied from fossil sources with biomass products and waste plastics. However there is a **complex system of barriers and enablers for carbon transitions** including vested interests and regulatory barriers.

Governance and social change

38. **Radical social innovation**, not only radical technical innovation, is needed. Circular economy conceptualisations are often still based on growth, though have a part to play in dealing with the limited through-put of a steady state economy. A steady state economy emphasises increased focus on wellbeing and happiness, living within ecological means and limiting inequality. Key to this is changes in the way the businesses are incentivised to grow profits, but at the same time societal pressures may be key to forcing any changes to business models.
39. Technical solutions are key to the better use of resources (including metals) but we also need to understand other factors, including what the routes are for products at end of life and what changes are needed for drivers in the economy. We need to understand the **diverse group of organisations** involved in managing e-waste, from transnational businesses to social enterprise and charities, and the policy impact on these. Regulation is fragmented and incoherent, falls back on local government, and favours recycling over re-use. Better **regulatory frameworks** that consider what scale makes sense for Australia would help make recycling more economical. **Coordinating resource flows with infrastructure and policy** enables the transition to a circular economy.
40. **Networks for business often don't often exist and need creating to allow businesses to collaborate and innovate** with one another. Governments programs can create networks for collaboration, provide support and encourage risk taking. Government programs involvement can accelerate environmental and economic outcomes, even if in hindsight some projects that make 'good business sense' may they could have happened on their own in the long run (e.g. materials efficiency)
41. The **sustainable management of secondary resources** (including metals) as a counterbalance to primary extraction is not a technical issue but an **issue of standardisation.** Secondary resource management, especially in developing countries, has issues of environmental pollution, health hazards, cross-contamination. Guidance principles, traceability schemes and support for standards is needed.
42. To ensure resource extraction has a wide benefit for communities and countries, **transparency and accountability of institutions** is key. Sovereign Wealth Funds can be a useful model to share the benefits of mining over many generations but needs to be properly managed to be successful (cf. Norway's success versus Nauru's situation).

Action agenda

43. Resource productivity is not yet a high priority for Australia and there is no national strategy. Australian industry and government urgently need to develop a collective vision for prosperity in a ‘take-make-recreate’ circular economy rather than ‘take-make-dispose’ approach of today. The UTS Institute for Sustainable Futures who lead the Wealth from Waste Cluster launched an ‘**Action Agenda for Resource Productivity and Innovation**’ at the World Resources Forum Asia-Pacific to put resource productivity on the policy agenda in Australia.
44. The action agenda highlighted **opportunities for Australia** within a circular economy including the need to (i) rethink the value of our resources and replenish stocks, (ii) adopt and design for renewable energy and resource cycles, (iii) harness innovation in the digital age for new modes of production and consumption and (iv) leverage existing know-how into new networks and markets.

“The Action Agenda is a starting point for further discussion and research to position resource productivity and innovation as high priorities on the national agenda. It outlines four future opportunities for Australia to achieve a new wave of prosperity, as our key trade partners in Japan, China and Europe are already gearing up for. We need to make sure Australia is in a strategic position to build a resilient, competitive economy and promote responsible prosperity within the Asia-Pacific region.” – Damien Giurco, ISF

BUILDING MOMENTUM THROUGH COLLABORATION

45. The need for **collaboration to scale up innovation emerged as a key theme for the forum**. The complexity of products, resources and systems is growing; and one individual, business, or even country cannot deal with these complex problems alone.
46. There is no simple solution; there are many aspects of resource productivity that need individual initiatives by other actors in each field. Governments have an important role, but there is a need for other participants to take the lead, particularly industry and consumers.
47. The forum also included an art competition ‘Imagining the Circular Economy’. The scope of the competition was to **extend the reach of the forum further**: to engage via the visual element of drawing, photography and digital imagery; to imagine what circular economy looks like and how the artist, or inspiring creative, views the idea of resource efficiency, reuse and recycling.
48. Moving forward, ISF intends to bring together a group of key stakeholders to develop the Action Agenda into a five year strategy for resource productivity and circular economy in Australia. Key to this is collaboration across industry, government, NGOs and researchers, building on the World Resources Forum Asia Pacific and the Wealth from Waste Cluster.
49. The World Resources Forum Asia Pacific has confirmed the **growing importance and opportunity for resource productivity** and the need to create **interfaces between research, science, engineering, business and government** leading to innovation and mainstreaming. Forum co-hosts ISF and SMaRT@UNSW will continue to drive the importance of Circular Economy for policy makers and the private sector in support of policies, behaviours and infrastructure for Australia’s future.
50. The next World Resources Forum will be held in Davos, Switzerland, 11-14 October, 2015.

Damien Giurco (UTS) and **Veena Sahajwalla** (UNSW Australia) Co-chairs WRF Asia-Pacific

Bas de Leeuw, Managing Director, World Resources Forum