A WASTE RESEARCH, DEVELOPMENT AND INNOVATION (RDI) ROADMAP FOR SOUTH AFRICA (2015-2025)

Towards a secondary resources economy

Henry Roman* (PhD)
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science & technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

Linda Godfrey (PhD)
NRE, CSIR

Background and approach

- Two years ago, the DST embarked on a process to develop a **strategic approach** to RDI in the waste sector
- To support South Africa's move away from landfilling towards alternative options through innovation
- While SA has embraced the principles of the **waste hierarchy** in legislation
- Still landfill ~90% of all waste generated
- Significant **opportunity** for RDI to fast-track a move away from landfilling towards alternatives

The Waste RDI Roadmap

- The **vision** of the Waste RDI Roadmap is to stimulate –

- Through the **investment in science and technology**

Anticipated Impact

- Reduce environmental and social impacts of waste disposal
- Reduce the generation of waste
- Increase the recovery of valuable resources in the face of resource scarcity
- Drive towards a circular economy
- Stimulate a regional secondary resources economy with potential for new jobs and business

Anticipated Impact

Waste Management	**20% reduction (by weight) in industrial waste and a 60% reduction (by weight) in domestic waste to landfill (by 2025)***
Environmental Benefits (not yet fully quantified)	▶ Reduced environmental impacts associated with (often poor) landfilling (incl. greenhouse gas emissions, leachate, litter)
Economic Value	▶ Equivalent resource value**: R17.4 bn per annum (additional R9.2bn pa) ▶ Avoided financial costs of landfilling: R4.7 bn per annum ▶ Avoided externalities of landfilling: R5.2 bn per annum ▶ Avoided financial costs and externalities associated with virgin material production (not yet fully quantified)
Socio-economic Benefits (not yet fully quantified)	▶ Contribution of a secondary resources economy to downstream manufacturing (multiplier effect) ▶ Potential for enterprise development and creation of sustainable jobs (direct, indirect and induced) ▶ Reduced operational costs or improved competitiveness through process performance improvements ▶ 'Multiplier' (knock-on) effects on the macro-economy (*potentially a 1-3x multiplier*)

Towards an Implementation Framework

RDI Clusters defined

Strategic Planning

- Macro-Economics
- Value Chain Strategy
- Policy and Legislation
- Governance

Build and strengthen the basis and application of strategic analysis and advice for the purposes of evidence-based decision-making to inform strategy formulation, planning and its execution and management

Modelling and Analytics

- Systems Analysis and Modelling
- Business Models
- Socio-Economic and Environmental Modelling
- Analytics
- Impact Assessment

Develop and use methods, tools, techniques, platforms, systems and frameworks for the analysis, monitoring and evaluation of technical, economic, social and environmental opportunities and impacts associated with secondary resources

Technology Solutions

- Process Performance Optimisation
- Technology Development
- Technology Evaluation and Demonstration
- Technology Localisation

Design, development, evaluation, demonstration, localisation and deployment of technologies – both local and inbound – for customer-driven performance improvement

Waste Logistics Performance

- Strategic Network Design
- Planning and Management Systems
- Operational Logistics Processes

Optimisation of strategic, tactical and operational decision-making in respect of logistics objectives, assets and resources

Waste and Environment

- Aquatic
- Land
- Atmosphere
- Climate Change

Strengthen the ability to identify, monitor, evaluate and report on environmental impacts of waste and its management, in order to inform better targeted and more effective responses

Waste and Society

- Jobs and Labour
- Business Practices
- Behaviour
- Awareness and Communication
- Human Health

Deepen understanding of waste-related opportunities and threats, to increase the success of influencing perception and practice positively

Waste RDI Outcomes

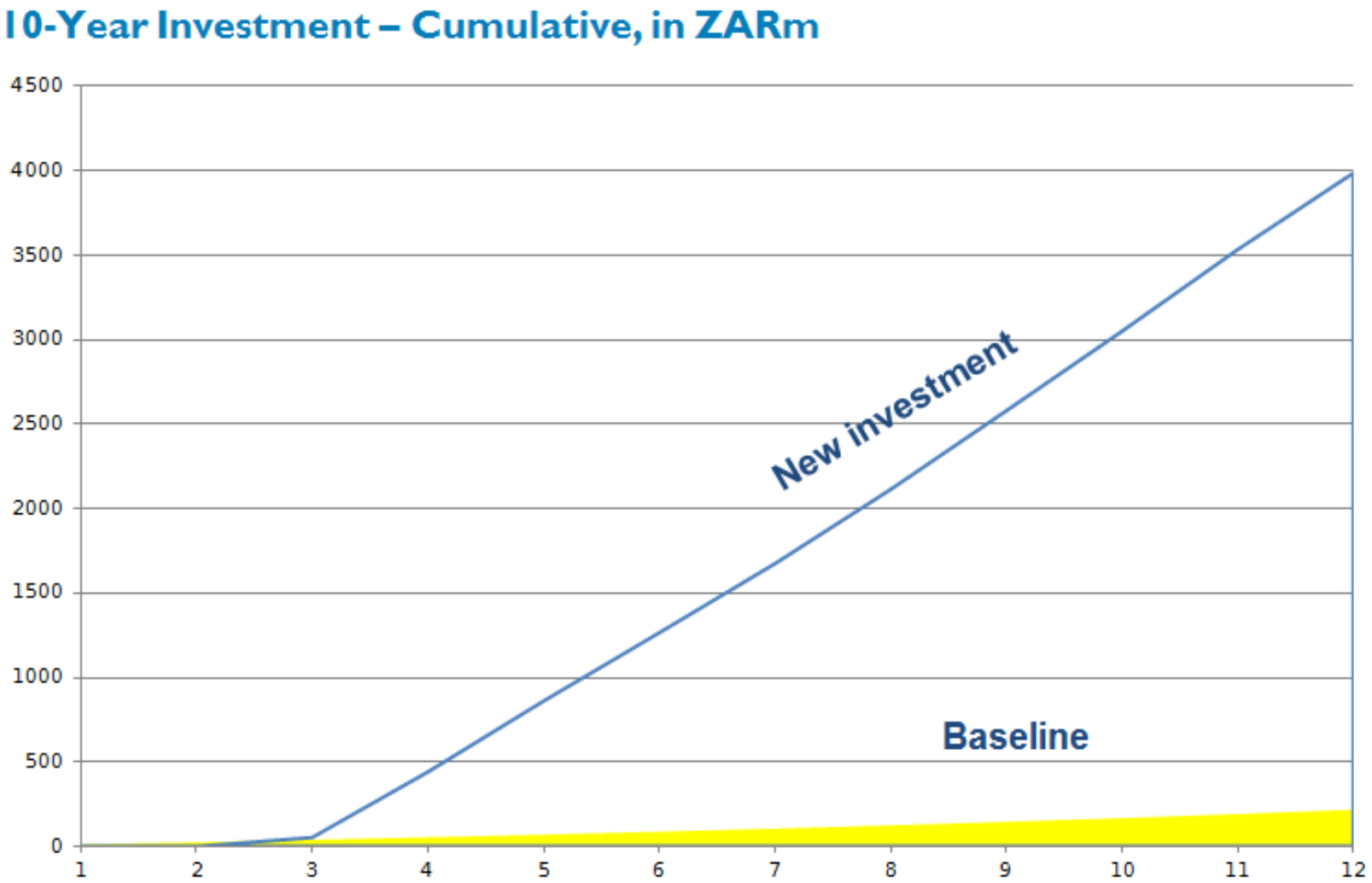
Vision *Development and deployment of performance improvements in waste management has delivered a significant contribution to the strengthening of a sustainable regional secondary resources economy in South Africa.*

Mission This has been achieved by means of a **National Waste RDI Programme** that supports maximisation of diversion of waste from landfill towards value-adding opportunities, including prevention of waste and the optimised extraction of value from reuse, recycling and recovery, in order to create significant economic, social and environmental benefit.

Means The underpinning contribution of RDI to strengthening South Africa's secondary resources economy is focused on four key Enablers:

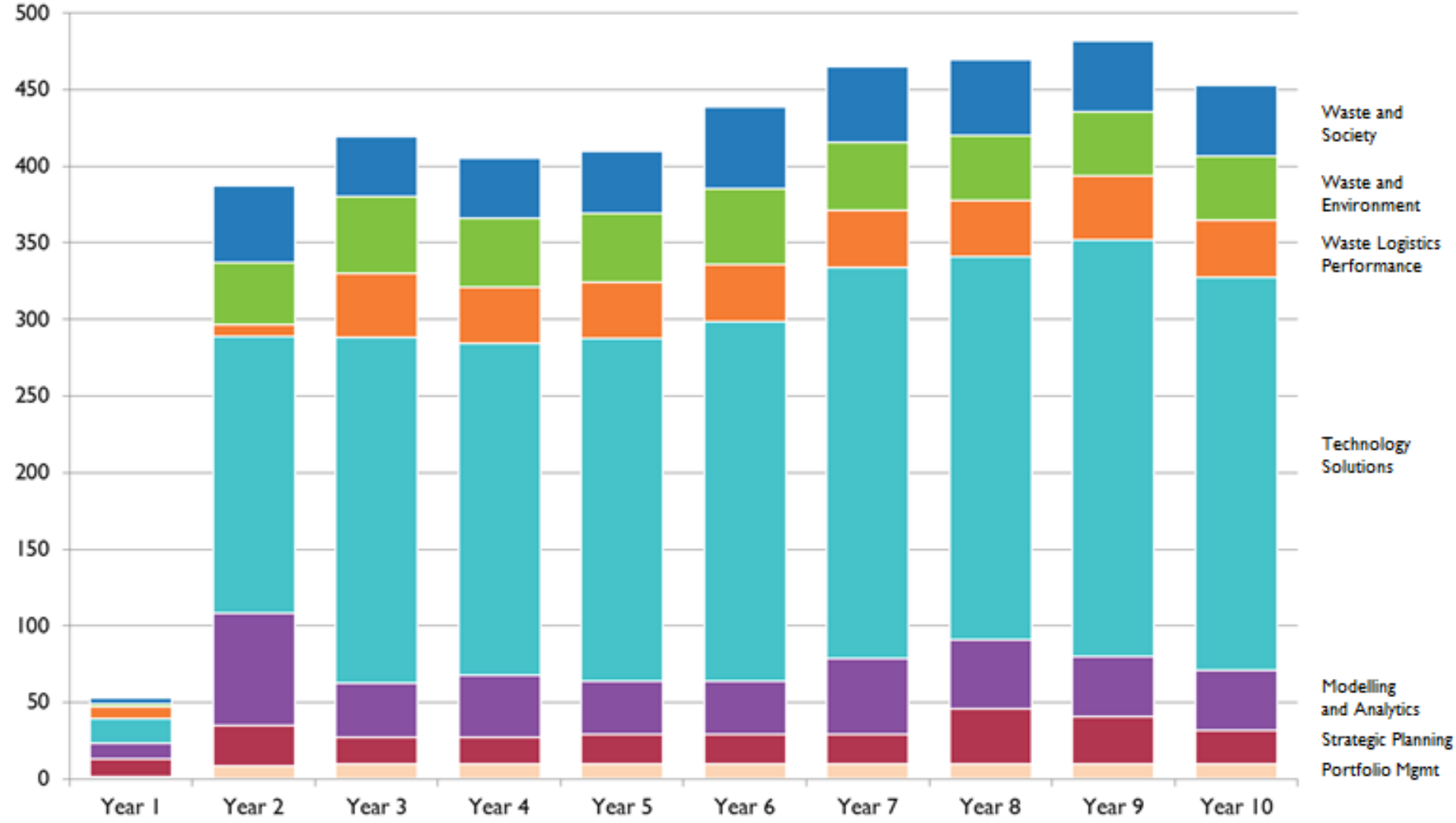
1. More effective decision-making
2. Faster insertion of context-appropriate Technology
3. Export of Know-How and Technology
4. Strengthened RDI capability and capacity

Ramping up RDI investment



Investment in Waste RDI

Per cluster, per year, in ZARm



Anticipated RDI Outputs

	Key Performance Indicator	Outputs Ambitious*
Technology Development	Products and services to market	4
	Technology packages	20
	Prototypes	60
Knowledge Generation	Registered patents	24
	Patent applications	68
	Publications	587
Human Capital Development**	Post Docs	65
	PhDs	163
	Masters	244

* Assumes a) total investment indicated is made and b) RDI Productivity assumptions are achieved in practice

** Number of students supported over the 10 year timeframe

What does this mean ito GHG emissions?

- The GHG inventory of 2013
  - Between 2000 & 2010 there was a 72% increase in GHGs from Solid Waste Disposal
  - Data on methane generation from managed landfills is not complete
- Achieving the goals of DEA through the Waste RDI Roadmap will reduce GHG emissions from landfills

Contact details

- **Dr Henry Roman**
  Director: Environmental Services and Technologies
  E-mail: henry.roman@dst.gov.za

- **Ms Magamase Mange**
  Deputy Director: Environmental Technologies
  E-mail: magamase.mange@dst.gov.za

www.wasteroadmap.co.za

Waste RDI Roadmap

Outlines the proposed interventions, progression paths and the related instruments, and the required RDI investment over time

Trends

Describes the local and global trends in waste management and approach adopted in arriving at the priority waste streams for the Roadmap

Capabilities

Maps the nature, availability and maturity of waste RDI capability and capacity in South Africa

Opportunities

Provides an overview of the Market Opportunities we see, how attractive they are and what is required to realise them