Bioeconomy

Vision
The sustainable utilisation of the Western Cape's bio-based resources for the greatest benefit to the local economy (i.e. improved competitiveness & job creation) & to enable a transition to a low carbon, resilient economy.

Goal
To unlock the potential of the Western Cape's bio-based resources & drive the "greening" of agricultural value chains. This is done through promoting the uptake of investment in green technology, processes & systems.

Structure
The Bioeconomy Programme builds the resource efficiency analysis done through the Regional Resource Flow Model Project in 2013-15 for the Western Cape economy. The Bioeconomy programme comprises of the Agriculture Sector Desk, the Resource Productivity Project & the Bioenergy Project (Figure 1).

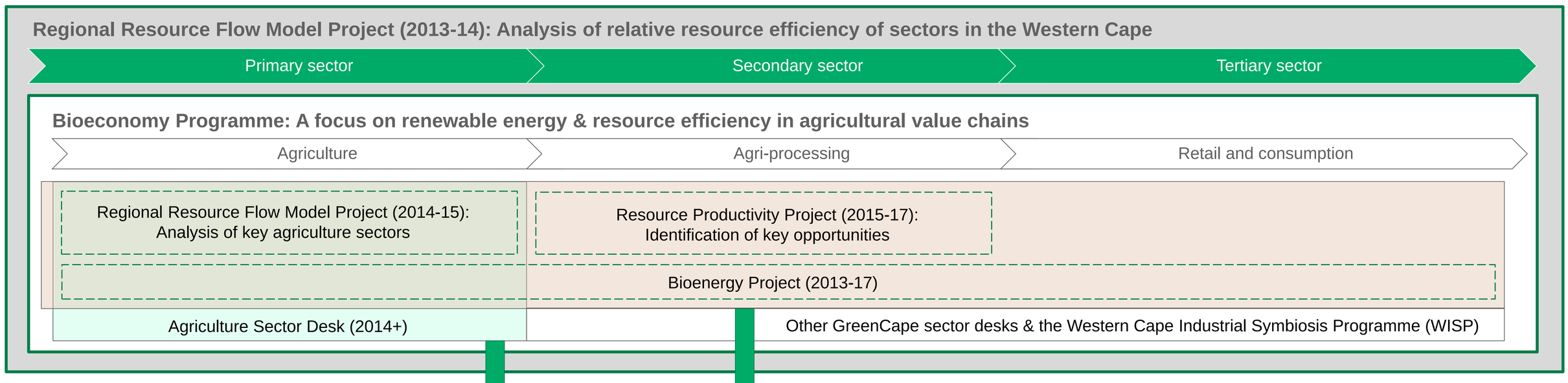


Figure 1: Programme components

Agriculture Sector Desk

Focus areas
Providing relevant & accurate information to farmers about:
- Energy & water efficiency
- Renewable energy applications
- Green farming practices, specifically precision agriculture & conservation agriculture

Outputs and activities
- The launch of the information portal "GreenAgri" in collaboration with the Western Cape Department of Agriculture
- The first GreenCape Agriculture Market Intelligence Report

Key insights
- Energy / water efficiency & renewable energy applications reduce costs for farmers & improve their energy & water security
- Green farming practices have demonstrated benefits to farmers in the form of improved yields, soil structure & a reduction in inputs such as energy, water & fertiliser
- There are knock-on benefits for the Western Cape; e.g. safeguarding jobs, improving the economic viability of the sector & food security

Agriculture Value Chains (Resource Productivity & Bioenergy)

Focus areas
Resource productivity in the agri-processing sector with a specific focus in 2015-16 on fruit value chains due to the sector's:
- High labour absorption of unskilled labour
- Significant contribution to economy (>R8 billion)
- Significant export earnings (±80% exported)
- Highly integrated value chains with significant knock-on effects

Approach
The project considers agricultural value chains in an integrated manner. Two strategies are applied to drive resource productivity: improving resource efficiency & value-add / waste beneficiation. The value-add hierarchy is used to prioritise opportunities for full value extraction (Figure 2) .

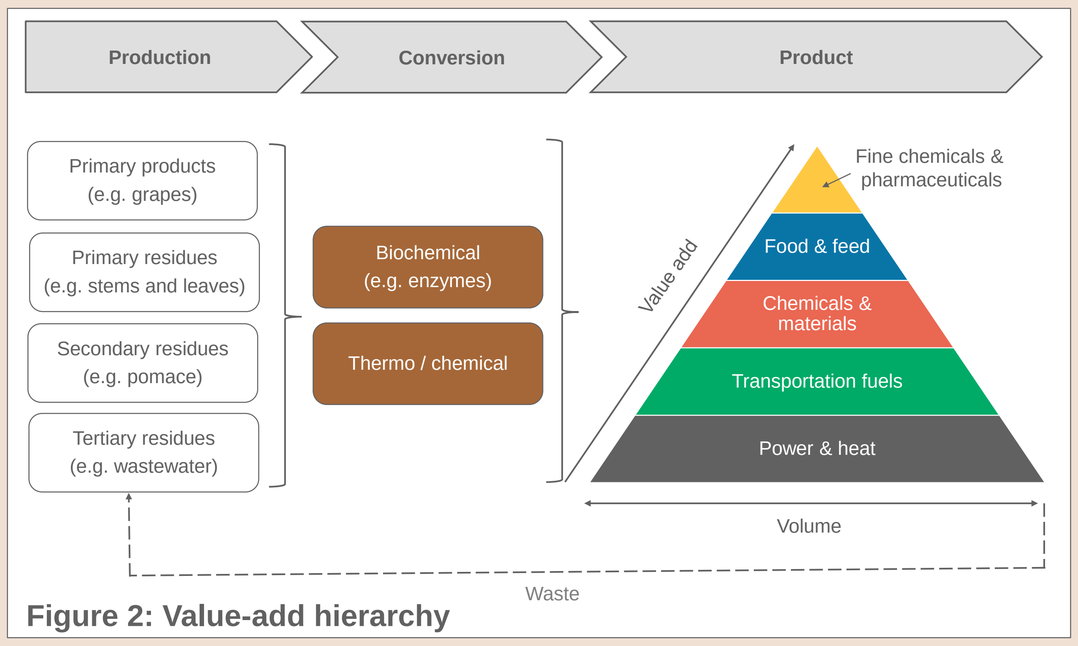
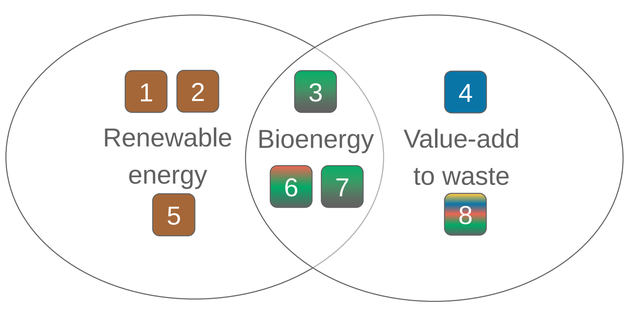


Figure 2: Value-add hierarchy

Green technology interventions (Figure 3) were selected based on alignment with GreenCape's mandate & support capabilities, as well as potential impact. These include:
- Renewable energy (RE)
- Value-add to waste (VA)
- Bioenergy (BE) i.e. energy applications from biomass & agri-wastes (intersection of RE & VA)

Outputs
- Developed business cases for private sector to illustrate feasibility of:
  - RE: Solar PV for packhouses, solar thermal for industrial scale heating
  - VA: Bioconversion of waste into high-value animal feed
  - BE: Viability of large-scale triticale-based bioethanol
- Collaborated with other sector desks to provide industry support



Business cases
1. Solar cooling in fruit packhouses
2. Solar thermal applications in agri-processing
3. Bioethanol from triticale
4. Value-add to organic waste: production of insect protein for animal feed

Industry support
5. Solar technology for dried fruit
6. Biogas for transportation fuel & energy applications
7. Biodiesel from waste oil & canola
8. Resource efficiency & value-add opportunities for fruit canning waste

Figure 3: Focus areas, outputs & activities

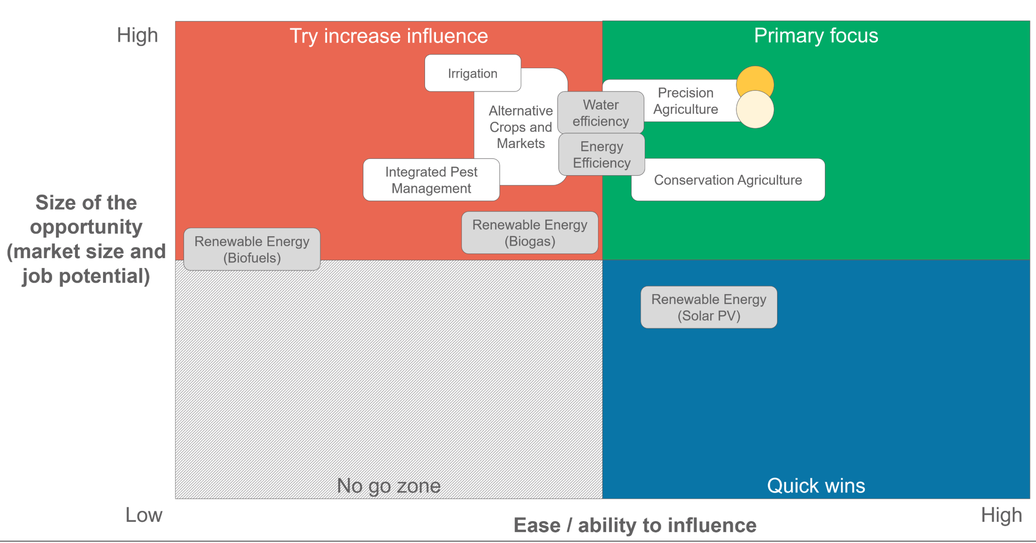
Key insights

Renewable energy in agri-processing
- Business case driven by on-site energy demand resulting in cost savings
- Enablers: ability to sell excess energy to the grid; promulgation of small scale embedded generation regulations & financing
- Barriers: cost of regulatory compliance & technology awareness

Bioenergy
- Bio-based residues generally not available - typically diverted to animal feed
- Large scale bioethanol: investment unlikely in short term due to variable feedstock price, low Basic Fuel Price (BFP) & regulatory uncertainty

Value-add
- Drive for waste-to-energy may redirect bio-based residues to lower value uses
- Improved value add possible through production of higher value feed components (e.g. protein)
- Insect production & processing for feed likely to expand as export barriers fall
- Economies of scale are critical, however logistic costs prohibitive

Opportunity Plot: Agriculture Sector Desk



Opportunity Plot: Agricultural Value Chains