



UNIVERSITY
OF
JOHANNESBURG

PEETS

Process Energy & Environmental Technology Station



Establishing a vibrant green economy that continually drives South Africa's equitable socio-economic success

Process, Energy and Environmental Technology Station

The primary mandate for PEETS is to contribute towards improving the competitiveness of industry and SMEs through the application of specialized knowledge, technology and facilitating the interaction between industry (especially SMEs) and academia to enable innovation and technology transfer to grow the green economy.

The Process, Energy and Environmental Technology Station (PEETS) was established in 2010 under the support of University of Johannesburg. PEETS is funded by Technology Innovation Agency (TIA), which is an agency of the Department of Science and Technology (DST).

Vision: To establish a vibrant green economy that continually drives South Africa's equitable socio-economic success.

Mission: Providing technical oriented enterprise development support in the water, energy and environment sector through appropriate technological innovations to grow South Africa's socio-economy in a sustainable manner.

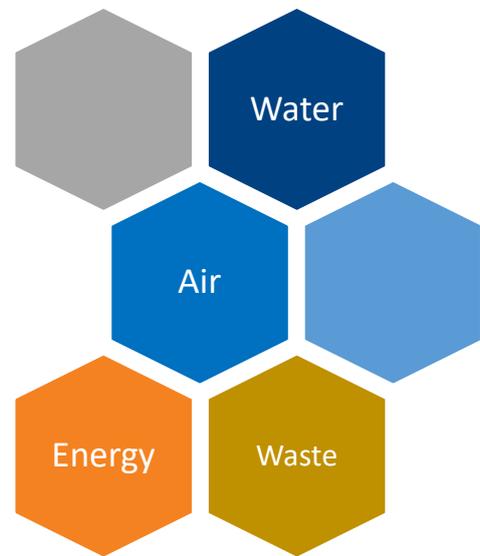


Figure 1: UJ-PEETS focus areas as it relates to the mission statement

A formal definition for the green economy can be regarded as a “system of economic activities related to the production, distribution and consumption of goods and services that result in improved human well-being over the long term, while not exposing future generations to significant environmental risks or ecological scarcities”. It implies the decoupling of resource use and environmental impacts from economic growth. It is characterized by substantially increased investment in green sectors, supported by enabling policy reforms. The Green Economy refers to two inter-linked developmental outcomes for the South African economy:

- Growing economic activity (which leads to investment, jobs and competitiveness) in the green industry sector
- A shift in the economy towards cleaner industries and sectors.

According to the state of green technologies, the priority areas for South Africa from a renewable energy perspective, given the policy direction, are those of solar, wind and bioenergy resources. To impact on the green economy in a sustainable manner, a return on investment in science and technology must be measured through the impact on the well-being of our communities. In the face of climate change, we urgently need to find pathways to a low-carbon, green economy. Only then can we improve the well-being of nine billion people by 2030 and achieve the Sustainable Development Goals (SDGs). Developing countries must leap-frog to a low-carbon, green economy while continuing to improve well-being of its citizens. Innovative eco-inclusive enterprises are already implementing low-carbon solutions while also providing social and economic benefits to those who need them most.

Technology Station Programme

The Technology Stations Programme (TSP) was established to enable Universities to provide technology development services to small and medium enterprises (SMEs). The Technology Stations (TSs) provide innovative Science, Engineering and Technology (SET) solutions for complex engineering challenges within the relevant industrial sectors aimed at supporting government's socio-economic priorities.



There are 18 Technology Stations (TS) based at 11 Higher Education Institutions in South Africa, managed by the Technology Stations Programme (TSP) Unit based in Pretoria at the Technology Innovation Agency (TIA) office. The TSP is a management and systems-wide support unit responsible for all Technology Stations across the country. The mission of the TSP is to assist the Technology Stations and Higher Education Institutions (HEIs) in the core, by performing the following functions:

- a. Ensure that funds allocated to the TSP have impact and are aligned with the TIA/DST national strategic objectives and performance measures;
- b. Reduce transaction and co-ordination costs of activities that involve or benefit multiple TSs to promote synergies and network benefits;
- c. Monitor and evaluate the performance of TSs SME-related projects, and initiate interventions where required;
- d. Identify opportunities to upgrade and/or expand the TSs high-end technology infrastructure;
- e. Facilitate opportunities for technology knowledge transfer and innovation support to TIA's stakeholders; and
- f. Promote the network of Technology Stations to other government programmes and ensure that the TSs are aware of and participating in related national priorities and industry programmes.

The Technology Stations are well positioned to support industry, particularly SMEs and Higher Education Institutions. The Technology Stations' activities offer an opportunity to bridge the gap between local suppliers and industry to take advantage of the recapitalization and expansion programmes by enhancing competitiveness of local suppliers through technology improvement. The TS provide technology transfer infrastructure that plays a critical role for transferring technologies from Higher Education Institutions to technology users.

The Department of Science and Technology (DST) provides financial support through TIA, to Higher Education Institutions (HEIs) which house Technology Stations to provide technical support to SMEs in terms of solutions for services and training.

Operational Objective

The TSP has contributed towards the achievement of the DST and national objectives relating to technology innovation, enabling and support. The TSP network offer sophisticated and effective technological solutions to enterprises and individuals in targeted communities.



The TSP directly contributed to the DST knowledge-based indicators by becoming a critical enabler for prototypes and technology transfer packages onto the regional innovation system with HEIs.

<p><i>The core goal of the TSP is to contribute towards improving the competitiveness of industry through the application of specialised knowledge and technology; and facilitating the interaction between industry (especially SMEs) and academia in order to enable innovation</i></p>		
<p>Objectives</p>	<p><i>Contribute to HEI being more responsive to the needs of industry</i></p>	<p><i>Enable industry, SMEs in particular, to benefit from the specialised knowledge and innovative technologies of the universities</i></p>
<p>KPA</p>	<p><i>Institutional learning and development</i></p>	<p><i>Technology transfer and industry support</i></p>
<p>Measures</p>	<p><i>Knowledge products supported, Post graduate studies and students on projects, Equipment of TS used by host, Collaboration with other TS, Contribution to academic content & by host to TS, Interns hosted</i></p>	<p><i>Technology based support & training to SMEs, Tech based products/processes developed or improved (projects), Industry relevant services, TS equipment used by industry, Industry uptake of technology, Financial contribution to TS from industry/public sources, Provision of industry relevant training</i></p>
<p>Socio-Economic Impact</p>		

Procedure to follow to access services

1. Fill out a Client Capturing Form (CCF) – Must be completely filled and signed with the Company registration number (if available)
2. For start-up companies not registered with the Companies and Intellectual Property Commission (CIPC), an Identity Document (ID) Copy of one of the members should be submitted.
3. Copy of ID (if the client is an individual without a registered company) should be submitted.
4. Clients under the age of 18 are to be accompanied by a guardian or school teacher when using any services at the TS.
5. For large groups (i.e. schools or organisations) the entity representative will need to sign a CCF

PEETS Focus Areas

There are close linkages between the production and usage of energy and water and consequently generation and disposal of waste. PEETS endeavours to promote cross-disciplinary knowledge transfer that supports the development of the green economy by building on relationship with research and development networks within the UJ and NSI community as it relates to sustainable development in the energy-water-waste nexus. Our focus is on **Process Optimization**, specifically in the energy and environmental sectors.

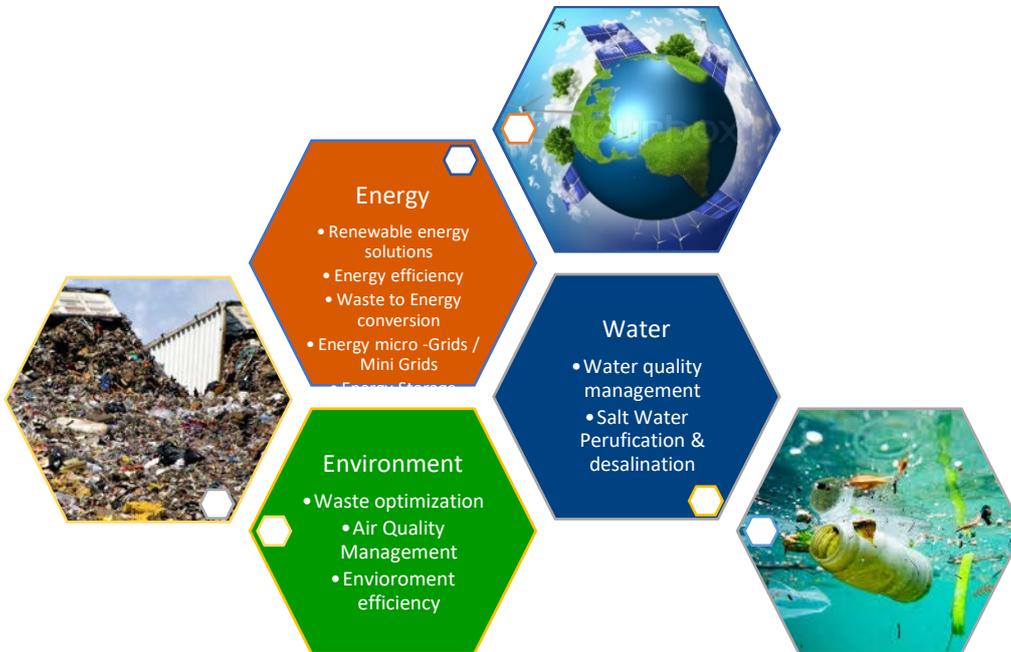


Figure 2: PEETS Focus Areas

In the **Energy Sector**, our focus is on energy efficiency and renewable energy solutions, waste to energy conversion, microgrids and energy storage. In the **Environmental Sector**, our focus is on waste utilisation and optimization, air quality management, water management and purification and desalination as illustrated in Figure 2.

The building blocks to support the green economy as it relates to the PEETS mandated is illustrated in Figure 3 below highlighting the Technology development areas and the SME application areas to support the green economy.

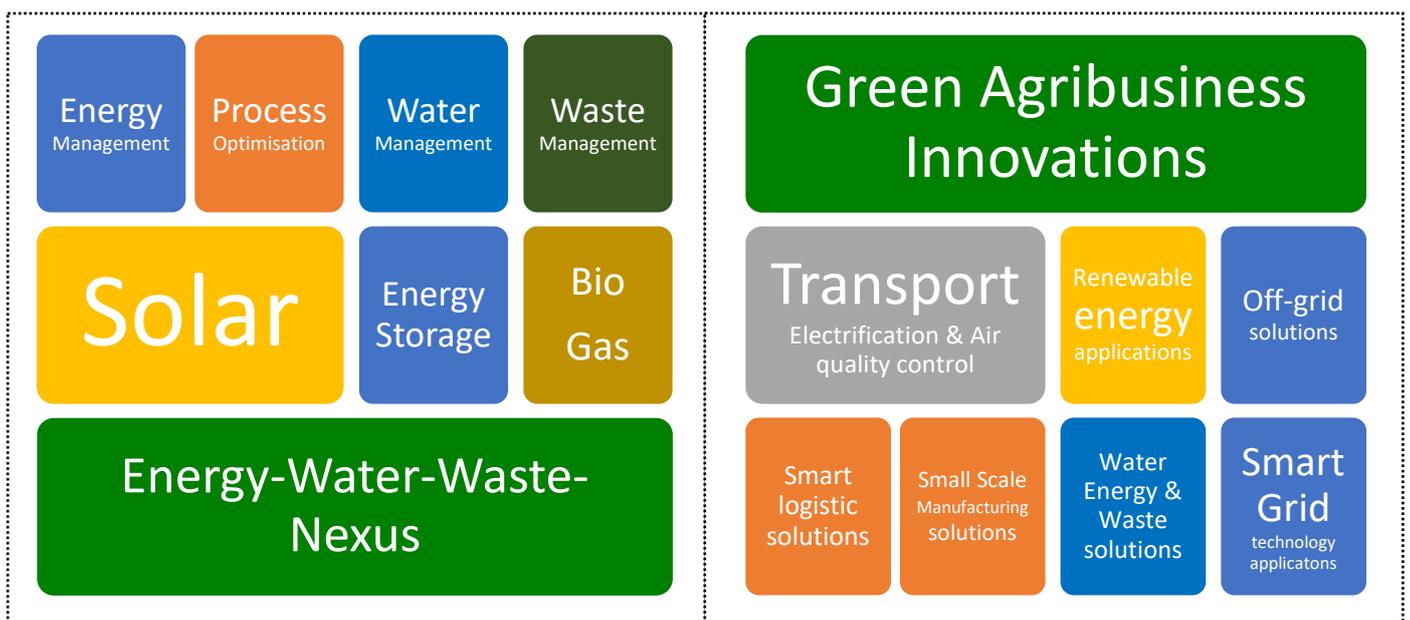


Figure 3: Building blocks to support SMEs growing the green economy

Concentrating on initiatives to support the green economy and finding the linkages with research conducted at the University of Johannesburg our strength lies in industry support relating to air quality control, energy management and waste management. The technology station has expanded on internal capacity in FY2017/18 to support and develop a green economy services industry in this environment by partnering with neighbouring technology stations, the Sustainable Energy Technology and Research (SeTAR) Centre, the UJ Energy M&V Group and research groups at UJ to accelerate on the roll out of these initiatives.

The Biofuel Research Network at UJ enhances the reach and capacity of PEETS and this relationship will be strengthened in the next financial year to support a research and innovation eco-system through strategic partnerships with local government, international research agencies and commercial partners. Linking the scaled production of solid waste to fuel conversion to the transport industry to existing initiatives to green the City of Joburg’s fleet vehicles will be a key driver and application area for this focus area. This focus will require PEETS to expand our air quality and particle emissions control capacity to support this growing industry on the continent, combating climate change and growing the biofuels industry.



Figure 4: PEETS Focus to support greening industry capacity building



Figure 6: PEETS Focus to support greening and capacity building in public transport industry.

The e-Mobility application area also extends to the last mile in public transport, supporting the development of lightweight electric vehicles to support the movement of people, logistics systems and expands to off-grid containerized small-scale manufacturing, supporting SMEs to retrofit and service e-bikes, and smart city data collection through geolocating and sensing using lightweight, electrically assisted vehicles. This research and development focus will also support the growth and development of solar charging stations, energy storage and smart grid applications.

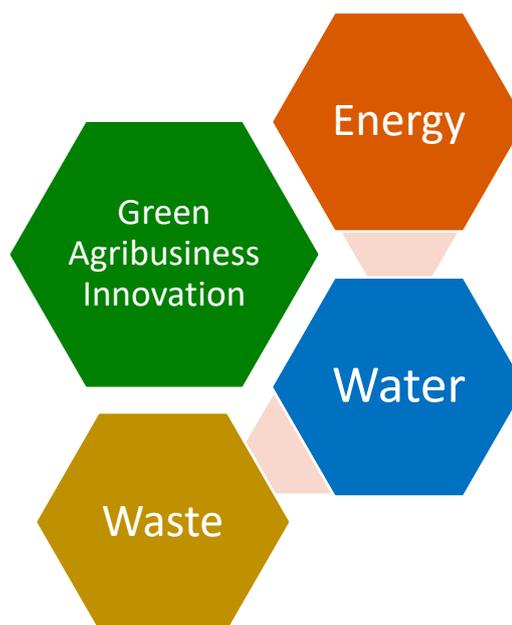


Figure 5: PEETS Focus to support green agribusiness innovations

Food, water and energy security form the basis of a self-sufficient economy, but as a water-scarce country with little arable land and a dependence on oil imports, South Africa’s economy is testing the limits of its resource constraints. When supporting sustainable development, the focus shifts to the food-water-energy nexus in the agriculture sector, the services and circular economy, and the role of SMEs in the green economy. South Africa has the potential to be at the forefront of green

agribusiness innovation. Its entrepreneurial culture, its leading role in the solar energy market in Africa and the importance of agriculture for the region all foster the development of cutting-edge energy solutions for the energy-agriculture nexus.

Building on the established PEETS capacity of waste to energy conversion, the energy-water-waste-agriculture applications link our focus areas to support SMEs in vulnerable communities. Continuing the support of rural and urban small-scale farmers throughout the value chain, PEETS will expand on renewable off-grid solutions to support production, food processing, water and waste management and logistics in this sector.

Institutional Positioning

PEETS is strategically positioned in the Faculty of Engineering and Built Environment to leverage the skills from the faculty and to link to strategic partners from this base. The station is directly associated with the Chemical Engineering Department, especially in relation to the bioenergy focus area, which has also expanded into the Mechanical, Electrical and Civil Engineering departments, based on research activities aligned to the PEETS mandate. The departments under the Faculty of Engineering and Built Environment (FEBE) have lecturers and students who provide their expertise as and when needed by the station. Cross-faculty collaboration has also expanded the support and knowledge transfer to SMEs. The positioning and reporting structures of PEETS are illustrated below.

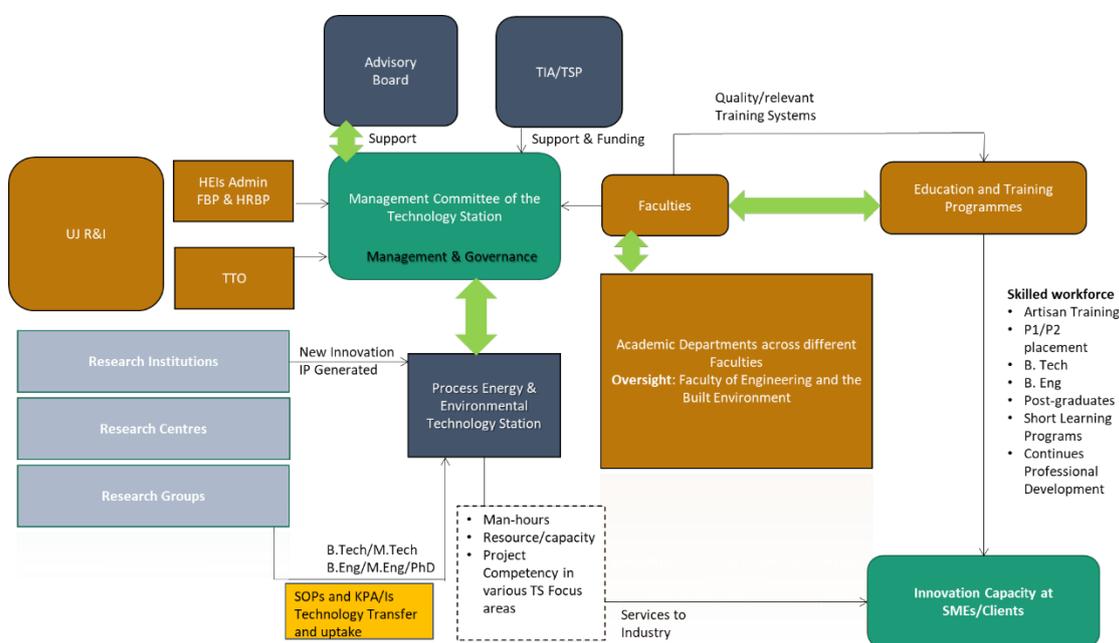


Figure 7: PEETS Institutional Position within the University

The UJ Research and Development Network has a strategic focus aligned to the PEETS mandate with experts in bio-energy and bio-fuels, air quality and emissions control, water and waste management, renewable energy sources, and specialist in measurement and evaluation. By building on the relationship with the Sustainable Energy Technology and Research (SeTAR) Centre, specific areas of research to support SMEs are:

- Development, testing and certification procedures for renewable and alternative energy technologies
- Safe and efficient domestic energy from combustion devices and fuels
- Energy efficiency in low cost housing
- Smart technologies for energy efficiency in buildings and cities
- Spatial planning, energy efficiency and sustainability
- Transportation energy
- Solar and renewable energy applications for poverty relief
- Rural biomass energy use
- Energy and water
- Knowledge exchange of energy and sustainability between researchers and government.

Product and Services

Technology services and support systems have been developed that incorporate future orientated knowledge management systems. The support system has enhanced the efficiency the Technology Station to give technology-based services to Entrepreneurs, SME's, large corporations and relevant industrial sectors.



Services offered at PEETS include:

- Test and analysis services relating to
 - Air Quality Auditing
 - Energy Auditing
 - Waste Characterization & Formulation
 - Water Testing and Analysis
 - Biofuel laboratory testing and Analysis
- Environmental Impact Assessment
- Engineering Consultation
- Technology audits and feasibility studies
- Applied development, engineering and design services
- Product and Process Development, Improvement and Optimisation
- Technology Research and Development
- Prototype development and Assembly
- Training and Demonstration



Figure 8: Products and services

Contact Details

For further information contact the Station Manager



Nickey Janse van Rensburg
Manager | Process, Energy & Environmental Technology Stations
University of Johannesburg
nickeyjvr@uj.ac.za | 011 559 6430 | www.uj.ac.za

