



INNOVUS

CONTACT

OFFICE: +27 (21) 808 3826

FAX: +27 (21) 808 3913

EMAIL: info@innovus.co.za

POWASAVE

Innovus Technology Transfer (PTY) Ltd is Stellenbosch University's wholly-owned technology transfer company. Contact Anita Nel, Innovus Chief Executive Officer, on (021) 808 3826 or send an email to ajnel@sun.ac.za for more information.



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POWASAVE (POWER, WATER, SAVE) WATER
SPRINKLER FOR AGRICULTURAL
IRRIGATION



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BRIEF DESCRIPTION

Irrigation is an essential part of commercial agriculture in South Africa and globally. However, the water and energy used in typical large-scale irrigation projects can be substantial. As water and energy become scarcer, conserving these precious resources is not only an ethical issue, but a financial one.

Centre pivot irrigation systems are already more water and labour efficient than many other types of irrigation. However, there is room for improvement. A centre pivot irrigation system typically consists of a centre pivot point with a computer system, electric motor, and water pump. Water is pumped at high pressure along an elevated length of pipes supported by trusses mounted on wheels. The wheels slowly move the radial sprinkler arm around the circle. A computer system, along with pressure regulators installed upstream of each high pressure sprinkler nozzle, attempt to distribute water evenly to crops, even though the outer sections of the arm cover much more ground than the sections nearer the central pivot. Traditional sprinkler heads work under high pressure to spread a mist of water evenly over crops.

By introducing a clever alternative to these sprinkler heads, POWASAVE, allows for centre pivot irrigation systems that require as little as 5% of the water pressure needed for traditional systems. Lower operating pressure means less electricity used. Additionally, compared to the mist produced in traditional systems, POWASAVE sprinklers create bigger drops, so less water is wasted to evaporation and wind drift. POWASAVE also delivers water more accurately for uniform distribution. This means less overlap, less local overwatering, and less water wasted.

TARGET MARKETS

- Irrigation system suppliers
- Agribusiness
- Independent farmers

VALUE PROPOSITION / BENEFITS

POWASAVE will be an attractive innovation to customers because it allows for much lower upstream water pressure (down to 5% as much) than that required by traditional irrigation systems. Lower water pressure means customers will save on energy costs. POWASAVE also reduces water consumption by reducing waste through evaporation, wind drift, and irrigation overlap. POWASAVE can be installed with new irrigation systems, or existing systems can be retrofitted with POWASAVE sprinklers.

COMPETITIVE ADVANTAGE

Traditional sprinkler heads are imported. Contrastingly, POWASAVE sprinklers use a simple design that can be manufactured locally. POWASAVE also requires less energy and uses less water, reducing irrigation costs. It also allows for more uniform water distribution to avoid problems of local over-irrigation.

TECHNICAL DESCRIPTION

POWASAVE sprinklers replace the traditional sprinkler heads on a centre pivot irrigation system (and can be used on other types as well). A centre pivot irrigation system typically has a central tower with a water pump, electric motor, and computer system. A long radial arm extends from the central tower, consisting of water pipes and support rods. The arm is supported by wheeled A-frames that allow the arm to pivot around the central tower.

At regular intervals along the radial pipe, sprinklers are attached to the ends of drop tubes. Each sprinkler generally has a dedicated pressure reducing valve upstream of it to control water distribution. Rather than the traditional sprinkler heads, the POWASAVE sprinklers are lateral pipes suspended parallel to the ground by the drop tubes.

The lateral pipes are oriented perpendicular (tangential) to the radial pipe. Each POWASAVE sprinkler pipe has an integrated pressure regulating system and consists of a number of orifice sets at given intervals to control water distribution. The layout of the orifice sets and pipe dimensions differ by radial distance from the central tower to uniformly deliver water to crops.

PRINCIPAL RESEARCHERS

Professor Hanno Reuter
Department of Mechanical and Mechatronic
Engineering, Stellenbosch University

Irrigation is an essential part of
commercial agriculture in South Africa



INNOVATION STATUS

A proof of concept has been developed. The POWASAVE sprayer has been created and is ready for installation. The design concept for the pressure control system still needs to be built and tested.

Patent applications are pending in the United States, Australia, New Zealand, Brazil and South Africa. These patent applications are based upon a PCT application in which the European Patent Office found the claims to be novel and inventive. The priority date is 18 November 2014.