



Process Instrumentation for Renewable Energy



# Process Instrumentation Supporting Renewable Energy

Reducing our dependence on fossil fuels has long been driven by environmental concerns, with a focus on limiting emissions and slowing climate change. Increasingly, this shift is also being driven by economic factors, as investment, policy and funding support the transition to alternative energy sources for both industry and consumers.

Alternative energy processes can generate significant levels of power while reducing environmental impact. Advances in engineering have enabled solutions that address key challenges, such as managing landfill waste and capturing noxious gases, while generating electricity or producing cleaner fuels for heat and energy use.

As reliance on traditional energy sources decreases, energy generation is becoming more diverse. Technologies such as wind, solar, hydrogen, hydro, biogas and waste-to-energy are forming a more flexible energy mix, with each source offering advantages depending on application and geography.

The development and operation of these energy systems relies on accurate monitoring and control. Reliable process instrumentation ensures temperature, pressure, flow and level are maintained within safe operating limits, supporting efficient and dependable energy generation.

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## Collaboration with Us

Delta Mobrey supports organisations across the renewable energy sector with tailored instrumentation solutions designed for demanding applications. Our engineers can work with you to offer some bespoke fittings to ensure that the instruments needed are ideally suited for the function required.

Accurate measurement and control of pressure, flow, level and temperature is essential to maintaining safety and operational performance. With over 100 years of engineering experience, Delta Mobrey delivers robust, reliable instrumentation designed for long-term use in harsh environments.

# Sample of Products

We manufacture a wide range of products for measuring and reporting change in: temperature, pressure, level and flow for the renewable energy industry. These products have been designed with accuracy and safety in mind, allowing you to run your plant more safely and more efficiently.

Below is a small sample of the products available, all designed to assist.

## Differential Pressure Transmitter D31 – D-Series

These SMART Differential Pressure Transmitters are suitable for measuring differential pressure of gases, vapours and liquids. The special design of the active sensing element ensures that it is able to withstand pressure surges and overloads of up to 250/320/413 bar.



## Pressure Switch – Sentry Series

These SMART Differential Pressure Transmitters are suitable for measuring differential pressure of gases, vapours and liquids. The special design of the active sensing element ensures that it is able to withstand pressure surges and overloads of up to 250/320/413 bar.



## CS2/4 Pressure Switch – Compact Series

The Compact Series, (C S), switch has been designed to meet the specific requirements of panel applications, whether they be of the Wellhead Control, Hydraulic Power Unit or Chemical Injection Skid type. With their compact, rugged, all stainless steel construction they're especially useful in the cramped and harsh environmental conditions.



## VM 2/4 Pressure Switch – Volume Series

These SMART Differential Pressure Transmitters are suitable for measuring differential pressure of gases, vapours and liquids. The special design of the active sensing element ensures that it is able to withstand pressure surges and overloads of up to 250/320/413 bar.



# Differing Energy Types

## Hydropower

The basic principle of hydropower is the use of flowing water to drive turbines. Hydropower plants generally fall into two configurations: with dams and reservoirs, or without.

Hydropower dams with large reservoirs can store water over short or long periods to meet peak demand. Facilities can also be configured for specific purposes, such as day or night operation, seasonal storage, or pumped-storage systems for both pumping and electricity generation.

Run-of-river systems, which operate without large dams or reservoirs, typically generate power on a smaller scale and are designed to operate within the natural flow of a river. For this reason, small-scale hydro is often considered a more environmentally friendly option.

## Bioenergy

Bioenergy use falls into two main categories: 'traditional' and 'modern'. Traditional use refers to the combustion of biomass in forms such as wood, animal waste and traditional charcoal.

Modern bioenergy technologies include liquid biofuels produced from bagasse and other plant materials, bio-refineries, biogas generated through anaerobic digestion, wood pellet heating systems, and other advanced processes.

## Biogas

Biogas plays a significant role within the renewable energy sector, with particular emphasis on the efficiency of biogas plants. By using proven technologies, production efficiency can be optimised. The automation and design of measurement and analysis systems contribute to long-term, reliable gas production.

To monitor process conditions effectively, there is a continuous need for accurate measurement of temperature, flow, level, pressure and gas composition.

The correct choice of instrumentation has a direct impact on plant efficiency, with systems required to deliver reliability, longevity and ease of operation.

## Energy from Biomass

### From plants

Biomass processing requires steam to soften and break down cellulose (e.g., straw) into a pliable material, allowing enzymes to liquefy the substance. Once liquefaction has taken place, the product is transferred into fermentation tanks, where yeast converts sugars into ethanol and carbon dioxide.

To manufacture ethanol efficiently and safely at scale, the process requires accurate flow measurement throughout the biomass-to-ethanol conversion stages. Flowmeters must be reliable and durable enough to withstand corrosive media, high pressures and potentially hazardous conditions, while also supporting integration with control systems to optimise performance and efficiency.

The solids resulting from the distillation process are dried and pelletised for use as solid biofuel.



## From Municipal solid waste landfills and livestock manure

Biogas is produced through the anaerobic decomposition of biomass. It can be used directly as a fuel or upgraded by removing CO<sub>2</sub> and other gases to produce biomethane, also known as renewable natural gas.

Anaerobic decomposition occurs when bacteria break down organic material in the absence of oxygen, producing biogas. This process occurs naturally in landfill sites and manure storage, and can also be controlled in anaerobic digesters.

The remaining material, known as digestate, is nutrient-rich and can be used as fertiliser.

Many wastewater treatment plants and industrial facilities, such as paper mills and food processors, use anaerobic digesters as part of their waste management processes. The resulting biogas can be used for heating, electricity generation, or both.

## Waste to Energy

A waste-to-energy facility may generate a range of energy outputs, including electricity, district heating, steam for industrial processes, desalinated seawater or district cooling. In this way, residual waste - i.e. waste that cannot be recycled in an economically or environmentally beneficial way - can be converted into a valuable energy resource.

Waste-to-energy facilities provide a local source of secure, stable and climate-conscious energy. They can reduce reliance on fossil fuels, support energy security, and in many cases significantly reduce the need for landfill.

In simple terms, waste-to-energy involves the combustion of waste at high temperatures to generate steam, which drives turbines to produce electricity. While the concept is straightforward, the process requires detailed engineering to ensure operational integrity and the safety of both personnel and the surrounding environment.

Pre-incineration processes, such as the removal of recyclable metals, help reduce emissions, although they can impact economic viability. Advances in incineration technology and process methodologies continue to improve environmental performance and support the ongoing development of this energy source.

## Hydrogen

Hydrogen has long been used across multiple industries, including fertiliser production, chemical processing and metal refining. With the increasing focus on green energy, hydrogen is becoming an important component of the future energy mix.

Its versatility allows it to act as an alternative energy source, particularly when generation from other renewable sources such as wind or solar is reduced. Its ability to be stored also enables it to help balance supply and demand.

Depending on how it is produced, hydrogen is classified as:

- ▶ **Grey:** This is what most of the world's hydrogen currently is, produced from natural gas or methane via steam reforming.
- ▶ **Blue:** during the steam reforming process, a high proportion of the carbon generated is captured and stored underground, this is low carbon hydrogen.
- ▶ **Green:** made using electricity from renewable sources to split water molecules into hydrogen and oxygen – this is carbon free hydrogen and is viewed as the most environmentally friendly.

Hydrogen can permeate metals due to its small molecular size. As a result, instrumentation used in hydrogen applications must be manufactured from carefully selected materials to ensure long-term integrity and measurement accuracy. Delta Mobrey has conducted extensive research in this area and offers a range of suitable solutions.

## Wind

Wind power is one of the fastest-growing renewable energy technologies, driven in part by falling costs. It generates electricity using the kinetic energy of moving air, which is converted into electrical energy via wind turbines.

Wind turns turbine blades, rotating a shaft connected to a generator, producing electricity through electromagnetic induction.

The amount of energy generated depends on turbine size and wind speed. Power output is proportional to rotor size and increases significantly with higher wind speeds.

## Solar Energy

Electricity is generated in a couple of ways:

### Solar PV

Solar technologies convert sunlight into electrical energy either through photovoltaic (PV) panels or through mirrors that concentrate solar radiation. It is the reaction of the silicon within the panels that generate the electricity.

This energy can be used to generate electricity or be stored in batteries or thermal storage.

### Concentrated Solar Power

Concentrated solar power (CSP) uses mirrors to focus sunlight onto a heat transfer fluid, generating thermal energy that is converted into electricity.

CSP is particularly effective in regions with high solar irradiance and can incorporate thermal energy storage, allowing power generation even when sunlight is not available.

This gives CSP a key advantage, enabling it to complement other renewable energy sources in an integrated energy system.

## Key Benefits of Delta Mobrey Instrumentation

- ▶ Reliable performance in harsh operating environments
- ▶ Designed for long service life and minimal maintenance
- ▶ Accurate measurement across critical process parameters
- ▶ Suitable for hazardous and safety-critical applications
- ▶ Designed and manufactured in the UK

# Reference Guide for Renewable Energy

Below is a quick reference guide of renewable industries and the most suitable products in the Delta Mobrey range:

Product Type/Industry	Ultrasonic/ Levels	Hydrastep/ Hydratect	Gap Sensors	Pressure Transmitters	Differential Pressure Transmitter	Temperature Transmitters	Sensors
Solar, CSR only	DMSP			D21 SMART HART, D22 Analogue	D31 SMART HART, D32 Analogue	D72 SMART HART	TSCS temperature sensor
Hydrogen	DMSP, submergible type pressure transmitters		MSM/MCU gap sensor	D21 SMART HART	D21 SMART HART	D72 SMART HART	TSCS temperature sensor
Hydro	DMSP ultrasonic level measurement	Hydrastep	MSM/MCU gap sensor	D21 SMART HART	D31 SMART HART	D72 SMART HART	TSCS Skin point temperature sensor
Biogas	DMSP, submergible type pressure transmitters	Hydrastep	MSM/MCU gap sensor	D21 SMART HART, D22 Analogue,	D31 SMART HART, D32 Analogue	D72 SMART HART	TSCS Skin point temperature sensor
Waste-to-Energy	DMSP, submergible type, MLT100 SMART HART Displacer LT, MSM 400	Hydrastep, Hydratect	MSM/MCU gap sensor	D21 SMART HART, D22 Analogue	D31 SMART HART, D32 Analogue	D72 SMART HART	TSCS Skin point temperature sensor



The renewables sector continues to expand rapidly, driving demand for reliable instrumentation that supports safe and efficient operation across nuclear, hydrogen, and waste-to-energy applications. From remote generation sites to large-scale processing facilities, accurate measurement and dependable control are essential to maintaining performance and protecting critical assets.

With a heritage of over 100 years in process instrumentation, Delta Mobrey provides robust solutions that help operators maintain performance, protect assets, and ensure long-term reliability in the clean-energy sector.

### **Trusted Quality. Reliable Dependence**

Quality and reliability have always formed the cornerstone of our success, we are recognised by industry with international approvals covering every aspect of our manufacturing, test and product portfolio.

Certifications span all areas of hazardous and regulated environments, and include: ATEX, ICEx, EXd, EXia, NEMA, SIL, IS, PED, NEC 500 and 505, with new certifications being gained.

### **Proven Value**

Performance and value are the reasons why so many customers return and continue to place their trust in us and our products. By combining engineering expertise with consistent product quality, we deliver dependable solutions for every application, giving customers complete confidence in our ability to perform without compromise.

### **Bespoke Solutions**

We're proud to be able to provide custom engineered solutions to meet your exact requirements.

The complexity of special engineering can vary from a simple change in process connection, or to a completely redesigned product to meet specific operational /performance criteria; available as one-offs through to large volume requirements.

### **Global Presence**

To ensure our customers have immediate and continuous access to our staff and support, we have several strategically placed offices around the globe. For more information, please visit the Contact Us page on our website - [www.delta-mobrey.com](http://www.delta-mobrey.com)



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