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Your strategic update on flow, temperature, and pressure measurement from Flow Research

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1. Why the flowmeter market is rebounding

In this issue's news from the president, we hope you will enjoy excerpts from an April 16 article Jesse wrote for P.I. Process Instrumentation.

Dr. Jesse Yoder, president of Flow Research

The current recovery of the flowmeter markets is due to recovering economies in the United States and around the world, the recovery of oil prices and the oil markets, pent-up demand and supply chain issues.

The recovery has been especially strong among new-technology flowmeters [Coriolis, magnetic, ultrasonic, vortex, and thermal].The COVID-19 pandemic affected all of the process industries, and many others as well. This was a global phenomenon that was not limited to any specific regions. Particularly hard-hit was the oil and gas industry, and the chemical, food and beverage, power, and water and wastewater industries. Since flowmeter suppliers sell into all of these industries, the markets for all types of flowmeters declined in 2020.

In 2020, the U.S. economy went into recession in March and April. Worldwide output shrank by 4.3 percent in 2020. The recession began in most countries in February 2020. In the early months of the pandemic, tens of millions of people lost their jobs in the United States. While unemployment improved late in the year, it remained high throughout 2020. Supply chain issues arose because manufacturing plants were unable to produce needed goods, due to lack of needed materials and parts. Due to the lack of goods, prices began rising and inflation became a problem for the economy.

The economy began recovering in 2021. The gross domestic product (GDP) in the U.S. increased by 5.7 percent in 2021. Global growth rate increased by 6.02 percent in 2021. Some of this growth was due to pent-up demand. This compares to a GDP growth of 4.1 percent in the U.S. in 2019. Even though the U.S. GDP growth in 2021 was impressive, it was coming off a decline of 2.3 percent in 2020. This means that many industries did not fully recover to the 2019 level in 2021.

The worldwide flowmeter market followed the same pattern. The flowmeter market experienced a downturn in 2020, along with the overall economy in the U.S. and many other countries. The flowmeter market has rebounded strongly since then, both in 2022 and 2023. The numbers show that the flowmeter market has moved on from the COVID-19 pandemic, and is now benefiting from pent-up demand as goods and services supplied by the process industries become available again.

Oil prices and production: 2019 to December 2023

The price of crude oil is vitally important to the flowmeter industry. Drilling for oil is an expensive process involving very sophisticated equipment. For drillers to make a profit, prices have to be high enough to justify the time and expense of drilling for oil. The cost of drilling also varies by location. Drilling on land is typically less expensive than drilling in the ocean, and subsea drilling is one of the most expensive locations for drilling. When oil prices fall below $40 per barrel, it is difficult for even low-cost producers to drill for oil profitably. Alternatively, with crude oil prices above $60 per barrel, drilling for oil at a profit is much more feasible.

While West Texas Intermediate (WTI) prices began in 2019 below $50 per barrel, by mid-January 2019 they had climbed above $50 per barrel. Prices in April and May 2019 climbed above $60 per barrel. Oil prices remained between $50 and $60 per barrel for most of the rest of 2019. The effects of the COVID-19 pandemic began to be felt in February 2020, and oil prices began declining. On April 20, 2020, WTI traded in negative territory for the first time. Prices remained depressed for the rest of the year, finally climbing above $50 per barrel in early January 2021.

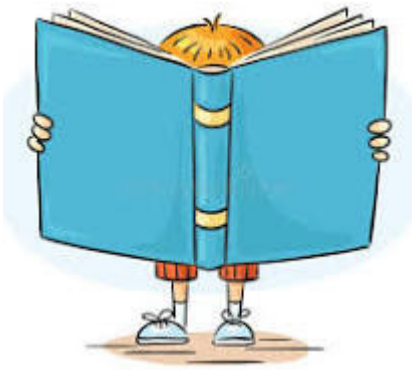
In 2021, oil prices were still affected by the pandemic, but were on the increase throughout the year. In 2021, prices mostly ranged between $50 and $80 per barrel. The oil market was much stronger in 2022, and prices varied between $80 and $100 per barrel for much of the year. WTI prices climbed above $100 per barrel in March 2022, and stayed near $100 per barrel through the end of July. The peak was on March 8, 2022, when WTI closed at $123.64 per barrel.

While 2023 was not as strong a year as 2022, oil prices remained north of $70 and $80 for much of the year. The effect of pent-up demand, which began in 2022, kept demand for refined petroleum products high. Despite growth in inflation and the effects of two wars, economies remained strong and stayed in recovery and growth mode throughout 2023. The recovery of the oil markets has been especially beneficial to the Coriolis, ultrasonic, differential pressure (DP) and turbine markets. Over 60 percent of inline ultrasonic flowmeters are sold into the oil & gas industry, including refining. Coriolis meters are used to measure flow in upstream, midstream, and downstream segments of the oil and gas industry. Ultrasonic, turbine and DP flowmeters compete in the measurement of custody transfer of natural gas.

The flowmeter market rebounded in 2022 and 2023 for multiple reasons. The recovery of oil prices and the oil markets is a major factor. The recovery of the U.S. and world economies in 2022 and 2023 is another reason why flowmeter markets recovered in both years. Pent-up demand played a significant role in this recovery. 2024 looks like another strong year.

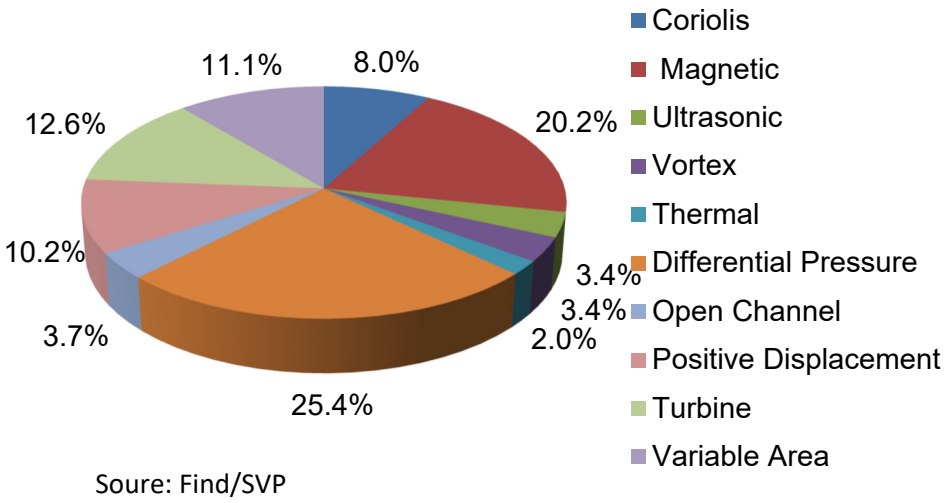
Link to P.I. to read the full article, "What is behind the rebound in the flowmeter markets."

2. Volume X is here! Get your copy now



We are delighted to announce that our comprehensive flagship study, *Volume X: The World Market for Flowmeters, 9th Edition* (www.flowvolumex.com), is now shipping. The study analyzes all major flowmeter technologies in both 2022 and 2023 – our first "post-pandemic" look at the entire market – with market forecasts through 2027. Our last *Volume X*, published in April 2022, focused on 2019, 2020, and 2021 data.

This new edition is a culmination of three decades of research and consistent research methodology. Jesse Yoder, who founded Flow Research in 1998, actually researched and wrote his first worldwide flowmeter study in 1994 for Find/SVP, later authoring the first official Flow Research worldwide flowmeter study as *Volume X* in 2003. We thought you might enjoy a chart from the original study showing differential pressure (25.4%) and magnetic meters (20.2%) as the market leaders in 1993, with the worldwide market totaling $2.059 billion. In 2003, the market totaled $3.14 billion though magnetic (19.1%) and positive displacement (15.9%) were the leaders. Since then, the worldwide market for all types of flowmeter technologies has more than doubled.



*Worldwide shipments **in 1993** in percent of $2,059.5 million dollars by technology*

Our 2024 *Volume X* found that Coriolis and magnetic flowmeters are the revenue leaders in the flowmeter market, with ultrasonic flowmeters projected to have the fastest growth rates through 2027. The flowmeter market experienced a downturn in 2020, along with the overall economy in the U.S. and many other countries. In 2022 and 2023, the flowmeter market rebounded strongly. The worldwide flowmeter market is now strong and trending upward as the economy continues to grow and rising oil prices drive exploration and production.

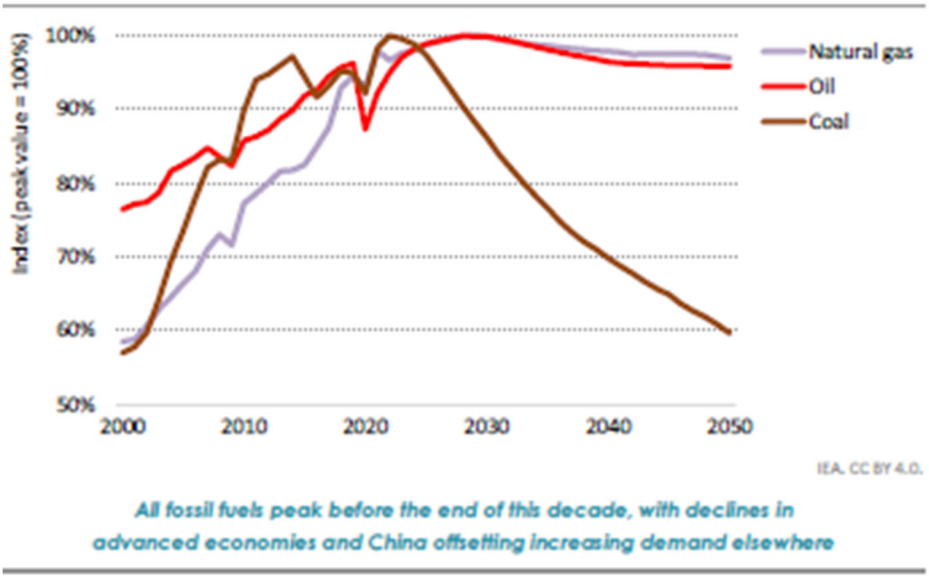
In addition to growth factors related to the oil & gas industry, we found that product improvements in both new and conventional flowmeters are contributing to the increases in the worldwide market. These include self-diagnostics, predictive and condition-based maintenance, enhanced connectivity, modern materials for meter parts or liners, additional line sizes, increased accuracy, and broader flow ranges.

Our companion volume, *Module A: Strategies, Industries, and Applications*, provides industry and applications data for most of the flowmeters included in *Volume X*. Together *Volume X* and *Module A* present a complete picture of the worldwide flowmeter market.

For more information or to order a copy of *Volume X, 9th Edition* and *Module A*, visit us at www.flowvolumex.com.

3. Demand for oil & gas expected to continue

Despite geopolitical challenges and the current transition to renewable energy, oil & gas are still expected to predominate for at least the next decade as the world's energy source. As shown in the following Fossil Fuel Consumption chart, the International IEA's *2023 World Energy Outlook* maintains that the demand for coal, oil and, natural gas will continue to grow and then likely peak sometime before 2030, with fossil fuels' share in the world's energy supply dropping to 73% by that year from the ~80% it has supplied for decades.



Projected Fossil Fuel Consumption 2000-2050

Source: International Energy Agency

Energy Outlook 2023 from bp (formerly British Petroleum) also predicts that global oil demand will level off over the next 10 years before declining over the remaining years to 2050. The report attributes the decline in part to falling oil use in road transportation as vehicles become more efficient and increasingly fueled by alternative energy sources. Strong growth in China,

however, including its continued switching from coal to gas, plus growth and industrialization in India and other emerging Asian countries, will cause the global demand for natural gas to rise over the rest of this decade, according to bp. The report maintains that the demand for natural gas will depend on the net impact of two opposing trends: 1) the increasing demand from emerging economies and 2) the pace of the energy transition from natural gas to lower-carbon energy led by the developed world.

On the renewables side, the worldwide transition to clean energy is not a question of "if," but rather, "how soon," according to the IEA. The report estimates that in 2030, for instance, there will be 10 times as many electric vehicles on the road worldwide and 50% of the cars sold in the U.S. will be electric. The EIA projects that EVs will account for between 29% and 54% of global new vehicle sales by 2050, with China and Western Europe accounting for between 58% and 77% of those EV sales. Continued increases in EV adoption will lead to a projected peak in the global fleet of internal combustion engine light-duty vehicles (LDVs) between 2027 and 2033.

This information is excerpted from *Module A: Strategies, Industries, and Applications*. For more details on this and other trends in oil & gas; refining; chemical, petrochemical, and pharmaceutical; electrical; food & beverage; and water & wastewater industries, visit www.flowvolumex.com to order your copy today.

4. Yokogawa buys Indian flowmeter manufacturer

Yokogawa announced on February 28, 2024, that it had finalized an agreement to acquire Adept Fluidyne Pvt. Ltd, by the end of March. Adept, which has 90 employees, claims to be the largest domestic manufacturer of magnetic flowmeters in India. The company also supplies ultrasonic meters, IoT solutions, and calibration services. The company also exports to customers in 25+ countries.

Adept's manufacturing and flow calibration facility in Pune, India

The acquisition gives Yokogawa an Indian manufacturing base for its high-performance magnetic flowmeters, access to Adept's product lineup, and enables more timely delivery of Yokogawa's broad portfolio of flowmeter products for the burgeoning India market, especially water & wastewater.

Adept, established in 1983, has been manufacturing magnetic flowmeters for more than 30 years, and introduced ultrasonic flowmeters to its lineup in 2010. The company has supplied over 70,000 flowmeters to the water, wastewater, and other industry sectors, and also provides IoT gateways, smart water meters, and flowmeter calibration services. The company recently expanded its sales network across India.

Yokogawa, a global supplier of vortex, magnetic, variable area, Coriolis, and differential pressure flowmeters, established a local subsidiary in India in 1987. Since then, it has been delivering control systems and field instruments for plants in the energy industry, as well as

remote monitoring for water supply and wastewater networks as part of India's National Hydrology Project and control systems for water treatment facilities. Yokogawa also has systems engineering teams and an R&D center in India that support its global operations.

Today, Yokogawa intends to enhance Adept's manufacturing capabilities and certified flow calibration facilities in Pune to facilitate local production of its magnetic flowmeters aligned with its global quality standards. The Japanese multinational also plans to continue to provide Adept's flowmeters through both companies' sales networks.

"India is one of our most strategically important markets, and we look forward to sharing our manufacturing know-how with the Adept team in order to provide made-in-India Yokogawa flowmeters as soon as possible," Hiroshi Tanoguchi, Yokogawa Electric vice president and head of the Yokogawa Products Headquarters, said in the press release. "With Adept becoming part of the Yokogawa Group, we will provide a full range of general use and specialized flowmeters to the water, energy, chemical, and many other sectors."

5. India – the new land of opportunity?

In 2022, India overtook China as the country with the largest population in the world, with more than 1.43 billion people. China now has the second-largest population in the world, still with just above 1.4 billion inhabitants, however its population began to decline in 2023. At $3.7 trillion in 2023, India is India is now the world's fifth largest economy, and it is expected to expand at an annual rate of at least 6%, making it one of the fastest growing economies in the world. Clearly, India offers immense potential as the country urbanizes.

Opening of Emerson's new facility in Chennai in 2022

Part of the success is due to a "Make in India" initiative the government launched globally in September 2014 as a part of the country's renewed focus on manufacturing. The objective was to promote India as the most preferred global manufacturing destination. At that time and before, India primarily exported services. In 2023, services trailed merchandise exports, according to Electronics and Information Technology Minister Ashwini Vaishnaw. In the last financial year, companies recorded a total of 762 billion dollars of exports, of which $453 billion was merchandise and $309 billion were services.

The expansion of India's industrial sector under the initiative has helped to increase the demand for flowmeters, and some major flowmeter manufacturers have been strengthening their presence in the country.

Emerson first entered India directly in the 1980s through joint-venture relationships with several Indian-owned companies, and has been investing significantly in India since the 1990s. Since then, Emerson has fully acquired several of these joint ventures and integrated the companies

into its existing businesses platforms. In 2020, Emerson in India had over 6500 employees at 10 manufacturing locations, 5 Global Engineering Centers and 35 offices across the country. In February 2022, Emerson reaffirmed its commitment to be a market leader in India by opening a new 145,000-square-foot integrated manufacturing facility at Mahindra World City, in Chennai, Tamil Nadu. The company said its developments were aligned with the Make in India initiative, which resulted in "a large number" of its products being manufactured in India. The expansion was expected to increase production capacity for customers in India and across the globe.

Endress+Hauser India, founded in 1994 and now employing 243 workers, includes state-of-art production facilities in Aurangabad, India. The company's manufacturing division develops flow metering skids, SWAS panels, and more. In August 2023, Endress+Hauser opened a new production building on its campus in Aurangabad, underlining the company's commitment to the region and investment in world-class production and working environments. The new production building is a modern facility for the manufacture of temperature measurement technology and system products as well as liquid analysis.

Siemens' history in India dates to 1867, when the company laid the groundwork for the Indo-European Telegraph Line from London to Calcutta. In 2018, Siemens announced plans to invest €1 billion in India over the next few years, focusing on electrification, automation, and digitalization. Today, Siemens has a strong manufacturing footprint across India, various Centers of Competence, R&D centers, a nationwide sales and service network, with more than 23,000 employees across all Siemens entities. The company says India is at the core of its IoT solutions and offerings. Siemens is also opening the India office for Next47, an independent global venture firm committed to helping connect Siemens customers to startup innovation from around the world.

KROHNE Marshall Pvt Ltd, a joint venture between KROHNE and Forbes Marshall, has played a significant role in serving the Indian market since its establishment in 1987. The joint venture offers a wide range of products and services, including flowmeters, level meters, pressure meters, temperature meters, and analytical instruments, catering to various industries such as oil and gas, chemical, power, water and wastewater, and pharmaceuticals.

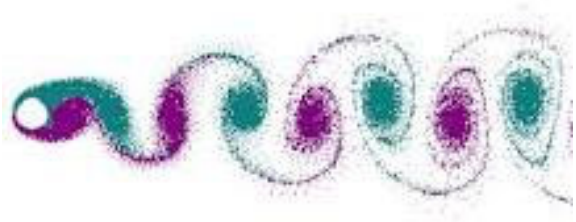
6. Vortek now a TASI Measurement company

Vortek Instruments, based in Longmont, Colorado, became a TASI Group company in January. The company, founded in 1995 as a high-quality manufacturer of flow measurement instruments, is now a leading manufacturer of precision flowmeters for liquid, gas, steam, and energy, including magnetic, ultrasonic, vortex, turbine, and hybrid VorCone flowmeters.

In late 2012, VorTek Instruments became a subsidiary of Azbil North America, a wholly owned subsidiary of the Japan-based azbil Group. Then on January 22, 2024 Azbil Corporation announced that it had transferred Azbil VorTek, LLC to Sierra Instruments, which the TASI Group had acquired in 2019 – although VorTek is now listed as one of TASI Measurement's

individual companies. Interestingly, Sierra and VorTek created a joint venture in 1997 to sell VorTek's multivariable vortex meters (InnovaMass). This joint sales agreement continued over the years, with VorTek doing the manufacturing and Sierra doing the distribution.

7. Vortex steams ahead



Vortex flowmeters' versatility, reliability, and accuracy at an economical cost continue to drive steady market growth, according to our latest study, *The World Market for Vortex Flowmeters, 7th Edition* (www.flowvortex.com). We found that as demand to measure steam and gas grows, vortex meters' flexibility in measuring various fluid types – especially steam – is a distinct advantage and an important growth factor.

The new study, released April 22, finds that the market for vortex flowmeters significantly exceeded its market size in 2018 and 2019, with China capturing the largest revenue volume (26.1 percent of the worldwide total) among the eight geographic regions, followed by North America and Western Europe. China and the Asia/Pacific regions are expected to experience the fastest growth in the vortex flowmeter market.

8. TechnipFMC Measurement Solutions now Guidant

GUIDANT

TechnipFMC's Measurement Solutions business – including its Smith Meter® ultrasonic, turbine, and positive displacement flowmeters – is now Guidant, a portfolio company of One Equity Partners (OEP). The middle market private equity firm, itself a 2015 spinout from JP Morgan, announced on March 27 that it had completed the $205 million acquisition of the business, its 450 employees, and its three units: Metering Products, Metering Systems, and Terminal Management. Guidant now has three units: Measurement, Systems & Automation, and Terminal Management. Guidant, based in TechnipFMC's home town of Houston, now claims that it is the most experienced measurement solutions businesses in the world, with a legacy built on 80+ years of expertise, accuracy, reliability, and best-in-class technologies. It also claims to be the undisputed leader in liquid custody transfer solutions, with the largest global installed base.

TechnipFMC, a leading technology provider to the traditional and new energy industries, was established in 2017 as a merger of FMC Technologies and Technip. The 2017 merger enabled TechnipFMC to offer a new generation of integrated subsea solutions.

The Measurement Solutions business was part of the TechnipFMC's Surface Technologies segment, which serves onshore and shallow water markets from well to export pipeline. The Measurement Solutions business was competitive in both multiphase and wetgas meters. It also offered a line of ultrasonic flowmeters, many of which are used for leak detection in petroleum liquid pipelines. It also supplied positive displacement and turbine flowmeters and Endress+Hauser's Promass Coriolis flowmeters. The 2017 merger of FMC Technologies with Technip enabled TechnipFMC to offer a new generation of integrated subsea solutions. A 2021 spinoff separated business focuses into TechnipFMC (upstream), and Technip Energies (midstream and downstream).

The newly formed Guidant offers a broad portfolio of measurement technology, digital and automation solutions, and systems, with manufacturing in the US and Europe.

9. It's market study refresh time

Now that the coronavirus economic dip has come and gone, we think it's the perfect time to refresh your study "wardrobe" with brand new post-pandemic data from 2022 and 2023. Of course we also think you can profit from our earlier studies on individual technologies, so don't throw them out if you have them, and please consider buying them if you don't. Here is a list of our latest and greatest studies. We hope you'll want to order them while they're super fresh.

- *Volume X: The World Market for Flowmeters, 9th Edition* (March 2024) and its *Module A: Strategies, Industries, & Applications* standalone companion study (April 2024) (www.flowvolumex.com)
- *The World Market for Vortex Flowmeters, 7th Edition* (April 2024) (www.flowvortex.com)
- *Core Study: The World Market for Ultrasonic Flowmeters, 7th Edition* and *Module B: The World Market for Clamp-on and Insertion Ultrasonic Flowmeters* (December 2023); *Module A: The World Market for Inline Ultrasonic Flowmeters* (November 2023) (www.flowultrasonic.com)
- *The World Market for Coriolis Flowmeters, 7th Edition* (August 2023) (www.flowcoriolis.com)
- *The World Market for Thermal Flowmeters, 3rd Edition* (July 2023) (www.flowthermal.com)

In addition to ordering our exciting 2023/2024 studies, you can still profit from earlier Flow Research studies that cover nearly every flowmeter technology in depth:

- *The World Market for Variable Area Flowmeters* (October 2022) our first VA study ever (www.flowva.com)
- *The World Market for Turbine Flowmeters, 3rd Edition* (September 2022) (www.flowturbine.com)
- *The World Market for Magnetic Flowmeters, 7th Edition* (July 2022) (www.flowmags.com)
- *The World Market for Pressure Transmitters, 5th Edition* (June 2022) (www.pressureresearch.com)
- *The World Market for Positive Displacement Flowmeters, 3rd Edition* (December 2021) (www.FlowPD.com)

Help us help you

What are your market research needs for the rest of 2024 and into 2025? Before we finalize our schedule for the rest of the year, we want to hear from you! We are already beginning to set up our study schedule for 2025. We are also open to custom work. Whatever your market research needs for flow and instrumentation, we are here to help. Tell us what you need to know and if we don't already have the data, we'll find it for you!

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