

FlowTimes – June 2020

*Your Strategic Update on Flow, Temperature, and Pressure Measurement
from Flow Research*

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1. Letter from the president: Cooperation goes a long way

In the James Bond movie “The Man with the Golden Gun,” an interesting conversation takes place between “M,” James Bond, and several colleagues. M is the Head of the Secret Intelligence Service (MI6), and is Bond’s superior. The conversation is about the invention of the Solex, which converts solar power into electricity. The inventor of the Solex, who had the Solex with him, has just come to an unfortunate end, at the hands of the man with the Golden Gun. In the ensuing confusion, the Solex is stolen.



When asked about the significance of the Solex, one of M’s colleagues says that the inventor of the Solex said that it was 95 percent efficient. “If he’s developed a solar cell that efficient, he’s solved the energy crisis.” M responds: “Yes, so you’ve told me. Coal and oil will soon be depleted; uranium is too dangerous. Geothermal and tidal control is too expensive.”

“The Man with the Golden Gun” was released in December 1974, not long after the Energy Crisis of 1973–74. This crisis was precipitated by the Arab-Israeli War of 1973, and by the embargo placed on oil shipments to the United States placed by the Organization of Petroleum Exporting Countries (OPEC). Oil prices quadrupled and the result was long lines for gasoline at gas stations in 1973 in the United States, as short supply resulted in scarce availability.

The situation described by M is still with us to some extent. However, the chief problem for coal and oil today is not so much that it will soon be depleted, but that the use of both resources needs to be controlled because using them unchecked does serious environmental damage. The energy crisis of 1973 was followed by several decades in which energy analysts and writers debated the idea of “peak oil,” and how soon geological scarcity would spell an end to our use of oil as an energy source. Then shale and hydraulic fracturing came along, and unconventional oil supplemented the output of conventional oil in the United States. This additional supply was so effective that it enabled the United States to become the leading oil producer among countries, even exceeding Saudi Arabia and Russia.

According to the World Coal Association, there are about 150 years of coal left in world, based on current consumption rates. The *BP Statistical Review of World Energy* says there were 1.7297 trillion barrels of crude oil left in the world at the end of 2018. This can be expected to last about 50 years. However, the discussion is complicated by the distinction between proved and unproved reserves, and by the fact the technology for oil recovery continues to become more sophisticated and effective.

The amount of oil remaining also depends on the rate of consumption. There is a commitment by many countries, in line with the Paris Accord, to reduce dependence on fossil fuels and to make more use of renewables. While price has been a barrier to the adoption of renewables, renewable energy is becoming more affordable as more research is done and technical barriers are reduced. In 2019, electric cars accounted for about 2.5 percent of car sales, although that percentage is being reduced in 2020 due to the effects of the COVID-19 pandemic.

If M had been speaking today, he would no doubt have included natural gas in his list of energy sources. According to the U.S. Energy Information Administration (EIA), as of January 1, 2019, there were an estimated 7,177 trillion cubic feet (Tcf) of total world proved reserves of gross natural gas. The EIA also estimates that as of January 1, 2018, there were 2,828.8 trillion cubic feet (Tcf) of technically recoverable resources (TRR) of dry natural gas in the United States. These can be expected to last 92 years.

The Important Role of Natural Gas

The world's search for energy has placed a new emphasis on natural gas. Natural gas burns cleaner than either coal or oil, and in many places it is in more plentiful supply. While renewable energy is making significant strides in adoption, price is still a barrier to the widespread adoption of renewable technologies such as solar power, wind energy, geothermal, tidal power, and others. Natural gas is used to power trucks and other vehicles and is very widely used as a source of power in power plants, where it is displacing the use of coal as an energy source. It serves as a source of heat for homes and for industrial buildings. Natural gas is widely viewed as a bridge to renewables and will likely remain so for a number of years.

The Role of Flow Measurement

There are many opportunities for flow measurement in the oil and gas industry. There are many opportunities for custody transfer measurement of both oil and gas all along the supply chain, including the upstream, midstream, and downstream phases. In custody transfer measurement, the ownership of a fluid changes hands from one party to another. For custody transfer of crude oil and refined fuels, Coriolis and positive displacement flowmeters are used. For natural gas, the primary types of flowmeters used for custody transfer are ultrasonic, turbine, and differential pressure (DP). Thermal flowmeters are used to measure stack and exhaust gases, along with ultrasonic and DP flowmeters. For more details, see our new study on gas flow measurement at www.gasflows.com.

The responses to COVID-19 starting in January 2020 have dramatically reduced demand for oil and natural gas and have consequently reduced the need to measure it. It is too early to tell how long this impact will last, but demand for fuels is picking up as economies around the country and the world are reopening. In the meantime, some flowmeter manufacturers may look to other industries such as food & beverage, biotechnology and life sciences, and water & wastewater to help make up for sales that would otherwise go to the oil and gas industry. Despite the current recession, better times are ahead. Whether it is in Q4 2020 or 2021, now is the time to plan for the coming upturn. Those who plan now will be prepared to take advantage of the good economy when it arrives.

2. World Market for Gas Flow Measurement – Fresh off the presses

Are you ready for the most comprehensive picture of the worldwide gas flow measurement market available to date? Fasten your seatbelts, because our new 3-volume worldwide gas flowmeter study set is ready to take you for a ride. Flow Research has been following the gas flow market regularly since the first edition of our worldwide gas flow measurement study in 2004, and this is our most comprehensive research yet by far – and the most comprehensive available anywhere – even if we do say so ourselves.

The World Market for Gas Flow Measurement, 4th Edition and its two companion studies, *Module A: Applications and Strategies for Gas Flow Measurement* and *Module B: Gas Production, Consumption, and Flow Measurement in the Oil & Gas Industry*, are ready to take you for a ride.

The *Core Study, The World Market for Gas Flow Measurement, 4th Edition*, determines the worldwide market size for gas flow measurement in 2019 for each technology used, and forecasts market growth through 2024. It provides average selling prices worldwide and by region, examines factors contributing to and limiting growth, profiles the main suppliers, and analyzes the leading products.



Our core world market study and two complementary but standalone modules give a complete picture of the gas flow market, worldwide and regionally, and its applications.

Module A: Applications and Strategies for Gas Flow Measurement discusses gas applications and data for each of the flowmeter types and gives strategies for competing in the markets. We show shipments worldwide for each flowmeter type by application.

Module B: Gas Production, Consumption, and Flow Measurement in the Oil & Gas Industry provides data on each region's gas picture, market influences, and flowmeters in the oil & gas industry. We examine the oil & gas industry flow measurement market for each region by flowmeter type and forecast their growth rates. We also give data on each region's natural gas production and consumption, including forecasts.

This research is a continuation of our resolve to view flow measurement from many perspectives, whether it is by fluid type, flow technology type, industry or application. Each of the studies presents different data sets and market views to provide the knowledge and understanding you need to successfully maneuver within the markets you serve. The studies are designed to be a complementary set for the best understanding of the whole market, but can be purchased separately.

Let's hear it for gas

We believe this is a great time to quantify the growth in the gas flow measurement market, and to take an in-depth look at its present and future prospects. Not surprisingly, our user interviews show that current interest in natural gas flow measurement is at a high.

Natural gas, traditionally a major source of energy for the entire world, is becoming an even more valued commodity. Natural gas is versatile – it can be delivered in a number of forms and

through a variety of ways. It is largely considered a cleaner and more economical alternative to oil as an energy source, and an interim step toward renewable energy. Thanks to new technology, recovery and delivery of natural gas is more feasible than ever before, even from subsea wells. And newly developed natural gas reserves in North America and elsewhere are making it possible for Western countries to be less dependent on foreign suppliers.

Opportunities are also emerging in the measurement of other gases, including compressed air for robotic equipment, hydrogen gas for vehicles, continuous emissions measurement, and control of various industrial gases for regulatory compliance.

We are confident our studies give suppliers all the data they need to make informed decisions and achieve higher returns, even in these uncertain times. We held this study over so that we could provide 2019 data, and also take into account the economic events of the first half of 2020, including the COVID-19 pandemic. Despite a likely downturn in 2020, we believe the long-term prospects for gas flow measurement are very positive, especially as they relate to our forecast period, which extends through 2024.

For complete details, go to www.gasflows.com. To get your copy, click the Order link or contact Flow Research. **Call or email us soon for special pricing.** Phone: 781-245-3200. Email: jesse@flowresearch.com.

3. OPEC+ cuts oil prices — Now what?

We probably don't need to tell you that the COVID-19 pandemic is taking a toll on the price of oil. As many of the world's economies came to a halt and many people started staying home, demand for refined fuels and petroleum plummeted. Since the price of oil is governed by supply and demand, this decreased demand, with no corresponding drop in supply, caused a major drop in oil prices. This is nice on those rare occasions when we're filling up our cars at the pump, but not for the oil producers and companies selling to the industry.

Flow Research was pleased that a group of 23 nations including OPEC+ and the G20 countries agreed to cut production by 9.7 million barrels per day for two months beginning May 1 – the single largest output cut in history. This decision followed dramatic discussions over four days that involved some heavy-duty cajoling of Mexico, and the U.S. stepping up to supply the remaining 300,000 b/d reduction.

OPEC+ consists of OPEC plus Russia, Mexico, and eight other non-OPEC oil exporting countries. On April 12, OPEC+ came together with the G20, a group of 19 countries and the European Union (EU) at the level of finance minister to craft an oil supply reduction agreement. Non-OPEC countries are contributing roughly 4 million b/d to the total. Saudi Arabia pledged a cut of 1.3 million b/d in May and June, and the UAE came in with a reduction of 1 million b/d. In addition, International Energy Agency (IEA) countries will be purchasing oil into their reserves, which will also take more oil off the market. All told, the total oil supply taken off the market is between 19 and 20 million b/d.

While oil prices were on the upswing in November and December 2019, they began slumping after the first of the year mainly due to fears of the COVID-19 pandemic. The price of WTI peaked at \$53.77 per barrel on February 20, 2020, and proceeded to decline from there. Oil prices continued their decline in March, with WTI dipping below \$20 per barrel several times,

even as low as \$12.17 on April 27. On the last day of April, the price was \$19.23. When production cuts began, U.S. oil prices kept climbing slightly, with WTI crude settling at \$24.73 a barrel at the end of the first week in May – encouraging, perhaps, but still well below the \$35 to \$40 it costs to produce one barrel of oil. And prices in April were still hovering in the low \$20s.

Why didn't oil prices jump by \$10 or more at the conclusion of the agreement, as some analysts suggested it would? The consensus is that traders had already priced a deal into the market. But this may not make sense — anyone who followed the details of the negotiations over the four-day period can only conclude that a deal was far from certain. It was only the unthinkable consequences of not making a deal that forced the agreement. Saudi Arabia, Russia, and the United States all deserve praise for negotiating this incredibly complex deal, though it is really the Saudis that have to do the heavy lifting in terms of production cuts.

After the production cuts took effect in May, prices of WTI rose to between \$30 and \$35 per barrel during the month. On June 1, WTI was trading above \$35 per barrel. This is a far cry from the negative territory visited on April 20, but it is still short of the level needed for making oil drilling profitable for many companies

In an effort to stabilize the oil markets for the long term, the agreement calls for 7.7 million b/d in cuts beginning July 1 and extending to year-end. Beginning in 2021, the production cuts are reduced to 5.8 million b/d through April 2022.

OPEC met again on June 6, 2020, and “reaffirmed the existing arrangements under the April agreement.” Compliance of countries to the production cuts agreed to at the April meeting has been very good. In addition, Saudi Arabia and Russia agreed to extend their June cuts one extra month into July in the interest of long-term market stability.

What does this all mean?

On the one hand, the results of no deal would have been catastrophic for the oil markets. WTI prices, already below \$20 at the time, would have dropped further into the teens. Even with a deal, the resulting cuts probably do not compensate for the amount of demand taken off the table by the ravages of the novel coronavirus pandemic. WTI is already trading close to \$40 per barrel, so chances are good that it will trade between \$40 and \$50 per barrel in Q3 2020. This could happen more quickly or more slowly, depending on how quickly the different world economies, including the United States, recover from this international event.

What happens next depends on how quickly countries “open up” their economies and resume some semblance of normal life. Only then will the demand for refined fuels and other forms of energy like natural gas and renewables come back. At this point, it looks like a slow path, but one that is leading to a much-improved economic outlook. However, the seriousness of the pandemic will leave permanent scars due to the devastating loss of life suffered by so many countries. Our paramount wish is for everyone's health and safety as we navigate these uncharted waters.

One Important Lesson from the Agreement: Cooperation Goes a Long Way

All the countries involved in the April 12 agreement have an interest in preserving higher oil prices because important segments of their economies depend on the price of oil. The United States has often taken an antagonistic stance towards OPEC. Yet in the past several years, the

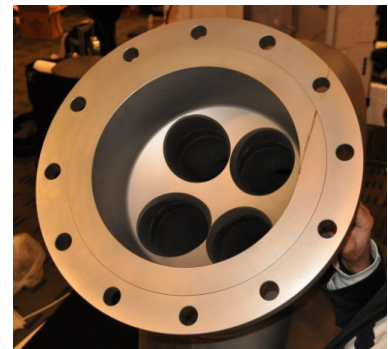
Trump administration has treated Saudi Arabia as an ally. Trump's attitude towards Russia seems more difficult to characterize, except that he seems to equate it with his relationship with Vladimir Putin. Regardless of these relationships, it seems clear that on April 12, 23 nations, including the United States and some traditional adversaries, were able to come to an agreement on a subject of vital interest to all of them: the price of oil.

What this shows is that cooperation rather than confrontation can go a long way to solve complex international problems. As shown by the example of Mexico, a refusal by any country to go along with the agreement could have scuttled the deal. Instead, all 23 countries were able to put the interest of the entire group first with the understanding that the result would benefit them all individually. There are so many other issues that would benefit from this type of cooperation, whether it be arms control, denuclearization, world hunger, global warming, and a host of other issues. The April 12 agreement should be viewed as a paradigm for how to solve international problems and should replace the confrontational attitude we see among the major countries in so many other arenas.

For more detailed information, please read *Oil's Wild Ride*, 4th Edition, at www.worldflow.com.

4. Study finds Coriolis flowmeters still popular after all these years

We're putting the polish on one of our most popular studies for one of the most popular flowmeters, *The World Market for Coriolis Flowmeters, 6th Edition*. Our research found that even after 40+ years, the Coriolis flowmeter market is still a leader and one of the fastest-growing. The low maintenance, high accuracy Coriolis meter is riding the general upward trend of the oil & gas industry, especially for natural gas custody transfer.



Technological improvements in design and materials keep Coriolis meters perennially popular.

Coriolis flowmeters can measure mass flow, which is particularly useful for measuring gases, since they are more readily affected by temperature and pressure than are liquids. The majority of Coriolis suppliers now have meters that can measure gas flow. In addition, they've made technological improvements like larger line sizes and straight tube design that mean Coriolis meters are now much better able to measure gases. In some cases, end-users are selecting Coriolis and/or ultrasonic meters to replace differential-pressure (DP) devices for gas measurement.

The *World Market for Coriolis Flowmeters, 6th Edition* builds on studies Flow Research published in 2001, 2003, 2008, 2013, and 2016. In our newest study, we determine:

- Worldwide supplier market size and shares for Coriolis flowmeters in 2019
- Market growth forecast through 2024
- Industries and applications where Coriolis flowmeters are used, including market growth sectors
- Strategies to manufacturers for selling into the Coriolis flowmeter market
- Company profiles and product analysis for the main Coriolis suppliers
- Product descriptions and average selling prices in the market

This important Flow Research study will be shipping in the next few weeks, so get your preorder in now to take advantage of our early bird pricing!

For complete details, go to www.flowcoriolis.com. To get your copy, click the Order link or contact Flow Research. **Call or email us soon for more details.** Phone: 781-245-3200. Email: jesse@flowresearch.com.

5. Should we say the *prices* of oils?

The four benchmark oils: WTI, Brent, Dubai/Oman, & OPEC Reference Basket

Do you really know what people mean by “the price of oil”? While there are many types of oil, four types have become benchmarks for the oil markets: West Texas Intermediate (WTI), Brent, Dubai/Oman, and the OPEC Reference Basket.

WTI is traded on the New York Mercantile Exchange (NYMEX). It is composed of oil extracted in the U.S., mainly from fields in Texas, North Dakota, and Louisiana, and transported via pipeline to Cushing, Oklahoma, where it is refined. The price of WTI is a benchmark for oil sold in the U.S. WTI is light and sweet and has a low sulfur content.

Brent crude oil is a benchmark for oil produced in the North Sea between the Shetland Islands and Norway. It is sold in Europe, Africa, Australia, and some Asian countries. It was named after oil extracted from the Brent oil field off the coast of the United Kingdom in the North Sea. Today, however, Brent is mainly extracted from four oil fields in the North Sea: Brent blend, Forties blend, Osberg, and Ekofisk. It is light and sweet, but slightly heavier than WTI. Brent futures are traded on the ICE Futures Europe in London.

For many years, Brent and WTI traded at roughly the same amount. Then, in 2011, when oil prices increased, Brent began trading higher than WTI. While the reasons for this are debatable, some analysts attribute it to the fact that the North Sea oil fields are being depleted, while WTI in the U.S. is more plentiful. Canadian oil production is also increasing. Production from the Brent field has declined to the point that, in early 2017, Shell announced plans to decommission this field over time.

Dubai/Oman oil refers to a “basket” of oils from Dubai, Oman, and Abu Dhabi. As a benchmark, it is an average of the prices of oil from Dubai, Oman, and Abu Dhabi. It is heavier



The Brent Goose is the namesake of the Brent oil field, the second field discovered in the North Sea (after Auk and before Cormorant). Esso and Shell named the North Sea oil fields after seabirds alphabetically in the order of discovery.

Why seabirds?

Industry insiders say the two companies originally named their oil wells by the letter of the alphabet, followed by UK. So the initial naming scheme was:

*A-UK
B-UK
C-UK
etc.*

Then a far-sighted person pointed out the consequences of getting to the letter 'F', so they decided to use the names of seabirds instead.

(Photo by Andreas Trepte, www.photo-natur.net)

than WTI and Brent oil, and is slightly sour. Dubai/Oman oil has been traded on the Dubai Mercantile Exchange since 2007. It has become a benchmark for oil shipped to Asia.

The OPEC Reference Basket is a blend of oils from Saudi Arabia, Iran, Qatar, Kuwait, and a number of other OPEC countries. The value of this Reference Basket is calculated by the OPEC secretariat in Vienna, Austria.

6. Beyond COVID-19: What else is driving down oil prices?

It seems pretty clear that the decrease in oil prices correlates quite strongly with the imbalance in the supply/demand equation, but what, exactly, are some of the factors affecting this equation?

Demand side. On the demand side, economic weakness tends to generate weakness in demand, which can quickly lead to an increase in supply that is likely to drive oil prices down. Many analysts point to reduced demand from the Chinese economy as a major factor in reducing demand.

In addition, automobiles are becoming more efficient, requiring less gasoline, and many companies are shifting to natural gas as a cleaner alternative to refined fuels for industrial uses. While implementation of clean and renewable energy is still in its early stages, it is already having an impact on the amount of oil many economies need.

Supply side. Many analysts point to the supply side as the main reason for the imbalance in supply and demand. For one thing, the advent of hydraulic fracturing, or “fracking,” has greatly increased the crude oil output of a number of countries, especially the U.S. Hydraulic fracturing has made it possible to get more oil out of existing wells, and to obtain oil from wells that were once thought to be “dry” or no longer viable. According to the Energy Information Administration (EIA), hydraulically fractured wells accounted for about half of the crude oil produced in the U.S. in 2015, and two thirds of the natural gas produced in the U.S. that same year. In 2016, hydraulically fractured horizontal wells accounted for 69% of all oil and natural gas wells drilled in the United States and 83% of the total linear footage drilled.

Of course, many other factors influence the price of oil, including currency fluctuations, sudden disruptions in major sources of supply, political factors, bad weather such as hurricanes, disasters such as oil spills, etc. All these factors can cause oil prices to spike or to plummet on a temporary basis. Usually, though, these effects are temporary and oil returns to the price dictated by the balance of supply and demand.

7. Studies from Flow Research

Upcoming studies:

- *The World Market for Coriolis Flowmeters, 6th Edition* (2020) www.FlowCoriolis.com
- World Market for Gas Flow Measurement 4th Edition www.GasFlows.com
Core Study: The World Market for Gas Flow Measurement, 4th Edition (Q2 2020)
Module A: Applications and Strategies for Gas Flow Measurement (Q2 2020)
Module B: Gas Production, Consumption, and Flowmeters in the Oil & Gas Industry (Q2 2020)

- Ultrasonic Flowmeters Series (2020) www.FlowUltrasonic.com
Core Study: The World Market for Ultrasonic Flowmeters, 6th Edition (Q4 2020)
Module A: The World Market for Inline Ultrasonic Flowmeters (Q3 2020)
Module B: The World Market for Clamp-on and Insertion Ultrasonic Flowmeters (Q3 2020)
- *The World Market for Turbine Flowmeters, 3rd Edition* (Q3 2020)
www.FlowTurbine.com
- *The World Market for Positive Displacement Flowmeters, 3rd Edition* (Q3 2020)
www.FlowPD.com

Recently published studies:

- Covering all the main flowmeter types: www.FlowVolumeX.com
Volume X: The World Market for Flowmeters, 7th Edition, published May 2019
Volume X: Module A: Strategies, Industries, and Applications, published October 2019
- *The World Market for Mass Flow Controllers, 3rd Edition*, published July 2019
www.FlowMFC.com
- *The World Market for Pressure Transmitters, 5th Edition* (Q3 2020)
www.PressureResearch.com
- *The World Market for Vortex Flowmeters, 6th Edition*, published January 2019
www.FlowVortex.com
- *The World Market for Primary Elements, 3rd Edition*, published January 2019
www.FlowPlate.com
- *The World Market for Thermal Flowmeters, 2nd Edition*, published January 2018
www.FlowThermal.com
- **Ultrasonic Flowmeters Series, 5th Edition** www.FlowUltrasonic.com
 - *Core Study*: published September 2017
 - *Module A: Inline*, published July 2017
 - *Module B: Clamp-on and Insertion* (separate data sections), published August 2017
- *Module A (to Multiphase): The World Market for Watercut Meters*, published April 2017 – www.WatercutMeters.com
(for the multiphase study: www.FlowMultiphase.com)
- *The Market for Temperature Sensors in the Americas, 3rd Edition*, published February 2017 www.TempResearch.com

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Energy Monitor features news, trends and projects in the oil & gas, LNG & fracking, and power & renewables industries, and related topics. It also includes "Issues and Perspectives" market analysis by Jesse Yoder, and a highlight of a region, organization, or company.

Market Barometer reports on industry news and trends, acquisitions, mergers and other company changes, industry-related topics and new product developments in categories covering each major flowmeter types plus several other process instrumentation types and flow calibration. It also includes "State of the Industry" summaries of current market research by Jesse Yoder, and a "Company Korner" profile.

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