

# Back to the future?

Today's tough times call for new attitudes about mature fields.

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In the oil and gas industry, change is continuous and cyclical. The current cycle is characterized by depressed prices, lower rig counts, companies right-sizing and an even heavier emphasis than usual on ensuring every dollar is invested as wisely as possible. To the inexperienced, this might appear to be a time of reassessment, retrenchment and retreat. Seasoned professionals, however, can view this as the perfect time to increase interest, insight and initiative in existing assets to boost productivity and profitability. Mature fields can offer the best way to achieve this goal.

## Immense potential

When asked why he robbed banks, famous American safecracker Willie Sutton is said to have replied, "Because that's where the money is." This may or may not be an apocryphal tale, but there is no doubt that mature fields contain the most energy reserves. Approximately 70% of worldwide oil and gas production already comes from mature fields, yet the average worldwide recovery factor for oil is only 35%. A mere 1% recovery

increase could produce an additional two-year supply, which is definitely needed.

The International Energy Agency forecasts that energy demand will increase by 37% over the next 20 years. Because of disorder in so many important producing areas of the world coupled with changing climate goals and increasing environmental restrictions, supply might not be able to keep pace. Improved recovery from mature fields cannot only help meet this demand, but it can do so at far less cost than finding and developing energy from new fields.

## Good dollars and sense

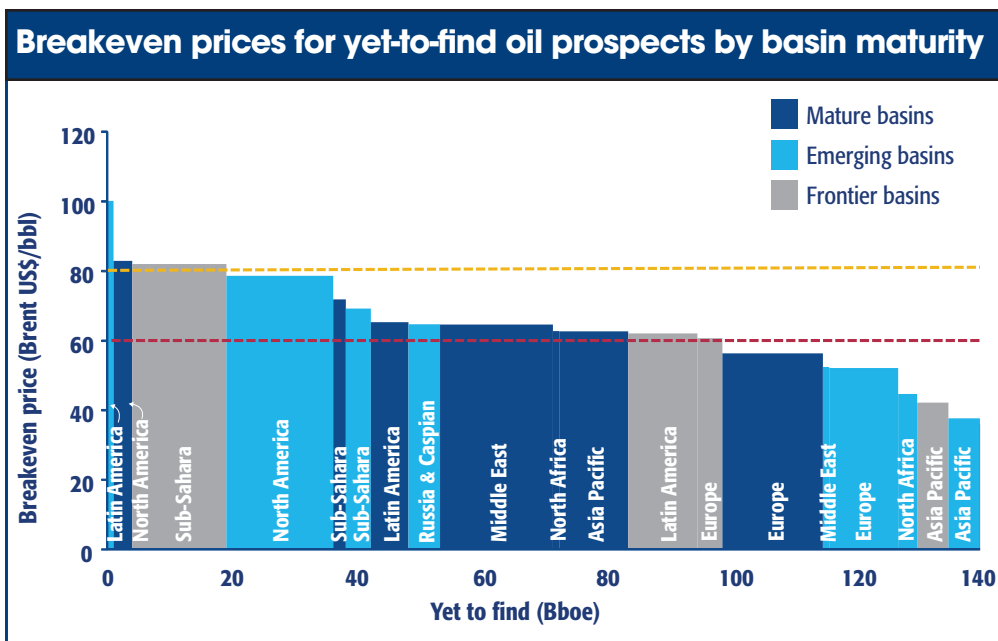
When considering the cost of barrels of oil equivalent, it is much more cost-effective to continue production from mature fields than to bring new discoveries into production. In North America, production from new wells costs virtually twice as much as production from existing fields. In Europe, the Middle East, South America, Australia and other parts of the world—while not precisely the same—the cost differences all trend in a similar direction and are all dramatic. New fields are simply a much more expensive proposition.

Mature basins have less cost sensitivity to discovering

hydrocarbons than frontier basins, and it is easier to maximize ultimate oil recovery with proven reserves.

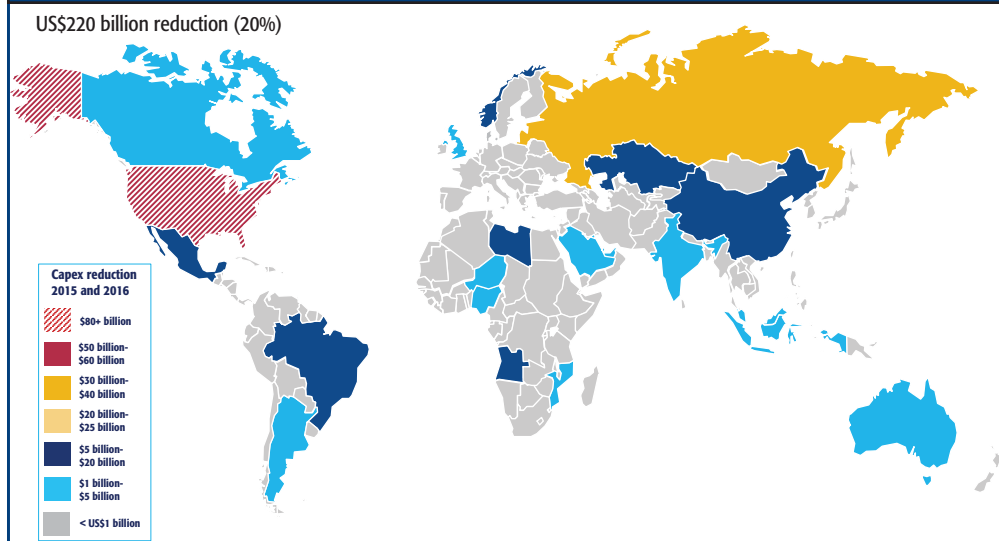
## Holding back new thinking

Present-day oil and gas professionals tend to have outdated ideas of mature fields, often considering them as secure revenue streams that only require ongoing routine maintenance. This kind of thinking is not only ill-advised but also prevents available hydrocarbons from being produced and ignores possible revenue



A comparison of costs to produce from basin types is shown. (Source: Wood Mackenzie Exploration Service)

## Wood Mackenzie's reduction in 2015-2016 capital investment



Spending was cut across all major oil sectors from fourth-quarter 2014 to second-quarter 2015. (Source: Wood Mackenzie Exploration Service)

### Immediate impact interventions

To immediately begin producing, operators must deal with challenges of conformance, cleanout, stimulation and overall process improvements. Fortunately, multiple technologies exist that can improve well production and rapidly increase performance on individual existing wells to achieve more barrels of oil equivalent such as refracturing the reservoir, cleanouts with coiled tubing, Pulsonix acoustic stimulation service to help ensure optimal fluid delivery and an

that could help producers increase productivity and profitability in these tough economic times.

Reservoirs seldom remain static; they change over time. The current state of a mature field could be vastly different than when first developed. Current advanced technologies can be used to help find new pay zones in older fields. Additionally, reentry capabilities are both decreasing costs and increasing recovery. These advancements in new production and recovery methods can be applied to older fields to help remediate productivity shortfalls.

### Finding incremental barrels, maximizing recovery

To maximize productivity from mature fields, operators should consider three approaches: immediate impact interventions, where the goal is to rapidly remediate underperforming wells and produce oil immediately; optimized reservoir management, which focuses on maximizing secondary and tertiary flooding techniques while looking for any pattern optimization; and discovery of new pay zones, which is where the application of new technology is required for detecting and accessing incremental reserves. All three present challenges but also have potential for significant benefits.

Tough times call for new approaches.

array of conformance chemicals and mechanical shutoffs.

When the proper immediate impact interventions are applied in insightful ways, production can improve; recovery can increase; and opex, downtime and lost production can all be reduced.

### Optimized reservoir management

Employing management solutions to access and optimize additional reserves can achieve more barrels of oil equivalent over time. Artificial lift can be employed by means of electric submersible pumps that stroke longer, pull harder, self-adjust when necessary, help dewater and continuously monitor performance. Infill wells can be geosteered to better locate sweet spots and improve contact, and adjustments to sweep efficiency can enhance overall hydrocarbon mobility. When these kinds of production optimization processes are engaged and contact is maximized, enhanced recovery is highly probable.

### Finding new pay zones

In the U.S., most mature fields were actually first drilled in the 1950s and 1960s. Logs for these wells were printed on paper and, after initial interpretation, were often archived in boxes and left to disintegrate. However, drilling tech-



nology has since advanced exponentially, enhancing the ability to view farther into the reservoir. With current data, new insight can be gained into fieldwide reservoir fluids contact and the different phases. This can help narrow the scope of the reservoir, thereby enabling rediscovery of increased production potential.

New drilling and completions can be targeted for initially undetected pay zones or untapped structures not connected to the main frame. Advanced logging techniques can help find zones that were missed by conventional tools of earlier decades. Once these bypassed or new zones are targeted, drilling and completion plans can be determined to more economically reach them, resulting in more available reserves and increased shareholder value.

### Justifying increased spending

While many experts are forecasting a small drop in expenditures for mature fields in 2015, the long-term trend is one of increasing investment to sustain necessary production levels. Since 2011, mature field drilling capex has increased globally, driven by buoyant oil prices and the cost of inflation.

Mature field intervention opex spending during that same period has been driven by rising costs and the increasing importance of mature fields for supplying growing global demand. Globally, the market is split approximately 70:30 in favor of drilling capex spending, and this is likely to remain the case for the foreseeable future.

### Much to offer

Globally, mature fields offer a vast opportunity to help meet global energy demands and stabilize financial markets across the energy industry. The Asia-Pacific region has approximately 43% of reserves in mature fields, with the large gas concentrations in Australia's Northwest Shelf being key to that total. Latin America has 24% of its onstream reserves currently considered mature. In Mexico, Pemex is investing heavily in managing the decline of its core assets. Nearly 80% of the Middle East and North-Africa region's reserves are considered to be mature.

In North America, virtually all of the onshore conventional reserves in the lower 48 states are mature, and spending also is increasing as mature reserves are added, largely in the Gulf of Mexico. Northwest Europe is a mature region, with relatively few new fields projected to come onstream in the near future.

In Russia and Central Asia, 80% of the total onstream reserves are considered mature. With relatively low recovery rates in many fields, significant investment is likely to be made to improve return. Sub-Saharan Africa is a largely nonmature region as a whole; however, West Africa and especially Nigeria contain large concentrations of mature plays.

In total, approximately 70% of the world's reserves are in mature fields. As more advances are made to recover these reserves, these fields become increasingly important for meeting the world's unrelenting requirement for energy. **E&P**