DeclineShift Mature Asset Solution for Maximized Capital Efficiency

Extend economic viability and maximize returns
Over time, production declines, operating costs increase, and cost per barrel goes up. In an effort to maintain economic production, cost-cutting measures may be instituted, or production enhancement efforts may be implemented—or both.

Most often, these methods offer only a short-term remedy to the overall trajectory of decreasing profitability. Sooner or later—and usually sooner—shutting in, divesting, or even abandoning the asset, starts to seem like the only feasible path.

However, in many cases, this decision is made too soon. Sometimes a second look, the right technologies and expertise, and a strategy centered on maximizing capital efficiency can make a difference—extending the economic life of a mature asset beyond what was previously thought possible.

*Fields estimated to have surpassed 50% of their production life
Source: Rystad Energy, Ucube, July 2015

Since 2006, production from mature fields—which accounts for more than 55% of global supply—has declined significantly.
The solution for a mature asset

The Baker Hughes DeclineShift™ mature asset solution is designed to help you get the most out of your investments through:

- The conceptualization, design, and surgical implementation of innovative production enhancement solutions that **solve your technical, operational, and economic challenges**

- A focus on making sure that every part of the solution serves a primary purpose: **to maximize capital efficiency and returns**

Implementing a DeclineShift solution can shift the production decline of a mature asset and lower cost per barrel, resulting in prolonged field profitability and significant incremental production gains.

The DeclineShift solution is based on the understanding that no two operating companies and no two mature assets are the same. That’s why, in building a solution for a particular asset, Baker Hughes takes an individual approach, focusing specifically on your asset and your objectives.

The resulting fit-for-purpose solution offers **minimal disruption, minimal downtime, minimal footprint—and maximum returns**
Transforming underperforming and idle assets into productive wells can quickly boost your output, thereby increasing the efficiency of your well stock.

It's often possible to optimize production by rejuvenating existing wells. In this scenario, Baker Hughes addresses the root causes behind low performance by tactically clearing and enhancing hydrocarbon pathways, boosting production volume and quality, and/or increasing flow efficiency.

You can also boost cash flow without the capital expense and time required for new wells by reactivating shut-in wells. Baker Hughes can develop a customized plan to restore well integrity, remediate formation damage, and/or enhance lift efficiency and overall production.

Whether it is for a few wells or for a portfolio of wells, Baker Hughes can help improve your well economics.

Challenge 1 Optimizing production from existing wells

Approach: Tactical selection of high-impact enhancements to accelerate production from existing well stock
Every DeclineShift solution is founded on a close examination of the areas that—individually and collectively—have the greatest impact on your bottom line. This examination, which fuels the development of the most capital-efficient and high-impact solution, can range from individual well diagnostics to full-field analyses. Depending on your needs, this examination typically focuses on three primary challenges.

DeclineShift Well Reactivation Solution Restored Well Integrity and Increased Daily Revenue by USD 500,000

Location: Abu Dhabi

BACKGROUND AND CHALLENGES
- Surface-controlled subsurface safety valves (SCSSVs) are required in all wells
- Many valves had plugged or leaking control lines, rendering the systems inoperative
- Wells were often shut-in for long periods of time due to lengthy rig workover schedules

BAKER HUGHES SOLUTION
- Design a DeclineShift well reactivation solution that would enable rigless operations and minimize the wellsite footprint
- Install Reconnect™ safety valve systems in two idle wells, using a DynaCoil™ thru-tubing system
- Restore the safety barrier with the same surface control as originally designed for the well

RESULTS
- Increased production from first two wells by 5,000 barrels of oil per day (BOPD)
- Immediately increased daily revenue by USD 250,000 per well
- Accelerated payback by avoiding long workover queue
- Reduced intervention costs by 66%
Proactively managing production and facilities helps reduce operating costs and accelerate hydrocarbon recovery, while maximizing production volume and quality.

Better flow from the reservoir and through the pipeline means faster and greater production revenue. Baker Hughes helps optimize flow—from reservoir to refinery—by debottlenecking production chokes throughout the system. You can eliminate flow constraints and increase flow efficiency by using advanced chemical services, artificial lift technologies, and streamlined monitoring capabilities. And by applying water management techniques, Baker Hughes can help decontaminate returns and reduce handling costs.

Baker Hughes also focuses on minimizing downtime by thoroughly analyzing your asset to mitigate undesirable production of unwanted byproducts (such as sand and scale), ensure the integrity of your asset, prolong equipment life, and/or intelligently monitor your flow channels.

Accessing additional hydrocarbons and proactively managing reservoir energy and fluid flows can improve recovery factors—increasing the total value of your asset.

Baker Hughes can help improve your reserves replacement ratio in developed fields by assessing and accessing bypassed oil. This starts by identifying and quantifying stranded hydrocarbons. Then, these additional hydrocarbons can be accessed by either tapping into new pay zones or optimizing displacement efficiency.

Challenge 3: Increasing economically recoverable resources

Approach: Re-assess the reservoir with advanced characterization technologies to improve management of recoverable resources

Extending field life is also possible by leveraging a collaborative approach that applies Baker Hughes production technologies. Using sound reservoir management practices (such as restoring and maintaining reservoir pressure), managing water and gas production, and/or monitoring and controlling reservoir performance enable you to increase total recoverable resources and maximize economic recovery.
DeclineShift Minimized Downtime Solution Increased Revenue
More than USD 320 Million and Saved Operator USD 30 Million

Location: Sumatra, Indonesia

BACKGROUND AND CHALLENGES
- Large mature field in Indonesia
- Wells experienced frequent workovers and lost production
- Average electrical submersible pump (ESP) run life was less than 300 days
- Over 90% watercut, and bottomhole temperatures up to 280°F (138°C)

BAKER HUGHES SOLUTION
- Design a DeclineShift minimized downtime solution to improve equipment life and decrease deferred production
- Install over 1,000 Baker Hughes ESP systems and 15 rod-driven progressing cavity pump systems, with minimal disruption, to increase production and address sand, scale, emulsion, and gas lock issues

RESULTS
- Enabled production of more than 10 million barrels of oil across a period of over 7 years
- Reduced workover rate by more than 30%, saving the operator an estimated USD 30 million
- Increased customer revenue more than USD 320 million by reducing deferred production from the top 11 wells

DeclineShift Bypassed Oil Solution Surpassed Customer Production Expectations by 35%

Location: Ecuador

BACKGROUND AND CHALLENGES
- Customer was performing infill drilling to access more oil
- Standard completion design called for perforating, then “killing,” the well with high-weight fluids prior to ESP installation
- Kill fluid caused formation damage and reduced production

BAKER HUGHES SOLUTION
- Design a DeclineShift bypassed oil solution that would increase completion efficiency, minimize formation damage, and enhance reservoir connectivity
- Combine a one-trip tubing-conveyed-perforating system with an ESP to accelerate completion time and to create underbalance in the wellbore prior to perforating
- Leverage Predator ZX™ high-performance shaped charges to extend perforations through near-wellbore damage and into the formation
- Use a Model J™ bottom gun anchor to reduce perforating shock impact on the ESP

RESULTS
- Eliminated 10 days of rig time through single-trip perforating and completion installation
- Preserved formation integrity by eliminating the need for kill fluids and reducing gun shock impacts
- Exceeded client production expectations by 35% overall
- Virtually eliminated water production, significantly reducing produced water handling costs
Each solution begins with the development of an accurate profile of your well or asset. Using Baker Hughes production and reservoir characterization technologies, the root causes of decreasing performance are diagnosed. This information is leveraged to design efficient solutions—applying only the needed technologies—to maximize immediate and long-term value.

During the planning and design process, Baker Hughes experts collaborate with your team. This ensures that every critical decision leverages both your asset expertise and Baker Hughes application knowledge and portfolio of production enhancement technologies, such as:

- Formation evaluation
- Drilling
- Completions
- Artificial lift
- Chemical services

This broad portfolio, backed by extensive expertise, enables Baker Hughes to architect innovative and effective solutions—based on asset potential and cost constraints—tailored to your specific needs. This approach helps you address technical challenges, as well as operational and economic challenges.
Because each solution is surgically engineered with precision, most require only a small wellsite footprint. In fact, many can be designed to address multiple challenges in a single operation, minimizing deployment time and production disruptions. This helps to accelerate payback, and grow the present value of your cash flows.

Effectively managing wellsite operations is an equally important part of solution execution. If any additional vendors are involved, Baker Hughes can coordinate with them, and even manage the project, to simplify the process and minimize the burden on your organization.

Baker Hughes also tracks results, weighing actual production and performance improvements against the projected results to ensure rapid adoption of the most successful practices—further driving capital efficiency and return on investment (ROI) on future projects.

And, because Baker Hughes is committed to your success, the company offers flexible commercial models to align with your business objectives and operational needs.
DeclineShift Solution Increased Production in Mature Field by 300%, Lowered Costs by 57%, and Reduced Decline Rates

Location: Latin America

BACKGROUND AND CHALLENGES
- 80-year-old giant field is one of the most complex in the world
- Reservoir rock quality is highly variable
- High development costs, low recovery

BAKER HUGHES SOLUTION
- Design and implement a DeclineShift solution, developing and prioritizing the portfolio of production enhancement opportunities
- Assume management of the field, including all technical and operational aspects
- Leverage precise target characterization technologies; create more streamlined well designs; and enable self-powered pads, using well’s gas supply to improve capital efficiency
- Drill and complete 30 wells, perform 36 recompletions and 86 workovers, and fracture 77 wells
- Utilize remote-operations services

RESULTS
- Increased field production by 300%
- Reduced monthly production decline rate by 43%
- Lowered production and field operation costs by 57%
- Delivered 83% of wells ahead of plan

Production from an 80-year-old field in Latin America was declining by 6% monthly, and new development wells were costly. Previous revitalization attempts were ineffective, so the operator contacted Baker Hughes to request a customized solution, including integrated field management.

Working closely with the operator’s teams, Baker Hughes designed and executed a holistic DeclineShift mature asset solution over a three-year period. The solution included a broad mix of fit-for-purpose technologies and services.

Once the solution was implemented, production increased from 2,600 to 10,500 barrels of oil per day in the first 12 months, and operation costs* dropped from USD 4.38 per BOE to USD 1.86 per BOE over the first 18 months. An additional 20,000 barrels of incremental production were realized through strategic well completions and interventions, and the monthly field production decline dropped to 3.4%.

This consistent focus on capital efficiency yielded precise, technical solutions to lower cost per barrel and reduce overall field decline, successfully extending the economic life of the asset.

*Excluding major operating and maintenance costs.
Efficient and effective use of your capital can significantly shift the life of a mature asset beyond its current trajectory.

The DeclineShift solution for mature assets delivers **efficient use of your capital, increased production, and prolonged recovery.** This is possible by combining fit-for-purpose technology with the right strategy—one that considers the impact of every detail of your DeclineShift solution, from design to execution, as it relates to your bottom line.

**Don’t accept the trajectory you’re on. Let Baker Hughes maximize your capital efficiency—and your returns—with your very own DeclineShift solution.**
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