IATMI22-100

A Review For 2021 and 2022 Production Performance from Development Drilling Perspective

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Abstract

SKK Migas has launched a vision for the national oil and gas industry to reach 1 million barrels of oil per day (BOPD) and 12,000 MMSCFD by 2030, which will be a sign of the revival of Indonesia's upstream oil and gas industry. One of the foundations that is important for achieving these targets is through massive, aggressive and efficient development drilling activities that will help to optimize existing production and also arresting national decline rate. This paper will describe the production achievements of development wells drilled during 2021 till August 2022. It is hoped that an overview of the effectiveness of development wells will be obtained as well as possible improvements to be made in the future.

2021 and 2022 had become important period for development drilling strategy to gain more attention and more activity in a few years ahead. On a national scale, in 2021 about 480 wells had been drilled and 444 onstream wells had been drilled. Meanwhile from Work Program and Budget (WP&B) 2022 results, it has been agreed and approved as many as 790 development wells and the potential for an additional 100 wells in one of the PSC Contractors on the island of Sumatra. The year 2022 is a new milestone in terms of the number of development wells drilled with nearly 900 number of wells to be drilled, which is the highest number of wells in the last 7 years. During 2021, the annual production contribution from development wells is 16,576 BOPD and 382 MMSCFD, where the drilling activity is able to withstand the National decline rate for oil from 10.4% per year (only monitoring existing wells and conducting well intervention) to 7% per year from 2020 to 2021. By volume, 6.05 million barrels of oil and 139 BCF of gas were produced. Until August 2022, the annual production contribution from development wells was 14,870 BOPD and 199 MMSCFD which equal to 3.61 million barrels of oil and 48 BCF of gas. The development drilling program for 2022 is ongoing and it is expected that more than 800 wells can be drilled by 2022. Looking at the results in 2021 and 2022 shows that the contribution from the development well drilling program is able to help to withstand the National decline rate for oil.

The competence and successful drilling of development and production of wells certainly involves many parties. It is hoped that good cooperation will continue to achieve the realization of drilling in the future, both from the subsurface aspect, drilling operations, social aspects and licensing in order for drilling programs to be executed according to schedule and get optimal production. By all means, this is to achieve the national oil and gas industry target of 1 million BOPD and 12,000 MMSCFD by 2030.

Keyword(s): Development drilling, Production performance, National oil and gas industry

1 Introduction (Overview of National Oil and Gas Historical Production)

Indonesia's oil production has been declining since its second peak in 1995, with the average declining rate around 3 – 5% per year. On the other side, the need of oil consumption tends to increase every year. In order to deal with that challenge, Indonesia upstream oil & gas sector established a vision to achieve production one million barrels oil per day in 2030 and reach its third peak in oil production's history in Indonesia.

There are four main strategies to achieve the goal in 2030, namely maintaining high production level, transforming resources into production, acceleration of chemical Enhanced Oil Recovery (EOR) and exploration of giant oil discovery. Those four strategies are needed to be executed precisely based on the timeline that has been designed. For short term, it is required to maintain the existing production by means of massive programs including development drilling, workover, well services and other production optimization jobs.

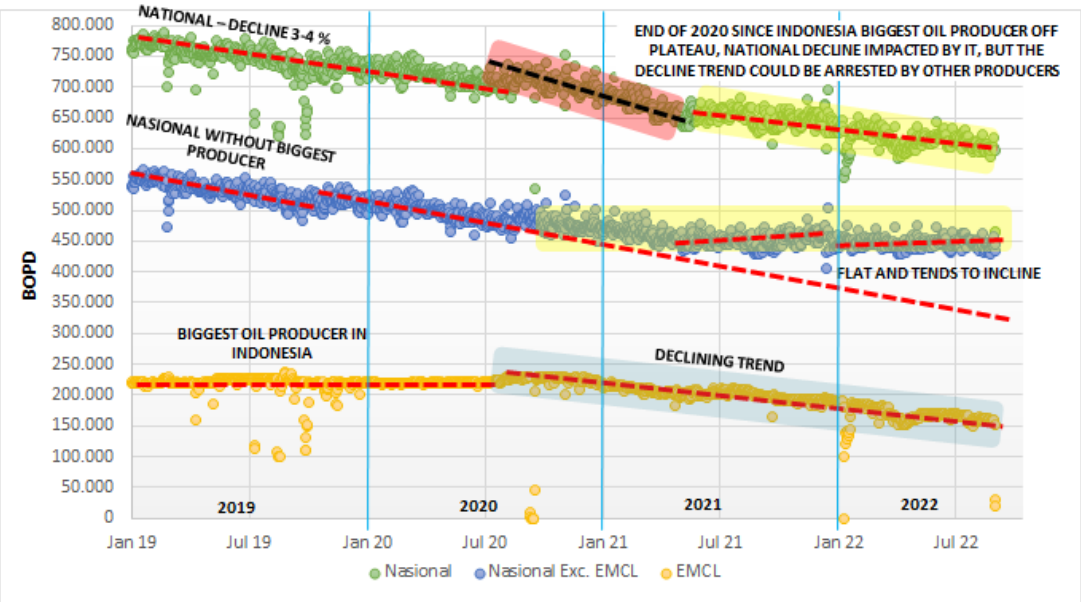

Figure 1. National Historical Oil Production (SKK Migas, 2022)

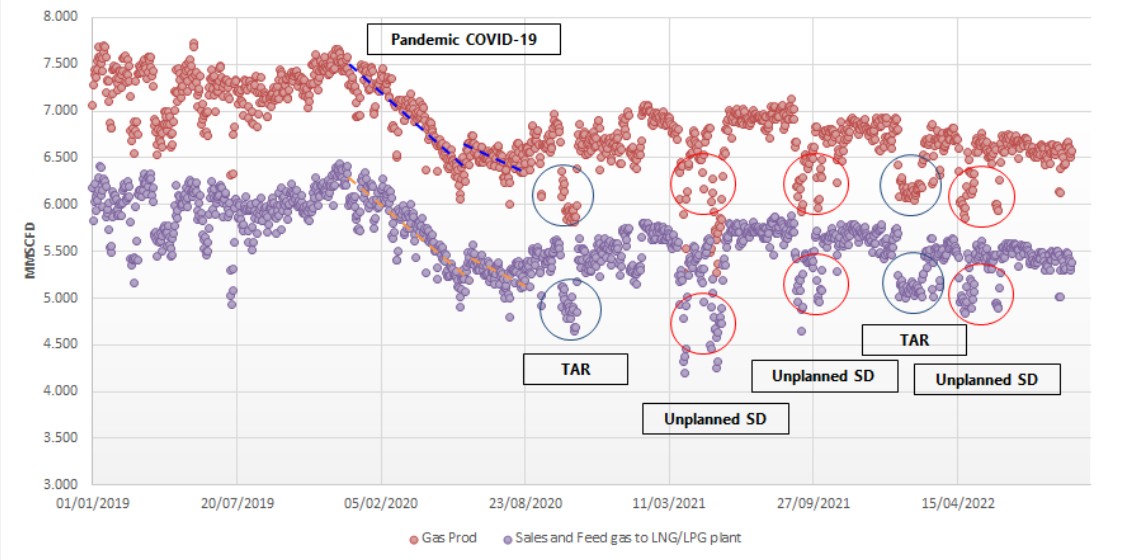

Figure 2. National Historical Gas Production (SKK Migas, 2022)

From Figure 1, it is shown that national oil production decline heavily affected by Indonesia biggest oil producer that already started to decline since end of 2020. But if that biggest producer excluded, National production showed relatively flat trend and tend to incline mostly because massive and aggressive activities such as development drilling and well intervention program.

Figure 2, which is national gas production, has shown there are no clear trend that massive and aggressive program will help to increase the production. Gas production performance from 2019 until 2021 mostly affected by shutdown events (either planned or unplanned) and also commercial aspect, which is clearly seen in 2019 until early 2020 where pandemic situation really impacted level of monetization at that period.

Focusing and evaluating on the impact of production from drilling development program will give a comprehensive strategy for the future action and also alignment with SKK Migas vision to reach 1 million barrels of oil per day (BOPD) and 12,000 MMSCFD by 2030.

2 Impact of Development Drilling

Development drilling and well intervention program from 2018 until August 2022 gives a quite huge impact to production as shown in Figure 3. Those programs could arrest oil natural decline from 13-20% per year if we only maintaining existing production into 3-7% per year (7% after Indonesia oil biggest producer declining). For gas production, development drilling also gives impact to production especially from new projects or fields, but usually it is override by gas demand from consumers.

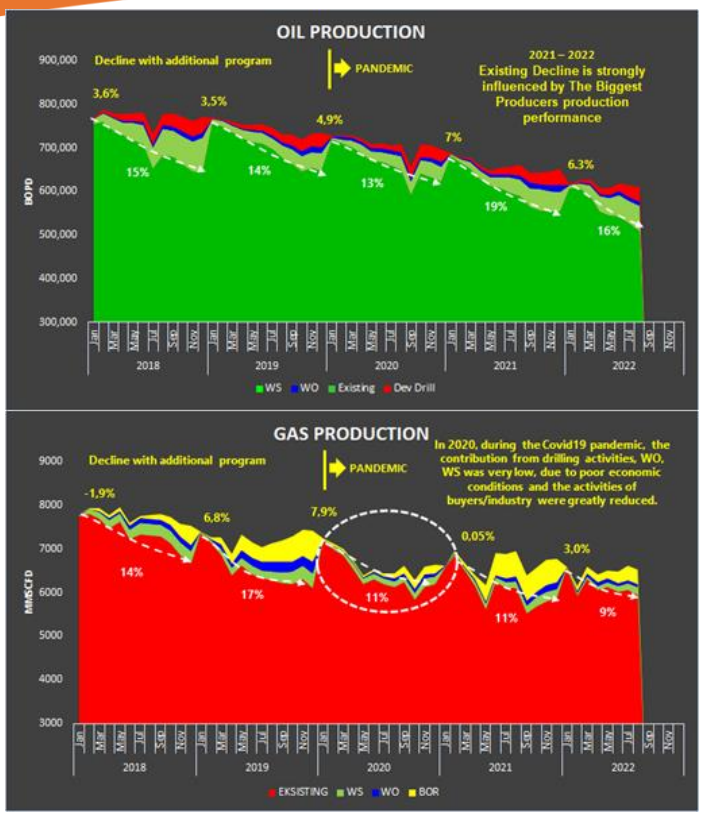

Figure 3. National Historical Oil and Gas Production Breakdown per Activities (SKK Migas, 2022)

Other parameter that needed to take into consideration to ensure gain production from development drilling program is the timing of well to Put into Production ("POP"), which from Figure 4 there are a clear correlation of well onstream to gain production either for oil or gas wells. Things that are needed to ensure the program will be executed in time consists of technical aspects such as drilling preparation, availability of rig, completion readiness and flowline readiness. Other aspect is non-technical such as formalities, land clearance and procurements. Integration of those aspects will help to deliver program and its production contribution.

Figure 4. Development Drilling Well Onstream Impact to Production in 2022 (SKK Migas, 2022)

3 Distribution of Development Drilling Contribution to Production

For further evaluation, mapping the distribution of production gain from development drilling throughout the whole area of Indonesia could give more comprehensive knowledge for the future strategy, such as areas to concentrate for next program and areas to re-evaluated due to unsatisfying result. As shown in Figure 5, areas which give the highest contribution are in Northern and Central Sumatera followed by Southern Sumatera and East Kalimantan area. For gas contribution it is relatively different where the most dominant area is in Southern Sumatera and East Kalimantan area.

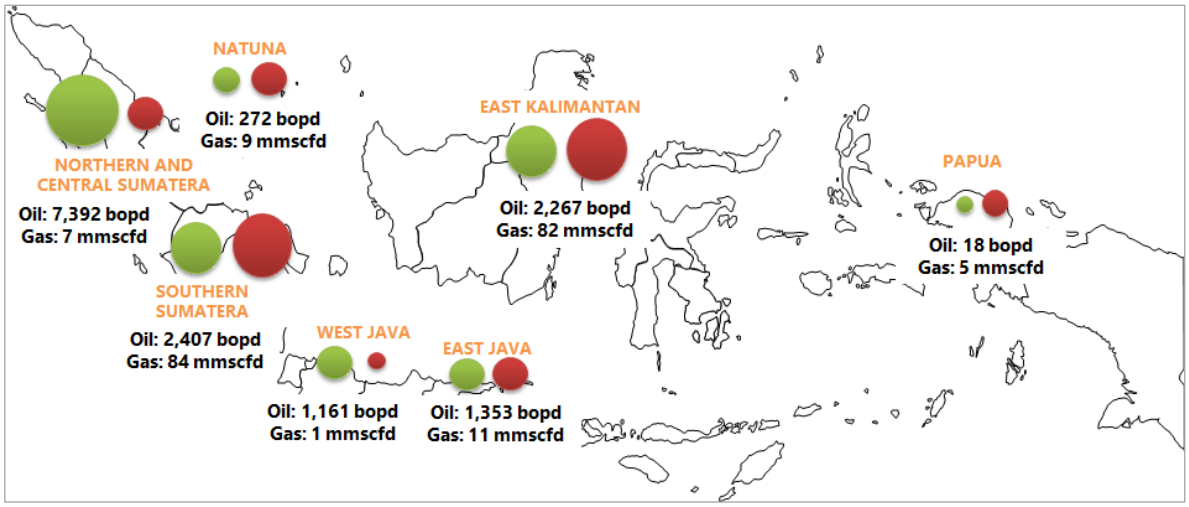

Figure 5. Distribution of Development Drilling in 2022 Production Contribution status Year to Date August 2022 (SKK Migas, 2022)

Another evaluation done by using matrix comparison between initial rate data compare to monthly average rate for oil and gas wells. From Figure 6, the most preferable results are in quadrant 1, that have high initial rate and high monthly average rate. Unfortunately, most of the well population are in quadrant 3 because mainly the reservoirs in Indonesia are mature fields. Some of the wells in quadrant 1,2 and 4 are drilled in new area. Even though the results of wells drilled in 2022 mostly in quadrant 3, by having massive program could result on high production contribution like in Northern and Central Sumatera case.

Based on the above evaluation, there are still opportunities to boost our production from development drilling program. There are two main strategies which are by executing massive program (by also considering the remaining reserves data and also possible handicap like produce water treatment, electricity consumption, gas handling and another technical aspects) and also drill in prospective new areas.

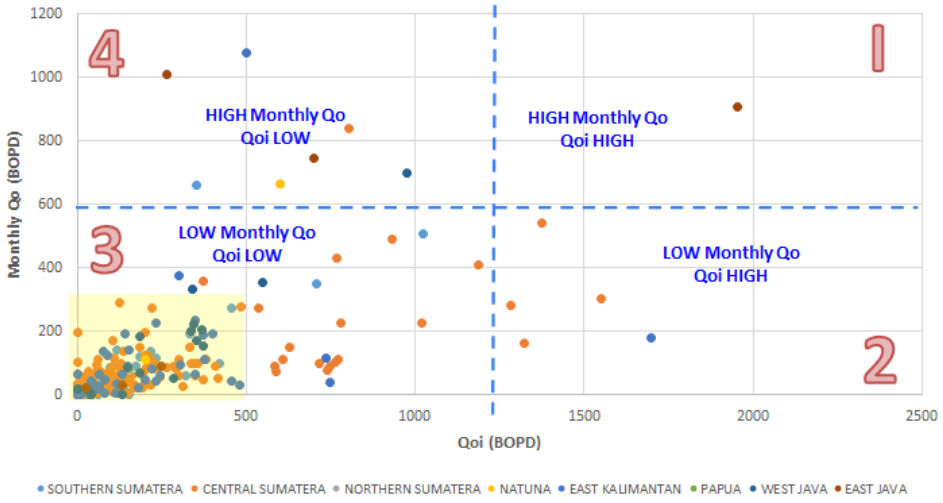

Figure 6. Comparison of Oil Initial Rate vs Monthly Average 2022 Development Drilling Well (SKK Migas, 2022)

4 Conclusions

In conclusion there are several notes regarding development drilling program and its impact to the National oil and gas production, such as:

- Current level of oil production determined by the biggest oil producer decline and massive program such as development drilling program.
- Massive program could help to maintain gas production but the dominant factor that control gas production level are shutdown event (either planned or unplanned) and also level of gas monetization from the consumers.
- There are several areas still prospective for drilling based on the 2022 drilling result like Northern and Central Sumatera for oil and Southern Sumatera and East Kalimantan for gas.
- Things needed to ensure the program will be executed in time consists of technical aspects and non-technical aspects.
- Still, game changer for drilling program, are in new areas, that is why step out wells and undiscovered prospective areas could give higher impact.

References

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Acknowledgments

Authors express their sincere appreciation to Production Operation Division and Exploitation Division SKK Migas also SKK Migas management for permission to publish this study.