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LEGAL PROTECTION OF OIL AND GAS MINING TO REALIZE SUSTAINABLE DEVELOPMENT

Ribuddi Santoso[1], Muhammad A.Athoriq[2], Numara Ardelia Fairuz[3] , Ananda Maprilia Janur Putri[4]
[1]1Faculty of Law, University of Jambi, Indonesia. E-mail: budiyansah1822@gmail.com (Corresponding Author)
[2]Faculty of Law, University of Jambi, Indonesia. E-mail: muhammadathoriq013@gmail.com
[3]Faculty of Law, University of Jambi, Indonesia. E-mail: numarafairuz@gmail.com
[4]1Faculty of Law, University of Jambi, Indonesia. E-mail: nadiajambi11@gmail.com

Abstract: Indonesia, as one of the countries with abundant natural resource potential, such as oil and gas, plays an essential role in the global energy landscape. As a Mining Authority (KP) stakeholder who collaborates with contractors through the oil and gas mining contract system, the government contributes to using oil and gas in various sectors, especially the industrial sector, as part of sustainable development efforts. Sustainable development with an environmental perspective is a conscious and planned effort that incorporates ecological aspects, including natural resources, into the development process to ensure the ability, well-being, and quality of life of current and future generations. The components of sustainable development include social, economic, and environmental aspects. The paradigm of sustainable economic development aims to achieve optimal production, improve the welfare of economic actors, and preserve the environment. In this paper, we will discuss the regulation of laws and technology for the management and utilization of oil and gas. Oil and gas resources in Indonesia require careful management and prioritization of the principles of sustainable development. The role of government through mining contracts and technological advances contributes to the optimization of oil and gas production. By integrating environmental considerations through technology into the development process and encouraging sustainable practices, Indonesia can ensure long-term resource availability, promote economic growth, and safeguard the well-being of current and future generations.

Keywords: Development; Exploitation; Technology

1. Introduction

Indonesia has a significant potential energy source, especially in oil and gas. Natural gas is a natural resource with the third largest reserves in the world after coal and petroleum. The utilization of natural gas in Indonesia is not only limited to transportation and households but also to industry. Natural gas has dominated after oil's role as the primary energy source began to be reduced. In addition, the government's commitment to the Clean Development Mechanism in the Kyoto Protocol encourages using natural gas due to its lower pollution levels.

Oil and gas utilization needs to be managed properly and correctly. Preparing natural resource balance sheets is an essential part of the governance of wealth controlled by the state. By knowing the value of its resources, the government can make the right policies, especially for oil and gas fields that will run out. Since oil and gas require a very long time to form and cannot be renewed (nonrenewable), these natural resources are often referred to as natural resources with a fixed stock.

With the development of technology that continues to advance, many petroleum fields that were previously considered depleted can be reproduced through secondary or tertiary methods (Enhanced Oil Recovery). Therefore, the government encourages the entry of new investors to encourage the search for new reserves. To realize sustainable energy development, conducive policies are needed supported by financial independence, technology, and human resources. Financial independence can be achieved by financing the operation of the national energy supply and using it independently. Technological independence must be carried out through long steps, including increasing the ability of national technology to provide goods and services in the energy sector so that the local content of national technology is getting bigger. Meanwhile, human resource independence can be achieved by actively involving the community by improving domestic human resources' ability in the energy sector.[1]

Natural resources have a significant role in national and regional development because they affect various aspects of life. Following the 1945 Constitution Article 33 paragraph 3, the state has control over the earth, water, and natural resources contained therein, which must be used as much as possible for the prosperity of the people. As the leading actor, the government has a role in controlling and regulating the use of natural resources.[2]

Oil and gas resources also play a vital role in economic growth at the national and regional levels. The mining sector is one of the dominant sectors in socio-economic growth. Although the mining sector positively impacts economic growth, it can also hurt social, environmental, political, and cultural aspects.[3]

National oil and gas export activities have increased monthly in 2022. In August 2022, oil and gas exports reached the highest value of USD 1686.5 million. In addition, based on SKK Miga's records, state revenue from the oil and gas industry in 2022 will reach 4.4 billion US dollars or around 61.6 trillion Rupiah (Aud, 2022). The considerable state revenue from the oil and gas sector shows that oil and gas production is a large-scale industry. However, overexploitation of mining resources is a failure to comply with environmental regulations that will burden future generations.[4]

In a juridical-constitutional context, the relationship between the state and oil and gas mining materials can be seen through Article 33, paragraph (2) of the 1945 Constitution, which states that the branch of production that is important to the state and that plays a role in meeting the needs of the community must be controlled by the state. Article 33 paragraph (3) of the

[1] Jauhari Dewi Kusuma, "Unizar LawReview," *Unizar LawReview* 1, no. 1 (2018): 35–44, http://e-journal.unizar.ac.id/index.php/ulr/index; Daris A Raft Ginting,

[2]H B Gusliana, and Dodi Haryono, "Tinjauan Yuridis Terhadap Kedudukan Badan Gas Bumi Pasca Putusan Mahkamah," *Fiat Justisia* 8, no. 3 (2014): 531–45;

[3]Faizal Kurniawan, "Bentuk Perlindungan Hukum Terhadap Kekayaan Minyak Dan Gas Bumi Sebagai Aset Negara Melalui Instrumen Kontrak," *Jurnal Hukum Dan Peradilan* 2, no. 3 (2018): 471, https://doi.org/10.25216/jhp.2.3.2013.471-492;

[4]Swastika Rahajeng Wihartina, "Dampak Eksploitasi Minyak Bumi Banyu Urip Terhadap Kehidupan Masyarakat Sekitar Lokasi Pertambangan," *Universitas Negeri Surabaya* 52, no. 1 (2014): 1–5, http://jurnalmahasiswa.unesa.ac.id/index.php/swara-bhumi/article/view/10359/10107.

1945 Constitution also states that the state has control over the earth, water, and natural resources contained therein, which must be used to increase the prosperity of the people. This shows that state control over natural resources must be directed to the welfare of society.

However, in practice, state control of natural resources for the welfare of the people is often disrupted by several factors. First, the legal politics of states are often influenced by the interests of groups or individuals in the name of the public interest, the state, or development. Second, the definition of "controlled" by the state in the substance of the law is unclear and can be interpreted differently, causing conflicts of interest and authority between government departments or agencies in the use of natural resources in Indonesia. These differences in interpretation also create legal uncertainty.

LEMIGAS, as a technology development institution, has significant strength in maintaining and competing in the oil and gas industry. However, LEMIGAS faces challenges such as government legal rigor, financial schemes, non-commercial research results, and ambiguous organizational status.

In order to achieve sustainable development, the role of technology cannot be ignored. However, significant challenges are also faced in this regard. To support sustainable development, environmental efficiency in producing and consuming a technology or product must reach a factor of 32.4 (Mulder, 2006). Sustainable technology development requires more than just changing technology to reduce waste. Technology is needed to have a broader purpose: to meet human needs without exceeding planet Earth's carrying capacity and ecological capacity and promote equality of human needs. The offshore technology development in the oil and gas sector has experienced rapid progress. Various technologies have been developed to optimize oil and gas production. Many platforms are designed to address operational challenges on high waters, both fixed and mobile.

2. Research Method

The method used in this journal research is the descriptive analysis method, where the research method relates to the topic of discussion using the process of describing or describing data from other scientific works—conducting comprehension studies from related references. The data collection technique used in this study is secondary data. This data is sourced from books, journals, and oil and gas laws.

3. Discussion

Gas mine management applies as stipulated in Law No.22 of 2001 concerning Oil and Gas. Oil and gas are still the central mainstay of the economy for the Indonesian people, which is one of the influences on infrastructure development. The role of the oil and gas industry has contributed to several regions increasing its effect, which has a considerable influence on infrastructure in Indonesia. During the implementation activity process, one of the infrastructures that have been built includes repairing bridges and sidewalks and improving education, society, and health (Data et al., n.d.)

3. 1 Oil and Gas Mining Legal Protection

The state has the authority to manage natural resources to realize social justice, general welfare, and prosperity of the people. Contract legal instruments are used as a legal umbrella to protect state assets in the form of oil and fuel. Production Sharing Contracts are the basis for managing and utilizing oil and fuel business activities. A profit-sharing contract is a public contract not fully subject to private law. In establishing contractual relations, the state must pay attention to the protection of state assets and must not be harmed (state immunity).

Natural resources play an essential role in national and regional development because natural resources strongly influence various aspects of life. Article 33, paragraph 3 of the 1945 Constitution states that the earth, water, and natural resources contained therein are controlled by the state and used as much as possible for the prosperity of the people. Law Number 22 of 2001 concerning Oil and Natural Resources also explains that oil and gas are strategic natural resources that are not renewable, controlled by the state, and have an essential role in the national economy and many people's lives. Managing these natural resources must provide maximum prosperity and welfare for the people.

As the leading actor, the government has a role in controlling and limiting the use of natural resources so as not to damage the existing ecosystem. Oil and gas resources are one of the essential natural resources for national and regional economic growth. The mining sector is the dominant sector in socio-economic development. Although the mining sector positively impacts economic growth, it can also harm social, environmental, political, and cultural life. Excessive extraction of mining materials is often carried out by companies or business entities with permits to conduct mining activities in certain areas. Therefore, the government must formulate policies that regulate companies or operators to manage natural resources without damaging the ecosystem. Mining business actors tend not to consider the impact on the surrounding ecosystem in land use for mining activities.[2]

The Government's Role as a Determinant of Priorities for Domestic Natural Gas Utilization

A vital issue born from the Constitutional Court decision related to the revision of the Oil and Gas Law is the emphasis on the government's obligation to prioritize the use of natural gas for domestic needs rather than export needs. Currently, the provisions of Article 8 of Law Number 22 of 2001 concerning oil and gas affirm that the government should give priority to the utilization of Natural Gas for domestic needs and is tasked with providing strategic reserves of

[5]Ridwan , Cs : Evaluasi Kebijakan Tambang Minyak Dan Gas Bumi …. Universitas Bina Taruna Gorontalo Ridwan , Cs : Evaluasi Kebijakan Tambang Minyak Dan Gas Bumi ….” 10, no. 6 (2023): 127–39; Strong Christopher, B, “The Oil and Gas Law Review Editor,” *The Oil and Gas Law Review* 1st Editio, no. Law Business Research Ltd. (2013):

[6]Rhona Flin, David Millar, and Luca Corradi, “Faktor Psikologis Yang Mempengaruhi Adopsi Teknologi : Studi Kasus Dari Industri Minyak Dan Gas” 102 (2021);

[7]Ridwan Nyak Baik, “Machine Translated by Google Investasi SDA Migas Dan Pembangunan Daerah Berdampak Pada Pemberdayaan Masyarakat” 47, no. 1 (2015): 60–68.

Petroleum to support the provision of Fuel Oil in the country, which Government Regulations further regulate. The new Draft Oil and Gas Bill affirmed that "The Government must prioritize the utilization of Natural Gas for domestic needs and is tasked with providing strategic reserves of Petroleum to support the provision of domestic Fuel Oil which Government Regulations further regulate."

Adding the word "mandatory" in the new draft oil and gas bill legally strengthens the government's obligation to prioritize using natural gas for domestic consumption. With the word "mandatory," the government has a legal obligation to fulfill the provisions of Article 8, so there is no longer any reason for the government not to complete the legal responsibility. If the government does not implement the provisions of Article 8, it can be said that the government has violated the Oil and Gas Law. This emphasis is an implication of the provisions of Article 33 of the 1945 Constitution, which affirms that the earth, water, and natural resources contained therein are controlled by the state and used as much as possible for the prosperity of the people. In the Article, the right of control by the state includes the authority to regulate, manage, and supervise the management and exploitation of oil and gas, as well as the obligation to use these natural resources as much as possible for the prosperity of the people. The term "greatest prosperity of the people" is a consequence of the words "controlled by the state" and "used." The word "used" in Article 33 has a solid cause-and-effect relationship. Thus, natural resources controlled by the state aim to be used as much as possible for the prosperity of the people.[3]

Compensation of Indigenous Peoples for Land Use for Mining

Rights to mining above and below the earth's surface are legally granted to indigenous peoples. However, mining activities can damage the soil surface with excavations and large pits, making the land unusable for agriculture and other activities. In addition, mining activities can also damage the earth's bowels, which is a deep layer of soil containing mineral sources. Mines are generally located in the bowels of the world. Law Number 4 of 2004 concerning Mineral and Coal Mining in Article 134 Paragraph (1) explains that the rights to mining business permit areas (WIUP), People's Mining Areas (WPR), or Special Mining Business Permit Areas do not include rights to earth surface land. Article 136 also confirms that miners must settle land rights with rights holders by the provisions of laws and regulations in mining activities. Therefore, land rights remain owned by other parties and not by miners. Article 138 of the Mining Law also explains that mining business permits, community mining permits, or special mining business permits are not forms of ownership of land rights. In this situation, there is a potential conflict of interest in land use, where the government grants land and mining rights to two individuals in the exact location. Further information in the context of mining law in Indonesia shows a difference between land rights (customary rights) and mining rights. Land rights remain owned by indigenous peoples or landowners, while mining rights are given to those with mining business licenses. There are challenges in resolving land rights with rights holders when

conducting mining activities, especially if the land rights come from indigenous peoples. Conflicts of interest can arise when governments grant mining permits to different parties in the same area as land rights owned by indigenous peoples or other individuals.

3. 2 Oil and Gas and Sustainable Development

Oil and gas are the hydrocarbon compounds sourced from fossils or the remains of living things or an organism that has undergone a process of decay or weathering derived from marine plants or ancient animals. Meanwhile, in this case, Sustainable Development stated by Emil Salim that every movement of development must consider environmental aspects. In this case, it can also be explained that development is a long-term process that aims to improve the community's welfare within an unlimited period. So, it can be concluded that sustainable development in oil and gas is a long-term development process that aims to improve the welfare of people in oil and gas.

Currently, two widely used fossil energy sources are petroleum and coal. However, the use of natural gas in the country still needs to be constrained by the limitations of network pipelines. In sustainable energy development, development activities in the energy sector, from the origin of supply to utilization, can potentially harm changes in the function of the biological environment. Using energy can also cause pollution through solid waste, liquid waste, and emissions from burning fossil energy.[4]

Development is sustainable if it meets economic criteria, provides social benefits, and maintains the preservation of the biological environment. The concept of sustainable development has changed since its introduction in the 1970s. Global oil prices are experiencing high price increases, resulting in recessions in developed countries, especially those that import oil. In the 1980s, attention to the environmental dimension intensified as the world's oil supply normalized. The Earth Summit in Rio de Janeiro in 1992 became an important starting point in considering the social size of sustainable development (TERI 2002). One of the most important things to come from this conference is the establishment of the Commission on Sustainable Development (CSD). The Commission has reached a convention to implement the concept of sustainable development set out in Plan 21. Equality of access to resources for all social levels and poverty alleviation are necessary plans at this conference.

Safe policies must be supported by financial independence, technology, and human resources to realize sustainable energy development. Financial freedom can be achieved through the ability to finance the operation of supplying and using national energy independently. The initial term is to increase the capacity of national technology to provide goods and services in

[8]A Sugiyono, "Perubahan Paradigma Kebijakan Energi Menuju Pembangunan Yang Berkelanjutan," *Makalah Seminar Tahunan Ekonomi I*, 2004, 8–9, http://sugiyono.webs.com/paper/p0401.pdf; Rian Cahya Rohmana and Fiqya Fairuz Zaemi, "Carbon Capture, Utilization, and Storage (CCUS) Untuk Pembangunan Berkelanjutan: Potensi Dan Tantangan Di Industri Migas Indonesia," *Prosiding Seminar Nasional Teknik Lingkungan Kebumian Ke-III "Tantangan Pengelolaan Limbah Domestik Dan Industri Untuk Pembangunan Berkelanjutan*, 2021, 11–21.

the energy sector so that the local content of national technology in these goods or services is increasingly significant. Meanwhile, independence from human resources can be achieved by actively involving the community by improving domestic human resources' ability in the energy sector.

At that time, the main problem was the government's efforts to increase petroleum production through profit-sharing contracts. With the increase in oil production, state revenues from exports of this commodity must be even more significant. However, in the early 1990s, the export of energy commodities decreased and was replaced by manufacturing-based industrial things. Exports focus more on items with high added value than exports of natural resources using low added value. Along with utilizing this industrialization process, there is poly environmental damage. The environment is starting to receive attention, and energy policy is directed at using renewable energy that is more environmentally friendly.

The decree of the head of the National Energy Development Coordinating Board (KUBE) in 1998 aims to establish a climate that supports the implementation of development management in the energy sector and provides certainty to economic actors related to the use of energy procurement, supply, and use. In this KUBE, there began to be indications of limited origin of energy power, especially petroleum. Petroleum is gradually directed to be used domestically in fuel and industrial raw materials that can increase high-added value.

However, the oil and gas sector is restructuring as stipulated in Law No. 22 of 2001 concerning Oil and Gas. This restructuring is intended to: [5]

a. Increase efficiency and avoid conflicts of interest between government and company functions.
b. Eliminate monopolies.
c. Provide equal treatment to business actors.
d. Enact market mechanisms gradually.

By 2025, the national industry is expected to have the following characteristics (Annex to Presidential Regulation No. 28/2008):

a. The manufacturing industry has entered world-class.
b. Growth potential and robust structure and Prime Mover Economy.
c. Balanced and equitable capabilities between business scales.
d. The role and contribution of industry is high to the National Economy.
e. Industry structure from various aspects to support sustainable development.

[9]Darwati Susilastuti, "Pembangunan Ekonomi Dan Kepedulian Masa Depan Oleh : Darwati Susilastuti (Guru Besar Fakultas Pertanian Dan Dosen Pascasarjana Universitas Borobudur)," 2004; Putra Akbarsyah Pratama, "Analisis Dampak Kegiatan Industri Hulu Migas Terhadap Pembangunan Kabupaten Indragiri Hulu," 2021, https://repository.uir.ac.id/16101/1/163210264.pdf.

Future industrial development is developed in an integrated manner using the development of agricultural, marine, forestry, mining, and industrial human resources, as well as the result of research and development capabilities, including the development of supporting services, building design, and industrial engineering. The National Industrial development strategy is based on the regional industrial roadmap.

Economic development is the primary goal of development in Indonesia, which includes three crucial elements: economic growth, economic equity, and national stability. In the 1970s and early 1980s, Indonesia's economic development depended heavily on oil and gas foreign exchange. At the same time, the concept of sustainable tourism development began to exist, which means that part of the broader concept of sustainable development originated. In 1987, the World Commission on Environment and Development stated that the environment and development are currently unsustainable, so new actions that claim global sustainability are expected. The commission defines sustainable development as development efforts that meet current needs without compromising the ability of future generations to meet their needs. Referring to the concept of sustainable development, The idea of sustainable tourism initiated by UNWTO considers meeting the needs of tourists today and in the future. Sustainable tourism development, as described in the Sustainable Tourism Charter (1995), is a development that is ecologically supportive, economically feasible, and ethically and socially just (including cultural) to the people.

President Ir. Jokowi has set tourism to be the leading sector in the limited rendezvous. The determination of tourism to be a top sector means that the tourism sector is used as a mainstay in earning foreign exchange, which is expected to increase economic growth (Kemenparekraf, 2020). It is different from using the oil and gas sector; the tourism sector is an industry that uses resources that will never run out. This results in tourism as an industry that is expected to play a role in national development in the future.

3.3 The Impact of Oil and Gas Mining on Development

Exploration is the initial stage in mining activities. Like other early stages, exploration also has its challenges. One of the challenges faced in exploration means how to get people living around the concession area to get these activities without rejection. [6]

In exploration, especially in the early stages such as mapping and drilling, it is hoped that intensive approach efforts to residents so that these activities are maintained. Development in oil and gas for the public interest is a national development priority with a time limit. The land acquisition process for this activity often faces many obstacles, especially if the land needed is in a forest area. Research has concluded that land acquisition constraints in forest areas are caused by sectoral legislation in the forestry sector, so there are overlapping arrangements for the same object (land) without synchronization and harmonization using the fundamental Agrarian Law. To overcome these obstacles, synchronization, and harmonization between the

[10]Firman Muntaqo, "Pengadaan Tanah Pada Kawasan Hutan Bagi Pembangunan Untuk Kepentingan Umum Di Sektor Migas," *Repertorium* 9, no. 2 (2020): 71 – 84, https://doi.org/10.28946/rpt.v9i2.921; Applied Mathematics, "済無No Title No Title No Title," 2016, 1 – 23; Bina Eradany, "Tindak Pidana Kerusakan Lingkungan Akibat Pertambangan Minyak Dan Gas Bumi" 02, no. 04 (2023): 397–404.

Forestry Law and the Basic Agrarian Law are crucial and urgent as the basis for land acquisition for public interest development in oil and gas in forest areas.

Par exemple, l'exploration de gaz naturel à Saumlaki est réalisée à grande échelle. Cette exploration implique des capitaux importants, un risque élevé et une technologie de pointe. Saumlaki possède les plus grandes réserves de gaz naturel d'Indonésie. L'exploration du gaz naturel a été réalisée grâce à la coopération entre le gouvernement et la population. Ce projet implique des activités poly utilisant du capital et de grandes ressources instantanées, ce qui a certainement des impacts positifs et négatifs pour les résidents. En outre, l'exploration est également menée dans la concession de gaz naturel du bloc de Masela dans la régence de l'ouest des Moluques du Sud-Est. Le gouvernement central a décidé de réaliser un projet de traitement du gaz à partir du champ gazier d'Abadi, Masela Block, dans la région en utilisant une usine flottante de GNL. This project is owned by the Japanese oil and gas company, Inpex Corporation, which has been operating in Indonesia since 1966. Inpex has carried out 41 oil and gas projects for more than 47 years in Indonesia, and currently participates in 12 oil and gas blocks covering exploration, development, and production activities. The eternal Gas Field Project, Masela Block is located in the Arafura Sea, approximately 155 km southwest of Saumlaki City, West Southeast Maluku Regency. This project is the first floating LNG plant in Indonesia to receive approval from the government.

Another area for improvement in exploration activities is the difference in views between the governments of West Southeast Maluku, Southwest Maluku, and Maluku Provinces and the central government regarding the division that will occur. One of the requirements in oil and gas management in the Masela Block is authority over marine areas, both for the district government and the province as the producing area. As a result, the ambiguous jurisdiction of the central government, especially in development financing, requires regions to be independent and more creative in exploring the potential of local resources. The ability of an area to be separate lies in its ability to analyze its financial resources, manage them, and use them to finance regional government. Ideally, the dependence of local governments on central assistance should be minimized.

3.4 Technological Utilization of Oil and Gas in Sustainable Development

In the Indonesian region, the Oil and Gas Technology Research and Development Institute (LEMIGAS) is one of the public institutions that has implemented government entrepreneurial practices. Since the end of 2009, LEMIGAS has been inaugurated as an entrepreneurial government providing oil and gas technology services. This step can increase the organization's funding through the scheme.

LEMIGAS has national and international organization certifications such as ISO 9001: 2008, Indonesian National Standard (SNI), ISO / IEC 17025: 2008, ISO 14001: 2004, and OHSAS 18001: 2007. It demonstrates a commitment to the quality of research and development activities, oil and gas testing services, and professionalism in running an efficient and effective organization. On December 28, 2009, LEMIGAS began to change its organizational form to the Public Service Agency (BLU) to be less dependent on the government budget and seek new sources of revenue through collaboration with private and state companies and institutions. This step is

by the Decree of the Minister of Finance Number 513/KMK.05/2009 and Regulation of the Minister of Energy and Mineral Resources Number 24 of 2014. Regulations related to BLU are regulated in Government Regulation Number 23 of 2005, strengthened by Government Regulation Number 74 of 2012, and implemented by LEMIGAS to date, better known as BLU LEMIGAS jargon.

Influence of Oil and Gas Technology

To increase oil and gas production nationally, drilling activities in exploration to find new reserves and drilling development or production wells showed an increasing trend in 2005-2009. However, since the global recession in 2008-2009, the global natural gas market has experienced a decline in demand almost all over the world. This is the first such incident since the 1960s. Declining demand and discovery of new, unconventional natural gas sources in American regions are causing imbalances in the world natural gas market. Natural gas prices in the spot market have declined, while selling prices according to long-term contracts (commonly used in Europe and Asia) tend to follow world oil prices, currently in the range of $ 80 - $ 90 per barrel. As a result, there is a high price gap between the spot market and long-term contracts.

Oil production continues to decline, and gas production also declines. This has caused oil to cease to be a significant financial contributor to the country. The dangerous decline in gas production due to the experience of declining oil production can cause difficulties for Pertamina (and the government) in fulfilling LNG delivery contract commitments in the future. As a result, Indonesia cannot hope to leapfrog to industrialized country status through its oil and gas business.

Although Indonesia's oil production tends to decline, data on the realization of drilling exploration and production wells nationally shows a different trend. The number of exploration wells prepared and reserve discoveries led to stable[7] numbers, while the number of production wells drilled increased significantly using subsea processing technology.

The development of offshore technology with equipment placement on the seabed has been carried out for a long time, such as the subsea wellhead well and X-master. Still, subsea processing was only considered a revolution in offshore development worldwide in 2007. With the installation of subsea processing, space in offshore production facilities can be saved, and the separation of oil, gas, water, and sand can be carried out on the seabed. By separating the phases of the production fluid on the seabed, healthy production efficiency can be improved.

[11]Rukmono Hariwibowo and Martini Huseini, "Praktik Manajemen Publik Di Pusat Penelitian Dan Pengembangan Teknologi Minyak Dan Gas Bumi 'Lemigas' Dalam Perspektif Kewirausahaan Organisasi," *JPSI (Journal of Public Sector Innovations)* 4, no. 2 (2020): 63, https://doi.org/10.26740/jpsi.v4n2.p63-67;

[13]Muslim Abdurrahman and A.K. Permadi, "Jurnal Teknologi Minyak Dan Gas Bumi," *Teknologi Minyak Dan Gas Bumi* 12, no. 3 (2016);

[14]M. Ridwan Ansyori, "Subsea Processing Sebagai Solusi Baru Pada Teknologi Migas Lepas Pantai," *Forum Teknologi* 3, no. 1 (2007): 1–5;

[15]Tjandra Setiadi, "Teknologi Untuk Pembangunan Berkelanjutan Bab Dalam Buku MDGs Sebentar Lagi [Type the Document Subtitle] [Pick the Date]," *Researchgate*, no. February (2017).

By splitting water and solids, the energy required by the well to lift the fluid becomes smaller, so the life of the well (which is related to the ability to raise the liquid to the surface) will be longer. In addition, the water disposal/injection process becomes more efficient because it does not need to be lifted to the surface.

Changing the use of primary energy sources in industrial production systems

Industry and human activities still rely on fossil fuels, such as petroleum, gas, and coal, as primary energy sources. This direct energy refers to the leading point directly used in an activity. For example, gasoline or diesel is fuel for motor vehicles, coal, gas, or oil to produce hot steam (steam) used to drive machinery, heat equipment in factories, or generate electricity from a factory.

However, in the coming decade, we will witness a significant shift in the use of primary energy sources in industrialized countries, namely the shift to using electricity as direct energy. Some developed countries are further pushing for using electric-powered vehicles, although today, they are often criticized as "vehicles with emissions elsewhere" rather than "vehicles with zero emissions." The point is that emissions still occur to generate that electricity, although not directly from the vehicle, but at the power plant's place. Likewise, production processes in industry are also moving towards using electricity as a primary energy source.

These changes are driven by a desire to reduce the negative environmental impacts of burning fossil fuels, such as greenhouse gas emissions contributing to climate change. Electricity as primary energy has the potential to be a cleaner and more sustainable option because it can be generated from renewable energy sources, such as solar, wind, and hydroenergy. Using electricity in vehicles and industrial production processes also provides other benefits, such as reducing air pollution in cities and reducing dependence on fossil fuel imports.

Although the transition to electricity as primary energy is promising, challenges remain. Investment in charging infrastructure and a strong power grid is needed to support the widespread use of electric vehicles. In addition, it is also necessary to increase the production of electrical energy sourced from renewable energy sources to meet growing needs.
In conclusion, significant changes in the use of primary energy sources occur in the coming decade, with a shift to electricity as the primary source. While challenges remain, this shift is essential to cleaner, sustainable, and greener energy systems.

4. Conclusion

Government contracts have different characteristics than contracts usually made between private law subjects because they have a public element. Although basically government contracts are included in the category of personal law acts, Cooperation Contracts, as explained in Article 1 number 19 of the Oil and Gas Law, are forms of production sharing contracts or other cooperation in exploration and exploitation activities that benefit the state and are used for the benefit of the prosperity of the people.

Mines are generally located in the earth's bowels. Article 136 also explains that settling land rights with rights holders following applicable laws and regulations is mandatory in mining

activities. According to Article 138 of the Mining Law, the right to IUP, IPR, or IUPK is not a form of ownership of land rights.

The dominant fossil energy resources used today are petroleum and coal. However, fluctuations in world oil prices have caused recessions in developed countries, especially for countries that import oil. One of the challenges in exploration activities is conveying information and involving communities living around the concession area so that they accept the movement without rejection. In early exploration efforts, such as mapping and drilling, an intensive approach to the community must be taken to maintain activities. Therefore, the potential of offshore drilling business in Indonesia is expected to increase, considering that Indonesia has significant oil and gas resource potential in its water areas, so the application of Subsea Processing technology is an offshore production solution, both for marginal fields such as off the coast of East Kalimantan and the Java Sea, or for future areas such as in the Sulawesi Sea, Makassar Strait, Aru Sea, and Fore Arc Basin.

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