

Review

Comparison of Hydrocarbon Fiscal Regimes of Some European Oil and Gas Producers and Perspectives for Improvement in the Republic of Croatia

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Abstract: Hydrocarbon exploration and production activities are basic to the functioning of the oil and gas industry, while concession contracts and fees are central concepts in the aforementioned activities. The authors consider several questions regarding these concepts, such as: what is the legislative, institutional, and fiscal framework in certain European countries regarding hydrocarbon exploration and production? What are the major differences between them? Finally, is there room for improvement of the framework in the Republic of Croatia? To answer these questions, the authors contacted some of the relevant institutions and accessed official government gazettes, institution websites, legal aggregators, journal articles, books, and different legal publications regarding the oil and gas industry for several European countries, namely the Kingdom of Norway, the Russian Federation, the Republic of Austria, and the Republic of Croatia. As a result, this paper presents an overview of legislation, institutions, concession contracts, taxes, and fees for each of the aforementioned countries. The authors conclude that the Republic of Croatia could benefit from applying some foreign solutions in its own legislative and fiscal framework, i.e., using a sliding scale for royalty calculation and simplifying some administrative procedures.

Keywords: legal framework; concession workflow; energy fiscal regimes; hydrocarbons



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1. Introduction

Hydrocarbon exploration and production activities are basic to the functioning of the oil and gas (O&G) industry, which makes these activities important for all industries which depend on the O&G industry for energy and raw materials. Concession contracts and fees are central concepts in the aforementioned activities, while the industry conducts operations all across the globe. Regulations and procedures for exploration and production are different from country to country in many ways. However, these regulations are based on some common principles, which makes it somewhat easier to compare different systems.

This article gives a comprehensive and representative review of institutional and legislative frameworks, as well as fiscal terms, for exploration and production of hydrocarbons in the Republic of Croatia, then the Russian Federation, the Kingdom of Norway, and the Republic of Austria, respectively. Therefore, the article serves to present the most accurate high-level information, currently, on hydrocarbon fiscal regimes of selected countries. Norway and Russia have been chosen because of their status as the largest European producers of oil and gas. Croatia has been chosen since it is the home country of the researchers. Austria has been chosen because of certain similarities to Croatia: it is a Central European country, a member of the European Union, it produces hydrocarbons from the Pannonian basin, and it produces a similar amount of oil and lease condensate as Croatia does.

Additionally, a lot of effort has been put into providing references and names of institutions, laws, subordinate legislation, taxes, fees, and other concepts, in their original language, alphabet, and place of publication, not only their English translation. All this

should make any future research of the topic faster and easier by drastically reducing the time required for finding, compiling, and verifying collected information, especially taking into account fragmentation of the data, which the authors encountered during research.

The authors then compare and discuss differences between hydrocarbon fiscal regimes of Croatia and other described countries. The authors have found that the Republic of Croatia has a very conventional European legislative framework and fiscal terms, while there are some peculiarities regarding the Austrian framework in comparison with Croatia and other countries. The Norwegian framework is very advanced and transparent, while its fees and taxes are among the highest in Europe. The Russian legislative framework and fiscal terms are, by far, the most complicated of those analysed, owing mostly to its size and abundance and diversity of resources.

Finally, the authors make recommendations for improvement of the hydrocarbon fiscal regime in Croatia, which could potentially contribute to economic development and growth of the industry in the country.

Concession is a right granted by a contract (Concessions Act, Official Gazette (hereinafter: OG) 69/17, 107/20) [1]. Therefore, the right to exploration and production of hydrocarbons, obtained by signing and entry into force of an agreement with the Republic of Croatia, is called a concession for exploration and production of hydrocarbons. In the Republic of Croatia, the procedure for obtaining a concession for exploration and production of oil and gas is governed by the Act on the Exploration and Production of Hydrocarbons (OG 52/18, 52/19, 30/21) (AEPH), while fees are governed by the Regulation on fees for exploration and production of hydrocarbons (OG 25/20). This paper will not include matters not directly addressed by the Act on the Exploration and Production of Hydrocarbons, such as environmental protection, spatial planning, legal relations regarding marine and subsea areas, safety of seafaring, etc. The same applies to other countries.

2. Materials and Methods

The authors accessed legislation and subordinate legislation both from official government gazettes and from official English translations, where available. Used official gazettes were *Narodne novine* for the Republic of Croatia, *Российская газета* and *Собрание законодательства Российской Федерации* for the Russian Federation, *Lovdata* for the Kingdom of Norway, and *Rechtinformationssystem des Bundes* for the Republic of Austria. Furthermore, commercial Russian legislation aggregators Garant (Гарант) and Consultant Plus (КонсультантПлюс) were used owing to the fragmentation of official publishing of legislation in the Russian Federation. In the case of Norway, the website norskpetroleum.no, jointly developed by the Ministry of Petroleum and Energy and the Norwegian Petroleum Directorate, was especially useful for identifying key policies and competent authorities. For Croatia, the website of the Croatian Hydrocarbon Agency (CHA) provided some useful starting points for identifying key legislation and actors. The legislation aggregator Zakon.hr was also useful for Croatia, since the official gazette does not publish aggregated versions of legislation. Otherwise, journal articles, books, legal overviews, course presentations, and websites of competent authorities were used for all countries. Competent authorities and members of academia in different countries were also contacted if some clarifications, or confirmations, were necessary. All sources are properly cited in the article and the references section.

3. Results

3.1. Legal Basis in Croatia

The legal basis for issuing a concession for exploration and production of hydrocarbons by the Republic of Croatia is a logical structure whose foundation lies in the Constitution of the Republic of Croatia.

Article 52 of the Constitution of the Republic of Croatia (OG 56/90, 135/97, 08/98, 113/00, 124/00, 28/01, 41/01, 55/01, 76/10, 85/10, 05/14) regulates that “The sea, seashore, islands, waters, air space, mineral resources, and other natural resources, as well as (. . .

)” are goods of interest to the Republic of Croatia and shall enjoy special protection of the Republic of Croatia. Paragraph 2 of the article stipulates that “the manner in which any resources of interest to the Republic of Croatia may be used and exploited (. . .) shall be regulated by law” [2]. Therefore, the power over hydrocarbon exploration and production is formally vested in the Republic of Croatia by Article 52 of the Constitution.

Furthermore, the Act on the Exploration and Production of Hydrocarbons continues the logical structure and further solidifies the point. In accordance with the Constitution of the Republic of Croatia, Article 1 paragraph 1 of the AEPH commands that “This Act shall regulate the exploration and production of hydrocarbons (. . .)”, and Article 4 paragraph 1 of AEPH commands that hydrocarbons “represent goods of interest for the Republic of Croatia, have its particular protection and shall be produced under the conditions and in the manner stipulated by this Act” [3].

There is also a Concessions Act (OG 69/17, 107/20), which is a general legal basis for matters when issuing a concession in Croatia. However, the AEPH is the act which is primarily applied for matters of issuing a concession for exploration and production of hydrocarbons in Croatia. The Concessions Act is a general law (Lat. *lex generalis*), while AEPH is a law governing a specific subject matter (Lat. *lex specialis*), so AEPH ‘overrides’ the Concessions Act.

3.2. Act on the Exploration and Production of Hydrocarbons (OG 52/18, 52/19, 30/21) (AEPH)

This section presents an overview of the procedure for issuing a concession and carrying out petroleum operations with basis in the Act on the Exploration and Production of Hydrocarbons.

The AEPH regulates the procedure for issuing a concession for exploration and production, obligations during exploration and production and performing of ‘petroleum operations’, conduction of inspections, obligations for keeping of registers (e.g., register of concessions, exploration block register, exploitation field register etc.), sets up fees for exploration and production, names competencies of the Croatian Hydrocarbon Agency, the competent ministry, and the Government of the Republic of Croatia, etc. [3] Fees for exploration and production are only named in the Act, whereas the amount and allocation of fees is governed by the regulation on fees for exploration and production of hydrocarbons (OG 25/20) [4], described later in this paper.

The Act also sets up the framework for the management of hydrocarbons on a national level. In particular, the act commands that the Energy Strategy of the Republic of Croatia is the primary planning act which organises the management of hydrocarbons and the planning of petroleum economic activity on a national level. Hydrocarbon management shall, then, be performed according to the “Framework Plan and Programme for Onshore Exploration and Production of Hydrocarbons” and the “Framework Plan and Programme for Exploration and Production of Hydrocarbons in the Adriatic” [5,6]. For specific matters, e.g., environmental protection, spatial planning, etc., which are not covered by this law, provisions of other regulations governing these matters shall be applied.

By definition, a concession is a right granted by a contract (Concessions Act, OG 69/17, 107/20) [1], also referred to as an “agreement”. Therefore, only by signing and the AEPH coming into effect between an investor and the Republic of Croatia, is a concession granted in the Republic of Croatia for exploration and production of hydrocarbons. Even so, that does not by itself allow the investor to conduct all petroleum operations. For example, the investor must obtain the “Licence for Exploration and Production of Hydrocarbons” prior to signing of the agreement and should obtain the “Production Licence for Hydrocarbons” prior to starting production, which is all explained further in the paper. Furthermore, these are obviously obtained separately, but the AEPH provides that “the Production Licence for Hydrocarbons forms an inseparable integral part of the Licence for the Exploration and Production of Hydrocarbons and the Agreement on the Exploration and Production of Hydrocarbons” (Articles 28 and 48 of the AEPH) [3].

Therefore, there are particular steps that must be taken in order to obtain a concession and to conduct exploration and production activities in Croatia. The schematic of the process in the Republic of Croatia is shown in Figure 1.

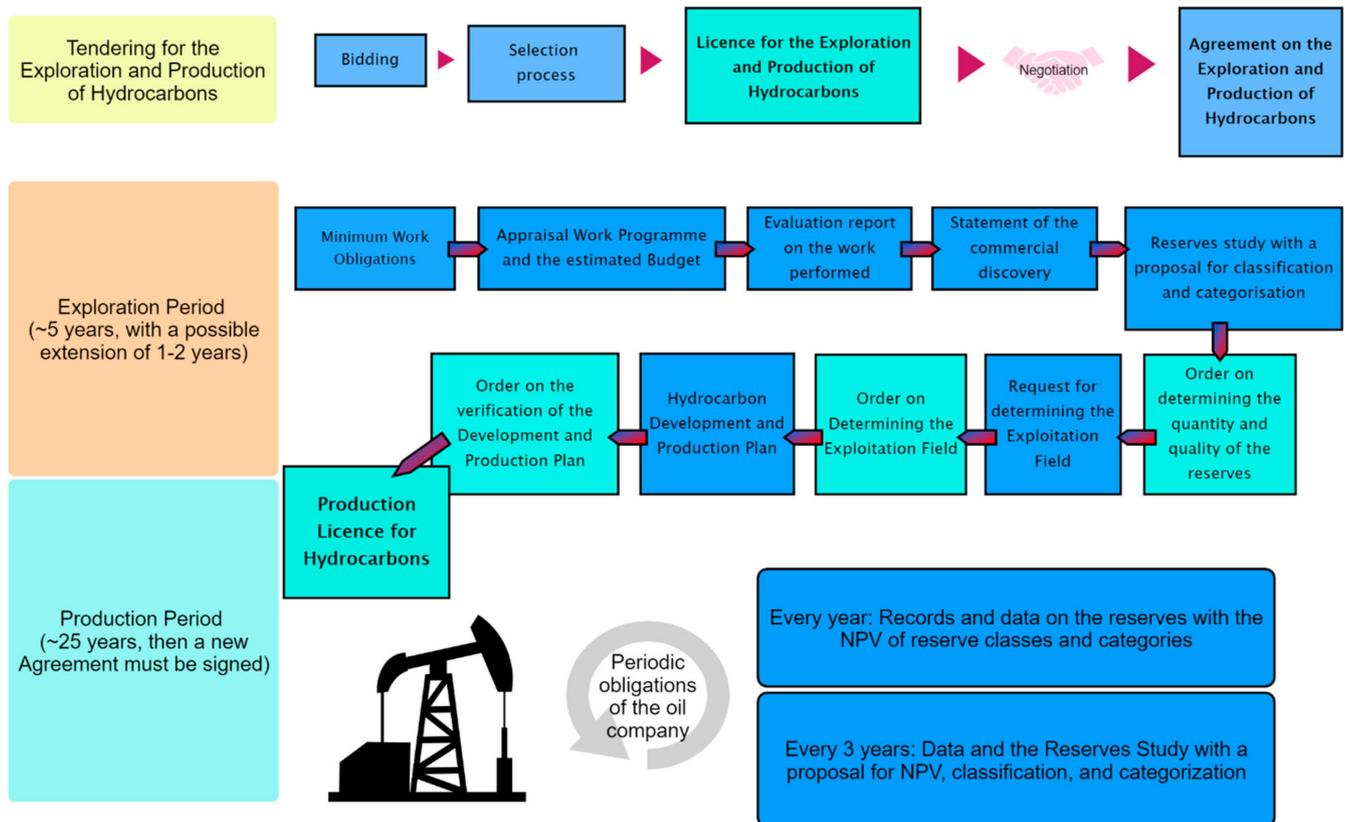


Figure 1. Process of obtaining a concession for exploration and production of hydrocarbons in the Republic of Croatia.

The Croatian Hydrocarbon Agency (CHA, Cro. *AZU*) conducts the tendering procedure for the exploration and production of hydrocarbons, where certain exploration blocks are offered for bidding. A licence for the exploration and production of hydrocarbons is issued to chosen investors. However, no exploration or production works can begin yet. The investor then has to enter negotiations to conclude the ‘Agreement on the Exploration and Production of Hydrocarbons’ between the investor and the Republic of Croatia. If the agreement is signed, the investor has successfully obtained a concession for exploration and production of hydrocarbons in the Republic of Croatia. By entry into force of the agreement, the exploration period begins. The licence for exploration and production is issued for a period of 30 years. The duration of the agreement is tied to the validity period of the licence, but it cannot not exceed 30 years. This can be extended upon mutual agreement of both parties, at the request of the investor.

The exploration period has a duration of 5 years and is divided into two phases with durations of 3 and 2 years, respectively. Exploration operations, during which the investor shall perform the required minimum work obligations, can be initiated only after approval of the Work programme and budget. If the investor believes that a hydrocarbon discovery deserves an appraisal, the investor must devise an “Appraisal Work Programme” with the corresponding budget, which serves to conclude if the hydrocarbon discovery is indeed a commercial discovery, and also to ascertain the boundaries of the reservoir.

After appraisal works, the investor has to submit to the agency the “evaluation report on the work performed relating to the Work Programme”, together with a written statement indicating a determination of a commercial discovery, or a lack thereof.

If the discovery is commercial, the investor must then submit an “Exploitation Field Reserves Study”, containing a proposal for classification and categorisation of reserves. Based on the evaluation of the reserves study, the competent ministry issues an “Order on determining the quantity and quality of the reserves”. Reserves must be classified and categorised in accordance with the ordinance on reserves.

Upon receipt of the “Order on determining the quantity and quality of the reserves”, the investor should hand in to the competent ministry a “Request for issuing an order on determining the exploitation field” and should attach to the request: a map of the proposed exploitation field which shows the scope of the confirmed reserves, a certificate of compliance of the requested exploitation field with the spatial plan received from the central state administrative authority in charge of spatial and physical planning, and a legal act pursuant to provisions on environmental protection from Article 132 paragraph 1 of this Act.

Within 1 year from coming into force of the “Order on determining the (Hydrocarbon) Exploitation Field”, the investor shall present the “Hydrocarbon Development and Production Plan” to the competent ministry for approval. After the competent ministry issues the “Order on the verification of the Development and Production Plan”, the Government should finally issue the “Production Licence for Hydrocarbons” to the investor.

The production licence enables the investor to finally begin petroleum operations regarding the production of hydrocarbons. Basic provisions for the performance of petroleum operations are given in Part Two, Title VI of the Act, and are further regulated by subordinate legislation. The investor, furthermore, has the obligation to submit to the competent ministry every three years the reserves study, which includes: a suggestion for classification and categorisation of reserves, the net present value of designated classes and categories of reserves, and a declaration of used economic indicators. The investor also has to submit the data on the reserves per exploitation field every year. The data on the reserves should include a technical and economic appraisal, together with the NPV of reserve classes and categories, as well as a declaration of used economic indicators.

After finishing all of the petroleum operations, the investor is obliged to decommission the exploration block, or the exploitation field, in compliance with the Act and other special regulations at his own expense.

3.3. Regulation on Fees for Exploration and Production of Hydrocarbons (OG 25/20)

The regulation on fees for exploration and production of hydrocarbons (OG 25/20) establishes fee amounts, ratios of distribution of fee revenues, and methods of determination of fees for exploration and production of hydrocarbons in the Republic of Croatia. This regulation is sometimes unofficially referred to as a decree in English.

The fee consists of the: (1) “Total pecuniary fee”; and the (2) “Distribution of the hydrocarbons produced” (consequence of the production sharing agreement).

The total pecuniary fee (also referred to as the “Total Fee for the Exploration and Production of Hydrocarbons”) has five components: (1) the “pecuniary fee for the exploration block” (surface fee/tax), 400.00 HRK/km² per year; (2) the “pecuniary fee for the determined exploitation field area”, 4000.00 HRK/km² per year; (3) the “pecuniary fee for the conclusion of the Agreement on the Exploration and Production of Hydrocarbons” (the bonus), a minimum of 1,400,000.00 HRK; (4) the “pecuniary fee for the produced hydrocarbon quantities” (the “royalty”), 10% of the value of produced hydrocarbons; (5) an “additional pecuniary fee for the realised hydrocarbon production” (a cumulative production bonus), 1,400,000.00 HRK for crude oil, 900,000.00 HRK for natural gas, paid at the beginning of production and later after certain produced amounts (in boe); and (6) a “pecuniary fee for administrative costs” (the administration fee), 600,000.00 HRK yearly, from the entry of the Agreement into effect, increased annually at a rate of 4%.

Revenue from the royalty (the pecuniary fee for the produced hydrocarbon quantities) of 10% is distributed as follows: 40% to the unit of local self-government on whose territory hydrocarbons are being produced, 20% to the unit of regional self-government on whose

territory hydrocarbons are being produced, 40% to the state budget of the Republic of Croatia. Such a distribution represents an increase in the relative amount belonging to the unit of local self-government in comparison with the previous regulation (OG 37/14, 72/14), while it is a reduction in the relative amount belonging to the state budget.

The second part of the fee, "Distribution of the hydrocarbons produced", is expressed as a percentage of produced hydrocarbons which belongs to the investor. More precisely, the basis for the distribution calculation is "profit oil" or "profit gas", meaning: the produced volume less the quantity required for royalty payment and less the quantity required for cost recovery of the investor ("cost oil", "cost gas"). The percentage is calculated using the R-factor (R) method for each quarter. The R-factor is calculated as shown in Equation (1):

$$R = X/Y, \quad (1)$$

where:

- X is the cumulative net revenue actually received by the investor in the previous quarter regarding the Agreement area;
- Y is the cumulative capital expense actually incurred by the investor in the previous quarter regarding the Agreement area.

Based on the R-factor value, the percentage of hydrocarbons (actually, of profit oil/gas) that the investor is entitled to, since the first day of production, equals: 90% for R-Factor $0 < R \leq 1.0$; 80% for R-Factor $1.0 < R \leq 1.5$; 70% for R-Factor $1.5 < R \leq 2.0$; 60% for R-Factor $R > 2.0$.

Generally, the royalty (10%) is charged first, then the investor receives a recovery of approved costs (called cost oil/gas), after which the investor takes a share of the remaining hydrocarbons he is entitled to. In the end, a corporation tax is applied.

Hydrocarbons recovered during test production may be sold only if relevant fees for produced quantities have been paid. As such, these hydrocarbons can be included into the R-factor calculation for the relevant quarter.

3.4. Petroleum Fiscal Systems and Types of Contracts

There are three types of contract for exploration and production of hydrocarbons in the oil and gas industry: tax and royalty agreements/contracts (T&R), production sharing agreements/contracts (PSA/PSC), and service contracts. Service contracts are the rarest of all three. PSAs and service contracts are usually grouped together as "contractual" regimes/systems, while tax and royalty agreements are the sole member of the "concessionary" systems/regimes group. Contractual regimes and concessionary regimes are together referred to as petroleum fiscal regimes/systems [7,8].

The concessionary system is based on the payment of a royalty and a corporation tax. The royalty is calculated as a percentage of the value of produced, or sold, hydrocarbons in a certain period by the investor. The royalty can also be paid directly in produced hydrocarbons. After paying the royalty, the investor receives a recovery of approved costs. The pre-tax profit (EBT, earnings before taxes) that remains subject to the corporation tax of a country. The royalty and the corporation tax can be determined as a constantly fixed percentage or by a sliding scale method. With the sliding scale method, the percentage usually depends on a certain variable, like the amount of daily production, the market price of petroleum, R-factor, or some other criterion. In the case of very high expenditures, and especially if this would make the field unprofitable for the investor, the royalty can even be 0% (non-existent). With T&R agreements, the investor becomes the owner of hydrocarbons as soon as they are brought to surface ("at the wellhead"), while with PSAs the investor becomes the owner of only a part of produced hydrocarbons, often at a different place to the place of production [8].

Production sharing agreements are based on the splitting of produced quantities of hydrocarbons between the state and the investor. The investor can also be obliged to pay a royalty, but, if there is such an obligation, it is usually lower than in tax and

royalty agreements (concessionary systems). After paying the royalty, the investor receives a recovery of approved costs for a specified period, usually in the form of produced hydrocarbons (“cost oil”). Remaining hydrocarbons are, then, physically split between the state and the investor in a ratio determined according to the agreement. In the end, what remains, and belongs to the investor, is considered a pretax profit (EBT), on which a corporation tax is paid [9,10].

Service contracts are used in a small number of countries. Coincidentally, these are also hydrocarbon-rich countries, such as Saudi Arabia, Kuwait, Iran, etc. Service contracts are based on a direct invitation of the investor, by the country’s government, to conduct exploration and/or production operations on its territory. Generally, with service contracts, all produced hydrocarbons belong to the country, while the contractor is paid money for his services [7,11,12].

Other than fees and taxes already cited in previous sections, there are some other clauses, fees, and taxes in all types of contract which also have a realistic impact on the investor’s desire to conduct business in a certain country, e.g., customs duties for importing equipment and exporting hydrocarbons, government and national oil company participation in the investment, arbitration rules, obligations towards the local community, expenditure control, ringfencing, field abandonment and decommissioning rules, work programme approval, amount of the bonus for contract signing, etc. [7].

Agreements in the Republic of Croatia

In the Republic of Croatia, only production sharing agreements (PSA, PSC) are currently used for newly signed concession contracts. However, two types of contract are actually used. There are tax and royalty agreements still in effect from the period prior to the latest Act on the Exploration and Production of Hydrocarbons (OG 52/18, 52/19, 30/21), which mandates PSAs are the only type of new contracts signed in Croatia. Additionally, existing T&R Agreements can be prolonged under the same legal conditions under which they were originally signed.

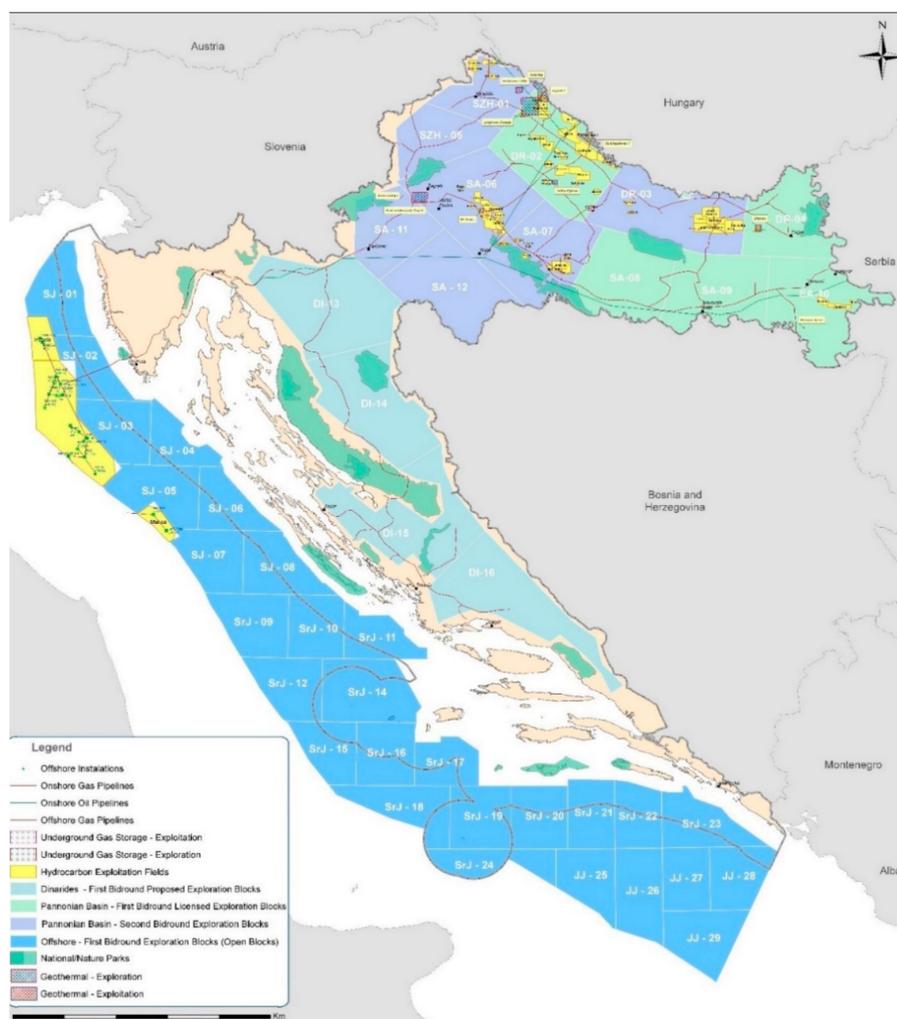
Under production sharing agreements in the Republic of Croatia, a royalty amounting to 10% of the value of produced hydrocarbons is first paid. The investor, then, has the right to recovery of approved costs according to terms of the agreement, but with a yearly cost recovery ceiling of 50% of produced hydrocarbons (remaining after 10% royalty payment) for offshore production and 70% of produced hydrocarbons (remaining after 10% royalty payment) for mainland (onshore) production, as defined by the Regulation on fees for exploration and production of hydrocarbons (OG 25/20). The particular percentage of cost recovery ceiling in the agreement is subject to negotiation prior to signing, but these are legally prescribed maxima. Any recoverable costs exceeding the value of “cost petroleum” (also “cost oil”, “cost gas”) can be carried forward into the next calendar year without interest. Furthermore, the investor is entitled to recover 100% of approved costs incurred in the “original agreement area” during the exploration phase, if there is a subsequent commercial discovery. The list of costs eligible for cost recovery (in the PSA regime) is given in Annex II of the Act (OG 52/18, 52/19, 30/21). After cost recovery, remaining quantities of hydrocarbons (“profit petroleum/gas/oil”) are split between the investor and the Republic of Croatia in a ratio calculated according to a sliding scale, the R-factor. In the end, the investor pays the corporation tax with the same conditions as other companies in Croatia [13].

Other than aforementioned fees and taxes, some other general fees and taxes are paid too, specifically mentioned in the section about the regulation on fees for exploration and production of hydrocarbons (OG 25/20). Furthermore, the royalty payment, and certain other taxes, are eligible to be counted towards a tax relief for the payment of the corporation tax. An overview of fiscal terms for Croatia is given in Table 1.

Table 1. Fiscal terms of exploration and production of hydrocarbons in the Republic of Croatia.

Fiscal Term Category	Provision
Royalty	10% of the Value of Produced Hydrocarbons
Cost recovery	Available for eligible costs. Subject to negotiations with a maximum of 50%, or 70%, of value of hydrocarbons remaining after royalty payment, for offshore and onshore production, respectively
Production sharing ratio	R-factor (sliding scale)
Corporation tax	10% for companies with revenue below 7.5 million HRK; 18% for companies with revenue above, or equal to, 7.5 million HRK [14]
Other taxes and fees	Contract signing bonus, Surface fees, Production bonus, Administration fee

Current producers of oil and gas in the Republic of Croatia are: INA, INA Jadran (formerly INAgip; only offshore natural gas), and Edina (only offshore natural gas) [6,15,16]. Vermillion Energy, a Canadian IOC, is scheduled to start producing natural gas in mainland Croatia in the next few years, based on its recent discoveries in the Croatian section of the Pannonian basin. Therefore, Vermillion is set to become the only other natural gas producer in mainland Croatia besides INA, currently. Croatia also has two benchmark crude oils: *Slavonija* and *Moslavina* [6,17]. A map of exploration and production blocks can be seen in Figure 2.

**Figure 2.** Map of exploration and production blocks in the Republic of Croatia (Provided by CHA, 2019).

3.5. Legislation and Procedures in other European Countries

In this section, cases of Russia, Norway, and Austria are going to be presented. The overview covers main laws and regulations, procedures for obtaining a concession, competent authorities, types of contracts, general fees and taxes, etc.

3.5.1. The Russian Federation

The Russian Federation is among the world's top producers of oil and gas. However, its petroleum fiscal regime is possibly the most complicated out of all those outlined in this paper, as is shown in the following sections.

Main Laws, Competent Authorities, and Contracts

Two types of hydrocarbon exploration and production contract are used in the Russian Federation: the tax and royalty agreement and the production sharing agreement (PSA; PSC). However, the tax and royalty agreement is by far the most used in the Russian Federation [18].

The main law which regulates exploration and production of hydrocarbons is the Law of the Russian Federation on Subsoil (shortened as the Federal Law on Subsoil; Rus. *Закон Российской Федерации «О недрах»*), passed on 21 February 1992 [19].

The regime of production sharing agreements (PSA) is also more closely regulated by the Law of the Russian Federation on Production Sharing Agreements (shortened as the (Federal) Law on Production Sharing Agreements; Rus. *федеральный закон Российской Федерации «О соглашениях о разделе продукции»*), passed on 30 December 1995 [20], with numerous amendments added in the following years. However, all existing PSAs in the Russian Federation had been signed before the Federal Law on Production Sharing Agreements came into effect. Poor investment conditions, stipulated by that particular law, have been found to be the reason for the lack of interest from investors [21,22].

In the Russian Federation, hydrocarbons are legally treated as minerals. The Federal Law on Subsoil, with a basis in the Constitution of the Russian Federation, commands that subsoil, and minerals contained in the subsoil, are state-owned property. Landowners have no personal rights to subsoil mineral ownership. The Russian Federation and constituent states have a joint competence over questions of ownership and usage of subsoil and subsoil resources. Ownership can be transferred only when minerals have been extracted from the ground.

Issuing the right to explore and exploit hydrocarbons is the competence of the Ministry of Natural Resources and Environment of the Russian Federation (Rus. *Министерство природных ресурсов и экологии Российской Федерации*, abbreviation *MNR*). The Federal Subsoil Resources Management Agency (Rus. *федеральное агентство по недропользованию*, shortened as *Роснедра* or *Rosnedra*), which works under the jurisdiction of the ministry, is responsible for providing state services, and management of state property, in the field of subsoil use. Therefore, Rosnedra is an administrative agency, whose main task is to regulate subsoil usage, which includes exploration and production of crude oil and natural gas. The agency has the competence to issue licences for subsoil usage, to check compliance with terms of the licence, but also to suspend and revoke licences.

Types of Licences and Awarding Procedures

In addition to two types of contract, there are also five types of licence: exploration licences, production licences, combined licences, and two new types of licences only for unconventional resources. New licences for unconventional resources have been added by late 2019 amendments of the Federal Law on Subsoil [18,23,24]. Subsoil licences are awarded by tenders or auctions, but Russian law also determines when licences can be issued without a tender or auction process. In the tender process, the licence is issued to the investor with the technically best overall bid. In the auction process, the licence is issued to the investor which submits the highest offer for the one-time payment for awarding of the licence (the "signature bonus").

Exploration licences are awarded without a tender, or auction, process directly by a decision of a commission formed by Rosnedra. With an Exploration licence, the holder can only conduct exploration activities, while no production activities can take place. If there is a commercial hydrocarbon discovery, a production licence can be issued directly to the licence holder, without a tender or auction process. However, if the hydrocarbon field is classified as a subsoil area of federal significance, and the percentage of foreign ownership in the investing company is above a threshold established in the Strategic Investments Law, the exploration licence holder can be denied a production licence [18].

Production licences are issued by an auction, or a tender, for already explored areas with proven reserves. Combined licences are issued by an auction, or a tender, for areas which also have proven reserves, but additional exploration is needed first. Obviously, both exploration and production terms are included in the combined licence [18].

Licences for subsoil located on the continental shelf are issued directly, by a government decision, to investors that meet special criteria permitting offshore subsoil use. Licences intended to be used under a production sharing agreement are also awarded without a tender or auction [18].

One of the two new licences for unconventional resources is for areas already covered by a licence, but also containing unconventional resources. The owner of the licence can separate the area with unconventional resources from the original licence and obtain a special new licence exclusively for the unconventional resources. This can be called a combined licence for the development of technologies for geological study, exploration, and production of hard-to-recover minerals and for the exploration and production of such minerals. It is awarded directly to the licence holder by a Rosnedra commission. The other licence is for unconventional resources not already in an area covered by someone's licence. In this case, a new licence for unconventional resources is issued through a tendering process. This can be called a licence for the development of technologies for geological study, exploration, and production of hard-to-recover minerals and for the exploration and production of such minerals [18,23–25]. Unconventional resources, for the purpose of these new licences, are hard to recover (Rus. Трудноизвлекаемые) resources either from specific deposits (Bazhenov, Abalak, Khadum, and Domanik) or from reservoirs containing super-viscous crude oil with viscosity of 10,000 mPa·s (centipoise) or more, as defined by the Order of the Government of the Russian Federation of 19 September 2020, No. 1499 (Rus. Постановление Правительства РФ от 19 сентября 2020 г. N 1499) [26].

Fees and Taxes

Generally, hydrocarbon taxes and fees in Russia include: a fee for participation in tenders or auctions, area fees for geological studies and for exploration, one-time payments upon the occurrence of certain events and milestones, a one-time bonus for award of the licence, the tax for production of hydrocarbons called the Mineral extraction tax (abbreviation MET, Rus. Налог на добычу полезных ископаемых, abbreviation НДПИ), the corporation tax (20%), customs duties for exporting produced oil and gas, VAT, and other smaller fees and taxes [18].

The mineral extraction tax (MET) is paid per amount (mass or volume) of produced hydrocarbons, not by the amount of sold hydrocarbons. It is determined using very lengthy formulae which modify base rates set for crude oil, natural gas, and gas condensate. Since 2017, the base rate for crude oil has been 919 RUB per tonne. Since 2014, the base rate for natural gas has been 35 RUB per 1000 m³. Since 2019, the base rate for natural gas condensate has been 42 RUB per tonne. Modifications of these base rates reflect movements in world oil prices, level of depletion of reserves of a particular field, reservoir permeability, oil viscosity, whether the company is Gazprom-affiliated or not, transportation distance and costs, domestic price of the product, etc. The MET is considered towards a tax relief for the corporation tax [27,28].

There is also a customs duty for exporting produced hydrocarbons, and refined oil products, outside of the Eurasian Economic Union (abbreviation EAEU) area, which

encompasses territories of the Russian Federation, Belarus, Kazakhstan, Armenia, and Kyrgyzstan. The export duty for crude oil is calculated by the Russian Government on a monthly basis using legally prescribed formulae and is given in USD per tonne. The exact formula used depends on the average price of Urals blend crude oil on Mediterranean and Rotterdam markets for the previous month (sliding scale principle). The export tax for refined petroleum products, also given in USD per tonne, is set as a percentage of the export tax for crude oil. For example, diesel fuel and gasoline export duties are both 30% of the crude oil export tax, in USD per tonne. However, if the average Urals price is lower than 109.50 USD per tonne (~15 USD/barrel), there is no export tax for crude oil or oil products. Export duty for natural gas is 30% of its customs value, while there has not been an export duty (0%) for LNG since 2013 [13,29,30].

A phase-out of crude oil and petroleum products export duties is underway. From 2019–2024, gradual reduction coefficients will be applied to the price of export duties, until in 2024 the export tax is 0%. Of course, if special circumstances occur, export duties can be increased by government decision [13]. It should be noted that separate tax regimes and export duties are applied to many offshore and unconventional deposits [31], creating many exceptions to rules stated here.

To make up for the lack of tax revenues due to the phase-out of export duties, Russia is gradually increasing the MET [13]. However, there are also plans to rescind the MET in the future and replace it with the Additional Income Tax (abbreviation AIT; Rus. налог на дополнительный доход добычи углеводородного сырья, abbreviation НДС, NDD) [18,32–34] also referred to as Revenue Added Tax in literature (abbreviation RAT) [18,35–37], which would be based on the amount of hydrocarbons sold, rather than the amount produced (as is the case with MET) [18,27,28,38]. Trial runs of the AIT are already underway at some oilfields in Russia [13,18,39,40].

An overview of fiscal terms for Russia is given in Table 2.

Table 2. Fiscal terms of exploration and production of hydrocarbons in the Russian Federation (T&R contracts).

Fiscal Term Category	Provision
Royalty (Mineral Extraction Tax, MET)	919 RUB per Tonne of Crude Oil, Adjusted by Coefficients 35 RUB per 1000 m ³ of Natural Gas, Adjusted by Coefficients 42 RUB per Tonne of Gas Condensate, Adjusted by Coefficients
Corporation tax	20%
Export duties	Applicable, depends on the product
Other taxes and fees	Area fees, Fee for participation in tenders or auctions, One-time bonus for the award of the licence, VAT, etc.

3.5.2. The Kingdom of Norway

All production of oil and gas in Norway is located on the Norwegian continental shelf (abbreviation NCS). This means all hydrocarbon production mentioned in this section is offshore production.

Main Laws, Regulations, and Competent Authorities

The main law which regulates exploration and production of oil and gas is the Act relating to petroleum activities (shortened as the Petroleum act; Nor. *Lov om petroleumsvirksomhet*, shortened as *petroleumsloven*), passed on 29 November 1996 [41]. Furthermore, the “Regulations to Act relating to petroleum activities” (Nor. *Forskrift til lov om petroleumsvirksomhet*) [42] is an important regulation, since it prescribes in detail the tendering rules and procedures, production operations rules, CO₂ storage rules, the area fee, etc. The tax system for production of petroleum is governed by the Act of 13 June 1975 No. 35

relating to the Taxation of Subsea Petroleum Deposits, etc. (shortened as the Petroleum Taxation Act, Nor. *Lov om skattlegging av undersjøiske petroleumforekomster mv.*, shortened as *Petroleumsskatteloven*) [43].

The Ministry of Petroleum and Energy (Nor. *Olje og energidepartementet*) has competence over hydrocarbons within the Norwegian government. The Norwegian Petroleum Directorate (Nor. *Oljedirektoratet*) is an administrative agency of the Norwegian government which conducts the tendering procedure for the exploration and production of hydrocarbons, monitors petroleum operations of the investor, keeps and organizes a database of geological and geophysical data, etc.

Contracts, Taxes, and Fees

The owner of all hydrocarbons in the Norwegian subsoil is the Kingdom of Norway. The Kingdom of Norway uses only concession contracts (tax and royalty agreements) for exploration and production of hydrocarbons, officially called the Production licence (Nor. *Utvinningsstillatelse*). A public bidding procedure is the basis for awarding of the licence. Companies awarded a Production licence are then also obliged to enter an “Agreement concerning petroleum activities”, with or without state participation (State’s Direct Financial Interest, abbreviation SDFI). A group of companies usually applies for one Production licence, so the Agreement serves to better define mutual obligations and interests [44,45].

When awarded, the production licence usually lasts for 10 years, which is the duration of the exploration period. If there is a commercial discovery, and the investor wants to continue with petroleum operations, the production licence can be extended. The length of the extension period is decided by the Ministry of Petroleum and Energy, but most often it is 30 years and can be extended again if needed.

Interestingly, the usual “royalty” is not paid in Norwegian contracts [46]. After cost recovery, the investor pays the regular corporation tax and a “special tax” for oil companies (Nor. *Særskatt*), sometimes referred to as the “resource rent tax”. Nevertheless, overall taxes amount to a large percentage of the revenue. Corporation tax rate in Norway is 22%, while the resource rent tax rate is 56%. The corporation tax is paid first, after which the special tax for oil companies is applied. However, many expenditures can be considered towards a tax relief for the corporation tax and the special tax [13,46].

Tax calculation is based on the “norm price” (Nor. *normpris*) for crude oil. The Petroleum Price Board/Council (Nor. *Petroleumsprisrådet*) sets the norm price at quarterly meetings based on Regulations for determining the norm price (Nor. *Forskrift om fastsetting av normpriser*) [47] and publishes the norm price for the past quarter. The investor then pays taxes as if the crude oil were sold at the norm price, rather than the actual price achieved. Therefore, if the investor sells at a price lower than the norm price, crude oil is still taxed at the norm price. However, if the investor sells at a higher price than the norm price, the investor gets to keep the extra money. The norm price is not applicable to natural gas production, for which the actual selling price is used [13,46,48,49]. An example of tax base calculation for oil companies in Norway is given in Table 3.

Table 3. Tax base calculation example [46].

Calculation of the Tax Base for the Corporation Tax and for the Special Tax
Operating Income (Based on the Norm Price)
-Operating expenses
-Linear depreciation for investments (6 years)
-Exploration, R&D, Decommissioning expenses
-Environmental taxes and area fees
-Net financial costs
= Tax base for the corporation tax (22%)
-Uplift (5,2% of the investment per year during 4 years)
= Tax base for the special tax for oil companies (56%)

There are also certain exploration fees and a potential yearly surface/area fee. The area fee is payable only after the initial granting period of the production licence (10 years) has expired, and the investor has not conducted further activities in the area covered by the production licence. Area fees provide an incentive for companies to move from discoveries to development and production. When granting a production licence, a non-recurring fee (a cash bonus) may also be levied and there may be stipulated a fee which shall be calculated on the basis of production volume (a production bonus) [13,45,50,51].

Procedure for Awarding the Production Licence

Investors are given the right to explore and produce hydrocarbons through a public tendering procedure, called licensing rounds, by which a production licence is awarded. The production licence gives exclusive rights for exploration, exploration drilling, and production of hydrocarbons in a specific area. The decision to offer blocks in the tendering procedure for exploration and production of hydrocarbons is made by the Norwegian parliament (Storting). Beforehand, the Ministry of Petroleum and Energy must conduct several impact studies and a public consultation is held on the topic [44,50,52–54].

There are two types of licensing round for exploration and production of hydrocarbons in Norway, depending on field maturity and the extent of exploration: “numbered licensing rounds” (Nor. *nummererte konsesjonsrunder*) and “awards in predefined areas” (abbreviation APA, Nor. *tildeling i forhåndsdefinerte områder*, abbreviation TFO). The main procedural difference between the two is in phases before the tendering procedure is announced. After the announcement, procedures are very similar [44,50,52–54].

Numbered licensing rounds are used for areas not yet explored enough, which present a greater technical challenge. Before a numbered licensing round is announced, a block nomination process is carried out. Companies which already possess production licences in Norway, and other qualified companies, nominate blocks to be included in the tendering procedure. The Norwegian Petroleum Directorate evaluates all nominations and makes its own geological assessment. The Directorate then forwards its own recommendations to the Ministry of Petroleum and Energy. These recommendations are submitted to public consultation. Finally, the Government decides which blocks are going to be offered for tendering. Bids are evaluated and negotiations with investors are held. In the end, the Government decides which companies shall be awarded the production licence, while the final awards are formally made by the King in Council (Nor. *Kongen i statsråd*) [44,50,52–54].

Awards in predefined areas (APA) is a tendering procedure used for mature hydrocarbon fields, where production has already been underway for many years. The APA tendering is announced on a yearly basis. There is no special nomination procedure in APA tendering. Before publication of the APA tendering procedure, the Norwegian Petroleum Directorate sends its own suggestions of blocks to be included in the procedure to the Ministry of Petroleum and Energy, based on expert assessments. The final proposal of

blocks to be included is submitted for public consultation. Like in the numbered licensing rounds procedure, the Government makes the final decision on blocks to be included in the tendering procedure. After receiving investors' bids, applications are evaluated based on predefined criteria and negotiations with investors are held. The Government makes the decision to offer Production licences to chosen investors and the final awards are made by the King in council (Nor. *Kongen i statsråd*) [44,50,52–54].

A map of exploration and production blocks in Norway is shown in Figure 3.

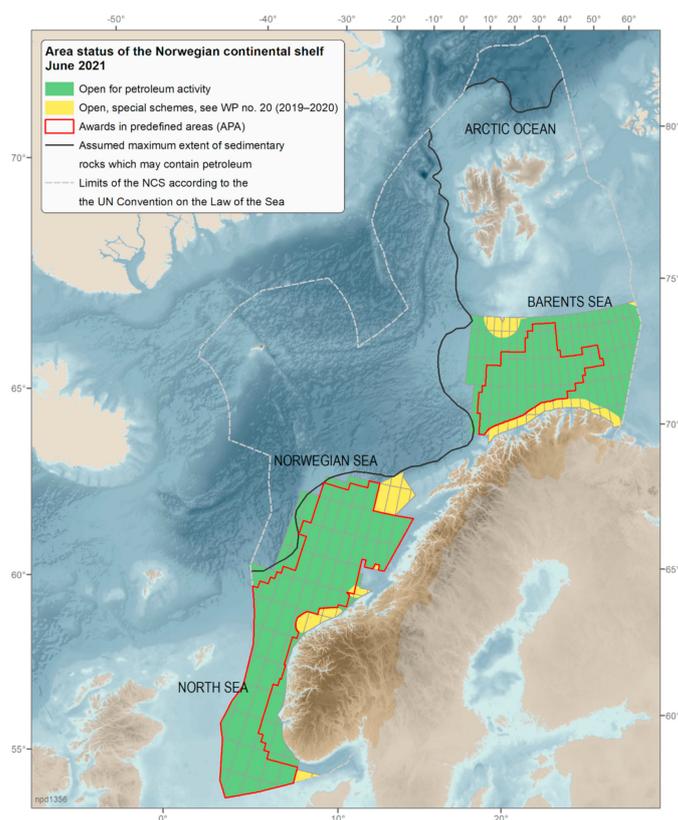


Figure 3. Map of exploration and production blocks in the Kingdom of Norway, June 2021 [52].

3.5.3. The Republic of Austria

The Republic of Austria is not the largest European producer of oil and gas, but it has a long-standing tradition of both mining and crude oil and natural gas exploration and production. Austria also has some, at least within Europe, unexpected and exotic legislative solutions with regards to the oil and gas industry, as it is outlined in following sections.

The Main Law, the Competent Authority, and Contracts

The main law which regulates exploration and production of hydrocarbons is the Mineral Raw Materials Act, also referred to as the Mineral Resources Act (Ger. *Bundesgesetz über mineralische Rohstoffe*, shortened as *Mineralrohstoffgesetz*, abbreviation *MinroG*) [55].

The competent ministry for hydrocarbon exploration and production in the Republic of Austria is currently the Federal Ministry of Agriculture, Regions and Tourism (Ger. *Bundesministerium für Landwirtschaft, Regionen und Tourismus*, abbreviation *BMLRT*). However, this often changes, as ministries merge and split with almost every new government in Austria. There is no special administrative agency working for the Ministry which would provide support for petroleum activities. These tasks are carried out by the Directorate-General IV—Telecommunications, Postal Services and Mining (Ger. *Sektion IV—Telekommunikation, Post und Bergbau*), an organizational unit within the ministry.

The Federal Government is the owner of all mineral resources on the territory of the Republic of Austria, including oil and gas. Only the federal government has the right to

explore and produce hydrocarbons. The Government can transfer this right to persons, and companies, which satisfy certain technical and financial criteria, for a certain compensation. The transfer of rights to explore and produce is done by concluding a contract under the civil code between the Federal Government and the investor [56]. Only tax and royalty agreements (a concession type regime) are used in the Republic of Austria for exploration and production of hydrocarbons [57]. The investor must pay the royalty (Ger. *Förderzins*), determined using the sliding scale method, and the corporation tax after cost recovery. Surface fees for exploration (the area fee; Ger. *Flächenzins*) and for production (the field fee; Ger. *Feldzins*) also apply.

Transferred rights are valid in a strictly defined area for a defined period. The investor must obtain all necessary permits and approvals from competent authorities to perform works after signing of the contract, e.g., the investor has to submit the work programme for approval by the competent ministry. At the end of each calendar year, the investor must submit a report on exploration works performed [58].

All this means there is no public tendering procedure for concession blocks in the Republic of Austria, but investors can individually contact the Government to enter negotiations for contract signing. Since particular contracts are not publicly available, there is not enough information to comment on anything other than public legislation.

Royalties and Taxes

According to the Mineral Raw Materials Act, the royalty (Ger. *Förderzins*) is determined according to the average yearly price of imports of crude oil (per tonne), or natural gas (per terajoule equivalent), into Austria in the calendar year of production. Therefore, this average price of imports is the calculation basis (Ger. *Berechnungsbasis*) for determination of the amount of royalty for produced hydrocarbons in Austria. The average yearly price of imports is calculated by dividing the total yearly value of imports (in euros) by the total yearly amount of crude oil or natural gas imported (in tonnes or terajoules, respectively). Import statistics from the Austrian Federal Statistical Office (mostly referred to as Statistics Austria; Ger. *Bundesanstalt Statistik Österreich*; mostly referred to as *Statistik Austria*) are used for this average price calculation. The royalty is finally determined as a percentage of the calculated yearly average price of imports, payable for every tonne of crude oil or terajoule of natural gas produced. The sliding scale is different for crude oil and for natural gas. The sliding scale for crude oil royalty is given in Table 4, while the sliding scale for natural gas royalty is given in Table 5.

Table 4. Royalty for crude oil production in the Republic of Austria (sliding scale).

Average Yearly Import Price	Royalty
<460 EUR per tonne of crude oil	15% of the calculated import price (payable per tonne of produced crude oil)
460–670 EUR per tonne of crude oil	15–20% of the calculated import price
>670 EUR per tonne of crude oil	20% of the calculated import price

Table 5. Royalty for natural gas production in the Republic of Austria (sliding scale).

Average Yearly Import Price	Royalty
<5100 EUR per 1 TJ equiv. amount of energy (amount of heat, upper calorific value is used)	19% of the calculated import price (payable per 1 TJ equiv. of produced natural gas)
5100–8200 EUR per 1 TJ equiv. amount of energy	19–22% of the calculated import price
> 8200 EUR per 1 TJ equiv. amount of energy	22% of the calculated import price

This system of royalty calculation might be unusual in international terms, but it could be justified if the aim is to calculate the royalty according to a realistic, “locally used” price for this global product. Also, discounts can be applied for difficult or deep production, which is generally more expensive.

Before the corporation tax, cost recovery is applied. The corporation tax is the same as for any other company in Austria and it amounts to 25% [58], as set in the Corporation Tax Act (Ger. *Bundesgesetz vom 7 Juli 1988 über die Besteuerung des Einkommens von Körperschaften*; shortened as *Körperschaftsteuergesetz 1988*; abbreviation *KStG 1988* or *KStG*).

Current Producers in Austria

Currently, two companies are producing hydrocarbons in Austria: OMV and Rohölaufsuchungs AG (abbreviation RAG) [58], or, more precisely, the newly-founded RAG Exploration and Production GmbH, because the original RAG split into RAG Austria and RAG Exploration and Production in 2018. RAG Austria is a gas storage company with investments in renewable energy. General information about issued concessions and hydrocarbon fields are available on the BergIS geoportal, while geological data and mineral resource data, including hydrocarbons, are available on the Interactive Raw Material Information System platform (IRIS Online).

4. Discussion

As shown in previous sections, concessionary systems for exploration and production are very different from country to country. Thankfully, they are also based on some common principles, which makes them easier to compare.

4.1. Croatia and Norway

In comparison with the Republic of Croatia, the Kingdom of Norway has a much more developed system for exploration and production of hydrocarbons. Information on exploration and production of hydrocarbons in Norway is much more comprehensive, very up-to-date, and published both in English and Norwegian. This includes a detailed overview of legalities, information about investors and issued concessions, about production, about every exploration and production block, etc.

The Norwegian public is included in the process of publishing a tendering procedure, and the decision to offer particular blocks, through public consultations. Also, there are two kinds of tendering procedure for exploration and production of hydrocarbons. There is no royalty for produced, or sold, hydrocarbons, even though the Kingdom of Norway uses the tax and royalty agreement (concession contract). Nevertheless, enough tax revenues are collected with the corporation tax and the special tax for oil companies. The tax base is formed according to the “norm price”, instead of the price achieved on the market. There is only offshore production in Norway, which means conditions are significantly hardened, so Norway has always been at the forefront of technological development regarding offshore petroleum activities.

Those are the chief differences between Croatian and Norwegian systems. However, it is important to point out that the same basic concepts are present, like the existence of a competent ministry, an administrative agency, a main legal act, subordinate legislation (regulations) defining fees, a public tendering procedure, standardized contracts and fees, etc., even though their provisions are very different in the two countries.

4.2. Croatia and Russia

The Russian Federation has a much more complicated system of concessions and fees for exploration and production of hydrocarbons than the Republic of Croatia. The situation is made quite complex, and diverse, by differing legal regulations and special tax regimes for different types of fields and deposits in different parts of the Russian Federation.

There are two types of contract, three types of licence, and two types of tendering procedure in the Russian Federation. Moreover, there are many different types of hydrocarbon

deposits, which leads to various legal exceptions, different tax calculations, and tax reliefs. Even export duties for hydrocarbons and hydrocarbon products are applied. Therefore, there are plans for a necessary simplification and improvement of the legal system and the fiscal regime for exploration and production of hydrocarbons, with the goal of attracting investments and increasing production.

However, due to an enormous abundance of resources, all this still does not stop Russia from being one of the largest hydrocarbon producers in the world [59]. The Republic of Croatia, on the other hand, can attract more investments only by improving the legal system and investment conditions, since Croatia does not have nearly as much resources as the Russian Federation does. Consequently, there have been significant improvements of this kind in Croatia in the past decade, like new strategies, new legal acts, new regulations, new procedures, establishment of an administrative agency competent for petroleum operations, etc.

4.3. Croatia and Austria

As a country, Austria has many similarities to Croatia. Both are Central European countries and members of the European Union, they have a similar amount of daily production of crude oil and lease condensate, and most Austrian hydrocarbon production comes from the Pannonian basin, just like the Croatian production does. Therefore, there are geographical, geological, and numerical similarities in Austrian and Croatian hydrocarbon production.

However, it is interesting to observe that legal provisions regarding exploration and production of hydrocarbons are very different in the two countries. The Republic of Austria does not conduct public tendering procedures, nor does it have a specialized administrative agency, for exploration and production of hydrocarbons. In Austria, an interested party directly contacts the government to negotiate signing of an agreement on exploration and production of hydrocarbons. Instead of a specialized administrative agency, an organizational unit within the competent ministry is tasked with supporting and monitoring petroleum activities in the country, like the situation in Croatia was before 2014, when the Croatian Hydrocarbon Agency was founded. Comprehensive information on procedures and the legal system is not fully available in English on web sites of competent authorities, unlike in Norway and Croatia.

Nevertheless, Austria still owns a large stake in an international oil company, OMV, which produces hydrocarbons in Austria alongside RAG. Moreover, OMV also has a respectable worldwide portfolio. With a good system of stipends and education, Austria keeps its highly-educated workforce in the country, which, along with a developed market and industry, and good management of companies, gives it an advantage over the Republic of Croatia for exploitation of its own resources and business development, regardless of procedural differences mentioned previously. It should be noted that the overall legal and fiscal system in Austria has been in place for decades now, while in Croatia it has virtually just been passed, so there is more regulatory continuity for doing business in Austria.

To better facilitate understanding of differences in fiscal, institutional, and legislative frameworks between all four analysed countries, the authors have also devised a comprehensive review of comparisons provided in this article, presented in Table 6. The table also provides reserves and production data for each country, and any currencies are converted into euros (EUR).

Table 6. A comprehensive review of comparisons of the fiscal, institutional, and legislative frameworks of Austria, Croatia, Norway, and Russia, including reserves and production data.

	Austria	Croatia	Norway	Russia
Total reserves of crude oil including lease condensate (10⁶ m³)	2016: 7.21802 2017: 6.83645 2018: 6.55028 2019: 6.04152 2020: 5.88253 2021: 5.59635 [60]	2015: 11.9321 2016: 11.0270 2017: 10.2303 2018: 7.9510 [61] 2019: – 2020: – 2021: –	2016: 816.99869 2017: 1050.99827 2018: 1226.91692 2019: 1279.40689 2020: 1306.76225 2021: 1291.31886 [60]	2016: 12,718.984 2017: 12,718.984 2018: 12,718.984 2019: 12,718.984 2020: 12,718.984 2021: 12,718.984 [60]
Total reserves of dry natural gas (10⁶ m³)	2016: 7900.400 2017: 6994.261 2018: 6512.875 2019: 6201.389 2020: 5578.419 2021: 5040.399 [62]	2015: 14,928.6 2016: 13,168.4 2017: 10,286.3 2018: 20,290.7 [61] 2019: – 2020: – 2021: –	2016: 1,921,977.646 2017: 1,855,971.076 2018: 1,782,177.373 2019: 1,729,054.97 2020: 1,621,564.22 2021: 1,544,457.447 [62]	2016: 47,805,293.288 2017: 47,805,293.288 2018: 47,805,293.288 2019: 47,805,293.288 2020: 47,805,293.288 2021: 47,805,293.288 [62]
Production of crude oil including lease condensate (m³/d) [63]	2016: 2410.4386 2017: 2254.9883 2018: 2109.5236 2019: 1993.5283 2020: 1719.9889 2021: –	2016: 2159.3603 2017: 2206.8927 2018: 2203.6563 2019: 2139.0008 2020: 1885.0616 2021: –	2016: 26,2007.161 2017: 25,7166.649 2018: 24,1152.468 2019: 22,8486.333 2020: 27,2352.464 2021: –	2016: 167,7554.062 2017: 168,6068.157 2018: 171,0473.585 2019: 172,4594.728 2020: 156,8476.763 2021: –
Yearly production of dry natural gas (10⁶ m³) [64]	2016: 1186.0011 2017: 1269.0012 2018: 1031.5212 2019: 924.5166 2020: – 2021: –	2016: 1211.0126 2017: 1048.0124 2018: 1224.2597 2019: 1024.015 2020: 851.0005 2021: –	2016: 11,6521.1055 2017: 12,3888.1124 2018: 12,1493.0071 2019: 11,4748.7751 2020: – 2021: –	2016: 615,892.7599 2017: 635,796.428 2018: 667,586.2492 2019: 677,838.4009 2020: 637,151.8996 2021: –
Contract types	T&R	Production sharing	T&R	T&R and Production sharing. However, new PSAs have not been signed in practice under the current legislative framework, which came into effect in 1996
Royalty	15–20% for produced crude oil; 19–22% for produced natural gas; Both determined by a sliding scale	10% of the value of produced hydrocarbons	Not applicable	T&R contracts: Mineral extraction tax (MET) 919 RUB (10.56 EUR*) per tonne of produced crude oil, adjusted by coefficients; 35 RUB (0.40 EUR*) per 1000 m ³ of produced natural gas, adjusted by coefficients; 42 RUB (0.48 EUR*) per tonne of produced gas condensate, adjusted by coefficients

Table 6. Cont.

	Austria	Croatia	Norway	Russia
Cost recovery	Not publicly known	Available for eligible costs. Subject to negotiations with a maximum of 50%, or 70%, of value of hydrocarbons remaining after royalty payment, for offshore and onshore production, respectively [4]	Cost recovery is available for all relevant costs, especially costs associated with research and development, exploration, financing, operations, and decommissioning [46]	Cost recovery is available for exploration costs and through depreciation of assets [13]
Production sharing ratio	Not applicable	Determined using the R-factor (sliding scale)	Not applicable	Not applicable for T&R contracts
Corporation tax	25%	10% for companies with revenue below 7.5 million HRK; 18% for companies with revenue above, or equal to, 7.5 million HRK(999,822.96 EUR **)	22%	20%
Export duties	Not applicable	Not applicable	Not applicable	Applicable, depends on the product
Other taxes and fees	Surface fee for exploration (the area fee) and the surface fee for production (the field fee)	Contract signing bonus, Surface fees, Production bonus, Administration fee	The special tax for oil companies (56%) after 'uplift'	Area fees, Fee for participation in tenders or auctions, One-time bonus for the award of the licence, etc.
Main law(s) regulating exploration and production of hydrocarbons	Mineral Resources Act	Act on the Exploration and Production of Hydrocarbons (OG 52/18, 52/19, 30/21)	Act relating to petroleum activities Petroleum Taxation Act	Federal Law on Subsoil Federal Law on Production Sharing Agreements
Subordinate legislation regarding exploration and production of hydrocarbons	Not relevant for this paper	Regulation on fees for exploration and production of hydrocarbons (OG 25/20)	Regulations to Act relating to petroleum activities; Regulations for determining the norm price	Not relevant for this paper
Ministry competent for energy or petroleum operations	Federal Ministry of Agriculture, Regions and Tourism	Ministry of Economy and Sustainable Development	Ministry of Petroleum and Energy	Ministry of Natural Resources and Environment of the Russian Federation

Table 6. Cont.

	Austria	Croatia	Norway	Russia
Administrative agency competent for petroleum operations	[Administrative support is provided by an organizational unit within the competent ministry (Directorate-General IV—Telecommunications, Postal Services and Mining)]	Croatian Hydrocarbon Agency	Norwegian Petroleum Directorate	Federal Subsoil Resources Management Agency (Rosnedra)
Type(s) of licence(s)	(Any rights are defined by a contract concluded with the Federal Government)	One type of licence: Licence for the Exploration and Production of Hydrocarbons	One Production Licence, also serving as a contract, issued by two different procedures, based on whether the area already has mature production or not	Five types of licence: (1) Exploration licences; (2) Production licences; (3) Combined licences; (4) Combined licence for the development of technologies for geological study, exploration, and production of hard-to-recover minerals and for the exploration and production of such minerals; (5) Licence for the development of technologies for geological study, exploration, and production of hard-to-recover minerals and for the exploration and production of such minerals

* Exchange rate used 1 EUR = 86.9913 RUB; ** Exchange rate used 1 EUR = 7.501328 HRK.

5. Conclusions

The Republic of Croatia has a mostly well-arranged system for exploration and production of hydrocarbons. The legal system is conventional and in accordance with European and world trends: the country is the owner of hydrocarbons, one of the main types of contract is used (the production sharing agreement), concessions are issued based on a public tendering procedure, there is a ministry competent for exploration and production of hydrocarbons, there is a specialized administrative agency (which conducts the tendering procedure, gives support to investors, monitors petroleum operations, organizes the data room for geological data, etc.), taxes and fees are clearly prescribed by an Act and a subordinate regulation, etc.

The tax burden of investors is around average when compared to taxes and fees for exploration and production in other petroleum producing countries. It should be noted that high taxes and fees are standard only in countries with very large hydrocarbon reserves and production (e.g., UAE, Libya, Nigeria T&R, Venezuela, Indonesia, Norway, etc.). It is profitable enough for companies to produce hydrocarbons in such countries, regardless of the severity of taxes and fees, because produced quantities are extremely large. Therefore, the Republic of Croatia has, in principle, definitely taken a good stance in terms of fiscal, and legal, regimes to attract investors, considering the amount of its reserves and production.

Nonetheless, there is always room for improvement. There especially needs to be improvement when there has been a general lack of exploration activity in the past decade,

with the presence of a constant drop in domestic production of natural gas, while crude oil production has been kept relatively constant by methods of secondary, and tertiary, recovery and CO₂ EOR. A drawback could be that a strictly fixed percentage is used for the royalty, rather than a variable sliding scale calculation, which would have the potential to jumpstart some previously unprofitable projects.

Accordingly, the authors recommend several improvements for the hydrocarbon fiscal regime of the Republic of Croatia, based on the research in this article.

The first recommendation is that Croatia should consider using a sliding scale for royalty calculation. Currently, the fixed royalty of 10% is probably too high for some potential projects in the long run, especially in the environment of unstable crude oil and natural gas prices that have been seen in the last few years. Moreover, since Croatia is using the production sharing agreement (PSA) for all new concessions, it could consider rescinding the royalty altogether. The royalty is not used in all PSAs in the O&G industry and, in Croatia, it is most likely a remnant of previous fiscal regimes, which introduced the 10% royalty in the first place. It is interesting to mention the case of Norway, which does not impose a royalty, even though it uses T&R contracts. The effective government take in Croatia is currently around 30%, which has already been mentioned as average. However, if the Croatian government plans to sustain current levels of production in the next few decades and partial energy independence, especially through production from new fields, it should consider easing the burden on potential investors. It should be mentioned that a sliding scale (R-factor) is, at least, used for determining the production sharing ratio between the state and the investor.

The second recommendation is that administrative procedures tied to obtaining the Licence for the Exploration and Production of Hydrocarbons and signing of the Agreement on the Exploration and Production of Hydrocarbons prior to the start of the exploration period should be simplified in order to shorten the amount of time required from bidding on a tender until the start of operations. Within the scope of the tendering process, this would include holding negotiations with investors immediately after receiving their bids and evaluating the offer, as well as merging issuing of the licence with signing of the agreement. The authors feel that these processes are unnecessarily fragmented and the current process architecture needlessly prolongs the time from publishing of the tender until signing of the agreement. It can be seen from the Norwegian example that such a process already exists in practice. Tenders could also be published on a regular yearly basis.

Moreover, perhaps submitting of the reserves study with a proposal for classification and categorisation, submitting of the request for determining the exploitation field, and submitting of the Hydrocarbon Development and Production Plan, after the investor had submitted a statement indicating a commercial discovery, could be a unified procedure. Currently, each of these is submitted separately and requires a separate confirmation from the competent ministry. Unifying these could help hasten the beginning of the production period after determining a commercial discovery.

Consequently, the authors consider that adjustment of the financial burden on new investments and optimizing the process architecture could contribute to economic development and growth of the industry in the country.

Otherwise, the Croatian public, and potential investors, would probably benefit from a comprehensive overview, and availability, of information on hydrocarbon concessions, which adorns the Norwegian system. This particularly concerns the display of information on hydrocarbon concessions on the website of the Croatian Hydrocarbon Agency, as the competent administrative agency for such matters in the country.

The knowledge gaps, which the authors have identified in the field during research, are that there is a lack of comprehensive, and up-to-date, overviews of fiscal regimes for exploration and production in many countries. Hence, such an overview is useful for investors considering exploration and production in different countries, but also for authorities, which can compare different legal and fiscal frameworks during improvement

of their own framework for exploration and production of hydrocarbons, or geothermal energy, but also CO₂ storage.

Moreover, it could be an interesting future research to evaluate the fiscal impact of changes proposed in this article on the Croatian state, local, and regional budgets, as well as the effect on the economy and oil and gas industry in Croatia.

There are also some unknowns about the outlook of certain hydrocarbon fiscal regimes, such as that of the Russian Federation. Even though it has not been the subject of this paper, some tax incentives for specific crudes and oil fields in Russia have been abandoned, as a result of the COVID-19 pandemic, to raise more funds for the federal budget. This gives us reason to ask whether other hydrocarbon tax incentives shall be rescinded. Is there going to be an export duty on LNG, which currently stands at 0%? Is the planned phase-out of export duties on crude oil and petroleum products going to proceed as planned? Is implementation of the AIT going to be slowed down in favour of the existing MET? The authors encourage some future research in this direction.

In conclusion, improvements of the legal system, tax reforms, new tendering system, new licences and concessions issued, newly-declared commercial discoveries, both onshore and offshore, and exploration phases just beginning in numerous blocks as a result of tendering procedures held in the last 5 years, all give an expectation of revitalization of the oil and gas industry in the Republic of Croatia.

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