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# Energy Policy: A Norwegian Perspective

Tore Tønne\*

## I. INTRODUCTION

Few countries in the industrialized West are more energy directed than Norway.<sup>1</sup> Whereas most nations have paid particular attention to the relationship between their economic growth and the consumption of energy, Norway has to a high degree based her industrialization and economic growth on the *exploitation* of indigeneous energy resources. Therefore, establishing principles of developing and using energy resources has been an important political topic in Norway since industrialization gathered headway near the turn of the century.

There are two distinct phases in Norwegian energy history—first, the development of hydropower potential beginning on the eve of the nineteenth century, and second, the development of oil and gas resources on the Norwegian continental shelf which started only 15 years ago. Different as the phases are, they are nevertheless importantly similar in their approaches and solutions to various legal and economic problems in the energy field. Although it is the policy concerning exploitation of the oil and gas fields off the Norwegian coast that has drawn international attention lately, it is useful to look at this policy in retrospect by first considering the principles laid down for the development of Norwegian hydropower potential. This article, therefore, sets out to describe the legal and political principles, as well as the perspectives, of Norwegian policy of using indigeneous energy resources—first in the hydro and then in the petroleum sector. A main conclusion will be that in both these sectors Norway has managed to establish a legal framework which secures the full national control and which leads to a rational

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<sup>1</sup> See INTERNATIONAL ENERGY AGENCY, *ENERGY POLICIES AND PROGRAMMES OF IEA COUNTRIES 1982 REVIEW* (1983) [hereinafter cited as 1982 REVIEW]. Table below was compiled by the author from this source:

KEY ENERGY INDICATORS. 1981.

	Energy prod./energy demand (TPE)*	TPE/GDP- ratio	TPE per capita (mtoe)	Energy prod. per capita (mtoe)	Electricity prod. per capita (kwh)
Australia	1.4	0.75	5.2	7.0	6,819
Austria	0.44	0.59	3.5	1.5	6,042
Belgium	0.18	0.62	4.42	0.8	5,152
Canada	1.06	1.13	9.7	10.3	16,534
Denmark	0.07	0.40	3.38	0.2	3,882
Germany	0.50	0.53	4.3	2.1	5,977
Ireland	0.31	0.85	2.52	0.8	3,172
Italy	0.18	0.60	2.4	0.4	3,177
Japan	0.16	0.55	3.1	0.5	4,956
The Netherlands	1.1	0.63	4.3	4.7	4,546
New Zealand	0.7	0.84	3.7	2.7	7,452
Norway	2.54	0.67	5.9	15.0	22,634
Portugal	0.13	0.54	1.1	0.1	1,400
Spain	0.34	0.66	2.02	0.7	2,950
Sweden	0.53	0.65	6.0	3.2	12,374
Switzerland	0.5	0.4	3.9	1.9	8,234
Turkey	0.61	0.79	0.75	0.5	540
United Kingdom	1.07	0.79	3.5	3.7	4,959
United States	0.88	0.95	7.69	6.8	10,760

\*) TPE = Total Primary Energy Requirements

utilization of the resources to the benefit of the whole society, without at the same time reducing the importance of foreign capital and technology or ignoring international cooperation.

## II. TAPPING NORWAY'S HYDROPOWER

### A. History and Background: The Panic and Concession Acts

Norway is the northernmost nation of the world, stretching from the 58th parallel (like Kodiak) to north of the 70th parallel (like Prudhoe Bay), which means that nearly half of the country is north of the arctic circle. The land area is 125,000 square miles, which is a little less than Montana, but bigger than for instance Italy, Great Britain or Germany. The country is mountainous, and with a coastline of 1,700 miles toward the North Atlantic ocean, the yearly precipitation is high, much of it falling as snow in the winter months. The total energy potential of water flowing on Norway's surface is estimated at 550 terawatt-hours (TWh) per year.<sup>2</sup> Of this amount, 172 TWh are reckoned to be economically exploitable under today's economic conditions.<sup>3</sup> Despite modest technology and small-scale power plants, much of that potential has for a long time been relatively easy to utilize. Toward the end of the eighteenth century, however, increased possibilities for the use of electricity in households and industry caused increased interest in developing Norwegian hydro resources to generate electricity. Soon investors of foreign capital looked to invest in Norway's electricity production alone or, more commonly, in combinations that included power intensive industries like fertilizers and aluminum.

The rapid increase of foreign interest in Norwegian hydro resources triggered one of Norway's most complex and important political struggles. According to Norwegian law, rivers, waterfalls and lakes may be privately owned. As a result, it soon became clear that foreign capital could gain control of substantial natural resources.<sup>4</sup> This led to the passage of legislation in 1906 that required anyone, Norwegian or foreign, to obtain a "concession" from the public authorities before acquiring a waterfall.<sup>5</sup> This Act, which is sometimes referred to as the "panic act" because of the political circumstances when it was passed,<sup>6</sup> was only

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<sup>2</sup> 1 TWh = 1 billion kilowatt-hour (10<sup>9</sup>kWh). The energy content of 1 TWh per year is similar to the energy content of approximately 84,000 tons of oil per year or 1,740 barrels of oil per day.

<sup>3</sup> NORWEGIAN WATER RESOURCES AND ELECTRICITY BOARD (NWE), APPENDIX TO REPORT NO. 54 TO THE STORTING REGARDING THE FUTURE USE AND PRODUCTION OF ENERGY IN NORWAY (1979-80). [Hereinafter cited as REPORT NO. 54].

<sup>4</sup> Act of Mar. 15, 1940, No. 3. At that time, Act of July 1, 1887, No. 4.

<sup>5</sup> Act of June 12, 1906, No. 12.

<sup>6</sup> Act of June 12, 1906 was introduced in a proposition of Apr. 7, 1906, which, in some respects,

temporary, however. Years of legal debates and political struggles resulted in passage of new legislation in 1917—the so-called Concession Act.<sup>7</sup> This Act, with only minor amendments, and the Water Regulations Act<sup>8</sup> passed in the same year have together regulated the development of hydropower in Norway ever since.

While the immediate objective of the Panic Act had been to avoid foreign takeover of Norwegian waterfalls, the objectives of the Concession Act were broader. It sought to secure public control and the best possible economic utilization of national resources. The Act now provides that no one, except the state, may acquire usufruct or proprietary title of waterfalls of capacities exceeding 1000 natural horse-powers without the King's permission, a "concession."<sup>9</sup> The King may grant such a concession to either Norwegian or foreign persons or companies only in accordance with basic rules written into the Act itself and detailed conditions established by the state in each individual case.<sup>10</sup> In addition, Parliament must approve nearly all grants of concession.<sup>11</sup> One of the most important provisions of the Concession Act was a general rule limiting the duration of concessions to private persons or companies. After years of political struggle, it was established that concessions could be granted only for periods not exceeding sixty years. The waterfalls and all power production installations—dams, channels, tunnels, power stations and all their belongings and machinery—were to accrue to the state free of charge at the end of the granted concession.<sup>12</sup> This rule, the *hjemfall*, which was proposed during the political turmoil following passage of the Panic Act,<sup>13</sup> was unique in both the Norwegian and international contexts. Nevertheless, the Supreme Court upheld its constitutionality when it was challenged in 1918.<sup>14</sup> There has been no further legal dispute about it.

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was more restrictive than the act finally adopted by the Storting. The political situation was rather hectic. Norway had just gained its independence from Sweden. It was quite clear that strong foreign capital interests were exploring the country for waterfalls available for sale. Also, foreigners were trying to convince private owners to sell. Often, these owners were unaware of the potential worth of their properties. To prevent a rapid foreign takeover of what most people considered national resources, a law had to be written and introduced within a few days. Some people said that the temporary act was written in panic—therefore, the "Panic Act".

<sup>7</sup> Act of Dec. 14, 1917, No. 16, Relating to Acquisitions of Waterfalls, Mines and other Real Properties, etc.

<sup>8</sup> Act of Dec. 14, 1917, No. 17.

<sup>9</sup> *Id.* § 1.

<sup>10</sup> *Id.* § 2.

<sup>11</sup> *Id.*

<sup>12</sup> *Id.* § 17.

<sup>13</sup> Act of Mar. 23, 1901.

<sup>14</sup> Supreme Court decision, effective Mar. 12, 1918. (Norsk Rettstidende 1918).

Some of the powerplants built after the passing of the Concession Act have already accrued to the state, and several others will accrue in the 1980s and 1990s. In many cases, companies that built and operated power stations during a concession period have entered into long-term lease agreements with the state in order to continue operations after the expiration of the concession. Most of those companies have arranged to continue utilizing some of the power for their production of goods, but on revised terms decided by Parliament.

#### B. Evaluation of the Results of the Concession Policies

Any evaluation of this legislation should take into consideration the fact that Norway developed her hydropower primarily to serve industry. Although private household electrification also was a national goal, it was the goal of industrialization and the possibility of utilizing the vast hydro potential to achieve it that compelled development of a special legal framework.

Both the desire to industrialize and the interest in developing water resources to facilitate it had broad support. But because the resources were national and inexhaustible, the state wished to maintain control of them. Nevertheless, the state clearly did not have the capital needed for hydro power development. It was obviously necessary to invite foreign capital and technology. In this context the "hjemfall" rule served as a practical political compromise. While it vested full control of Norway's hydro-resource development in the state, it did not impose full responsibility for hydroelectric investment and production in the state as well. In the years that followed, private industry and local public utilities carried out most of the hydroelectric expansion.

Moreover, it is impossible to calculate what effect the new legislation may have had on the expansion of the hydropower sector. Because there was at the time no real politically realistic alternative, the question is but a theoretical one. It is possible that the Concession Act may have temporarily restrained private industry's willingness to invest in the hydropower sector—at least as compared with the propensity to invest prior to the "hjemfall" rule. Nevertheless, there was substantial industrial expansion during the first quarter of this century. Although some was based on hydropower acquired and developed prior to the Act, some stemmed from many projects realized under the new legislation.

Considering the limited availability of development resources like technology and labor capacity, actual expansion of generating capacity did not fall short of what could have been expected under the previous legislation. Whereas the production of hydroelectricity in Norway in

1920 was 1.2 TWh,<sup>15</sup> by the time of the Second World War it had increased to 10.9 TWh.<sup>16</sup> In addition, by 1925 Norway had obtained a twelve percent share of the world production of aluminum, and had begun substantial production of fertilizers, ferro alloys and magnesium.<sup>17</sup> Even if Norway later lost some of its share of the world market for aluminum, the decrease did not result from any scarcity of electricity. Norway's role as a producer of energy-intensive products was never questioned.

Moreover, during the long reconstruction and growth period after the Second World War broad political support for developing hydropower for further industrial expansion remained stable. As a result, from approximately ten TWh in 1945, production of hydroelectricity increased to sixteen TWh in 1950, to thirty TWh in 1960, to fifty-six TWh in 1970, and approximately ninety TWh in 1980.<sup>18</sup>

### C. Recent Development in Norwegian Hydroelectric Production

During the post-war period the size and complexity of hydropower projects increased immensely. This period also saw increases in the state's role as a direct investor in production and transmission. Whereas in 1957 private companies produced 36.5% of the electricity, local public utilities produced 39% and the state produced 24.5%,<sup>19</sup> twenty years later the proportions have changed to 14%, 49.5% and 36.5% respectively.<sup>20</sup> This direct state involvement is handled by the State Power System, a directorate under the Norwegian Water Resources and Electricity Board.<sup>21</sup> The State Power system plays an important role in supplying electricity on equal economic terms to local utilities and distributors all over the country, thus contributing to security of supplies and harmonization of electricity prices. Second, it also plays a significant role in industrial concerns. Because the state was striving to promote the further expansion of power intensive industries, the State Power System worked

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<sup>15</sup> See REPORT NO. 54, *supra* note 3 and accompanying text.

<sup>16</sup> *Id.* In the meantime, the depression had made many investments unprofitable and led to the financial collapse of many utilities.

<sup>17</sup> Internal statistics of the Association of Norwegian Electrochemical and Metallurgical Industries. (not published).

<sup>18</sup> CENTRAL BUREAU OF STATISTICS OF NORWAY, 1982 STATISTICAL YEARBOOK 149, 152 [hereinafter cited as STATISTICAL YEARBOOK]. The latter figure corresponds to approximately 13.5 mtoe, or 270,000 bd. which is more than half of the total yearly energy requirements of Norway.

<sup>19</sup> REPORT NO. 54, *supra* note 3, at 33.

<sup>20</sup> *Id.*

<sup>21</sup> The Norwegian Water Resources and Electricity Board (NVE) was first organized under the Ministry of Industry and later under the Ministry of Petroleum and Energy when that Ministry was established in 1978. Royal Decree of Jan. 11, 1978.

to develop the capacity and to supply power intensive industries with electricity on special long-term contracts. Large investments in producing aluminum, magnesium, iron and steel, ferro alloys and chemicals could be made only with the long-term contract assurances of electricity supply and price.<sup>22</sup>

It should be noted, however, that the relatively cheap power was not the sole factor behind expansion of these industries. As already mentioned, there was also the import of capital and technology. And, there was a third factor—the market. With a population of only 3.1 million in 1945, the domestic market was insignificant for industries of this size.<sup>23</sup> Consequently, the industry had to aim close to one hundred percent of its production at export markets. Active efforts to liberalize trade therefore became another cornerstone of Norwegian post-War industrial policy. This attitude and need is reflected in Norway's accession to the GATT and participation in all the GATT negotiating rounds; membership in OEEC/OECD; the Bretton Woods institutions, EFTA; and the establishment of free trade agreements with the European Communities. With exports of more than forty percent of gross national product and eighty to ninety percent going to the OECD countries, Norway's industry and economy have become closely linked and exposed to international trade.<sup>24</sup>

In addition to the expansion of an export industry of power intensive production, the extensive development of the hydropower industry caused an important side effect—Norway developed a domestic market for nearly everything required to build and operate a comprehensive hydroelectric system. From the outset the state clearly expressed its inter-

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<sup>22</sup> [Editors' note: the following chart was compiled by the author from information supplied in THE CENTRAL BUREAU OF STATISTICS OF NORWAY, INDUSTRIAL STATISTICS, an annual publication which was not available for reference:]

Gross Investments (Mill. NOK)

	1950	1955	1960	1965
Iron, steel, ferro alloys	55	87	102	142
Non ferrous metals	42	92	111	272
Aluminium	21	49	83	212
Chemicals	108	149	137	283

<sup>23</sup> See *supra* note 17.

		Aluminium	Ferroalloys
Norwegian consumption (approx.)	1982	40,000 tons	4,000 tons
Norwegian production capacity	1982	770,000 tons	800,000 tons

<sup>24</sup> See *supra* note 22.



est in fostering domestic Norwegian capacity to supply to industry on a non-discriminatory basis with its needs. Thus, Norwegian production of equipment for power stations and transmission systems, as well as engineering and construction works, expanded rapidly and further increased the energy orientation of the Norwegian economy. Over the years, the Norwegian industry has developed the competence and capacity to construct and manage most elements of an integrated hydroelectricity and power intensive industrial system—for not only Norwegian needs, but also for export.

#### D. The Future of Norwegian Hydropower

Today, the total economic hydropower potential in Norway is estimated at 172 TWh.<sup>25</sup> Of this, approximately ninety-seven TWh, or fifty-six percent, has already been developed.<sup>26</sup> This capacity places Norway on top among industrial nations for per capita electricity production.<sup>27</sup> While in 1981 per capita electricity production in Norway amounted to 22,600 kWh, the corresponding figure in the United States was 10,800 kWh and in Canada was 16,500 kWh.<sup>28</sup> Hydropower accounted for virtually one hundred percent of electricity generated in Norway as compared with a mere eleven percent in the United States.<sup>29</sup>

Development of hydropower resources will continue in the years ahead. But while political agreement characterized development of water resources in the 1950s and 1960s, controversy over the environmental consequences of development has arisen in connection with several recent projects. Environmental concerns have caused the banning of twelve of the remaining seventy-five TWh of hydropower potential available from waterfalls.<sup>30</sup> Some twelve to thirteen TWh have also been temporarily banned pending evaluation of environmental impact.<sup>31</sup>

	1960	1970	1980
Norwegian GNP	36 bill NOK	80 bill NOK	285 bill NOK
Total exports of goods services	14 bill NOK	33 bill NOK	135 bill NOK
Total exports/GNP	39%	41%	47%
Exports to OECD/ Total exports	81%	88%	90%

<sup>25</sup> See REPORT No. 54, *supra* note 3, at 42.

<sup>26</sup> *Id.*

<sup>27</sup> See generally INTERNATIONAL ENERGY AGENCY, *supra* note 1.

<sup>28</sup> *Id.* Total energy consumption in Norway amounted to 5.9 toe *per capita* in 1981, which was above the OECD average but below the United States consumption of 7.7 toe *per capita*. *Id.*

<sup>29</sup> *Id.*

<sup>30</sup> Proposition No. 4 (1972-73), Apr. 6, 1973.

<sup>31</sup> Proposition No. 77 (1979-80), Oct. 20, 1980.

Nevertheless, the remaining potential should suffice in this century to avoid the need to build alternative generating capacity, be it coal-fired or nuclear.

The State Power System will play a dominant role in developing the remaining potential, which will involve the development of projects that are technically complex, financially demanding and politically controversial. Investments could amount to some three to four billion Norwegian 1984-Kroner<sup>32</sup> per year for the next ten years. Although some of these investments may be financed by loans from abroad, such foreign loans will probably play a lesser role than previously. The state budget will cover the State Power System's financial needs while most of the public utilities will finance their investments through the domestic credit market.

## II. NORWAY'S HYDROCARBONS AND PETROLEUM

### A. The Beginnings of Hydrocarbon Development and Gradual Government Involvement

As a result of the discovery in 1959 of a giant gas field in Groningen, Holland, international oil company interest in the North Sea sedimentary basin increased dramatically. Previously, the possibility of Norwegian oil and gas production had hardly been considered; even in 1959, few considered it more than wishful thinking. Nevertheless, oil company interest in exploration activities continued to grow. That interest called for new Norwegian legislation.

On May 31, 1963, Norway proclaimed sovereignty over the seabed and its subsoil outside the Norwegian coast by Royal Decree.<sup>33</sup> The Decree defined the area of sovereignty in respect of the exploration for an exploitation of natural deposits to such extent as the depth of the sea permits the utilization of natural deposits, irrespective of any other territorial limits at sea, but not beyond the median line in relation to other states.<sup>34</sup> Compared to the turmoil spurred by introduction of the Concession Act covering waterfalls, the establishment of basic legislation on the continental shelf did not create much internal political debate or raise questions of constitutionality. On the other hand, the new Norwegian continental shelf legislation involved questions not posed by the Concession Act—questions of international law.

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<sup>32</sup> One United States dollar is approximately equivalent to 7.50 Norwegian *Kroner*.

<sup>33</sup> Royal Decree of May 31, 1963, Relating to the Sovereignty of Norway over the Seabed and Subsoil outside the Norwegian Coast.

<sup>34</sup> *Id.*

The Geneva Convention of 1958 gave coastal states the right to extend their jurisdiction to the continental shelf, as defined by the Convention, for the purpose of exploring and exploiting its natural resources.<sup>35</sup> The basis for such jurisdiction had been laid in 1945, when the United States proclaimed exclusive right to the natural resources on the seabed and in the subsoil of the American continental shelf.<sup>36</sup> Because several countries followed the United States example by making similar claims, the Geneva Convention can be regarded more or less as a codification of international law.

It was not quite clear, however, what influence the Convention might have on the future delimitation of continental shelves. As a result, Norway and several other countries did not immediately sign or ratify the Geneva Convention. But in the years following the 1963 proclamation of sovereignty, the delimitation of the southern part of the Norwegian continental shelf was accomplished through bilateral treaties with the United Kingdom,<sup>37</sup> Denmark<sup>38</sup> and Sweden.<sup>39</sup> Then in 1971, Norway finally became a party to the Geneva Convention.<sup>40</sup> In 1981, the Norwegians reached an agreement with Iceland on the continental shelf between Iceland and the Norwegian island of Jan Mayen.<sup>41</sup> However, the delimitation between Jan Mayen and Greenland and boundary line on the continental shelf bordering with the Soviet Union still remain unsettled.

Shortly after the Royal Decree proclaiming sovereignty, in June, 1963, the legislature passed a special act, the Submarine Resources Act, addressing exploration and exploitation of submarine natural resources.<sup>42</sup> The Submarine Resources Act of 1963 applies to the part of the continental shelf which under the decree of 1963 became subject to Norwegian sovereignty. In 1979 the Submarine Resources Act was amended to apply to such activities also outside the Norwegian part of the continen-

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<sup>35</sup> Geneva Convention of the Continental Shelf, Apr. 29, 1958, 15 U.S.T. 471, T.I.A.S. No. 5578, 499 U.N.T.S. 311.

<sup>36</sup> The Truman Proclamation of the Continental Shelf, Sept. 28, 1945, Proclamation No. 2668, 3 C.F.R. § 68 (1943-48 Cum. Supp.), *reprinted in* 59 Stat. 884 (1945).

<sup>37</sup> Agreement Relating to the Delimitation of the Continental Shelf, Mar. 10, 1965, U.K.-Norway.

<sup>38</sup> Agreement of Dec. 8, 1965, Relating to the Delimitation of the Continental Shelf between Norway and Denmark.

<sup>39</sup> Agreement of July 24, 1968, between Norway and Sweden Relating to the Delimitation of the Continental Shelf between the two countries.

<sup>40</sup> Proposition No. 112 (1970-71) to the Storting, formal ratification Sept. 9, 1971 (came into force Oct. 9 1971).

<sup>41</sup> Agreement of Oct. 22, 1981, between Norway and Iceland Relating to the Delimitation of the Continental Shelf between Iceland and Jan Mayen.

<sup>42</sup> Act of Mar. 25, 1977, No. 21.

tal shelf “. . .if such application follows from specific agreement with a foreign state or from international law.”<sup>43</sup> This typical “authority act” had three general effects:

- (1) It established the state's sole right to subsea natural resources;<sup>44</sup>
- (2) it authorized the King to give the right to explore and exploit these resources to Norwegian or foreign persons—including institutions, companies, and other association; and<sup>45</sup>
- (3) it authorized the King to stipulate specific conditions for such permission and to issue detailed regulations relating to the exploration for and exploitation of subsea natural resources.<sup>46</sup>

This formed the necessary legal basis for the state both to permit and to regulate activities on the Norwegian continental shelf.

## B. Government Granted Licenses

The resulting regulations constitute an extensive legal framework for offshore activities. That framework covers areas such as the granting of licenses, working environments and safety, and taxation. Although description of these laws and regulations lies beyond the scope of this perspective, brief mention should be made of the rules covering the granting of licenses.

The current rules relating to licenses are prescribed by the Royal Decree of December 8, 1972.<sup>47</sup> According to the provisions of the Decree and subject to any additional conditions specified in a license itself, three general types of licenses may be granted: (1) exploration licenses; (2) production licenses; and (3) licenses for storage installations, liquification installations, installations for production of electricity, pipelines, shipment installations and electrical cables.<sup>48</sup>

### 1. *Exploration Licenses*

An exploration license may be granted to Norwegian or foreign companies, institutions or other associations for a three year period.<sup>49</sup>

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<sup>43</sup> Act of June 21, 1963, No. 12, Relating to Exploration for and Exploitation of Submarine Natural Resources.

<sup>44</sup> *Id.* § 2.

<sup>45</sup> *Id.*

<sup>46</sup> *Id.* § 3.

<sup>47</sup> Royal Decree of Dec. 8, 1972, Relating to Exploration for and Exploitation of Petroleum in the Seabed and Substrata of the Norwegian Continental Shelf. A comprehensive revision of the present legislation has led to a bill expected to pass Norway's parliament, the Storting, early in 1985. The bill, which is mainly a codification of existing principles is expected to enter into force some months later.

<sup>48</sup> Act of June 21, 1963, No. 12, Relating to Exploration for and Exploitation of Submarine Natural Resources, § 3.

<sup>49</sup> *Id.* §§ 4, 6.

The license entitles the holder to perform general geological and geophysical exploration.<sup>50</sup> It does not, however, authorize drilling.<sup>51</sup> Nor does it confer sole rights for exploration or preferential status for future exploitation of potential petroleum discoveries.<sup>52</sup> In fact, licensees must forward all exploration results, such as field data and interpretations, to the Ministry of Petroleum and Energy free of charge and on a confidential basis.<sup>53</sup>

## 2. *Production Licenses*

A production license may be granted to companies, institutions or other associations established in accordance with Norwegian legislation and situated in Norway. In special circumstances, foreign companies may receive production licenses—but only if they (1) have a branch in Norway, (2) have permanent facilities, and (3) have representatives who are authorized to enter into binding commitments to the same extent as the board members of a Norwegian joint-stock company.<sup>54</sup> A production license gives the licensee an exclusive right both to explore and to exploit petroleum deposits in a specific area.<sup>55</sup>

There are several basic conditions and limitations for receipt and use of production licenses. First, to obtain a production license, an applicant must undertake to carry out a work program in the licensed area during the first six years.<sup>56</sup> That program must include, inter alia, plans to drill a certain number of wells down to a certain depth.<sup>57</sup> Secondly, the applicant must pay special fees for the application and for the granting of a license.<sup>58</sup> And thirdly, as soon as production starts, the licensee must begin to pay a royalty on the value of petroleum produced.<sup>59</sup>

## 3. *Installation Licenses*

Each time the Ministry grants installation licenses, e.g. for constructing pipelines or storage facilities, on the continental shelf, it stipulates terms for the individual case.

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<sup>50</sup> *Id.* § 7.

<sup>51</sup> *Id.*

<sup>52</sup> *Id.* § 8.

<sup>53</sup> *Id.* § 10.

<sup>54</sup> *Id.* § 11.

<sup>55</sup> *Id.* § 15. This production license is valid for six years. *Id.*

<sup>56</sup> *Id.* §§ 15, 20, 22. Section 20 provides that this license will be extended for 30 years under § 15 after the expiration of six years. *Id.*

<sup>57</sup> *Id.* § 17.

<sup>58</sup> *Id.* §§ 12, 18, 25.

<sup>59</sup> *Id.* § 26.

## C. The Fields

### 1. *Announcing and Allocating Blocks*

Like legislation in the hydropower sector, legislation in the petroleum sector gives the state complete control of resource development without necessarily making the state a main investor or producer. When the first announcement of blocks on the Norwegian continental shelf was made in 1965, there were no Norwegian oil companies. It was quite obvious that during the first years foreign oil companies would have to carry out offshore activities with foreign technology and capital. But it was equally clear that the state should thoroughly control such activities in order to bring Norwegian industry into all aspects of the petroleum activity as soon as possible. Many often wonder whether this and other aspects of Norwegian petroleum policy have delayed the development of Norwegian petroleum resources. The best response is probably a brief overview of developments thus far.

The government first announced the availability of 278 blocks of approximately 200 square miles *each* on the Norwegian continental shelf in 1965.<sup>60</sup> In response, the government received eleven applications covering 208 of the blocks. At the conclusion of negotiations with each individual applicant, the state allocated seventy blocks.

The first drilling on the Norwegian continental shelf took place the following year. Only two years later, the first discovery was made at the Cod field. On Christmas Eve of 1969 the Phillips Petroleum Company discovered the Ekofisk field. Oil production began in 1971.

Six concession rounds have followed that first announcement of blocks in 1965. The first announcements were concentrated in the area south of the sixty-second parallel and adjacent to the British sector. The fifth round of June 1979, however, announced twenty-six blocks north of sixty-two degrees latitude. This resulted in the first licenses and the first exploratory drilling off the coast of northern Norway. That area's first petroleum finds were made in 1981.

### 2. *Ekofisk Field*

As mentioned above, the first production of oil on the Norwegian continental shelf took place at the Phillips-operated Ekofisk field in 1971, some six years after the first announcements of blocks and eighteen months after the field's discovery. The Ekofisk field, together with other smaller adjacent fields in the so-called Ekofisk area, had recoverable

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<sup>60</sup> REPORT NO. 53 (1979-80) TO THE PARLIAMENT CONCERNING THE ACTIVITY ON THE NORWEGIAN CONTINENTAL SHELF. Each block is approximately 200 square miles.

reserves of 1.6 billion barrels of oil and 7.4 Tcf of natural gas.<sup>61</sup> By 1975, oil production from the field reached 8.7 mtoes, thereby exceeding Norway's own consumption of 7.4 mtoes.<sup>62</sup> Norway became the only net exporter of oil within the OECD area. Soon, in 1977, the field's gas came on stream through a pipeline to Germany.

### 3. *Frigg Field*

At that same time, the Frigg natural gas field, with recoverable reserves of approximately 7.4 Tcf, came on stream through a pipeline to Scotland. The Frigg field had been discovered in 1971 in a block awarded three years earlier. It is located some 220 miles north of Ekofisk on the border between the British and Norwegian continental shelves. Negotiations between the British and Norwegian governments resulted in a division of the field that allocated 60.82% of the reserves to Norway.<sup>63</sup> Elf Aquitaine, the current operator, has developed the field as one unit. With both the Ekofisk and Frigg fields in operation, combined oil and gas production in 1980 climbed to approximately one million barrels per day.<sup>64</sup>

### 4. *Statfjord Field*

By that time, production had also started at the Statfjord field discovered five years earlier. Statfjord, with originally recoverable reserves of 2.7 billion barrels of oil and 1.7 Tcf of natural gas,<sup>65</sup> is the biggest field in production in the North Sea. It also is located on the border between the British and Norwegian sectors, and is only some ten miles north of the Frigg field. The licensees, the Statfjord group, have agreed to a distribution of the reserves that assigns 84.1% to the Norwegian side.<sup>66</sup> With Mobil Oil as operator, the Statfjord group is developing the field as one unit, but in several phases. The field currently produces some

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<sup>61</sup> See generally OLJEDIREKTORATET, 1982 PERSPEKTIVANAYSEN 11 (NORWEGIAN OIL DIRECTORATE, PETROLEUM OUTLOOK (August 1982)).

<sup>62</sup>

Norwegian oil consumption 1975:	7.0 mtoe
Norwegian oil production 1975:	8.7 mtoe

These figures are not published and have been calculated by the author on information received from the Central Bureau of Statistics of Norway. Mtoe = million tons of oil equivalents.

<sup>63</sup> Agreement relating to the Exploitation of the Fregg Field Reservoir and the Transmission of Gas Therefrom to the United Kingdom, May 10, 1976, U.K.-Norway.

<sup>64</sup> ROYAL MINISTRY OF PETROLEUM AND ENERGY, 2 FACT SHEET 10 (1983).

<sup>65</sup> OLJEDIREKTORATET, *supra* note 61, at 11.

<sup>66</sup> Agreement Relating to the Exploitation of the Statfjord Field Reservoir and the Offtake of Petroleum Therefrom, U.K.-Norway, Proposition No. 15 (1980-81) to the Parliament, adopted Dec. 19, 1980.

300,000 barrels of oil per day.<sup>67</sup>

### 5. Current Importance of the Fields

Ekofisk, Frigg and Statfjord fields are Norway's three main producing areas. Two others, Murchison and Valhall/Hod also produce significant amounts. Of Murchison's 350 million barrels of recoverable oil, however, only 16.25% lie on the Norwegian side of a division with Britain.<sup>68</sup> The Valhall/Hod fields have recoverable reserves estimated at 280 million barrels of oil and 1.2 of natural gas. These are the fields from which Norway produces oil and gas today. They will continue to be the most important for the rest of the decade.

It is interesting to note at this point that compared with offshore field development elsewhere in the world, development in Norway has proceeded rapidly and without unnecessary political or administrative delays. All of the above-mentioned fields were developed as soon as the operating companies declared them commercial. Naturally, concern for both the socio-economic impact and the safety and environmental aspects has prompted warnings against overly-rapid development of Norway's petroleum sector. But while such factors have been thoroughly considered in the planning and regulation phases, and have strongly influenced final decisions, they have not delayed or limited exploration or production.

### D. Government Involvement Today

Today Norway produces nearly one million barrels per day, of which close to one-half is oil.<sup>70</sup> As a result, the petroleum sector, which now accounts for nearly one-fifth of Norway's gross national product and one-third of its total exports, has within a short period come to occupy a dominant position in the Norwegian economy.<sup>71</sup>

Development of the continental shelf has involved investments of a volume which seem out of proportion to the rest of the Norwegian economy. Thus far, some twelve billion dollars have been invested in explora-

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<sup>67</sup> OLJEDIREKTORATET, *supra* note 61, at 11.

<sup>68</sup> *Id.*

<sup>69</sup> ROYAL MINISTRY OF PETROLEUM AND ENERGY, *supra* note 64, at 10.

<sup>70</sup> *Id.* Conversion factor: 1 mbd = 48.2 ntoe per year.

<sup>71</sup> See generally STATISTICAL YEARBOOK, *supra* note 18.

GNP 1982:	363 billion NOK
Value of oil and gas production in relation to GNP:	17%
Total exports 1982:	166 billion NOK
Oil and gas exports in relation to total exports:	35%

Source: Central Bureau of Statistics of Norway, *supra* note 22.



tion, permanent installations and pipelines.<sup>72</sup> And, we can expect yearly investments in the magnitude of two to three billion dollars, or twenty-five percent of Norway's total investments, in the next ten years.<sup>73</sup> In addition, operating costs will probably range between two and three billion dollars per year.<sup>74</sup> Although most of those investments have in the past been undertaken by foreign oil companies and financed from abroad, the Norwegian share of investments is growing. This tendency is likely to continue in the years ahead.

Such growth in Norwegian participation in the petroleum industry resembles the trend in the hydropower industry. Thus it has been an important state objective both to promote the use of Norwegian goods and services for petroleum activities and to secure direct Norwegian participation. The state encourages Norwegian deliveries on a nondiscriminatory basis. Concession terms provide that "the licensee shall use Norwegian goods and services in the activity as far as they are competitive with regard to quality, service, schedule of delivery and price."<sup>75</sup> While they ensure that the Norwegian industry have the opportunity to compete with established foreign suppliers, the terms do not constitute a preferential clause.

Norwegian industries have gradually succeeded in building up their ability to compete in the support market. In the beginning they made only limited deliveries. By 1975, however, Norwegian industry's net share of contracts for goods and services for use on the continental shelf had reached twenty-eight percent. Today, a steady increase has led to a nearly sixty percent share.<sup>76</sup>

The direct participation by Norwegian oil companies, is equally as important as the delivery of goods and services to the operating companies. Currently there are three Norwegian oil companies that participate. In 1972 Parliament decided by unanimous vote to establish a one hundred percent state-owned oil company—"Den norske stats oljeselskap A/S" or Statoil.<sup>77</sup> At that time Norway's largest industrial company, Norsk Hydro, was ready to enter the petroleum sector. Norsk Hydro was established in 1905 for the industrial utilization of Norwegian hydroelectricity and was originally controlled by private, foreign capital. In

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<sup>72</sup> ROYAL MINISTRY OF PETROLEUM AND ENERGY, REPORT NO. 40 TO THE STORTING, RELATING TO THE PERSPECTIVES IN THE PETROLEUM ACTIVITY IN THE COMING YEARS 8-9 (1982-83).

<sup>73</sup> *See id.*

<sup>74</sup> *Id.*

<sup>75</sup> Royal Decree of Dec. 8, 1972, § 54.

<sup>76</sup> *See generally* ROYAL MINISTRY OF PETROLEUM AND ENERGY, *supra* note 72.

<sup>77</sup> Proposition No. 113 (1971-72).

1971, however, the Norwegian government acquired a majority of Norsk Hydro's shares. In 1971 a group of large industrial companies established a new oil company, Saga Petroleum, which is an entirely private company.

#### E. Concessions and State Participation

In the first allocation of blocks on the Norwegian Continental Shelf in 1965, the concession principle granted private companies the right to explore, produce, transport and dispose of petroleum for a particularly defined period of time. At that time, Norwegian equity share amounted to only nine percent<sup>78</sup>—the rest was granted to foreign companies. Moreover, the state did not participate at all. It exercised its control and secured its interests only through laws, regulations, taxes and royalties.

By 1969 and the second allocation, however, the Norwegian equity share had increased to fifteen percent.<sup>79</sup> More importantly, however, the government changed the concession system by introducing participation agreements. This made the state a direct party to agreements regulating the development of each block. The state could then use those agreements to secure the state's economic interests. It could establish either a net profit agreement or an option agreement that would enable the state to participate in case of commercial discoveries.

With the government's establishment of Statoil, it also effected another major change, one that further increased state participation. With this change, Statoil became a direct party to the agreements in place of the state. And, the agreements then awarded at least fifty percent to Statoil, an increase to fifty-one percent at the time of discovery, and a share which could go up to eighty percent, depending on a sliding scale keyed to the level of production.

It should be noted at this point that the special status of Statoil is regulated not by law, but through the detailed rules of the participation agreements. Description of the rules lies beyond the scope of this article. And those rules may change soon. The government decided (some time ago) to examine the organization of the state's participation in the petroleum sector and it appointed a special committee. Although the committee delivered its report in February of 1983<sup>80</sup> it is still too early to predict what changes it may cause. Furthermore, the committee's mandate was

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<sup>78</sup> Report of Feb. 21, 1983, Relating to the organization of the state's participation in petroleum activities, by a Committee appointed by Royal Decree of Mar. 5, 1982.

<sup>79</sup> *Id.*

<sup>80</sup> *Id.* The government also appointed a committee to examine the consequences of various levels of activity on the continental shelf. This committee delivered its report on Apr. 20, 1983.

limited to making recommendations to strengthen the parliamentary control and management of petroleum activities. Neither the state's rights nor income were to be reduced but public administration functions were to be separated from commercial operations. The recommendations, therefore, might lead to organizational changes, which could in turn have consequences for the role of Statoil.

#### F. THE FUTURE: Available Norwegian Resources

Although estimates of total hydrocarbon reserves remain uncertain, there is no doubt that Norwegian oil and gas production can continue well into the future. The potential areas may be identified as those either north or south of the sixty-second parallel. South of the parallel, there are some 2.7 billion toe of proven reserves.<sup>81</sup> Of those reserves, oil accounts for about 1.2 billion tons, or nine billion barrels (18), a figure comparable to one-third of the proven recoverable oil reserves in the United States.<sup>82</sup> To date, only 250 million toe of those Norwegian proven reserves have been produced.<sup>83</sup> And, in addition to proven reserves there are also another two billion toe that are "estimated recoverable resources."<sup>84</sup> Those sources probably contain a high proportion of natural gas.

There might also be significant reserves north of the sixty-second parallel. Although there are still no official estimates and exploration has yet to yield reliable estimates, the area is six times larger than the shelf south of the parallel and has yielded several finds since exploratory drilling began in 1980. Natural gas was discovered in 1981 in the very north of Norway, west of Troms, at Tromsøflaket. In 1982, three new finds were made in that same area. And later, in 1983, oil was found offshore of mid-Norway at Haltenbanken.

The mere discovery of such reserves does not alone suffice, however. Commercial development is often complicated by deep waters, complex seabeds and long distances to markets. Thus, it is still too early to know whether and under what transportation alternative these recently discovered fields will prove to be commercially feasible. Even if gas production at Tromsøflaket were ready to begin by the end of the 1990s, it is unlikely that production would reach significant levels until after the turn of the century.

It follows, therefore, that the reserves south of the sixty-second par-

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<sup>81</sup> See generally OLJEDIREKTORATET, *supra* note 61.

<sup>82</sup> See INTERNATIONAL ENERGY AGENCY, *supra* note 1.

<sup>83</sup> See OLJEDIREKTORATET, *supra* note 61.

<sup>84</sup> *Id.*

allel will decide production levels until the year 2000. For those reserves, however, experience shows that it takes three to ten years of exploration to develop the information required for a decision to exploit a field. It then takes yet another four to six years of investment before production can start. We can therefore conclude that Norwegian oil and gas production for the rest of the 1980's is more or less determined by the capacity of fields already in production or under development. On this basis, it is fairly safe to assume that oil production may increase from the current 500,000 barrels per day to a maximum of 700,000 barrels per day around 1990. For that same period, natural gas production will probably remain stable at the equivalent of 500,000 barrels per day, or maybe increase slightly.

Although total production will remain relatively stable, it will involve substantial changes in production patterns. Ekofisk field production, which has already peaked, will continue to decrease in the 1980s. This is being offset, however, by increased production from other fields, mainly from Statfjord. Production levels at the Frigg field are expected to remain at a stable level of approximately 200,000 barrel equivalents per day throughout the decade. To summarize, therefore, combined oil and gas production from the fields now in production or under development may increase to about 1.2 million barrels per day by 1990. From then on, however, production from these particular fields will decrease to a probable level of 300,000 barrels per day.

Decreased production from the older fields will be offset, however, by production in other fields. Several new fields are now being evaluated for production. Four bigger ones—Oseberg, Sleipner, Gullfaks and Troll—will be decisive. Oseberg is a combined oil and gas field west of Bergen. Since the license was granted in 1979, reserves have been estimated at 0.7 billion barrels of oil and at 2.1 Tcf of gas.<sup>85</sup> This field could come on stream by 1991. Sleipner, a gas field between Frigg and Ekofisk, has estimated reserves of 7.1 Tcf.<sup>86</sup> This field also could come on stream in the early 1990s. Its licensees are currently negotiating with European gas buyers. The outcome of the negotiations will be decisive for the field's future development.

Gullfaks, located east of Statfjord, is primarily an oil field. Its reserves are estimated at 1.4 billion barrels of oil and at 0.8 Tcf of gas.<sup>87</sup> Because the first phase of development is already underway, production will probably begin by 1987. The second phase, which involves the de-

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<sup>85</sup> *Id.*

<sup>86</sup> *Id.*

<sup>87</sup> *Id.*

velopment of an additional 0.7 billion barrels of oil, could possibly lead to production start-up in the mid-1990s.

The fourth field, Troll, which was discovered east of Bergen in 1979, is a giant. Although it is primarily a gas field, it also contains substantial quantities of oil. Its total recoverable reserves have been estimated at fifty-six Tcf of gas and at one billion barrels of oil.<sup>88</sup> This probably makes Troll the biggest known offshore field in the world. The problem, however, is that Troll is also one of the most complicated fields. Located in the middle of the so-called Norwegian Trench, its waters 300 to 350 meters deep are twice as deep as those above any other field thus far developed in the North Sea. Moreover, the field's geology is complicated. The communication among its variety of geological structures is still somewhat unclear, and the combination of oil and gas in thin layers may cause production problems. Despite its technological and economic challenges, however, the Troll field could be this century's most important offshore undertaking in either Norway or in all of Western Europe. It is the gas from this field that may help Europe to diversify its gas supplies in the late 1990s.

Thus, based on the proven or reasonably assured reserves of the fields described above, Norway can expect to maintain both oil and gas production in the 1900's—and perhaps increase production to 1.6 mbd toward the year 2000.<sup>89</sup> Whether this may be realized, however, will depend particularly upon technological, financial and political factors.

### III. CONCLUSION

Industrialization and economic growth in Norway are probably more closely linked to the development of indigenous energy resources than in any other western country. The hydropower and hydrocarbon sectors clearly differ. Nevertheless, Norway's main objectives and her basic principles for developing her resources are similar. Comprehensive special legislation now secures national control of energy resources. By taking into account basic social and economic policies, the government aims to insure that these resources provide maximum benefit to society as a whole.

Both Norway's energy resource development policy and related industrial policy rely on international cooperation, paying particular attention to international law, economic and monetary policies, and to trade. Moreover, internal energy consumption policy, including pricing and

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<sup>88</sup> *Id.*

<sup>89</sup> See INTERNATIONAL ENERGY AGENCY, ENERGY POLICIES AND PROGRAMMES OF IEA COUNTRIES 1981 REVIEW.

conservation, has taken the international energy situation into account by developing in line with principles established by the International Energy Agency.

Within this framework the creation of domestic industrial and management capacity to develop and utilize indigenous energy resources has become a primary goal. In light of Norway's experience thus far, it is fair to assume that these basic objectives and principles will predominate in her future energy policy. As a result, the development of indigenous energy resources will continue to play a decisive role in industrial and economic growth. And Norway can then be expected to maintain, or even increase, its exports of energy and of energy-based products to Western Europe and to the United States.