

Resources from the Snøhvit field on the way in to the Melkøy facility in Hammerfest. (Photo: Harald Pettersen, Statoil)

## Resources

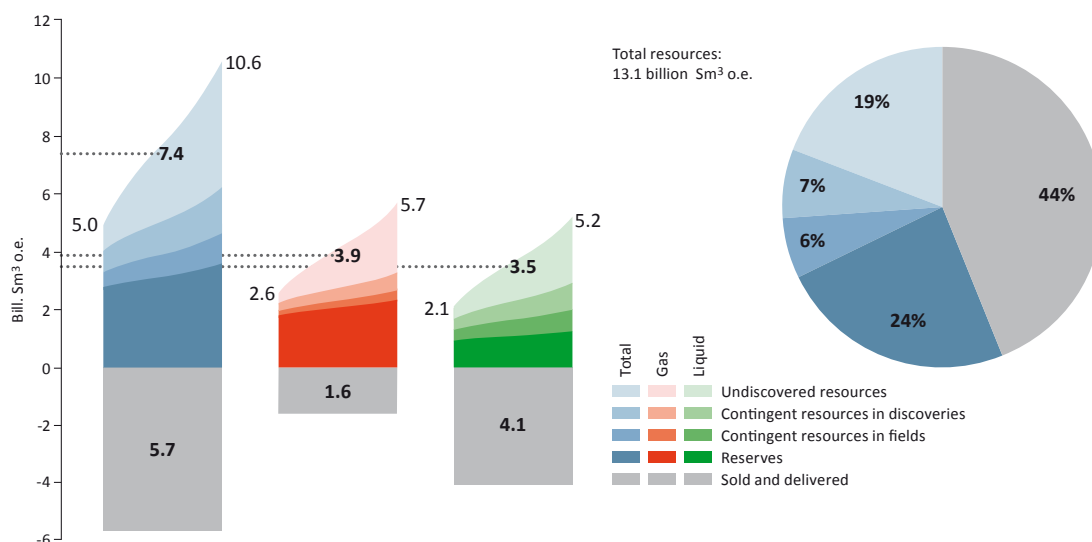
Resources is a collective term for recoverable petroleum volumes. The resources are classified according to their maturity, see Figure 4.2. The classification includes the following categories: decided by the licensees or approved by the authorities for development (reserves), volumes dependent on clarification and decisions (contingent resources) and volumes expected to be discovered in the future (undiscovered resources). The main categories are thus reserves, contingent resources and undiscovered resources.

The Norwegian Petroleum Directorate's base estimates for discovered and undiscovered petroleum resources on the Norwegian continental shelf amount to about 13.1 billion standard cubic metres of oil equivalents (billion Sm<sup>3</sup> o.e.). Of this, a total of 5.7 billion Sm<sup>3</sup> o.e. have been sold and delivered, which corresponds to 44 per cent of the total resources. The total remaining recoverable resources thus amount to 7.4 billion Sm<sup>3</sup> o.e. Of this, 4.9 billion Sm<sup>3</sup> o.e. have been discovered, while the estimate for undiscovered resources is 2.5 billion Sm<sup>3</sup> o.e.

The overall growth of discovered resources from exploration activities in 2011 is estimated at 61 million Sm<sup>3</sup> oil and 53 billion Sm<sup>3</sup> gas. Twenty-two new discoveries were made in 54 exploration wells. Many of the discoveries have not been evaluated, and the estimates are therefore very uncertain.

Since production started on the Norwegian continental shelf in 1971, petroleum has been produced from a total of 82 fields. In 2011, production started from the Trym field in the North Sea. Of the fields that were producing at the end of 2011, 56 are located in the North Sea, 13 in the Norwegian Sea and one in the Barents Sea.

Figure 4.1 shows the estimates for recoverable resources on the Norwegian continental shelf. The volumes are divided according to the Norwegian Petroleum Directorate's resource classification and shows total resources, liquid and gas.



**Figure 4.1** Petroleum resources and uncertainty in the estimates per 31.12.2011 (Source: Norwegian Petroleum Directorate)

The detailed resource accounts as of 31 December 2011 are presented in Table 4.1 and in tables in Appendix 2.

## Reserves

Reserves include remaining recoverable petroleum resources in deposits for which the authorities have approved PDOs or granted PDO exemptions, and in deposits the licensees have decided to produce, but where the authorities have not yet processed the plan.

In 2011, the reserve growth was 260 million Sm<sup>3</sup> o.e. At the same time, 222 million Sm<sup>3</sup> o.e. (including historical gas production from Tambar, which was not included last year) were sold and delivered. The resource accounts show, therefore, an increase of 38 million Sm<sup>3</sup> o.e. in remaining reserves, which is about one per cent.

As regards the authorities' goal of maturing 800 million Sm<sup>3</sup> of oil to reserves by 2015, 93 million Sm<sup>3</sup> of oil were recorded as new reserves in 2011. During the period from 2005 to 2011, the overall reserve growth totals 452 million Sm<sup>3</sup> of oil.

## Contingent resources

Contingent resources include proven petroleum volumes for which a decision to produce has not yet been made. Contingent resources in fields, not including resources from possible future measures for improved recovery (resource category 7A), decreased by 189 million Sm<sup>3</sup> o.e. The reason for this is that in 2011 there has been a good maturing of resources on the fields to reserves.

The volume of contingent resources in discoveries has increased by 356 million Sm<sup>3</sup> o.e., to 1006 million Sm<sup>3</sup> o.e. The increase can be explained by factors such as the positive growth of resources from new discoveries, and that the resource estimate for the 16/2-6 Johan Sverdrup discovery increased by 270 million Sm<sup>3</sup> o.e. after drilling several delineation wells in 2011.

## Undiscovered resources

Undiscovered resources include petroleum volumes that are assumed to exist, but which have not yet been proven through drilling (resource categories 8 and 9).

The Norwegian Petroleum Directorate has, as a result of the new discoveries made in 2011, reduced its estimate of total undiscovered resources by the year's discoveries.

The estimate was reduced by 0.1 billion Sm<sup>3</sup> o.e. to 2.5 billion Sm<sup>3</sup> o.e.

## The North Sea

The changes in the accounts for what has been sold and delivered from the North Sea over the past year totalled 145 million Sm<sup>3</sup> o.e. (including the historical gas production from Tambar, which was not included last year). The growth of gross reserves was 184 million Sm<sup>3</sup> o.e. This increase is partly due to the approved PDOs for the 25/5-7 Atla og 7/7-2 Brynhild discoveries, and because the licensees submitted a PDO for 25/8-17 Jette\*. In addition, there has been an increase in reserves for fields in operation. This led to an increase in the remaining reserves in the North Sea by 39 million Sm<sup>3</sup> o.e. Contingent resources in fields were reduced by 170 million Sm<sup>3</sup> o.e. This is partly because projects on several fields were decided, and contingent resources therefore matured to reserves. Sixteen new discoveries were made in the North Sea in 2011, and the contingent resources in discoveries increased by 302 million Sm<sup>3</sup> o.e. The reason is that the resource estimate for the 16/2-6 Johan Sverdrup discovery proven in 2010 was updated.

\* PDO for Jette was approved in February 2012.

## The Norwegian Sea

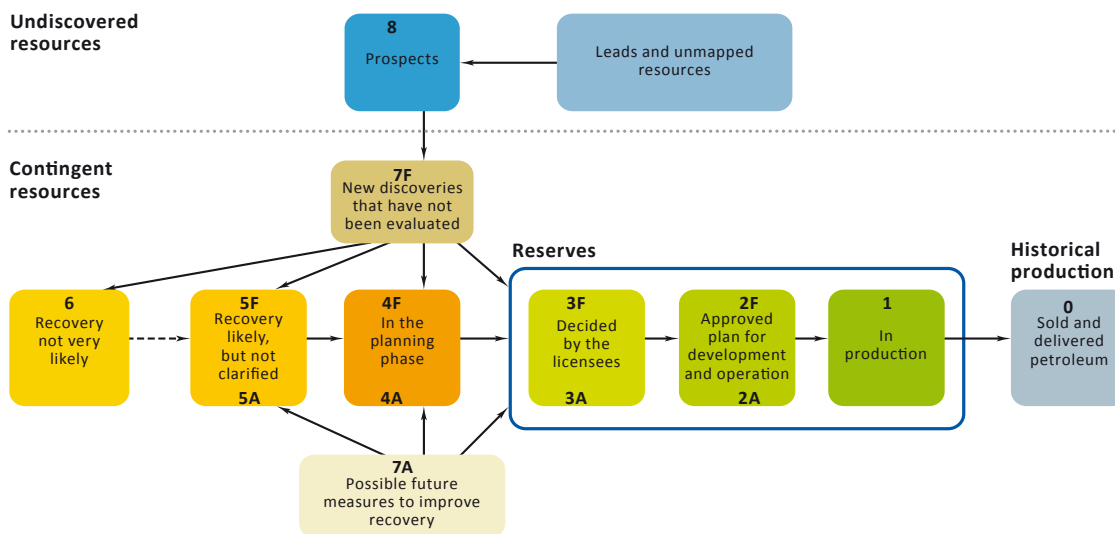
Changes in the accounts for what has been sold and delivered from the Norwegian Sea in 2011 totalled 72 million Sm<sup>3</sup> o.e. The growth in gross reserves was 58 million Sm<sup>3</sup> o.e., due in part to approval of the PDO for 6407/8-5 S Hyme and submission of the PDO for 6608/10-12 Skuld\*. Gas reserves in fields such as Åsgard and Njord have increased. Still, remaining reserves in the Norwegian Sea are reduced by 14 million Sm<sup>3</sup> o.e. Contingent resources in fields are reduced by 49 million Sm<sup>3</sup> o.e., primarily due to the PDO for Åsgard compression being submitted and resources maturing to reserves. Three new discoveries were made in the Norwegian Sea in 2011. Still, the estimate for contingent resources in discoveries was reduced by 21 million Sm<sup>3</sup> o.e. compared with last year's accounts. This is partly due to resources maturing to reserves for 6407/8-5 S Hyme and 6608/10-12 Skuld.

\* PDO for Skuld was approved in January 2012.

## The Barents Sea

Changes in what has been sold and delivered from the Barents Sea in 2011 totalled 5 million Sm<sup>3</sup> o.e. Gross reserves on the Snøhvit field have increased by 20 million Sm<sup>3</sup> o.e., and therefore the remaining reserves in the Barents Sea have increased by 15 million Sm<sup>3</sup> o.e. Contingent resources in fields have increased by 31 million Sm<sup>3</sup> o.e., partly because two new projects for improved recovery on the Snøhvit field were formalised. Three new discoveries have been made in the Barents Sea in 2011. This resulted in contingent resources in discoveries increasing by 73 million Sm<sup>3</sup> o.e.

### NPD's resource classification



**Figure 4.2** The NPD's resource classification (Source: Norwegian Petroleum Directorate)

**Table 4.1** Resource accounts per 31.12.2011

Total recoverable potential Project status category	Resource accounts per 31.12.2011					Changes from 2010				
	Oil mill Sm <sup>3</sup>	Gas bill Sm <sup>3</sup>	NGL mill tonnes	Cond mill Sm <sup>3</sup>	Total mill Sm <sup>3</sup> o.e.	Oil mill Sm <sup>3</sup>	Gas bill Sm <sup>3</sup>	NGL mill tonnes	Cond mill Sm <sup>3</sup>	Total mill Sm <sup>3</sup> o.e.
Produced*	3723	1651	142	100	5743	98	104	8	5	222
Remaining reserves**	823	2070	125	30	3161	-5	27	11	-5	38
Contingent resources in fields	356	179	18	3	572	-54	-114	-9	-3	-189
Contingent resources in discoveries	574	386	14	19	1006	319	29	3	3	356
Potential from improved recovery***	140	50			190	0	-20			-20
Undiscovered	1140	1205		110	2455	-60	-50		-5	-115
<b>Total</b>	<b>6756</b>	<b>5540</b>	<b>299</b>	<b>262</b>	<b>13127</b>	<b>298</b>	<b>-25</b>	<b>13</b>	<b>-5</b>	<b>293</b>
<b>North Sea</b>										
Produced	3228	1383	107	69	4884	76	58	5	2	145
Remaining reserves**	636	1433	70	2	2203	-9	45	3	-4	39
Contingent resources in fields	314	118	11	1	454	-56	-105	-4	-1	-170
Contingent resources in discoveries	488	162	10	15	684	286	9	2	4	302
Undiscovered	520	270		20	810	-20	-10	0	-5	-35
<b>Total</b>	<b>5187</b>	<b>3365</b>	<b>198</b>	<b>107</b>	<b>9036</b>	<b>277</b>	<b>-4</b>	<b>6</b>	<b>-4</b>	<b>281</b>
<b>Norwegian Sea</b>										
Produced	495	253	33	27	839	21	42	3	2	72
Remaining reserves**	156	472	48	9	728	4	-26	6	-4	-14
Contingent resources in fields	42	30	5	0	82	2	-35	-7	-4	-49
Contingent resources in discoveries	47	171	4	4	230	-5	-16	0	-1	-21
Undiscovered	280	450		40	770	-5	-5	0	0	-10
<b>Total</b>	<b>1020</b>	<b>1377</b>	<b>90</b>	<b>81</b>	<b>2650</b>	<b>18</b>	<b>-40</b>	<b>3</b>	<b>-7</b>	<b>-23</b>
<b>Barents Sea</b>										
Produced	0	15	1	3	19	0	4	0	1	5
Remaining reserves**	31	165	8	19	230	0	8	2	3	15
Contingent resources in fields	0	30	2	2	36	0	27	1	2	31
Contingent resources in discoveries	38	53	0	0	92	38	35	0	0	73
Undiscovered	340	485		50	875	-35	-35	0	0	-70
<b>Total</b>	<b>409</b>	<b>748</b>	<b>11</b>	<b>75</b>	<b>1252</b>	<b>3</b>	<b>39</b>	<b>4</b>	<b>6</b>	<b>55</b>
* Includes historical production of gas from Tambar, not included last year. ** Includes resource categories 1, 2 and 3. *** Resources from future measures for improved recovery are calculated for the total recoverable potential and have not been broken down by area.										