

# **Subsoil Asset Accounts**

**Results of a questionnaire  
and points for further discussion**

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## 1 Introduction

In spring 2004 we sent out a questionnaire about subsoil asset accounting to members of the London Group. In total 49 people from 29 countries and organisations received the questionnaire. Nine countries responded by filling out the questionnaires.

*Nine countries with subsoil assets accounts* The nine countries were: Austria, Canada, Denmark, New Zealand, Norway, Philippines, South Africa, the Netherlands and United Kingdom.

Furthermore, Sweden and Germany answered that no subsoil accounting is carried out.

This paper summarises the information given by the nine countries in response to the questions.

*Reports and documents* Some of the countries and Eurostat kindly provided us with reports and documents concerning subsoil assets. A list of these reports and documents is found in the annex, but the reports and documents have not been reviewed by the subgroup.

*Points for discussion* *Based on the survey, some further questions at a rather general level are raised in this paper. The aim is to facilitate a discussion on how the subgroup could continue its work, and which overall issues the London group regards as most important for the subgroup to take up. Others and more specific questions might be (more) relevant, and members of the London Group are encouraged to raise these during the discussion.*

## 2 Type of subsoil accounting

### 2.1 Mineral and energy resources covered

The type of mineral and energy resources covered is very different in countries which participated in the questionnaire, because of different needs for those accounts and different types of resources countries are possessing.

*Energy* All nine countries have accounts for energy assets, either for oil and natural gas or coal. Canada and New Zealand have accounts for both types of energy assets.

*Metallic mineral assets* Metallic mineral assets are covered just in Canada, The Republic of Philippines and South Africa, and are under development in New Zealand.

*Non-metallic mineral assets* Only Canada and The Republic of Philippines cover non-metallic mineral assets (potash, and limestone and sand and gravel, respectively). New Zealand is developing non-metallic mineral accounts for aggregate, limestone, dolomite, clay and other non-metallic minerals.

*Canada* Canada covers the widest range of subsoil assets. Beside energy assets like crude oil, natural gas, crude bitumen, coal and uranium, Canada covers also several mineral assets: potash, gold, iron, zinc, silver, copper, nickel, molybdenum and lead. In Canada work is under way to include diamonds, and offshore extraction of crude oil and natural gas. Both activities are in their early stage of production. Consequently, the data are either not available or are confidential (particularly true with diamonds).

*Philippines* The Republic of Philippines covers also a wide range of minerals: gold, copper, chromate, nickel, manganese, iron, limestone, sand and gravel.

*New Zealand* New Zealand covers coal, oil and gas and is developing minerals accounts for gold, silver, iron, aggregate, limestone, dolomite, clay and other non-metallic minerals.

*Austria* Austria did pilot studies on subsoil focusing on mineral oil and gas as well as brown coal and lignite.

*Norway* Norway covers oil and natural gas by their accounts. In the early 1980s, Statistics Norway produced physical mineral accounts covering oil, coal, chalk, quarts, sand and gravel and physical metal accounts covering lead, iron, aluminium, magnesium, copper, zinc and nickel. The production of these asset accounts terminated in the mid 1980s. The reasons for the decline of the accounting activities were primarily due to the fact that the Ministry of Environment, commissioning the accounts, was not given the responsibility for the management of the resources. Once the accounts were published, the Ministry ended up with no particular use of updated accounts. The managers of the resources had their own information collection systems and did not need the accounts to do their work. Besides, not all the accounts developed were considered to be of importance and the costs of maintaining and developing the accounts further were much higher than expected.

*South Africa* South Africa covers gold, platinum and coal assets.

*Denmark, The Netherlands and UK* Denmark, the Netherlands and UK cover oil and natural gas

**Table 1. The type of mineral and energy resources covered**

	Oil and natural gas	Coal	Metallic minerals	Non-metallic minerals
Austria		lignite and brown coal	gold, copper, nickel, iron, uranium, crude bitumen, zinc, silver molybdenum and lead	
Canada	x	x		potash
Denmark	x			
New Zealand	x	x	developping gold, silver and iron.	developing aggregate, limestone, dolomite, clay and other non-metallic minerals
Norway	x			
Philippines		x	gold, copper, chromate, nickel, magnesium and iron	limestone and sand and gravel
South Africa		x	gold and platinum	
Sweden				
The Netherlands	x			
United Kingdom	x			

## 2.2 Units of measurement

*Physical and monetary* All nine countries have both physical and monetary accounts. However, for the Netherlands the monetary accounts seems not to be part of the current asset accounting, but based on pilot studies only.

*Physical units* The most common units of measurement are tonnes for solids, m<sup>3</sup> for liquids and gases in connection with physical accounts. Some countries like The Netherlands and

New Zealand use also energy units of measurement for physical accounts, for instance joules.

*Monetary units* For the monetary accounts current prices are generally used. However, Austria answers that stock value estimates are made in fixed prices.

Questions: Would it be interesting and useful to look more into the methods of fixed prices calculations of stock values?

### 2.3 Resource classification

*McKelvey box* Most countries use some kind of the McKelvey box principle as basis for their classification.

*New Zealand and Philippines* In New Zealand and Republic of Philippines proven plus probable were used as stock levels.

Physical coal stocks in New Zealand are classified using the JORC (Joint Ore Reserves Committee) code as this is the classification system used by the minerals industry in New Zealand and Australia. The JORC code is based on the modified McKelvey box and classifies minerals as proven and probable reserves and measured, indicated and inferred resources. JORC is very similar to the general resource classification recommended by SEEA. See [www.jorc.org](http://www.jorc.org) for more information. Petroleum physical stock accounts only include proven and probable reserves. Only proven and reserves are valued as assets.

*UK* United Kingdom use discovered (proven, probable, and possible) and undiscovered as resource classification. Undiscovered is given within lower and upper ranges.

*Austria* Austrian classifications are based on Eurostat’s questionnaire.

**Table 2. Resource classification**

Austria	Classification based on Eurostat questionnaire
Canada	Developed reserves
Denmark	Proven (ongoing and approved), planned recovery, possible recovery
NZ, PH	Proven, Probable
Norway	Total recoverable (discovered resources and undiscovered)
South Africa	?
Netherlands	?
UK	Proven, Probable, Possible

*Norway* In Norway the resource estimates in physical terms are made by the Norwegian Petroleum Directorate (NPD), which are based on reports submitted by the operating companies. NPD classifies the resource estimates by different resource classes. The total resource estimates is called “total recoverable resources”, and can be divided into “reserves”, “discovered resources” and “undiscovered resources”. NPD no longer uses the “proven”, “probable” and “possible” categories. In the physical balance sheets, respectively for oil/NGL and gas, the resources are divided into “discovered” (which refers to “reserves” and “discovered resources” classified by NPD) and “undiscovered” resources.

*Denmark* All physical figures on oil and gas in Denmark come from the Danish Energy Agency (DEA). DEA is operating with four classes of reserves: ongoing extraction, approved extraction, planned recovery and possible recovery. Fields with ongoing and approved extraction corresponds to the proven reserves.

*Canada* Canadian subsoil assets are restricted to developed reserves of subsoil resources; that is, those reserves that can be expected to be recovered through existing installations

(wells or mines) under existing operating methods and economic conditions. These reserves are defined as established in the cases of oil, natural gas and crude bitumen, as recoverable in the cases of coal and uranium, and as proven and probable for metals and potash.

*Accounting for “multi-mineral assets”*

The classification of metal assets used in the physical account in Canada is distinct from that in the monetary account. While the physical account records reserves on a metal-by-metal basis, the monetary account records reserves by mine type. The classification of mine used in the monetary account is based on the classification of mining industries in the North American Industry Classification System (NAICS):

- Gold and silver mines;
- Copper-zinc mines;
- Nickel-copper mines;
- Lead-zinc mines;
- Molybdenum mines;
- Uranium mines
- Iron mines

Classification by mine type rather than metal in the monetary account precludes arbitrary decisions regarding the share of mine development and exploitation costs attributable to each metal in poly-metallic mines.

The same applies to the Danish accounts for oil and gas, where the value is calculated for oil and gas as a whole since oil and gas are produced at the same platforms, and no separate data on exploitation costs exists.

Questions: Would it be useful to work more on the harmonization of the classification of reserves? Is it realistic to expect results in this field given that the information is obtained from other institutions than national statistical offices? What does it mean in terms of international comparison? Does this have a significant impact on the value of a resource for a given year if we take all reserves versus economic reserves only?

## 2.4 Geographic level

All countries are making calculations for subsoil assets at the national level.

*Regional breakdown*

Only Canada, The Republic of Philippines and New Zealand include a regional breakdown. In Canada monetary accounts are presented for all resources at national level plus regional (provincial) level for crude oil, natural gas, coal, gold and nickel. Physical accounts are also presented for all resources at the national level, but at the regional (provincial) level accounts for natural gas, natural gas liquids, crude oil, coal, copper, gold, lead, nickel, silver, sulphur and zinc are presented.

Subsoil assets accounts in The Republic of Philippines include a regional and provincial breakdown. Monetary and physical accounts for gold, copper, chromate, nickel, manganese, iron and coal are presented at national level. At regional level (Cordillera Administrative Region) physical and monetary accounts include tables for gold, copper and limestone. Only physical and monetary accounts for nickel and sand and gravel are presented at the provincial level (Province of Palawan).

New Zealand physical coal stocks are presented by region as well as nationally. Oil and natural gas is only commercially exploited in one region.

Question: Is there a need for work on guidelines for regional subsoil accounts?

## 2.5 Accounting items and completeness

Almost all countries include the entire set of accounting items: opening stock, additions and deductions, other volume changes, revaluation, etc., but the level of detail included vary somewhat between countries.

*New Zealand* New Zealand faces difficulties in getting data for a detailed break down of the account's change variables. Thus, the two change variables in the physical stock account are: changes in stock due to extraction and changes in stock due to discoveries and reclassifications. In the monetary accounts the change variables are: Extraction (resource rent) and other changes calculated as a residual.

*UK* Apparently, only the UK splits the revaluation item in the monetary accounts into revaluation due to time passing, and changes in rent.

*South Africa* South Africa includes a distinction between volumes sold and changes in inventories in their accounts.

Question: Is it sufficient that the overall accounting items are the same in different countries? Would it be useful to try to harmonize the level of detail? In that case: at which level?

## 2.6 Accounting period

All countries present annual data with lag in interval from 10 month to three years

**Table 3 Years covered by the accounts**

	Years covered	Time lag
Austria	1975-2000	
Canada	1977-2001	3 years
Denmark	1991-2002	2 years
New Zealand	1992-2001	3 year
Netherlands	(1986) 1996-2002	
Norway	Physical: (1984) 1985-2002 Monetary: 1980-2002	1 year
Philippines	1988-1998 (1996)	
UK	1981-	10 month
South Africa	1980-2001	

*Austria* In the pilot study carried out for Eurostat, Austria presented accounts for the period 1975 to 2000.

*Canada* Canada presents annual data, minimum 1977 to 2001. For the physical accounts, the time lag in Canada is approximately three years. However, the value of each asset at the national level is projected (based on "indirect" data like production) for two year (e.g. physical data are for 2001 while monetary data are for 2003) in order to integrate these data into the national balance sheets accounts (the 2003 balance sheets accounts were released in March 2004).

*Denmark* Danish subsoil asset accounts contain a time series from 1991 to 2002. The accounting lag is two years in the oil and gas accounts.

*The Netherlands* The Netherlands offer a partially time series for the period 1986-2002, and complete time series for 1996-2002. In the present publication of subsoil accounts, only some physical flows for oil and gas are published. For Eurostat some more details are collected to fill in the yearly Eurostat questionnaire.

- Norway* In Norway physical balance sheets for crude oil/NGL and gas are calculated for the period 1984-2002, and monetary balance sheets for crude oil/NGL and gas for period 1985-2002. The economic accounts and resource rent calculations for Norway contain a period 1980-2002, with a time lag of one year.
- UK* UK presents annual time series from 1981 compiled with only 10 month lag.
- South Africa* In South Africa the current accounting period is 1980 to 2001.
- New Zealand* In New Zealand the physical stock accounts have gaps in the time series due to limitations in source data and the monetary stock accounts are weak at the commodity level prior to 1996 due to lack of data.
- Philippines* In the Philippines the accounts covers 1988 to 1996 at the national level, while most of the regional accounts cover 1990 to 1998.

## 2.7 Renewable physical stock estimates for wind, hydro, biomass, etc.

Even though renewable energy is not regarded as subsoil assets, countries were asked about their plans for stock accounts for renewable energy.

- New Zealand* New Zealand intends to include renewable physical stock estimates. The draft monetary energy stock account in New Zealand includes renewable asset valuations for hydro, geothermal, biomass and biogas electricity generation.

The methodology for valuing renewable energy stocks as assets is still being developed, but is based on a standard net present value approach. It is assumed that renewable energy can be classed as an asset - SEEA implies that this is the case, but does not state this directly.

The electricity industry in New Zealand is reliant on renewable energy such as hydro and geothermal. To value these resources, Net Operating Surplus (NOS) and Produced Capital (V) for the electricity generation industry was disaggregated and apportioned between renewable energy generation sources. Resource rent for renewable energy generators was calculated as  $RR = NOS - rV$  (where  $r$  is the rate of return on produced capital). The lifespan of renewable energy resources is assumed to be without limit and consequently the value of each renewable energy resource is calculated as the net present value of a constant stream of resource rent over a period of time that tends towards infinity.

- Other countries* Countries like Austria, Canada, Denmark, The Netherlands, UK and South Africa do not include at this time renewable physical assets and there is no plan to include them in the near future.

Question: Is there a broader interest in countries for building asset accounts for renewable energy? Should the London Group/subsoil asset group go into the development of methodology, etc. for such accounts?

## 2.8 Decommissioning costs

- Only limited experience ...* Besides Norway, countries have no experience with calculations for decommissioning costs. Decommissioning costs are included in the Norwegian calculations as part of the intermediate consumptions in the economic account for resource rent calculations. These costs are still very low in Norway, but are expected to increase in the years to come.



*... but regarded as relevant* All respondents think that these costs are relevant. Decommissioning costs are relevant; because ignoring these costs will mean that net operating surplus in the extraction industry is overstated, implying too high a resource rent and asset value.

*Nuclear waste* Even though Sweden doesn't have any subsoil assets accounts, they account for the costs of taking care of radioactive waste in the accounts. Thus, some experience with the treatment of decommissioning costs exists.

In relation to the ongoing work on a revision of SNA the Canberra II group has suggested that decommissioning costs should be treated in the national accounts in the same way as cost of ownership transfer on disposal of an asset. This means that the expected decommissioning costs will affect the net stock values of oilrigs, etc. and other capital-equipment for production of subsoil assets.

Questions: Will/should the Canberra II group's suggestion for treatment of capital costs have consequences for subsoil resource rent? Is there a need for the London Group to take up this problem and to deal with the decommissioning cost issue in general?

### 3 Guidelines in use

*SEEA, SNA, Eurostat guidelines* The SEEA-manual, the SNA and the Eurostat-manual on subsoil accounting are the three main guidelines used by the nine survey respondents as backgrounds for their subsoil asset accounting.

Two countries (NZ and PH) are only using the SEEA-manual (1993 or 2003 version) in building their subsoil asset accounts, while five countries (CA, NO, UK, DK and AT) are using other guidelines than the SEEA-manual in their calculations of their subsoil asset accounts.

*European countries* The Eurostat-manual is in general used as a source for those European countries calculating subsoil accounts for oil and gas (NL, NO, UK, DK, AT). The Eurostat-manual on subsoil accounting is based on the guidelines given in the SEEA 2003 version.

*Non-European countries* The Non-European countries (CA, NZ, PH, and ZA) generally refer to more sources for their calculations than the European countries. In addition to the SEEA-manual and the SNA93, other sources are also mentioned as guidelines used in the calculations of subsoil assets accounts. This could be related to the observation that the Non-European countries calculate asset accounts for more subsoil assets than the European countries, which mostly calculate asset accounts only for oil and gas.

#### 3.1 Usefulness of the SEEA

*SEEA is generally clear and useful...* All countries that answered this question found the SEEA-manual clear and very useful when building subsoil asset accounts. It is worth mentioning that those countries that reported they did not use the SEEA-manual in the calculations of their subsoil asset accounts, also found the SEEA-manual generally clear with regard to subsoil asset accounting.

*... but ...* However, some topics were mentioned as missing or poorly covered with regard to subsoil and related assets:

- Methodology for renewable energy stock measurement
- Distribution of the resource rent between the owners of the subsoil assets
- Actual country examples

Questions: Is there a general feeling that there is a need to supplement SEEA with guidelines on renewable energy stock measures (cf. section 2.7), distribution of resource rent between owners, and actual country examples?

### 3.2 Organisation of the accounting

The subsoil accounts are in general compiled at the national statistical offices, where the responsibility lies either with the division for national accounts and/or the division for environmental accounts. However, it seems like most of the national statistical offices rely on other institutions for the supply of physical data on subsoil asset reserves, cf. section 4.

The Philippines differs from the other countries in how the accounting work is organised. At provincial level, the Palawan Council for Sustainable Development Staff (PCSDS) compiles the accounts with technical assistance from the National Statistical Coordination Board (NSCB). Data needed for the compilation of the accounts are requested from different concerned agencies at the provincial level. The Philippines has also created a Philippine Economic-Environmental and Natural Resource (PEENRA) Steering Committee, which consists of members from NSCB, various Ministries as well as different NGO's, business and labour sectors. The PEENRA and its subgroups serve as a forum for discussion of issues encountered by compilers, data producers and users of the data supplied by PEENRA.

## 4 Data issues

The data sources used for the monetary accounts were in most cases based on statistics from the different National Statistical Offices themselves, while the physical reserve data were obtained from other institutions and/or federal governments like:

- The Alberta Energy Resource Conservation Board, the Canadian Petroleum Association, the National Energy Board, Natural Resources Canada and the Alberta Energy and Utilities Board (CA).
- The Danish Energy Agency (DK)
- The Ministry of Economic Affairs (NL)
- The Norwegian Petroleum Directorate (NO).
- The Department for Trade and Industry (UK).
- The Department of Minerals and Energy (ZA)

The different national statistical offices compiling subsoil asset accounts all depend on physical reserve data from external sources. This might complicate the work with harmonisation of the physical accounts. Maybe the physical statistics collected by these institutions are collected with a particular purpose in mind and the ways in which they are structured are specified to this need and not to the subsoil asset accounting.

### 4.1 Problems in getting data

#### *Confidentiality*

Confidentiality is mentioned as the main problem connected to obtaining data. For some countries this is due to small-scale activities and reorganisation within the organisations supplying the data.

The three countries not facing any problems in getting data, Denmark, UK and Norway, are all calculating asset accounts for oil and gas only.

## 4.2 Uncertain data and sensitivity analysis

<i>Publishing reservations</i>	In order to explain the uncertainties for users, the published accounts of the Philippines, New Zealand and the United Kingdom have an explanation on the data sources, data limitations, methods used in the accounts, and difficulties encountered in measuring the accounts.
<i>Reliability measure</i>	Besides stating the limitations on data, Canada devised a certain measure on the degree of reliability(ies) (a relative measure of the reliability of the indicator based on data quality and conceptual and methodological soundness) of the accounts.
<i>Sensitivity analysis</i>	Denmark and Norway include also sensitivity analysis for the value of closing stock of oil and gas. A sensitivity analysis in Denmark is produced using different assumptions for the discount rate and the rate of return. This is done with discount rates of 0%, 3%, 4% and 5% and with rates of return on capital at 6, 7 and 8 per cent. Norway sensitivity analysis includes discount rates of 0%, 2%, 4%, 6% and 8% and with rates of return of capital at 6%, 8% and 10%.

Question: Would it be useful to develop common standards for reliability measures and sensitivity analysis?

## 5 Valuation

For the monetary accounts the valuation of stocks is mainly based on the *net present value method* and the *net price method*.

Table 4 gives an overview of the methods and parameters used for the valuation.

<i>NPV is the basic method</i>	The net present value method appears to be the basic method used by almost all countries at present. The exception, the Philippines, has used net price and user cost (El Sarafy) methods, and is currently developing estimates using net present value.
<i>Annual rent</i>	The method used to calculate annual rent seems to be common to most of the countries. The method follows the definition of rent in the Eurostat guidelines for accounts for oil and gas (revised January 2003). Rent is typically derived from operating surplus (gross of taxes) by deducting capital costs.
<i>An exception</i>	An exception is the Netherlands, which measures the rent value as the amount appropriated by government through royalties. (However, a comparison of the value of appropriated rent with a value based on operating surplus and capital costs of the extracting industry showed that appropriated rent was a good approximation.)

**Table 4. Methods used for the valuation**

Method:	Net Present Value Method			Net Price Method	Other Methods
Assump-tions:	Rate of return to fixed capital	Discount rate	Rate of extraction		
Canada	0%	4%	Constant	Net Price I: Uses positive return to fixed capital. Net Price II: Uses zero return to fixed capital	no
Denmark	8%	4%	Forecasts on future extraction	no	no
UK	8%	4%	Constant (?)	no	no
Norway	8%	4%	Constant (?)	no	no
South Africa		yes			no
Philippines		no		yes	El Serafy Method/ User Cost Method
New Zealand	8%	4%	Constant	no	NPV of expected resource rent calculated using the PIM method.

*Confused terminology* The terminology of rent calculation methods seems to be a bit confused. The confusion seems to stem from the wording of the 2003 SEEA which identified two types of capital cost estimates – perpetual inventory and capital services – as ways of deriving rent. However, the 2003 revised Eurostat guidelines are clear and concise, and reflect actual practice.

*Return on capital* Despite some differences in the reason for choosing it, 8% seems to be a widely used rate of return on capital. This rate could be expected to be different in different economies or zones.

New Zealand posed this question: given mobile international capital, should rates of return on capital be similar between different countries? If there is a general consensus on the real rate of return on fixed capital (and 8% seems to be popular), then should other countries be generally encouraged to choose this consensus rate? (cf. also the questions on valuation posed in the next section).

*Discount rate* A discount rate of 4% seems to be almost universal. (As with the return on capital, rates could differ among countries.)

*Depletion profiles* The depletion profile seems to vary. Denmark, the U.K. and Norway have forecast data available for future extraction levels. Other countries project the last year's available data (or a moving average of the last three years) forward. The need for (and ability to successfully) estimate future extraction probably varies among countries – the difference in practice probably reflects this.

## 6 Challenges in building subsoil asset accounts

*General challenges* The survey respondents mention the following general challenges in building subsoil asset accounts:

- Lack of data
- Data quality issues
- Maintaining consistent sources of data
- Confidentiality issues
- Lack of expertise and experience

*Challenges for valuation* When it comes to valuation of stocks the following issues have been mentioned by one or more countries:

- Assumption about the future depletion profile
- Choosing a rate of return to capital
- Choosing a discount rate
- The treatment of capital in the rent calculation
- How to divide costs between oil and gas
- How to handle the government's share of the revenues from oil and gas extraction

*Overcoming the challenges* Although facing many of the same challenges, the survey respondents seem to have overcome the challenges in different ways regarding lack of data and confidentiality problems.

*Lack of input* Lack of input data to the physical accounts is in Canada managed by a network of contacts throughout federal and provincial government agencies and industry specific associations providing the necessary input data. South Africa makes use of consultants, while the Philippines conducted a case study of the activities where data were missing. New Zealand is encouraging new data collection or surveys.

*Confidentiality* Confidentiality rules are in Canada usually overcome by combining various minerals before publication. Austria contacted the enterprises and got the consent to use some of the information.

*Eurostat guidelines* Challenges linked to the assumptions in the monetary asset accounts are in DK, NO and UK managed by following the Eurostat Task Force recommendations and the recommendations mentioned in the Eurostat-manual on subsoil accounting. For instance, for the return to capital and the discount rate the European countries use 8 and 4 per cent, respectively. This is in accordance with the Eurostat guidelines.

*Stepwise approach* New Zealand has tried different methodologies and assumptions to overcome the challenges connected to the monetary stocks totals, and work is in progress to examining ways in which these estimates can be improved.

General question: How can the countries' experiences of overcoming the challenges be of use for other countries? Should the London Group serve as a forum for exchanging experiences in this field?

Questions on valuation: The net present value method is the preferred method for valuation of subsoil assets. Should the London group develop guidelines for the specific way to calculate the NPV, e.g. lay down guidelines for extraction profile, discount rates, return to capital? Should countries be generally encouraged to choose consensus rates?

## 7 Dissemination and use of accounts

Seven countries (Austria, Canada, Denmark, Netherlands, Norway, New Zealand, Philippines and UK) have disseminated their accounts.

<i>Internet</i>	Canada, Denmark, Philippines, New Zealand, and the UK disseminate their account through the Internet.
<i>Hard copies</i>	Denmark, Canada, the Philippines and South Africa have also disseminated hard copies of their account.
<i>Eurostat</i>	Austria and Norway disseminate their accounts through Eurostat.
<i>Annual dissemination</i>	Denmark, Norway and the Netherlands update their account annually and also disseminate it annually.  New Zealand and South Africa are intending to disseminate their accounts annually.
<i>Biannual dissemination</i>	The United Kingdom on the other hand publishes their account biennially (spring and autumn) while the Philippines and Austria disseminate their accounts on an irregular/occasional basis.
<i>From discussion document to official statistics</i>	In South Africa, the accounts are first published as a discussion document on their website. Subsequently, it is scrutinized by a technical advisory committee before it is published as official document on the website as well as in hard copy.

Question: Is dissemination of the accounts an issue for the London Group? If so, in what way?

### 7.1 Indicators based on the accounts

<i>Wealth, Quantities, and Resource base</i>	Two countries (Canada and Denmark) mention that they derive indicators from the Accounts. Canada has three indicators namely, <i>Natural Resource Wealth</i> , <i>Physical Quantities of Natural Resource Assets</i> and <i>Total Resource Base</i> .
<i>PIR ratio</i>	Denmark mentions the <i>Production/Reserve ratio</i> (P/R ratio) as an indicator derived from the accounts.

Austria, New Zealand, South Africa, and the Philippines intend to derive indicators from the accounts in the future.

Question: Are indicators based on the accounts an issue for the London Group. If so, in what way?

### 7.2 Use of the accounts

<i>Index of well-being</i>	For Canada, the monetary value of the subsoil assets was included in the National Balance Sheet for the first time at the end of March 2004. Moreover, an Ottawa based economic think tank has incorporated the account (the monetary figures) into a new index of economic well-being.
<i>Implications of carbon tax policy</i>	Information from the account of New Zealand, particularly, the provisional flow data was used to draft a paper on the implications of carbon tax policy by the New Zealand Treasury.

*Sustainability Assessment Model* New Zealand natural resource asset valuations (including minerals and energy) are being used by a crown research institute (LandCare Research) for Sustainability Assessment Model (SAM) development. The SAM will be used to assess the sustainability of projects and businesses in New Zealand.

*Potential uses* The published regional accounts done by the Philippines incorporated possible policy applications of the accounts

*Growing interest* In other countries (Norway and the Philippines), other agencies/ministries seem to have a growing interest in the kind of data that the account provides.

South Africa mentions it is necessary to teach people about the use of the accounts.

Question: Should the London Group collect and/or develop examples of the uses of subsoil asset accounts?

## 8 Future country plans

Most of the survey respondents have developed subsoil accounts that largely cover their main economic subsoil reserves. Sweden does not produce subsoil accounts at all, although that is a deliberate decision due to Sweden's lack of significant oil and gas reserves. The Philippines have produced subsoil accounts for a number of minerals, but due to data limitations have not yet produced accounts for oil and gas. The Netherlands would like to develop monetary subsoil accounts to complement its physical accounts.

*Regular updates* Because most of the respondents are already producing substantial subsoil accounts, and appear to be comfortable with the conceptual frameworks they are using, many countries are simply intending to produce regular updates of their existing accounts. Many countries are doing this already, while all the countries that have produced an initial set of accounts are also intending to supply them on a regular basis.

*Relatively minor plans* Given this, most planned future expansions to, or development of, existing national subsoil accounts are relatively minor, involving the filling in of gaps or building on existing work. Canada may be planning on doing the most in bringing diamonds and offshore crude oil and gas abstractions into its subsoil accounts. Norway is hoping to incorporate its monetary oil and gas estimates into the National Accounts, while the Netherlands would like to develop initial estimates of its monetary oil and gas reserves. New Zealand is investigating adding carbon accounts alongside the non-renewable energy accounts. Similarly, carbon flow accounts are being investigated.

*Filling the data gaps* As already noted, the Philippines has some gaps in its subsoil accounts due to data limitations, and at least three other respondents also noted data availability as an issue that affects the scope of their accounts. Some data gaps may be compounded by a lack of resources in the statistical agency concerned. New Zealand, for example, bases its subsoil estimates on already available data and is not funded to run any subsoil account specific surveys. South Africa also noted data availability and retaining experienced staff as issues. These data and resource issues are probably too country specific for the London Group to address however, particularly as most countries are developing reasonably comprehensive subsoil accounts despite these problems.

*Accounts for more assets* The Republic of Philippines will in the near future consider other accounts in the subsoil assets e.g. hydro, oil, gas and other minerals.

Obviously the survey responses may be somewhat biased towards countries that have already developed subsoil accounts. Note that most of the respondents are producing regular subsoil account updates, or are planning on doing so. It seems that most countries that develop subsoil accounts find them worth persevering with. We can

possibly take from this that most countries with well developed national level economic and environmental statistics will find subsoil accounts a useful addition to their range of statistics, apart from special cases such as Sweden.



## 9 An overview of questions raised in this paper

*Based on the survey, some further questions at a rather general level are raised in this paper. The aim is to facilitate a discussion on how the subgroup could continue its work, and which overall issues the London group regards as most important for the subgroup to take up. Others and more specific questions might be (more) relevant, and members of the London Group are encouraged to raise these during the discussion.*

Section 2.2: Would it be interesting and useful to look more into the methods of fixed prices calculations of stock values?

Section 2.3: Would it be useful to work more on the harmonization of the classification of reserves? Is it realistic to expect results in this field given that the information is obtained from other institutions than national statistical offices? What does it mean in terms of international comparison? Does this have a significant impact on the value of a resource for a given year if we take all reserves versus economic reserves only?

Section 2.4: Is there a need for work on guidelines for regional subsoil accounts?

Section 2.5: Is it sufficient that the overall accounting items are the same in different countries? Would it be useful to try to harmonize the level of detail? In that case: at which level?

Section 2.7: Is there a broader interest in countries for building asset accounts for renewable energy? Should the London Group/subsoil asset group go into the development of methodology, etc. for such accounts?

Section 2.8: Will the Canberra II group's suggestion for treatment of capital costs have consequences for subsoil resource rent? Is there a need for the London Group to take up this problem and to deal with the decommissioning cost issue in general?

Section 3.1: Is there a general feeling that there is a need to supplement SEEA with guidelines on renewable energy stock measures (cf. section 2.7), distribution of resource rent between owners, and actual country examples?

Section 4.2: Would it be useful to develop common standards for reliability measures and sensitivity analysis?

Section 6: How can the countries' experiences of overcoming the challenges be of use for other countries? Should the London Group serve as a forum for exchanging experiences in this field?

The net present value method is the preferred method for valuation of subsoil assets. Should the London group develop guidelines for the specific way to calculate the NPV, e.g. lay down guidelines for extraction profile, discount rates, return to capital? Should countries be generally encouraged to choose consensus rates?

Section 7: Is dissemination of the accounts an issue for the London Group? If so, in what way?

Section 7.1: Are indicators based on the accounts an issue for the London Group. If so, in what way?

Section 7.2: Should the London Group collect and/or develop examples of the uses of subsoil asset accounts?

## **Annex List of reports and documents**

Berg, André van den and Ven, Peter van de:” Subsoil Assets: Net resource rent versus the government appropriation method - A comparison for the Netherlands.

Blix, Karin: “Danish Asset Accounts for Oil and Natural Gas 1990-96”; Statistics Denmark November 2000

Eurostat: Accounts for subsoil assets – results of pilot studies in European countries. Theme 2, Economy and Finance. European Commission, 2000

Eurostat: Natural resource Accounts for Oil and Gas 1980-2000. Theme 2, Economy and Finance. European Commission, 2002

Eurostat, B1: Summary of conclusions and results – revised version. Eurostat Task Force on Subsoil Assets. Luxembourg, September 1999.

Eurostat, B1: Subsoil asset accounts for oil and gas – Guidelines for the set of standard tables, Revised version, Luxembourg, January 2003.

Office for National Statistics UK, Environmental Accounts branch: ”The valuation of oil and gas reserves.

Statistics Canada: “Indicators and Detailed Statistics 2000 – Econnections: Linking the Environment and the Economy”. Catalogue no. 16-200-XKF, Ottawa, 2001.

Statistics Canada: “Concepts, Sources and Methods of the Canadian System of the Environment and Natural Resource Accounts – Econnections: Linking the Environment and the Economy ”. Catalogue no. 16-505-GPE, Ottawa, 1997.

Statistics New Zealand, Environmental Statistics Team: “ENERGY PHYSICAL STOCK ACCOUNT - 1992 to 2001, November 2002.

Statistics New Zealand, Environmental Statistics Team: “ENERGY FLOW ACCOUNT - 1996 to 1999”; Draft for comment. March 2004

Statistics New Zealand, Environmental Statistics Team: “ENERGY MONETARY STOCK ACCOUNT - 1987 to 1999”; Draft for comment. Statistics New Zealand, June 2004