

Independent Assessment of the State Geological and Subsurface Survey of Ukraine

Demicheli, L., Nałęcz, T., Ovadia, D., Regueiro, M.

Bjørlykke, A., Martin Alfageme, S., Satkūnas, J., Varet, J., Wall, P.

Doyle, R., Ko, K., Kostylev, V. and Verstraeten, I.

© 2016 Copyright EuroGeoSurveys

Rue Joseph II, 36-38 - 1000 Brussels, Belgium

All rights reserved. No part of this publication may be reproduced in any manner without permission.

All images are © the artists, reproduced with the kind of permission of the artists and/or their representatives

ISBN-NUMBER 9789082254747

Contents

Executive Summary	4
Introduction and Scope.....	5
Terms of Reference.....	5
Missions to Ukraine	5
PART 1 – Status Quo in Ukraine.....	6
Overall Role and Structure of SGSSU	8
Roles and responsibilities of SGSSU.....	8
Budgeting in SGSSU: State budget and Mineral Development Program	8
Relation of SGSSU to the government of Ukraine, concerned ministries and their role in SGSSU governance	10
Departments within the SGSSU	10
The State Owned Enterprises under SGSSU	10
The Academic & Research Institutions.....	12
Mining Legislation in Ukraine.....	12
Communication.....	13
PART 2 - Analysis	14
What Ukraine is trying to achieve	14
Why it is failing to achieve this.....	15
PART 3 - Recommendations.....	17
State Geological and Subsurface Survey of Ukraine Implementation Plan	20
Conclusions	23
Acknowledgements.....	24
Annexes.....	25

Executive Summary

As it adjusts to a more free market economy, the Government of Ukraine has recognised that the various bodies included in SGSSU, that comprise what in other countries would be called a Geological Survey, are in need of modernisation. As such, a request for independent expert advice was made to EuroGeoSurveys and to the Geological Surveys of Canada and the United States of America. This review resulted in a series of visits to Kiev and discussions leading to this report.

The independent experts concluded that the current structure of SGSSU is, in many ways, dysfunctional, fragmented, complicated, severely underfunded and lacks a clear mission. Consequently, this state of affairs of the current Ukraine Geological Survey is having a detrimental effect on the economy and wellbeing of the extractive sector of Ukraine, by failing to deliver the Country's priority needs in natural resources. These needs include instilling greater self-sufficiency in energy and industry critical minerals and privatization and attraction of foreign direct investment into the natural resources sector.

There is an apparent plethora of overlapping and often competing subsidiary organisations within SGSSU. There is clear confusion in terms of responsibilities, priorities, reporting lines and sharing of information and provision of expertise in the national interest. It is apparent that there is a lack of outcomes and clear deliverables in the interest of Ukrainian governance and, at times, internal conflicts of interest. Unsurprisingly, each organisation competes for its own survival at times to the detriment of the other SGSSU components and the nation as a whole. Meanwhile, selected interests of a conventional Geological Survey such as natural hazards and environment are being neglected.

The experts felt very strongly that the entire system

must be examined, streamlined, amalgamated and rebuilt into a smaller, stronger Geological Survey that is properly funded to meet the needs of the nation. It is unlikely that this can be achieved through minor adjustments. A total reorganization with a 'root-and-branch' rebuild will be necessary, based on a detailed functional decomposition, technical and management training, on-going external advice and appropriate public funding. Once rebuilt, a long period of stability will be necessary for proper consolidation, management, and increased positive outcomes in the interest of the nation.

On the other hand, the assessment teams were positively impressed with the quality of some of the components that will be required for a rebuilt Survey, in particular the highly qualified staff and selected detailed data that are available. In the case of the staff, training and mentoring in modern methods and markets facing differing cultures will be required; for the data, it will be necessary to carry out a major programme of restructuring, digitisation, amalgamation and dissemination and implement an open data policy to further transparency, economic growth and development, and remediate any indication of corruption.

The report that follows sets out the details of the mission and its findings, and makes a series of specific recommendations, including the offers of support from various western Geological Surveys to help with the transition of SGSSU. It is beyond the scope of this report to go into detail on the rebuilding process itself, and it is suggested that this is guided through time by an advisory panel that includes independent experts.

Introduction and Scope

Terms of Reference

The Ukrainian government is in the process of modernising its government institutions more in line with a western market economy and as such, is investigating how its national systems may be best integrated with those of other countries. This is in line with, inter alia, the EU-Ukraine Association Agreement which was signed on the 21st March 2014. As part of this process, the State Geological and Subsurface Survey of Ukraine (SGSSU) sought out the assistance of EuroGeoSurveys (EGS), the Organisation of the Geological Surveys of Europe, to carry out an independent expert assessment of their structural and operational framework, in cooperation with the Geological Survey of Canada - Natural Resources Canada (GSC) and the United States Geological Survey (USGS).

An expert panel was formed to carry out the assessment, consisting of:

- David Ovadia, former Director of the British Geological Survey
- Arne Bjørlykke, former Director General of the Geological Survey of Norway
- Jonas Satkūnas, Director, Geological Survey of Lithuania
- Jacques Varet, former Deputy Director of the Geological Survey of France (BRGM), EGS President from 1999-2005
- Santiago Martin Alfageme, Head of Technical Cabinet, Geological Survey of Spain (IGME)
- Manuel Regueiro, Head of External Relations and Communication, Geological Survey of Spain (IGME)
- Tomasz Nałęcz, Head of Department, Coordinator of International Cooperation, Polish Geological Institute - National Research Institute
- Luca Demicheli, Secretary General,

EuroGeoSurveys

- Patrick Wall, Scientific Policy Officer, EuroGeoSurveys
- Robert Doyle, former Deputy Director, U.S. Geological Survey
- Ingrid Verstraeten, Chief Europe, Russia, Central Asia and Circum Arctic Office of International Programs, U.S. Geological Survey
- Kenneth Ko, Director of Management and International Affairs Division, Natural Resources Canada
- Vladimir Kostylev, Section Head of Coastal and Shelf Studies, Natural Resources Canada

Missions to Ukraine

Due to the variable availability of all the experts to travel, three separate missions to Kiev took place. The first mission, from the 27th-30th of April 2015, involved David Ovadia, Manuel Regueiro and Tomasz Nalecz, who carried out a preliminary review of the general structure and operations of SGSSU. The second, from the 25th-29th May 2015, involved Arne, Jacques Varet, Jonas Satkunas, Santiago Martin Alfageme and Patrick Wall, who gained a more in depth understanding of the numerous enterprises that operate under the direction of SGSSU. The third, from the 9th-11th June 2015, grouped the USGS and GSC experts who carried out a similar review of the structural operation with an emphasis on how it could be improved. A list of all meetings which took place during these three missions are provided in Annex A. Two videoconferences also took place during the assessment, the first of which was on the 19th of May 2015 in order to get feedback from the first mission and discuss the targets of the following missions, whilst the second took place on the 22nd of June 2015 to discuss the structure and content needed in the final report.

PART 1 – Status Quo in Ukraine

The SGSSU is a large and complex organisation (see figure 1) that loosely comes under the Ministry of Ecology and Natural Resources and comprises 3400 staff including 9 State-owned operating units, 11 units under a national joint-stock company called Nadra Ukrayny, two Research Units and two Expert Units.

SGSSU is responsible for theoretically financing the conglomerate of 11 private companies under an entity called Nadra Ukrayny, a state company which holds 100% of the stocks of the para- private companies, thus, in fact they are public companies with public staff. These companies are dedicated also to mining exploration.

Scientific research in Earth Sciences is carried out in Ukraine by several academic institutions under the Academy of Sciences and financed by the Ministry of Education and Sciences, in addition to within parts of SGSSU.

The organisation as a whole was said, during a workshop held in the first mission, to be facing problems that include:

- At least a 10 times decrease in real-term funding
- Constant and rapid changes in management
- Unspecified social problems with low staff morale

Although SGSSU has total control of the permitting (licensing) procedures of all natural resources in Ukraine, the Ministry of Energy and Coal Industry has some responsibility for hydrocarbons production planning, although some of the data and research related to coal, oil and gas are carried out in the SGSSU family of organisations.

In the first interview with the management of SGSSU, they pointed out the following problems in the

organisation, mainly resulting from a legacy heritage from former Soviet times:

1. Staff highly qualified but old fashioned in training
2. Obsolete standards and legislation. The work carried out matches these standards
3. Old technical equipment

They also pointed out that 80% of the functions of the SGSSU are unnecessary, they are aware that many of the functions carried out by the organizations would be carried out by the private sector in other places.

Finally they also pointed out that they are working in a changing environment with different visions from the superior institutions (Ministry, Council of Ministries, President).

The head office of SGSSU is located in Kiev in a building managed by GeolInform. No rent is paid to GeolInform for this use. State-owned enterprises (SOEs) hold most of the geological information related to mining exploration (geological or otherwise) although this information seems to be in old and varied formats, with the resulting extra costs if this information should be updated or made accessible.

SGSSU does not own any vehicles, and uses those of the SOEs, particularly those of GeolInform.

In summary:

- Geological mapping is carried out by (some of) the SOEs and Nadra Ukrayny units who have staff, vehicles, drilling rigs and laboratories, but who also act as State-owned exploration / prospecting

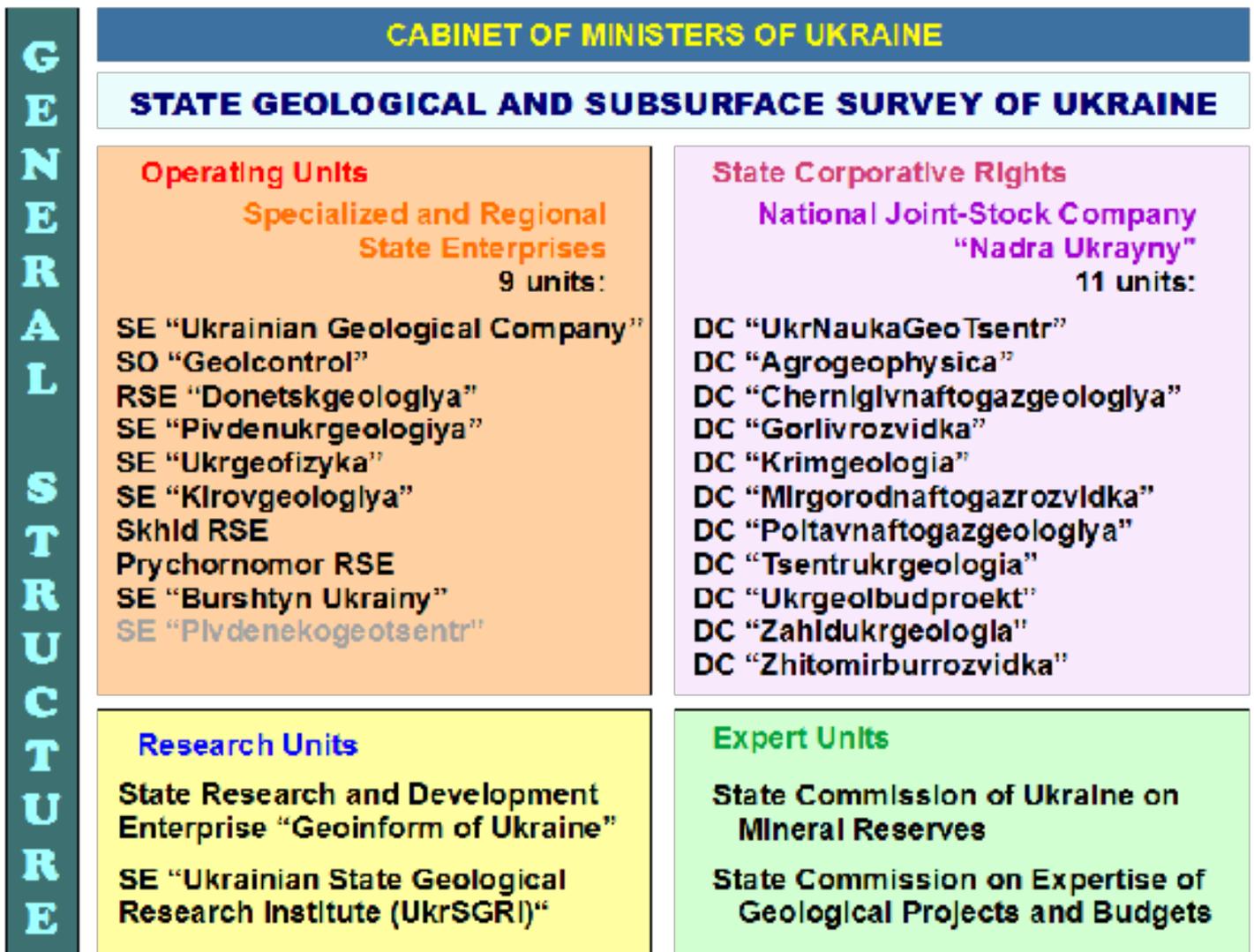


Figure 1. General Scheme of the SGSSU and its related organisations

SE - State Enterprise. RSE - Regional State Enterprise. SO - State Organization. DC - Daughter Company. Grey - lost in Crimea.

- companies with their own licences (permits), and who set their own staff terms and conditions, including numbers, selection, pay and conditions.
- In theory, but because of resource limitations not always in practice, all the data produced under State funding from SGSSU are stored with Geoinform, which has been working with Norway and Finland to digitise and make data available on-line.
- There appears to be a large and relatively well funded geophysics unit that has responsibility for seismic monitoring, although not, apparently, for exploration geophysics.
- Translation of its name to English does not accurately describe its Ukrainian title.
- It has roles of issuing and monitoring licences (permits) and traditional Geological Survey functions, which results in a potential conflict of

interest.

- It is focussed almost entirely on minerals with little apparent activity in areas such as geohazards, environment, groundwater, etc.

Overall Role and Structure of SGSSU

Roles and responsibilities of SGSSU

According to Decree of the President of Ukraine on the Statement of the State Geological and Subsurface Survey of Ukraine (06.04.2011 N391/2011), the SGSSU has the following main mission:

1. Submitting proposals on the development of the State policy in the sphere of geological study and rational use of subsurface;
2. Implementation of the State policy in the sphere of geological study and rational use of subsurface.

From these missions, it seems that the SGSSU is in charge both of defining the geological and mining policy of Ukraine and of executing it.

It is important to note here, that the SGSSU current roles are defined in the above mentioned Decree of 2011 and has inherited the structure of the former organisation, but apparently it is not clear that it has also inherited the responsibilities acquired by the former organisation. On the other hand, the Decree is a Presidential Decree, which means that the current SGSSU Director was appointed by the President, although the SGSSU is subject to the Ministry of Ecology and Natural Resources.

To understand the reach of the activities carried out by the conglomerate, we have grouped all the practical functions listed in the decree, grouped by subjects:

1. Mineral resources

2. Geological and mining databases
3. Hydrogeology
4. Geophysics
5. Geological mapping
6. International cooperation
7. Training in its field of competences
8. Outreach

The SGSSU also has the power to establish, liquidate and re-organize enterprises, entities and organizations, approve their statutes, appoint and dismiss their directors under defined procedure, develop personnel reserve of directors for enterprises, entities and organizations under the SGSSU management. This means that all the satellite organisations are totally under the control of the SGSSU management.

In conclusion, the SGSSU has many of the functions of an EU or North American style of Geological Survey, although in practice, the central umbrella organisation seems to only be dealing with mining permitting.

Budgeting in SGSSU: State budget and Mineral Development Program

The budget of SGSSU central office comes directly from the Government and is not affected with the budgetary bidding which affects the SOEs. The total budget is estimated as 410,000€ per annum of the total 5.4M€ per annum handled by the organisation, and part of this budget is collected from the mining laws, fees and royalties, although 70% of the royalties are used in studies to update and renovate state mineral resources databases.

The State Budget allocates 5.4M€ to SGSSU, of these 0.41M€ to SGSSU itself, and 4.99M€ to make government procurements for development of the mineral resources base, which the SOEs subsequently

bid for. The Mineral Development Program provides the ground for SGSSU to arrange the bidding.

The SOEs make their internal partitioning between selected items of the Mineral Development Program (included in Annex C), and submit their requests to SGSSU. Once the offer and requests are agreed, SGSSU compiles an entire set of bids and announces the tender. Over the last three years only SOEs have been admitted to the tender.

The State Budget includes two meaningful allocations related to SGSSU:

- Governance and management in the sphere of geological study and use of subsurface: 0,41M€
- Development of the mineral resources base: 4,9M€

The Mineral Development Program provides an accurate definition of the mineral resources base (MRB):

“MRB is the total of explored and preliminary evaluated mineral reserves and similar components, which may be used in the industry economically at a sufficient level for the expanded reproduction ensuring economic security of the state.”

This means that in Ukraine, the government provides financing for mining bureaucracy.

The Mineral Development Program also includes a provision for geological mapping, geophysics, hydrogeology and geohazards, although the general perception (both citizens and Government) is that mineral development is the key issue.

The above mentioned budget allocation for SGSSU of 5.4M€ was approved by the Ministry of Economy, then the State Budget was approved by Parliament on 28.12.2014, and only three months later this amount was approved in SGSSU, on 24.03.2015.

This means that SOEs did not have any government funding in the first quarter of 2015. Moreover, they do not have anything up to now. In fact, for the first

five months of 2015 most SOEs worked part-time, from 1 to 3 days per week. Within this period SOEs were financed from external contracts and services. For instance, GeolInform financed itself by selling geological information to private companies. This is a widespread example of a subordinate entity with the ability to generate revenue to sustain itself while other organisational entities are left to operate at less than full capacity – engendering an “everyone for themselves mentality”. The notion of a National SGSSU is undermined by these differences.

This situation is repeating itself every year. Before 2011, SGSSU’s annual work plan was normally approved within one month and they received their funding by March. But in 2010 a new law was approved “On the State procurement procedure” which meant that while before the funding for the Geological Survey was received from the Ministry of Ecology and then the Geological Survey (that time it was State Geological Survey of Ukraine) delivered a certain share to each SOE, after this law and up to now, the State just allocates a gross amount (e.g. UAH 119.8 M this year) and then SGSSU should organize bidding for so called State procurement of works and services devoted to the development of the mineral resources base. All of these procedures take time and delay delivering the funds.

In other words, there is no direct state funding to SOEs, while SOEs’ annual budget is actually defined by SGSSU and is in practice received after the procedure of State procurement tender has been made and approved.

As a result, due to the long and complicated procedure of State procurement, the SOEs commonly lose the first quarter every year, and in 2015 the money is expected to come in September only, that is in the third quarter.

In summary, the funding of geological studies is complicated by 1) constraints related to the works compliance with the Mineral Development Plan as the only State finance line, and 2) the procedure of State

procurement.

Outside of national funding sources, many SOEs receive supplementary income from external contracts and commercial activities. It is unclear how much this amounts to on average on an annual basis. Assets also belonging to satellite organisations – such as buildings, automobiles, equipment, data, etc. – rather than SGSSU creates a mentality that fosters independence within the organisation at the expense of a coherent entity. The significance of this is that resource requirements may be understated within the 5.4M€ figure and proposed organisational streamlining overstated. Further clarity here would be helpful to assessing SGSSU resource needs in the future.

Relation of SGSSU to the government of Ukraine, concerned ministries and their role in SGSSU governance

Political instability causes frequent changes to appointed Ministers, potentially leading to frequent changes in SGSSU Director. This does not allow for stable operations nor any long term strategic planning. However, with the autonomous nature of operation by subordinate units it is unclear how much this affects their operations and how they view these changes. Frequent change in senior leadership could encourage more independent operations, which would then undermine the concept of a National SGSSU.

Departments within the SGSSU

The SGSSU Central Management Body is largely an administrative body that is responsible for the overall functioning of the wider structure and sub-units. Their activities include the financial management and defining budgets for the SOEs, drafting regulations, setting standards, settling legal issues, preparing work programmes for the SOEs, arranging mining permit auctions and tenders,

monitoring of licences (permits) and collection of fees for exploration permits and exploitation royalties, as well as general administrative duties. A summary of the responsibilities of each Division and Department within the SGSSU Central Management can be found in Annex B.

The State Owned Enterprises under SGSSU

The SGSSU is a complex organization with several different functions carried out by State Owned Enterprises (SOEs), from mapping, data storage and processing, drilling and geophysical field work, exploration for minerals and water, and licensing.

A questionnaire was sent to all organizations under the SGSSU umbrella in order to compile an overview of which specific areas of competence each of them address. The results can be seen in Annex F, along with some additional impressions by the Assessment Team in Annex B, showing a high degree of overlap in the responsibility and work between the various units.

- The work may be divided into core activities:
- Geological and geophysical mapping, research and other data collection
- Services - laboratories, drilling, airborne geophysical investigations
- Legislation and licensing
- Databases and digital communication
- Consulting

Several units under SGSSU are working with permits. Given that SGSSU also evaluates and supplies such permits, there is potential for a conflict of interest arising within the process.

One of the problems within the SGSSU structure is

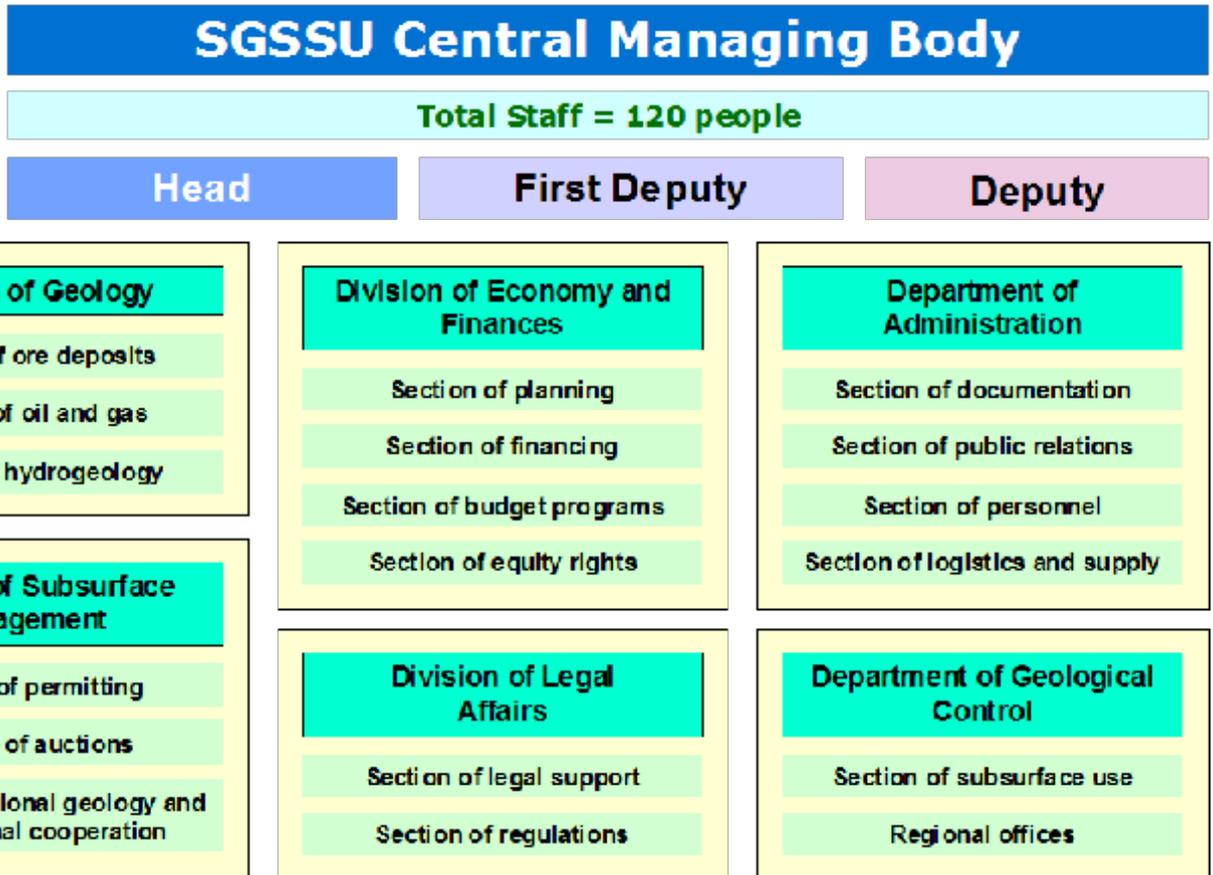


Figure 2. SGSSU Central Management

the division of responsibility between the different units and the lack of cooperation between the units under SGSSU. Their infrastructure is also of variable quality. Of those that operate in the Kiev area, the spread of these units geographically within the city is also not ideal for cooperation and sharing of knowledge, facilities and resources. However, upgraded technology and communications could improve and facilitate the sharing of knowledge, data, and technical capabilities.

Some SOEs carry out activities that can be costly for a publicly-funded entity, so privatisation is a consideration that will be developed further on within this report. It is particularly relevant to the National Joint-Stock Company “Nadra Ukrayny”. The initial

idea of forming Nadra Ukrayny, a joint-stock company with many subsidiaries which is 100% owned by the State, was to carry out geological activities that are in the interest of the State while having enough independence from State bureaucracy to generate their own revenue and become self-sustaining. Initially this system worked well and even just two years ago they were generating ten times more funding from their own activities. Recently however the company has become weaker, with many specialised staff leaving and not being replaced, thus creating a disproportionate amount of administrative staff. Some units under Nadra Ukrayny are now operating at minimal capacity or part-time.

The Academic & Research Institutions

Most of the standard geological research not related to mining is carried out in Ukraine by several academic institutions including the Universities.

The Ukrainian Academy of Sciences groups 16 earth sciences research institutes out of a total of 240. The Academy is fully financed by the State, through the Ministry of Education and Science, Youth and Sports. These institutions are carrying out geochemical exploration, geophysics, environmental studies, mineralogy, petrology, etc. They have old laboratories but experienced staff. They used to have a close relation with the SGSSU up until 2012, when this relation was stopped – the reasons for which remain unclear. They have a common scientific support group. They do exploration with the regional SOEs. They hold the only radiochronology laboratory in Ukraine. They have also made some of the 1:200,000 geological maps of Ukraine. They also carry out ecological studies and collaborate in field studies. Some institutes have regional offices. In general they are poorly financed and lack equipment and technical base. The activities of three major geological institutes are outlined in Annex B.

Universities can train future quality staff for SGSSU according their needs for future tasks, making them an important asset. Both Universities and Academia can participate in the accomplishment of Geological Survey tasks supporting SGSSU teams, their independence offering the opportunity to undertake reviews of SGSSU science, goals, practices, and responsiveness to national and global needs. They can also help further integrating science with the biological and across Earth sciences to expand our understanding of the interaction of the natural systems and how they are interconnected. For example, this may be especially helpful in understanding mining plans/operations and how they may impact the surrounding environment, ecology,

and water systems. Close relations should always be maintained for these reasons.

Mining Legislation in Ukraine

In view of the important functions carried out by the SGSSU in the mining sector, we have included here some details on the complex permitting procedures in Ukraine and the role of SGSSU.

In Ukraine there is a long tradition of Government regulating and controlling everything related with exploration and permitting.

All final exploration reports are stored in the GeolInform premises (there are more than 60,000 geological reports including permits of all types stored in the building). Access to these files is public and free of charge for SOEs, but has a fixed price for private companies or individuals.

Mining concessions granting includes the obligation to the applicant of buying the geological information used in the concession procedure from GeolInform.

When a concession is granted, the company signs an agreement with the Government for the use of the subsoil. The agreement has an annex with the Work Program. The Government, through SGSSU, checks that the Work Program is duly followed.

With respect to other aspects of mining, the SGSSU is only in charge of controlling the mining plan of works, the Ministry of Ecology and Natural Resources control the environmental matters and the Ministry of Health Protection deals with Health and Safety in the mining operations.

The permitting procedure can take an average time from 4.3 to 7.3 months, depending on the type of permit.

The assessment team found that the current system is not as transparent as it should be. In order to try and

improve this, open auctions for exploration licences may be necessary.

Communication

Internal

The overall governance of SGSSU is highly autonomous in terms of strategic, policy and regulatory development. Overall policy direction and legislative support are conducted in coordination with the Ministry of Ecology and Natural Resources at the most senior level, but the agency is empowered with autonomous management in terms of operations (finance and legal), regulatory decisions, information archives, and management of service operations. The agency

maintains close oversight and policy relations with state-owned enterprises (SOEs) which provide a wide range of geological and geoscience services primarily related to exploration, in addition to a tight control over state budgetary allocations to the SOEs.

External relations

SGSSU nominally maintains its own regime of external relationships with industry, research institutions, international organisations and foreign governments; independent of the Ministry. There is however no indication of any strategic direction or interest in research or applied science; as observed by the first mission group, most research work has been left to the National Academy of Science network of institutes, with little support or direction by SGSSU.

PART 2 - Analysis

What Ukraine is trying to achieve

SGSSU's mandate is primarily to meet the country's economic development needs in minerals and energy by providing a unique framework for resource mapping and exploration, information management, and an array of services support to prospective developers (national and foreign). The framework is based on a hub-and-spokes model that presumably was designed to provide a one-stop centre for research, regulatory, exploration and of data repository for geological studies and development. There is no current significant capacity to engage in studies in geo-hazards, groundwater (apart from hydrogeology), nor to engage in public consultations or communications on science work carried out in the national interest.

As a critical agency to provide advice and oversight of decision making of key sub-sector resource development to the Minister of Ecology and Natural Resources, and services support to Nadra Ukrayny (National Joint Stock Company), the agency has attempted to marry inherently contradictory mandates between undertaking geological studies, information management, regulatory permitting and decisions on exploration and development as well as providing ancillary services to companies in the public and private sectors.

The national needs of Ukraine for its Geological Survey and related organisations, as public entities, must be clearly defined by the governing Ministry. The operation of a modern Geological Survey should be based on regular tasks supported by the State and funded by them as a way to address strategic issues recorded in the relevant legislation. The importance of well thought-out legislation should be stressed

to validate the long-term activities of a Geological Survey. These may not be confined to mineral resources (energy, metals, minerals, materials...), but could also include issues like: groundwater resources, environmental issues (implying geology), hazards (natural and man-made, post-mining in particular), geotechnical, progress in basic geological knowledge, etc. A functioning national Geological Survey, however its priorities are set out by its Government, should be able to demonstrate its effectiveness as a public science agency, its ability to carry out the regulatory functions required of it, and to provide necessary services as needed (such as data provision or analysis).

Following our analysis of the status quo, a number of indications as to what the major needs of the country might be became apparent:

- To become nearly self-sufficient in energy (coal, oil, gas) as quickly as possible, in order to minimise politically sensitive imports from the east and foreign currency expensive imports from the west. The Geological Survey can assist in this driver significantly with the vast amount of data and knowledge at their fingertips.
 - Energy production should not be considered only, but also energy savings and alternative energy sources (the ecological transition), as well as scientific opportunities for carbon sequestration. Of course this is not a specificity of a Survey, but it can contribute to a well-defined state policy (geothermal energy and energy storage, e.g. for answering low enthalpy needs).
- To raise foreign (hard) currency by identifying and selling off (by auction or otherwise) valuable mineral assets. This requires the Geological Survey, and its parent Ministry, to carry out an

open and fully transparent procedure in order to build a sustainable foreign interest in their assets. The efficient management of the State raw materials, especially in the area of energy, is crucial. A user-friendly web-based system should be used to show who owns current operating licences and the availability of other exploration and mining licences.

- Selling assets to foreign companies should be considered as one of the options, but not the only one. The introduction of updated technologies and management systems in existing mines and exploitation activities can also be obtained through other kinds of partnerships, including buying western know-how, and would result in an increase of sales and competitiveness, and therefore income. A Ukraine-EU partnership could be looked for in this field as an answer to the initiative of the European Commission (DG GROW).
- To prioritise and take action on geohazards and pollution (of groundwater, soil etc.), possibly by carrying out surveys and establishing baselines.
- To improve water management and knowledge in the area of groundwater, ensuring regular monitoring and protection of groundwater as a strategic raw material in the era of climate change. Ukraine could take measures to adapt legislation towards addressing the EU Water Framework Directive and other related Directives.
- To minimise running costs to the public purse by making the Geological Survey (and its agencies) as cost-effective and efficient as possible, but to fund them properly to do their job. This must involve substantial reductions in current functionality, assets and personnel, but it needs to be quantified what is needed before recommending what must go.
- Data from the EGS internal statistics concerning the public spending on National

Geological Surveys, staff numbers, budget, referring to county's surface, population or GDP. These data vary widely from country to country but there is a tendency for similar figures in quite a few of them, and a thin analysis of these data may still help to look for reasonable targets to be looked for in the long term in order to get nearer to western European averages.

Once an agreed set of national imperatives is established, which would form the basis for the mission of the Geological Survey, further advice can be sought on what is needed in order to deliver it, based on past similar experiences whilst taking into account the current situation in Ukraine. This should result in a secondary set of recommendations that could identify the key areas in need of improvement, which areas may be strong enough already or which may become less important. For example the digitising and publishing of data would likely be high up the list as a key requirement for a fully functioning Geological Survey.

Why it is failing to achieve this

A modern Geological Survey requires a core capacity to respond to societal needs as well as providing evidentiary support to the government's public policy objectives that touch upon management of the land and inherent natural resources. Such capacity could include scientific and technical expertise to study and address issues related to climate change impact and adaptation, geo-hazards, energy resources development or geo-mapping, among many modern fields of study today.

These core science functions would complement and support other core economic and social development functions normally residing in separate bodies or organisations; for example, energy resources

regulation and development, mineral resources regulations and development, hazards monitoring, land surveying and cadastral management, environmental and/or forestry management.

SGSSU appears to have attempted a vertical integrated model involving: delivering science capacity and expertise delivered through an arrangement with the National Academy of Sciences; regulatory management over exploration and development of energy and mineral resources; as well as supporting geological and geosciences services through a network of “state enterprises”. Notionally providing a one-stop model to support public development goals as well as to oversee and control exploration and development ventures by external stakeholders, principally with foreign investors.

Under the current system of operation within SGSSU, based on a typically Soviet style set-up which divides many responsibilities and spreads the expertise and capacity across regional units, there are clear hindrances present which diminish the potential of the national Geological Survey to serve the nation. Due to the decentralisation of the expertise to numerous units spread across the country and without any clear communication channels between these units, there is a high risk of duplication of work and a lack of knowledge-sharing or collaboration. In fact, the impression of the assessment team was that these units compete amongst each other for national funding to carry out the work that they choose – this can lead to major gaps appearing in the national geological knowledge base and make it more difficult to address the national needs. Under the current system, national goals risk being subordinated to local/regional organisational needs, which would decrease their value on the national scale. This fragmented approach also leads to a spread of not only skilled personnel, which can affect the geological knowledge infrastructure, but also technical equipment, which could produce much higher quality results when brought together.

The following observations consider how the source

and distribution of funds as well as non-science activities may affect organisational behaviour within SGSSU:

- Funding mechanisms – use of tenders and reimbursable income (the latter invites service work that may deviate from the designated programme/science plans).
- Financial responsibility for 11 “private” companies under Nadra Ukrayny and 9 SOEs. SOEs must utilize external funding to continue limited operations during times of financial uncertainty/funding delays.
- Science is provided primarily through the Academy of Sciences and funded through the Ministry of Education & Sciences – this lessens direct management, coordination, and control of geoscience R&D by SGSSU.
- Use of external funding runs the risk of exposing the science component to external sources rather than maintaining the SGSSU direction. Without primary base funding for science by SGSSU, science will continue as a subordinate to energy and minerals development.
- Regulatory duties and permitting of mining activities creates a conflict of interest that can undermine scientific independence and objectivity.
- Policy making (mining) – geological study and rational use of subsurface. Do we want science to inform resource policy and management decisions or to drive them?
- Structural – relative independence of operating units with geographic focus and expertise tailored to regional geology.

PART 3 - Recommendations

The modern Geological Survey should ideally provide authoritative and evidence-based advice to the appropriate Ukrainian authorities that support resource mapping and development, environmental sustainability, hazards monitoring and management, and any scientific endeavour deemed critical to Ukraine's management of land and maritime resources dependent on earth sciences information. To support these objectives, the Survey would maintain national database on energy and mineral resources facilitate the development and establishment of national standards, protocols, and policies in geology and geosciences. Such goals could be achieved in cooperation with other science bodies, academic organizations, and multilateral and foreign institutions.

Safeguarding the credibility and authoritativeness of a modern Geological Survey requires that any regulatory functions should be limited to the strengthening or the reinforcement of the transparency and integrity of the Survey's management of information for the public interest. As a result, this would exclude any role for the agency in active participation in the rendering of decisions relating to the disposition of exploration and/or development of natural resources in the national domain.

There are several benefits and advantages to maintain an evidence-based and authoritative Geological Survey. Principal among these are:

- mitigating and reducing conflict of interest, real and perceived, of undue influence in decisions relating to the exploration, development and/or management of natural resources;
- maintain public support for transparent and evidence-based decisions for exploration, resource development, and environmental sustainability;

- establish national standards against which government organisations and research institutions could use as baselines for national assessments and research, that will further enforce rigour evidence-based analysis and studies;
- serve as trusted national locus for stakeholder engagement and national dialogue on issues relating to natural resource development and management, and environmental sustainability;
- establish credibility in SGSSU as an objective, unbiased source of scientific information, that includes standards grounded in National and International science, protocols, and practices.

In carrying out the assessment of the three missions to Ukraine, a number of issues were raised in discussions as posing a significant barrier towards the effective functioning of SGSSU as a whole, or towards the effective use of national geological data and knowledge for the benefit of Ukraine. The following recommendations may help to address the shortcomings identified:

1. SGSSU is too large and complex in its current state: 3400 staff including 9 State-owned operating units (SOEs), 11 units under a national joint-stock company, two Research Units and two Expert Units. Currently, SGSSU acts as a Natural Resource Management entity encompassing science, policy formulation, management (mining operations; safety inspections, regulating/permitting) and resource development (O&G drilling; developmental and extraction wells). There is a need for a coherent approach to the SGSSU mission, goals, and operations; the current decentralization of activities operates

in a way that minimizes accountability for achieving national goals. Historically, western Surveys such as the USGS evolved to their present science centric focus by transferring operational responsibilities such as mine safety inspections, royalty collections, and off-shore oil & gas drilling activities to other governmental and private sector entities due to the apparent conflict of interests that raised questions about the objectivity of its science. Other western and European Geological Surveys had similar experiences. The benefit of divorcing oneself from resource management, regulating, and operations is that science can be pursued without conflicting objectives and outcomes with those functions.

- Reduce the size of the state organisation, rearrange activities and privatize services or transfer certain responsibilities to other public entities. Creation of a Geological Survey of Ukraine (GSU). The new organisation should also be in charge of the national geological policy.
 - GSU should include SGSSU Division of Geology and the following services of the SOEs integrated into the new structure: geological and geophysical mapping, research and other data collection, services - laboratories, drilling, airborne geophysical investigations, databases and digital communication.
2. Low financial support and very complex budgeting system. The most significant issue here is that better budget development and execution is needed. Multi-year plans with annual increments at varying levels of funding are needed to accommodate whatever funding levels are ultimately approved, so that allocations can be distributed within days rather than months.
 - Reduce the size of state organisation, rearrange activities and privatize services. Change budgeting system.
 3. SGSSU has roles of issuing and monitoring licences (permits) and traditional Geological Survey functions but it is focussed almost entirely on minerals with little apparent activity in areas such as geohazards, environment, groundwater, etc.
 - Introduce clear legislation defining main tasks for the Geological Survey as well as secure sources of budget.
 - Support the Government in identifying priority mineral or hydrocarbon targets by high value and low risk that can be sold off as flagship privatisations of the State Assets for the purpose of securing hard currency (provided the Government is willing to adopt such a policy).
 - Transfer Geological Survey activities to new GSU and all permitting to new Mining Authority (see item 10).
 - Develop various non-extractive activities that are generally key components of a Geological Survey, including work on geohazards, groundwater, some basic research, public awareness, training and helping to develop the next generation of geoscientists.
 4. Staff are highly qualified but require further training in the latest technological developments and best practices.
 - Design and implement a 2 years training programme (EGS, GSC and USGS could offer assistance depending on available resources).
 - Encourage increased interaction between older, more experienced staff and newer, younger staff members to pass on experience and then support both groups with training courses.
 5. Obsolete standards are in use and legislation has not brought about renewal of these.

- Draft new standards according to the most up to date international standards.
6. Old technical equipment is prevalent.
 - Design and implement new laboratories, reorganising the existing SOEs labs which should be transferred to the new GSU facilities.
 7. Many functions carried out under SGSSU could be considered unnecessary for a national Geological Survey. Many of those “unnecessary functions”, which can be costly to the public sector, may well be useful but are simply misplaced as being the responsibility of a Geologic Survey. They could still be retained but more appropriately placed elsewhere within the government or private sector.
 - Adapt new GSU around the most relevant of its current functions, focusing on the core tasks of a Geological Survey based on the national needs identified. Leave the remainder to private enterprises or transfer to other public entities in order not to strain the public capital invested in geological services.
 - Introduce new functions (such as geohazards, hydrology or climate studies) based on the experiences of modern Geological Surveys.
 8. Changes in the responsible Ministry under which SGSSU operates can disrupt long term strategic planning and operations.
 - A new law giving GSU independent status would be beneficial. The Head of GSU should be appointed by the Ministry, at the level of Director General under a Secretary of State.
 9. Geological mapping is carried out randomly by some SOEs
 - Centralise in GSU the geological mapping of the country and define the hydrogeological and environmental mapping to ensure a coordinated approach towards high resolution national mapping activities.
 10. The SGSSU central organisation is mainly functioning as a Mining Authority, thereby marginalising some important roles which are normally priorities for a Geological Survey. There are some administrative overhead capabilities that could be retained, such as budget, finance, and human resources, however it creates a conflict of interest when some permits or licences are being requested by entities within the overall SGSSU structure and evaluated and granted by others within the same structure.
 - Create a new Mining Authority (MA) and transfer all mining permitting departments to the new entity under the supervision of the Ministry of Industry. The new Mining Authority will be in charge of submitting proposals on the development of the National Mining & Mineral Resources Policy and implementing the policy. The MA could include the following SGSSU Departments: Department of Geological Control, Division of Legal Affairs, Division of Subsurface Management and the necessary part of the Department of Administration, as well as the State Commission of Ukraine on Mineral Reserves – Kyiv and the State Commission on Expertise of Geological Projects and Budgets – Kyiv.
 11. The SOEs and Nadra Ukrayny units have staff, vehicles, drilling rigs and laboratories, and also act as State-owned exploration/prospecting companies with their own licences (permits), who set their own staff terms including numbers, selection, pay and conditions.
 - A number of these entities could be privatised and continue to successfully carry out much of the work they already do, or merge to form stronger service providers for the proposed new GSU, other public sector clients and, increasingly over time, private sector clients, should the required boost in foreign

investment be achieved.

12. The current infrastructure in place for Geo-information dissemination within SGSSU is inadequate, which can be a liability when quick access to such information is required.
 - Data produced and/or stored should be digitised and put on the web for access free-of-charge, using all the relevant geological information in their possession, in a sequence that requires careful prioritisation based on potential value in attracting investment and activity. There may also be the need for some new in-fill geological / geophysical / geochemical surveying, analysis and research where current information is inadequate, absent or out of date. A strong Geo-information centre should be developed. Access to Geo-information is a cornerstone of any Geological Survey and should support other divisions with data, whilst also delivering information for general society.

Partnering with donor countries for short and long term reform and technical assistance would be critical to the success of the re-birth of the Ukrainian Geological Survey. Given the wide ranging needs of Ukraine for geological services, attention should be focused on developing concurrent activities with both short- and long-term deliverables, and leverage assistance through direct technical assistance and advice from partner countries within the EU as well as North America.

Canada is prepared to offer technical assistance in the short term specifically focused on modernizing and bringing online the State Geological Map series, and to contribute to a greater understanding and knowledge of the available and exploitable alternative energy resources in Ukraine through personnel visits and exchanges.

Longer term assistance needs to focus on providing

Ukraine with best case studies and advice to help with re-developing the scientific capacity of the Geological Survey, and to re-engineer the business functions away from the Survey's core scientific mandate. Re-engagement with the country's well established science community in academia could lead to more support for the renaissance of the scientific capacity of the Survey, as well as encourage more support and interest in the development of an open, credible and authoritative science agency operating in the public interest.

State Geological and Subsurface Survey of Ukraine Implementation Plan

The transformation process of SGSSU will take time and require a multi-year commitment in leadership consistency, resource investment (monetary, intellectual, and physical assets) and demonstrated relevancy to the needs of Ukraine.

Whatever functional and organizational decisions are made, the implementation plan should reflect Ukraine cultural mores and governance process. It is important to maintain continuing dialogue with "oversight" entities within the Ukrainian Government to reinforce their support for this reform effort; to keep them apprised of progress, issues, challenges, and new opportunities; and to be responsive to their issues and concerns.

Inherent in the reform process will be certain underlying policies that will provide the context that will guide implementation and future directions (e.g. open market v planned economy, science focus, employee commitments, data management/sharing, etc.).

Underlying trust and credibility will be important to affirm unbiased, objective, and authoritative science

research results, strategic resource development, regulatory action and to overcoming the conflict of interest appearances that can undermine such credibility.

Multiple complimentary management, scientific, budgetary, human resource, and technical plans will be required to guide and re-inforce the principles of the reform and to demonstrate the complexity, seriousness, commitment, and the detailed thinking necessary to make proposed changes a reality.

The following are a number of suggested actions that should be considered in the development of an implementation plan for reform of SGSSU, based on the observations made during the Assessment missions. The numbering does not necessarily indicate a numerical order but rather a listing of significant actions that could be considered at some point in the transformation process. Indeed, some aspects of the plan may occur simultaneously but coordinating actions will be critical to effective implementation of the transition.

1. Mission – The SGSSU leadership needs to decide the organizational sense of purpose and mandates. Whether its core functions centre on science, resource development (i.e. expansion of its energy & resource base), services provider or regulator. Input from the Executive and Legislative branches, stakeholders, and public perspectives will be important to informing what it needs to be. A good understanding of the current organization (strengths & weaknesses), lines of authority (within and external to SGSSU), proposed policy and scientific changes will be important to the transition process. Agreement on current status and future state is critical.
2. Functions – Strength/Weaknesses of the current SGSSU in terms of science/service capabilities; people assets/skills; science contributions; equipment; data, etc. should be assessed and evaluated to guide function and program priorities. Included in the function and priority assessment process SGSSU leadership should

consider which functional activities should no longer be pursued because they are outside of the defined mission (e.g. regulating, permitting?) and/or what functions in other Ministries would be better located in SGSSU under the restructuring.

3. Implementation Team – Once the mission and functions are defined, a dedicated team should be designated to develop, direct and oversee the implementation plan. It will develop a transition strategy and will ensure that respective implementation actions are coordinated and integrated in support of the reform goals and objectives. It will work closely with senior leadership in SGSSU and the Ministry of Ecology and Natural Resources to affect changes and to resolve problems as they emerge. Unforeseen issues will arise and create impediments that need to be addressed before they stifle progress. The team leader will play a critical role directing, coordinating, and moving action forward.
4. Advisory Board – A separate, independent Advisory Board should be considered comprised of individuals experienced with the geological functions as well as organizational restructuring and change management dynamics. The Board will provide technical advice & guidance during the transition process.
5. Communications Strategy – It will be imperative to convey the rationale for the change and the benefits expected to be realized. Communications will play a critical role to any reform effort. A plan and strategy will provide some order to the chaos that can develop within the organization and alleviate anxieties by explaining why a change is being instituted; acknowledge impacts on geological functions and research projects; how employees may be affected; how stakeholders and external customers could be impacted; how the reformed organization will relate internally within and externally to the Ministry of Ecology and Natural Resources. The process of communicating what will happen and when needs to be repeated often and through multiple media

channels involving senior leadership of the new organization. A mechanism and process needs to be established to solicit and address employee and constituent feedback.

6. Management Plan – Consistent with the organizational maxim that “form follows function”, a management team should be established to begin developing organizational constructs and management strategies reflecting the core functions, lines of authority, and priority objectives. A staffing strategy component should be developed that avoids fragmentation of resources “stretched” to sustain numerous programs/activities and reallocates resources to high priority work. Consideration should be given to stopping lower priority work until additional resources are made available. Also, the team should explore business enterprise initiatives that include government and private sector partnerships; quasi-governmental entities; turnkey ventures, etc. that could serve as a transition for certain current government functions to the private sector.
7. Budget – A new budget should be designed to reflect the defined mission and the new organization with its immediate and long-term funding needs. Resources should be allocated to reflect downsized or terminated programs as well as new functions and directions. Program and research plans should be recalibrated to reinforce the organizational changes. Special attention should be given to the budget execution process to ensure that funds are effectively planned and allocated at the start of the fiscal year. Integral to the budget should be an infrastructure investment plan that embodies a broad range of assets from buildings and equipment to data storage, digitization, and networks consistent with the organizational immediate and long term priorities. The investments in people, technology, and infrastructure needed to support reform should be delineated.
8. Human Resource Plan – A human resource plan will also be important to reflect the commitment to invest in people resources. Recruitment will be needed to replace an aging workforce and to attract new skills necessary to pursue its mission. Other strategies will be required to address personnel and skills no longer needed, sequenced to coincide with terminating and/or winding down historically important but lower priority work. Investments in re-training impacted employees as well as outplacement services for displaced individuals to mitigate adverse impacts will reaffirm a commitment to employees. Does SSGSU have the existing resources to pursue the mission objectives it prescribes? What commitment, if any, does SSGSU want to make to current employees as part of any reform strategy? Will they be protected; reassigned within or externally; re-trained; or released?
9. Science Team – A science team should be formed to lead the planning for changes to the existing science focus and redirection to the new science priorities. A critical strategic question to answer is whether the science focus be Ukraine centric and/or more reflective of global trends such as climate change, water availability, natural or human induced hazards, energy and minerals, or ecosystem health.
10. Implementation Plan Time Line – Determine what can be accomplished in the first 12 months and beyond. Related contingencies should be identified such as new/revised/abolished decrees, laws, policies, management practices, lines of authority, etc. that will be necessary to enable the reformed SSGSU.
11. Legislative Strategy – A legislative/legal strategy also may be needed to facilitate changes necessary to the reformation of the SSGSU such as terminating or transferring functions from or to other Ministries or to modify how work is handled internally as with data sharing/data management.
12. External Reviews – Later in the transition process reviews by an independent external body (e.g. Academy of Sciences) should be undertaken periodically to assess progress towards reform and results achieved as well as to inform program and organizational adjustments.

Conclusions

First and foremost it is clear that there will need to be an internal dialogue between the Ministry and SGSSU in order to determine the most pressing needs of the country that are associated with geological knowledge, data and research – with a wider scope than solely the exploration and exploitation of mineral resources. Only then can an effective plan for reform be put together, focussing on integrating some of the stronger relevant units and developing those areas found to be weaker, in order to create a fully functioning and effective national Geological Survey which can serve the nation.

Within Annex D, the development of the Geological Survey of Lithuania and the Polish Geological Institute from their past Soviet structure to their current operating structure is described in some detail. However the structure and workings of other Geological Surveys, while relevant, in the end are shaped by the needs of those particular countries and might not necessarily be the right solution for Ukraine. The main issues that should be extracted from these descriptions are how Poland and Lithuania evolved their Surveys from meeting the needs of the former Soviet structures to meeting the needs of the western capitalist structures. But even here, the parallels are not exact, because of very different timescales and political circumstances which existed, while noting that each country has their own culture and values that should underpin their respective Geological Surveys. We now have the benefit of previous experience however, which should be exploited via Ukraine's network of contacts within EuroGeoSurveys. Based on the experiences of other former Soviet Union countries that had to adapt to the post-Soviet market economies, Ukraine can learn what might work well within their own circumstances.

The observations, recommendations and suggested implementation plan described in this report have

the potential to, we believe, make a positive and constructive difference in how the geological assets of Ukraine are applied toward helping the country progress. Whether or not they are all considered suitable or practical, some will no doubt be difficult to achieve – in particular if it is decided there is a need to sell off, close down, merge or reduce in size and scope some of the institutions currently under SGSSU. However there exists a solid foundation on which to revitalize the national geological services in Ukraine, as a country which has many excellent geoscientists on the ground and, probably, vast wealth under the ground, so the essential twin assets do exist. The challenge is to make the system more effective.

EuroGeoSurveys, along with their counterparts the U.S. Geological Survey and Natural Resources Canada, are ready to provide further advice and assist in any way possible with the potential reform of SGSSU and the national geological services within Ukraine. We will continue to investigate potential avenues for bilateral and multilateral cooperation, in particular through the EU funding programmes for research and development.

Acknowledgements

The authors of this report would like to offer their sincere thanks to SGSSU for their kind hospitality during the three missions arranged in Kiev. The amount of meetings they managed to arrange with individuals from around the country was

crucial towards the Assessment Team gaining an understanding of the situation not just within Kiev, but across the country.

Annexes

- A. Agenda of meetings attended during the three missions
- B. Detailed overview of SGSSU structure and operational descriptions of the State Owned Enterprises and Academic Institutions
- C. Ukraine Minerals Development Program
- D. Case studies
- E. Short CVs of the authors
- F. Questionnaire responses - Activities of SGSSU State-owned Enterprises



The Geological Surveys of Europe

EuroGeoSurveys - The Geological Surveys of Europe

Rue Joseph II, 36-38 - 1000 Brussels, Belgium

Tel +32 2 8887553 - Fax +32 2 5035025

info@eurogeosurveys.org

www.eurogeosurveys.org