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## **Making sense of a different place**

**- Cross-disciplinary knowledge  
integration in RussCasp**

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# Making sense of a different place - Knowledge integration in RussCasp

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## Abstract

RussCasp is a user oriented research programme on the future of Russia and the Caspian region as arenas and actors in oil and gas, aimed primarily at policy makers and business strategists in the Norwegian oil and gas sector.

User orientation requires an element of simplification, while the complexity of the subject matter poses clear limits to the value of simple answers and the study of simple causal relationships.

Therefore, the research programme includes a separate work package on cross-disciplinary knowledge integration. In this paper we argue for why a conscious approach to knowledge integration is needed in this program, and what knowledge integration methodologies we aim to apply at different stages to shed light on the main over-arching questions that motivate the research.

The proposed activities cover knowledge integration across themes from the short to the long term, as well as covering Russia as an energy investment arena, energy supply actor, and overall developments in broader terms. At the end of the research period, we thus aim to have a solid understanding of the complexities around Russia's role as energy actor and arena, and a comprehensive toolbox for knowledge integration in complex country studies for short, medium and long term analysis.

## Key Words

Russia, Caspian region, methodology, foresight

## JEL Classification

O10, O52, Y80, C53, B49

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# **1 Introduction: The RussCasp research programme – understanding the whole and the parts**

The RussCasp research programme aims to build knowledge and competence on oil and gas related developments in Russian and the Caspian Sea region, of relevance to Norwegian decision-makers and society at large. The primary users of the research findings are policy makers and business strategists in the oil and gas sector. These users are of course aware that the subject matter is complex and varied, but need help in handling this complexity and creating useful backdrops of understanding for their own decisions. User orientation thus requires an element of simplification, while the complexity of the subject matter poses clear limits to the value of simple answers and the study of simple causal relationships. With a theme as broad as this, we need cross-disciplinary integrative approaches that help users make sense of the whole without over-simplification.

The objective of the programme is to expand understandings of the long-term outlook for three greater whole issue clusters of strategic relevance:

1. What shape will Russia and the Caspian region take as arenas for foreign energy companies in the medium to long term?
2. How will strategies and volumes of Russian and Caspian energy exports develop in the medium to long term?
3. What energy developments will we see in the Russian High North in the medium to long term?

In previous research, three recurrent energy themes in Russian and Caspian politics have been identified:

1. Control of the oil and gas industries and revenue streams
2. Concern for the energy balance
3. The link between energy and foreign policy

These concerns, the way they will be addressed by Russia and the Caspian states, and the factors and driving forces that will influence their relative focus and interpretation interact in multiple ways. The overall development of Russia and the Caspian as energy arenas and actors will result from a complex interplay of forces and factors across sectors and levels of their economies and societies, as well as global developments.

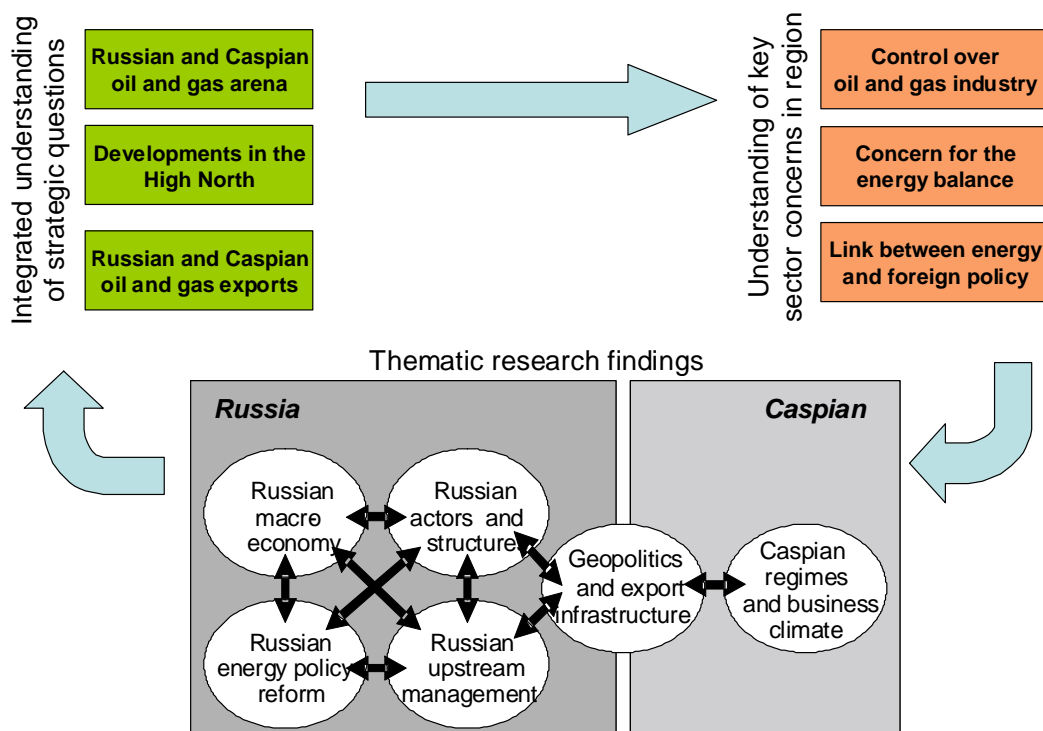
While it is important to dig deep into partial analyses and sub-problems, it is therefore also paramount to understand the interactions between factors and issues and find effective ways of integrating detailed findings into a greater whole. Most of the internal forces and factors will be studied in six thematic work packages where clearly defined sub-problems will be analysed in detail, while we will draw on existing research on external/global forces.

- Research in the thematic work packages will over the course of the research programme test hypotheses and drill into uncertainties and seeming paradoxes. The following is a list of the main over-arching hypotheses:
- Upstream oil and gas development challenges will not be adequately addressed by the peculiar state-oligarchic model that has emerged in Russia (WP1)
- Upcoming electoral cycles and the anticipated gas shortage will precipitate an ongoing re-negotiation of energy policies (WP2)
- The seeming lack of progress in implementing proposed economic reform policies owes substantially to the regime's perceived need to retain legitimacy and popularity and this will continue to be a challenge (WP3)
- Russia's economic growth is robust but with several structural challenges and with too high dependence on oil and gas revenues. Thus there is a real danger of Dutch Disease-related structural problems (WP4)
- Control over export infrastructure and downstream assets will be an increasing concern in the petroleum policy of Russian actors both as they struggle with the impending supply crunch and as they work to increase profits (WP5)
- The Caspian states are likely to remain semi-authoritarian regimes defined by varying degrees of instability, corruption, clientelism and informal networking (WP6)

Understanding the whole will require more than just summing up the parts, however, and therefore we have added one work package on knowledge integration. Reaching a more integrated understanding of the whole across disciplines and themes will also feed back on the study of the parts, in the form of better questions and better linkages between related studies.

The structure of the research programme as a whole is illustrated in Figure 1.1 below. The three boxes on the upper left show the three over-arching strategic questions, where we start out with an initial understanding based on previous research. In the upper right corner are three boxes representing our current understanding of the core energy agenda in Russia and the Caspian region, an understanding we draw from our current integrated understanding. The lower part of the figure shows six thematic work packages and their main inter-relationships, which we have designed based on the current state of our knowledge to lead to a revised understanding of the whole.

Figure 1.1 The research program - work packages, their inter-relationships and knowledge integration



The RussCasp research effort can thus be seen as a hermeneutic loop process where we start out with integrated analyses of the whole in the form of existing bigger picture analyses and scenario sets from previous research (Brunstad, Magnus et al. 2004;

ECON 2007; Baev 2008; ECON 2008; ECON-NUPI-PRIO 2008; FNI-NUPI-ECON-PRIO 2008; NUPI-FNI-FFI 2008) and the resulting understanding of what are the key energy related policy concerns in the region. We then revisit the details with well informed research questions, which in turn lead to new understandings of the integrated wholes, which then in turn will inform new detailed research questions.

The aim of this short working paper is to lay out our strategy for the knowledge integration part of the research program.

## **2 Cross-disciplinary knowledge integration methodology reflecting research user needs and complexity of subject matter**

Research users' needs may vary. Sometimes, what they want is open learning about a given theme to enhance their general understanding and preparedness, whereas in other cases they are looking for specification and quantification of findings to be used more directly in their decision making processes. User orientation requires an element of simplification, while the complexity of the subject matter poses clear limits to the value of simple answers and the study of simple causal relationships (McNeill 1995). Our knowledge integration efforts need to take into account both the type of user needs *and* the level of complexity of the subject matter.

### **2.1 Complexity and the study of political and economic developments in Russia and the Caspian region**

The word complexity is generally used to characterise something with many parts in intricate arrangement (Lloyd 2007), but not all such complexity is necessarily hard to make sense of. To take this into account, the level of complexity of a system under study can be understood as the amount of information necessary to describe the system with a given degree of detail (Bar-Yam 1997).

Complexity can be dis-organised (Weaver 1948), as with a gas in a container. This gas consists of a very large number of parts (molecules) which interact in largely random

ways, which leads the gas as a whole to display orderly behavior that can be easily studied using probability and statistical methods. The behavior of the gas is locally emergent, in that the same behavior can be found in any subset of a sufficient number of gas molecules (Bar-Yam 1997). Situations of dis-ordered complexity are thus only highly complex when we want to describe them with a lot of detail, since the emergent behavior on a crude level of observation can be rather simple. Also, it is rarely necessary to span across overall academic disciplines to reach a description. With dis-organised complexity, therefore, cross-disciplinary knowledge integration is not much of an issue.

Organised complexity (Weaver 1948), on the other hand, is when the interaction between the parts is non-random or correlated. Such a system displays global emergent behavior, which means that the collective behavior of the system as a whole cannot be understood from understanding the parts in separation, unless the parts are studied in the full context of the whole in which they are found (Bar-Yam 1997).

Our RussCasp topics clearly fall in the category of organised complexity. For instance, in studying the Russian oil and gas scene in order to understand how it can take shape over the medium to long term, it may not be good enough to understand the general logic of oil and gas companies and other relevant actors to understand how they will operate in and shape Russia. Since “Russia is another place” (Waage 1992) with very intricate and unique interactions between politics, economics and socio-cultural phenomena both inside and outside the country, to understand such actors’ contribution to Russia’s oil and gas future, we must study them in the particular context of the Russian oil and gas scene.

With high degrees of ordered complexity, a system is also likely to evolve considerably over time. As sub-systems continuously adapt to each other, the collective behavior of the system as a whole can change – also rapidly and drastically - in turn shaping the sub-systems in new ways (Bar-Yam 1997; Stacey 2000). In Russia’s case, such stages of non-linear change have been quite frequent over the last 25 years, with perestroika, the fall of the Soviet Union, the rigged privatisations under Yeltsin and the restoration of the ‘power vertical’ and the renationalisation of assets under Putin, to name a few of the most vivid system-wide changes. Further non-linear change could be in the cards within the time horizon that is relevant in RussCasp. Such changes can rarely be

understood by linear causal inference, in fact with non-linear change much of the linear causality within the system breaks down. So instead of looking for causal relations, it will make more needs to drill into paradoxes and study pattern formation (Stacey 2000).

## **2.2 User needs and complexity of the subject matter in the RussCasp research program**

Research users' needs and preferences can change in the course of the 5-year research program. It is likely that as knowledge expands and possibly business involvement in the region of study grows, their needs will move from open learning to gradually more specification and quantification.

Again, looking at our research objectives, we can say that the longer the time horizon we want to understand, the more information is necessary to describe the various ways that things could unfold – so complexity is higher. Similarly, the broader the theme, the more parts and interactions need to be covered, so complexity is higher.

None of our work packages can be said to be dealing with low complexity. We judge the complexity of the subject matter as medium *within* most work packages, especially those where the focus is mainly on describing the present, and where the problem formulation is relatively narrow. This is the case for example for work package 2, which is primarily concerned with mapping out and understanding key actors on the current stakeholder scene in Russian energy.

Complexity is higher in some of the work packages that are more future oriented and have a particularly broad scope, such as work package 6 on Caspian regimes and business climate.

First and foremost however, we face a high level of complexity when we try to answer our three over-arching longer term oriented research questions on the basis of the totality of research in all the six thematic work packages:

1. What shape will Russia and the Caspian region take as arenas for foreign energy companies in the medium to long term?
2. How will strategies and volumes of Russian and Caspian energy exports develop in the medium to long term?

3. What energy developments will we see in the Russian High North in the medium to long term?

At the start of the program, based on our previous interaction with the users,, we can tentatively assume for the sake of discussion in this paper, user needs and subject matter complexity as presented in Table 2.1 and Table 2.2.

*Table 2.1 Complexity of subject matter and user objective in the thematic work packages of the RussCasp program – tentative classification*

	Medium complexity of subject matter	High complexity of subject matter
Open learning objective	WP2: Actors and Structures WP3: Russian Energy Policy Reform and Public Consent WP5: Geopolitics and Strategic Export Infrastructure (mapping parts) WP6: Caspian Regimes and Business Climate (mapping parts)	WP1: Russian Upstream Management (long term drivers) WP5: Geopolitics and Strategic Export Infrastructure (long term drivers) WP6: Caspian Regimes and Business Climate (bigger picture future part)
Specification, quantification objective	WP1: Russian Upstream Management (mapping parts) WP4: Russian Macroeconomic Development (macro-economic model)	WP4: Russian Macroeconomic Development (long term perspectives, possibly from scenario based adjusted models)

The parts of the research in the thematic work packages that show up in the right column of Table 2.1 will be pursued in close interaction with research within the overall knowledge integration work package (WP7), see Table 2.2.

*Table 2.2 Complexity of subject matter and user objective in the integrative work package of the RussCasp program – tentative classification*

	Medium complexity	High complexity
Open learning objective		Overall development of Russia and the Caspian Region as energy arenas (medium to long term) Developments in the High North (medium to long term)
Specification, quantification objective		Russia and the Caspian Region as energy arenas (short to medium term) Russia and the Caspian region as energy actors (medium term)

Much of the integrative analysis within thematic work packages will be anchored in integrative efforts made within the framework of WP7, and in strategic forum workshops with the research users. Stimulation and cross-fertilisation between thematic research and integrative research will also be the case for research that is placed in the left column of Table 2.1, not least in the context of strategic forum workshops.

### **2.3 Available knowledge integration methods for different complexity levels and user needs**

When complexity of the subject matter is medium, knowledge across a broad theme can be integrated reasonably well with methods based primarily on descriptions of facts, factors and concepts, and linear causal relationships between them. With quantification, this can give rise to reasonably useful prognoses and predictions based on relatively simple equations or models.

With higher degrees of complexity, however, linear causal relationships lose much of their relevance and increasingly it makes more sense to study paradoxical elements, non-linear change, and actual and possible emergent patterns on the level of the whole (cf 2.1). These patterns can be captured for instance in narrative scenarios about the future (Wack 1985; van der Heijden 1996; Brunstad 2002) or formulation of possible new paradigms, or the non-linear change dynamics can be sought understood by system dynamics modeling or other complex system modeling or simulation tools (Kauffman 1980; Bar-Yam 1997; Stacey 2000).

Table 2.3 below is created to present an overview of selected knowledge integration approaches that can be useful in different combinations of used needs and complexity of the subject matter.

*Table 2.3 Knowledge integration options depending on level of complexity and ambiguity, available data and user objective*

	Medium complexity	High complexity
Open learning objective	Descriptive studies	Narrative scenarios
	Theory building	Paradigm formulation
	Simple causality maps	Causal loop analysis
Specification, quantification objective	Prognoses	Scenario or paradigm based modeling
	Quantitative modeling	System dynamics
	Model based scenarios	Complex system modeling or simulation

## 2.4 Knowledge integration approaches planned for use in RussCasp

A starting point for integrative analysis in RussCasp is provided by existing bigger picture analyses and scenario sets from previous research (Brunstad, Magnus et al. 2004; ECON 2007; Baev 2008; ECON 2008; ECON-NUPI-PRIO 2008; FNI-NUPI-ECON-PRIO 2008; NUPI-FNI-FFI 2008), as illustrated in the hermeneutic loop in Figure 1.1. This existing understanding of the bigger picture has informed the research program as it is designed from start, including the research questions posed and the choice of strategies for how to answer them. As we continuously carry out the research and learn more about the problem parts, we will also be able to see the whole in new ways. The latter will be ensured e.g. through the knowledge integration workshops, so as to enhance the iterative hermeneutic loops of grasping the problem whole and drilling into the problem parts.

The work within the integrative work package is separated in several parts that are planned for different stages of the five year research effort.

A first priority effort is to finalise a set of broad scenarios for the Caspian Sea region, based on more rudimentary scenarios developed in an earlier research effort (ECON-NUPI-PRIO 2008). The new scenarios will be published in a book at the end of the first year of research, in close cooperation with work package 6.

Building on earlier research efforts, existing Russia, Caspian and High North scenarios are continuously updated in light of current events and research findings (from all work

packages) that signal changes in probability of different possible courses of events in the future. When and if developments take more dramatic turns that make our current scenario set obsolete, we will sketch new scenario sets to replace them, so that at any given time we will have a set of relevant scenarios to stimulate research in the RussCasp programme as a whole as well as learning and long term decision making for the users. Another option to re-evaluate the long term foresight is to perform a new paradigm analysis of Russia and the Caspian region for example in light of a global shift resulting from resource scarcity and climate policy. This option will be held open for later stages of the integrative research.

Informed by the more open learning that we aim to facilitate with the scenario work, we also aim to explore knowledge integration with other tools that open up for a higher degree of specification and quantification, albeit on a shorter time scale (short to medium term). Thus, as research in the various work packages has progressed somewhat, we aim in the second and third year of research to experiment with two innovative knowledge integration tools for this setting – a complex adaptive system simulation or modeling tool for Russia as energy actor, and a country specific country risk assessment tool tailor made for our research users. Depending on the success of these experiments, we may continue to develop and refine these tools in the last couple of years of the research program.

### **3 Summing up**

Making sense of oil and gas related developments in Russia and the Caspian region is not straight forward even in the short term, and in a longer term view the complexity of the subject matter may seem overwhelming. The impossibility of accurate description, prediction and prognosis does not mean that useful understanding cannot be reached, however. Cross-disciplinary knowledge integration tools for complex settings, such as scenario building, can make complex issues available for thought and speculation, opening up for new learning and insight and the creation of a useful and flexible backdrop for informed decision making.

The proposed above activities under the RussCasp research programme cover knowledge integration across work packages from the short to the long term, as well as covering Russia as an energy investment arena, energy supply actor, and overall

developments in broader terms. At the end of the research period, we thus aim to have a solid understanding of the complexities around Russia's role as energy actor and arena, and a comprehensive toolbox for knowledge integration in complex country studies for short, medium and long term analysis.

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