The (Bigger) Business Development Story in Russia

The Soviets created many technologies widely used by the industry. Is Russia poised to make new contributions? What's the GoForward strategy to incorporate these innovations to create competitive advantage in local and international markets?

By Thomas D. Nastas, President, Innovative Ventures Inc.

For decades, Soviet scientists and Russian developers pioneered new technology for the petroleum industry. In 1917, Russian scientist Armais Arutunov developed the first electrical submergible pump. In the 1950s, 43 horizontal wells were drilled in the Soviet Union, one of the most ambitious drilling efforts for the untested technology.

Building on the work of U.S. scientist Lester C. Uren, Alexander Grigoryan put theory into practice by branching the borehole, and in doing so, he became known as the father of multilateral technology. In 1953, the Soviets drilled a main bore in the **Bashkiria** field (**Bashkortostan** today) with nine laterals and a horizontal reach of 136m (446ft). Although the well was 1 ½ times more costly than other wells, it penetrated the pay thickness 5 ½ times better and generated 17 times more oil per day. During the next 20-plus years, the Soviets drilled 110 multilateral wells with Grigoryan drilling more than 30 wells[1].

These are just a few of the contributions Soviet science has made to the industry. Other Russian technologies widely used include *in-situ* combustion and vertical seismic profiling (VSP), invented in 1957 by Soviet geophysicist Evsei Galperin of the Soviet Institute of Earth Physics. His first VSP profiles showed the structure of seismic wave fields, including shear waves and polarization effects. After almost 50 years of improvements by Western developers (led by Bob Hardage of Phillips Petroleum), VSP is firmly planted in the toolkits of geophysicists around the world.

The Russian petroleum industry's labor crisis is battling against an increase thanks to the rise in technology and innovation

Кризис 90-х годов на рынке труда в нефтяной промышленности преодолевается за счет развития новых технологий и инноваций

As the West looks to Russia and the Commonwealth of Independent States (CIS) for hydrocarbons and economic opportunity, new technologies are needed to efficiently find, extract and bring fossil fuels to market. Siberia, the Russia Far North, Sakhalin and the Barents Sea pose unique challenges for energy majors and service suppliers. Western oil multinationals operating in the CIS as well as Russian oil companies employ international services suppliers and their technologies, some of which are Russian in origin but never exploited by the Russians to their commercial potential.

With continued growth and development in the market, several questions are being asked:

- Is the time right for technology users and investors to look to Russia and former Soviet states like Ukraine and Belarus as developers of technology to solve Russia- and CIS-specific exploration and production (E&P) problems in deep water, cold weather, large and distant geography?
- Are any of these technologies suitable for global use, to create game-changing solutions or improve technology cost/performance thereby opening price sensitive segments and filling economic vacuums and market gaps? Do opportunities exist to mix and match foreign and Russian technology to build the supply chain and better localize product content with less expensive solutions?

If yes, what are the ways to access opportunities, structure transactions and manage projects to conclusion?

These questions are certainly on the minds of forward-thinking business planners as they look at the larger strategy of Russia and CIS countries as contributors of E&P technology to develop the region's potential. A current example is the giant **Shtokman** discovery in the Barents Sea. Specifically, where should the industry add Russian and CIS technology content to solutions from other centers of excellence like the United States and European countries such as Norway, France and the United Kingdom? What can international E&P companies do to help Russian developers capture more economic value from their innovations?

The GoForward plan

A bigger business development picture is emerging for the supply chain to generate new value with and from Russian technologies as well as those from selected Former Soviet Union (FSU) countries to:

- create solutions that do not exist through game-changing research and development (R&D) with global value to build new models that open new markets, increase revenues and lower cost;
- expand the commercialization of almost world class technology with price/value combinations for sale in the CIS and selectively upgrade some for global sales; and
- mix and match foreign and Russian technology to more quickly localize and build the second-and third-tier supplier segment to lower technology cost as a percentage of the solution, such as well cost. While first-tier suppliers like Halliburton successfully introduced the first wave of technology to the CIS, the environment continues to evolve and considerable needs exist to replace (old) technology assets and add value in multiple segments of the supply chain.

The hydrocarbon business is basically one of technology and new solutions are needed to:

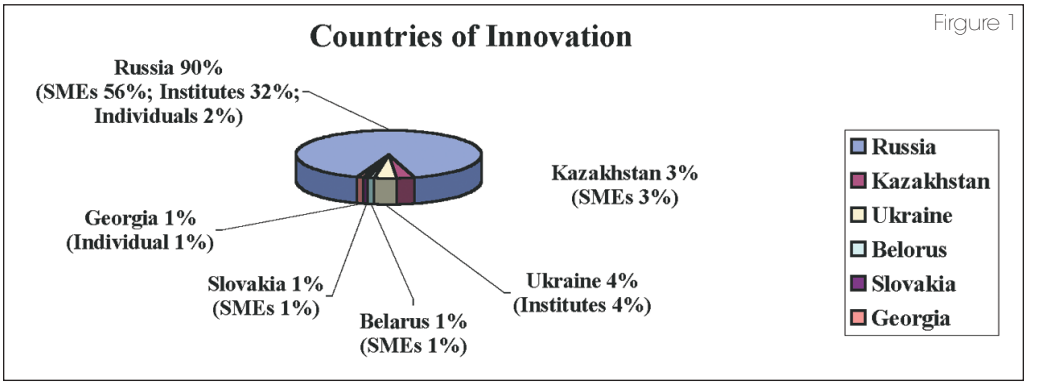
- increase revenues and profits from hydrocarbons;
- increase the life of hydrocarbon reservoirs; and
- position the industry for an alternative future.

Technology development is a global effort; service suppliers and E&P companies must seek new technologies and solutions from enterprises and institutes wherever they are located.

Multinationals in multiple industries — such as Intel, Siemens, Motorola, Microsoft, Boeing, IBM, United Technologies, Cadence and Sun — are investing in and incorporating Russian technology into their products. A few global venture capital (VC) technology investors capitalized Russian technology with the start-ups' corporate headquarters in Europe and the United States with the development team in Russia. They have done so to harness the technical and cost advantages of Russian developers with the ease of doing business in Europe or the United States.

Schlumberger is especially active in the CIS, with a Moscow-based R&D center and a regional unit in Novosibirsk. Baker Hughes recently opened an R&D office in Novosibirsk. Shell Oil Moscow has organized two annual technology fairs.

Firgure 1



In spite of these successes, there is a lack of information about technology opportunities and suppliers, actual and emerging seed and early stage business opportunities as well as how to channel the skills of Russian talent into R&D and technology commercialization to create new companies, investment and revenue opportunities.

Innovative Ventures Inc. (IVI) makes VC investments in CIS start-ups and early stage companies. This article summarizes the company's experiences working in the sector to create game-changing products and services for the petroleum industry. In addition to highlighting market characteristics and examples of technology opportunities, IVI provides learning curve lessons for international corporations and financial investors that seek strategies to access and develop the Russia potential for strategic and financial gain.

Short- and long-term trends are discussed so multinational oil companies and their suppliers can benefit from promising developments with existing products and services; corporate and financial investors with a global search for technology, internal incubation groups and corporate venture capitalists can benefit as well since knowledge presented is useful for those in aerospace, computer, information technology, communications, microelectronics, chemicals, materials, medical and biotechnology. Game-changing technology investment opportunities in the petroleum industry are an indicator that potential exists in other technology spheres.

Russian petroleum technology sector

Findings and data presented are the results of IVI's sourcing of technology and VC investment opportunities beginning March 2004. IVI received deal flow from small and medium size enterprises (SMEs) and institutes in Russia with opportunities from Kazakhstan, Ukraine and Belarus as well as Eastern Europe (Figure 1).

IVI sought VC investments in upstream, downstream and renewable technologies.

Deal flow and investment opportunities

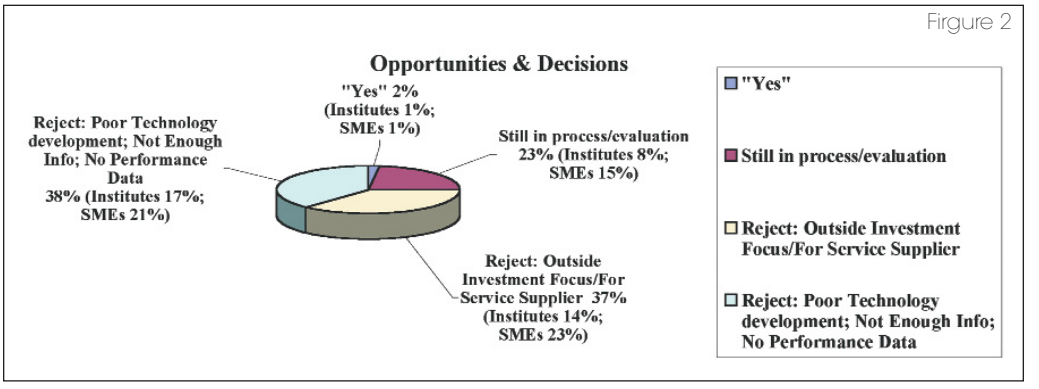
Strategic potential exists in Russia as demonstrated by the quantity and quality of technology deal flow opportunities. IVI evaluated more than 100 technologies in upstream, downstream and renewables with business plans and technical descriptions from SMEs, institutes and innovation centers affiliated with institutes, as well as individuals. Some institutes and SMEs submitted multiple technologies for investment.

IVI selected a few as interesting and is conducting detailed technology and investment due diligence (Figure 2) on some. IVI rejected most proposals for a number of reasons,

Oleg Kuprianov, Schlumberger wellsite supervisor, on one of the few Western drilling rigs operating in Russia. (Photo courtesy of Schlumberger)

Олег Куприянов, супервайзор на скважинной площадке компании Schlumberger, на одной из немногих западных буровых установок, работающих в России. (фото предоставлено Schlumberger)

Firgure 2



including, poor definition of the technology, lack of information about its value, lack of competitive differential and test data substantiating its performance.

IVI thinks this is a terrific response from the market; the number of technology opportunities from SMEs and institutes demonstrates the depth and breath of intellectual capital to innovate that exists in Russia and its neighboring states.

These technologies were created under less than ideal development and commercialization circumstances in Russia and the CIS – little money for proper R&D and difficulty finding potential customers to conduct testing in actual field conditions, performed to international standards/practices. The ability of the Russian innovation system to achieve these results under these circumstances demonstrates its ability to create technology of strategic importance.

Caught between two worlds

The Russian technology system is in a split stage of development with some developers making the transition to serve industry with innovative products while others face extinction.

While technology creation (Figure 3) is in the early stages of development, such as R&D (52%), 46% of technology is in the later stages of development/commercialization and more of a match to the interests of strategic investors, corporate venture capitalists and financial investors.

This split stage of development reflects the Russian oil industry's rapid growth during the past few years as institutes and SMEs respond to market needs by creating new technologies in R&D. Technologies in mature stages of development – those ready for manufacturing and customer delivery – are older solutions developed under a different Russian E&P strategy vs. international practices and before strong foreign attention/investment in Russia and the CIS. These older and mature technologies offer little value-added when compared to the best from the West, and is the reason such a high number were rejected.

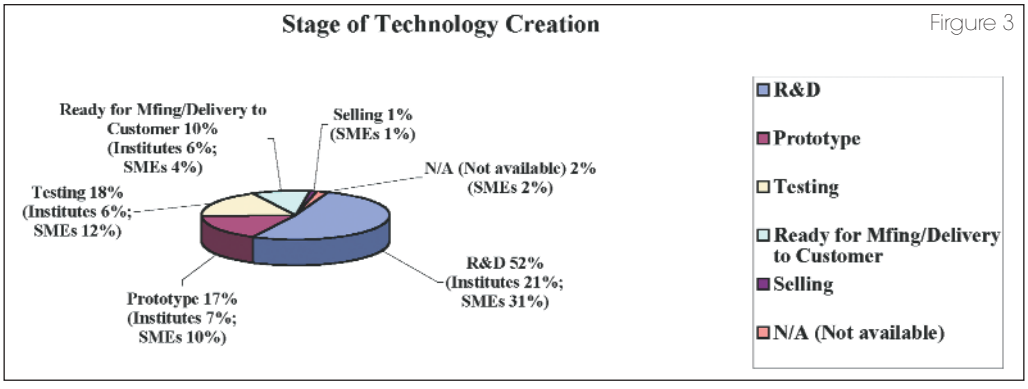
This duality in activity – obsolete vs. innovative technologies – is explainable. Many institutes and SMEs were focused on the Soviet defense sector, while others worked in closed Soviet markets; such isolation shut them off from leading-edge technology developments in G7 countries and others. Denied the opportunity to learn and leverage from the technology experiences of global players and others' successes, Russian R&D, application development, engineering and quality assurance lagged vs. innovation from the West and the Far East. This situation is slowly improving as more Russian SMEs integrate themselves into supply chains, conclude supplier contracts with international service companies and as CIS institutes compete for R&D contracts against Western and Far Eastern universities.

IVI's short-listed VC deals from SMEs are in the prototype and testing phase and reflect developers' response to the business and financial potential from the growth in the petroleum industry. Russia's ability to bring technologies to advanced stages of development gives strategic and financial investors the confidence that Russians can commercialize, to generate strategic and financial returns.

Russian technologies stratified into two classes

Russian developers are innovating in two directions:

Firgure 3



- highly differentiated solutions with a step change in performance and value creation; and
- almost world class products developed under Soviet E&P–scientists and product innovators took a different approach vs. Western practices. These solutions have excellent price-to-value benefits with the opportunity to expand commercialization in the CIS and selectively upgrade some with foreign technology for global sales.

Examples of technologies in these two categories and source of innovation (SME or institute) include:

- distributed temperature/pressure system monitoring of the wellbore (24 hours a day/7days a week)—SME;
- disc crystallizer for de-oiling and de-waxing processes—SME;
- enhanced oil recovery, two-stage combustion technology—Institute;
- low frequency seismic acoustics—Institute;
- novel well testing—Institute;
- ceramic vitrification of the borehole—Institute;
- hemispherical resonator gyroscope—SME;
- 3-D and VSP—SME;
- gas separation and recovery—SME;
- deep separation of binary gas-liquid flow—SME;
- sphere insulation plastic for extreme cold, deep water—SME; and
- geophysical data interpretation (inverse problems) software—Institute.

Structures for investment

These classes of innovation require different amounts of capital and effort to move them into the field:

- SMEs with fully commercial products/services that seek expansion capital between U.S. $250,000 and $1 million to update technologies with more capabilities and performance features, build out the marketing, sales and distribution activities for Russia and the CIS, to mount an international sales effort by partnering with international suppliers for distribution and/or co-development rights;
- technologies at the prototype stage and requiring capital to complete development, conduct testing and, productize the solution with commercialization of these opportunities within 2 to 4 years of investment. These technologies come from CIS SMEs and institutes. Investment requires a blend of structures – initially technical and product development financing between $50,000 and $1 million with transactions structured as partial or full ownership in the intellectual property (IP) licensing and use of technology rights. Follow-on financing is between $250,000 and $2 million for opportunities successfully developed and where a big enough opportunity exists for a company to commercialize the technology with first rounds of equity; and
- 'eyes and ears' technologies are at the exploratory idea stage with the potential to fundamentally change business models to search, find and extract fossil fuels. These technologies come from CIS scientists and institutes with a development timeframe between 3 and 5 years to market. These opportunities are financed through technical and product development agreements of $250,000 and $2 million with partial or full ownership in the IP, licensing and use of technology rights. For those successfully developed, follow-on financing of $250,000 and $2 million is required to commercialize the technology to market.

Transforming Russian potential into solutions

As expected with the majority of innovation in the R&D/prototype stage, Russian developers require financing to complete R&D and prototype development (Figure 4). SMEs and institutes specifically mentioned a need for 'commercialization assistance;' business development, marketing/sales and capital to bring innovation to market. As Russian talent is directed toward international needs and testing standards, technology in R&D will emerge as candidates for VC investment. It's encouraging that a large percentage of R&D comes from SMEs, not just institutes since it's quicker to market by investing equity into an existing SME instead of creating a new company from institute technology.

IP status of Russian technology

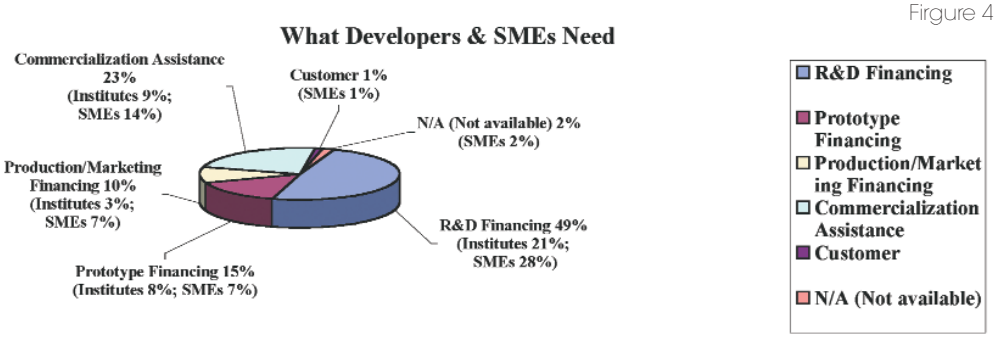
Many believe Russian technology is obsolete and outdated vs. international competition, yet facts are contrary to this conventional wisdom. Russia continues to create innovative technologies – 55% of opportunities evaluated are patented in Russia and/or international countries (Figure 5).

Transparency, business practices and Russian risk factor

Russians can be difficult to work with at times, and a few have attempted to sell IP to multiple parties when the buyer thinks exclusivity is offered. Such occurrences in fact are actually rare. Multinationals developing IP and using IP in Russian operations include Intel, Microsoft, Cadence, Motorola, Siemens, Sun, IBM and United Technologies, in addition to oil majors with billions of dollars committed like Shell, Sakhalin Energy, BP and service suppliers like Schlumberger. Boeing for example, has more than $2.5 billion invested in the country. Private equity investors operate in the region as well with more than $1 billion of capital committed from international institutional investors.

The Russian technology market is fairly transparent. SME managers and scientists willingly provide information and are receptive to industrial partners as well as equity co-investors vs. cash flow businesses that operate as the personal fiefdoms of the general director and his/her senior staff. From time-to-time, IVI did not receive information requested from

Firgure 4



developers, and this is partially because of their lack of experience dealing with foreign strategic investors, Western business protocols and attitudes that are a carryover from Soviet times. The inability of the Russian counterparty to provide information requested is frequently mislabeled as lack of transparency, and this is simply not true.

Russians are a proud people and not forthright when performance data is not generated to international standards and protocols. Russian managers, developers and scientists are embarrassed when tests are not benchmarked to competitive alternatives and established procedures used in the West, when they are unable to clearly present its strengths and weaknesses because of a lack of comprehensive analyses under different field conditions.

Russian oil majors contribute to this lack of transparency and risk because of Russian business practices. When a Russian oil company conducts a technology evaluation, results are deemed confidential and withheld; hence the innovator is unable to demonstrate value added to others. Consequently, Russian developers have little recourse but to test their technology informally and under less than ideal situations, which puts them at a disadvantage when approaching international users accustomed to comprehensive data generated under transparent test conditions.

Russian E&P companies block innovation and erect barriers in other ways:

- a production vs. an exploration focus; and
- a lack in the basics of technology development through execution and loyalty with the tried and true even when service suppliers offer (more effective, but more expensive) third- and fourth- generation solutions. A contributor to this single mindedness is the difference in labor rates of Russian vs. Western staff that make less costly, but less effective technologies still used in Russian and CIS E&P.

Some developers refused to send performance data to IVI, such as oil production increase, amount of cost reduction or patents, without confidentiality agreements executed. This behavior goes back to Soviet days when information was protected and disseminated to satisfy hidden agendas, create and reward cronyism. Performance data is neither proprietary nor confidential information; a competitor or others can't use it to copy a technology, it only tells how well the technology works or does not work. In other cases, some developers were slow and took months to answer requests. We rejected these opportunities; if a technology developer, manager or scientist is unresponsive to an investor in the beginning stage of making an investment decision, then the relationship will have significant problems after the investment is consummated.

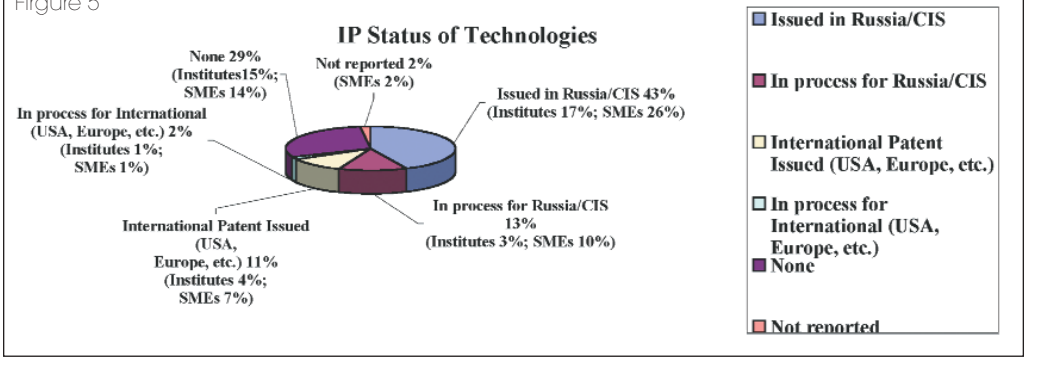
Future Outlook: The GoForward Plan

Real and undeveloped potential exists in Russia and the CIS. Exploiting opportunities requires proactive strategies and investment for the long term.

Conduct R&D to build the technology pipeline—Research and development projects are the prelude to generating future transactions based on new technical solutions and approaches. Consider contracting with institutes and selected enterprises with the skill to work on defined problems of customers and users.

Although their technologies were not short-listed for

Firgure 5



investment, several institutes work in innovative areas of upstream and downstream technologies, such as the Department of Radiation Monitoring, Ural State Technical University; the Facility of Information Technologies, Novosibirsk State University; the Institute of Petroleum Chemistry; and the Institute of Oil & Gas Solutions.

Russian institutes and SMEs need direction on emerging trends, where the industry is headed, customer direction and feedback at the early stages of technology development. A clear understanding of problems and potential solutions directs their R&D efforts to the needs for new technology and products. Such direction 'jump-starts' developers' attention toward opportunities in the petroleum sector. Commercialization of new technology starts with R&D and product development projects to demonstrate proof of concept and the value of novel ideas.

Targeting SMEs and institutes for upstream, downstream and renewable technologies is straightforward since several clusters of innovation exist: Moscow/Moscow region, Tomsk, Novosibirsk and Nizhniy Novgorod (Figure 6). Software, enhanced oil recovery (EOR), earth modeling and sensors are examples of E&P technologies. A secondary cluster is the Urals (cities of Yekaterinburg, Ufa, and Kazan) with technical development in crystals and crystallography for sensor applications, EOR and chemical processes for improving oil recovery in old fields.

Drive innovation into the market; link enabling technologies with platform solutions—Russian institutes and companies operate in innovation spheres that match the petroleum industry's strategic priorities (Figure 7).

Some of these technologies are stand-alone opportunities, while others require Western technology and skills as enablers and/or complementary functionalities to speed market introduction and customer adoption. Numerous foreign platform technologies can use Russian-enabling or complementing technologies to maximize value creation. Many of these technologies already exist in joint venture and portfolio companies of Western oil companies and their service suppliers. Instead of financing duplicate technologies and/or skills,

Examples of Technologies

The supersonic separator (3S) is a device based on aerodynamics technology from the aerospace industry. The main principle of operation is the acceleration of swirled gas flow in the nozzle to supersonic velocities, through which the gas flow is highly cooled, further separated from emerged liquid drops and finally gas flow pressure recovery in the diffuser. The technology is protected under patents issued by Russia, the United States, Canada, Europe and several Eurasia countries.

Main advantages of 3S-technology are:

- small size and reduced space requirements, greater portability, reduced handling and installation costs;
- low capital and operating costs;
- no adverse environmental impact;
- no moving parts;
- limited maintenance;
- low energy consumption; and
- significant performance capabilities compared with conventional separation equipment and configurations.

The technology solves multiple problems in the industry, including gas conditioning (dehydration and hydrocarbons separation); propane/butane separation with the potential for the separation of hydrogen sulfide and carbon dioxide, ethane extraction and methane liquefaction. Some achievements include:

- *Gas conditioning*—at an initial pressure 1,400psi and initial temperature 20°C (68°F) it's possible to reduce the dew point (with respect to water and hydrocarbons) from the outlet gas flow to -10°C (14°F) while only using between 17% and 20% of the inlet pressure and reduce the level to -15°C (5°F) while using between 22% and 25% of the inlet pressure;
- *Propane/butanes extraction*—for units with inlet and outlet pressure of 60 bars (840psi), gain is obtained in energy efficiency vs. competing technology schemes:
  - *for plants of 'shallow cut' type*—saving between 15% and 20% of total compressor capacity under the same C3+ extraction or 85% of recovery under the same total compressor capacity.
  - *for plants of 'deep cut' type*—saving between 15% and 18% of total compressor capacity.
  - *for associated gas*—the extraction rate above 90% without the use of turbo expanders and chillers is possible; and
- *ethane recovery*—the new technological scheme for ethane recovery plant is developed, thus saving 30% of required compressor capacity. The 3S separator is especially effective for use in marine platforms and subsea processing.

3D+VSP—This SME is an off-shoot of the main geosciences institute under the Former Soviet Union with more than 40 software engineers, customers in Russia, China and South America. The founder and chief scientist has worked in this field for decades and studied under Evsei Galperin, the grandfather of vertical seismic profiling (VSP).

3D+VSP gives direct information of the 3-D characteristics of a reservoir and provides for the combined surface-downhole acquisition geometry and model-based vector processing of seismic data. The technology processes full vector (three components) wave fields on principles of additivity and implementation of reference velocity models at each stage of iterative refinement. This

continued on page 22

opportunities exist to mix and match those that are imported to make Russian and foreign technology more robust.

Speed commercialization; mix and match CIS and foreign technology together—Russian developers are especially strong in specific technology targets of multinational petroleum companies and international service suppliers (Figure 8).

Mixing and matching Russian technology with complementary technology/skills from Western companies makes technology more robust to leverage investments into new revenues, maximizing value creation and eliminates much of the Russian risk factor. IVI's strategy is to invest in and link Russian solutions with Western technologies to build the management expertise in Russian entrepreneurs as the prelude for the successful ones to graduate and raise venture capital. As an example, risk, cost and market time is reduced by integrating the Russian distributed pressure/temperature system with the technology of one of IVI corporate partner's investee companies to create the total solution. Linking these two companies speeds commercialization since the foreign SME has the international sales, distribution and service networks that the Russian counterparty lacks for global marketing.

Target Russian value clusters as satisfiers of strategic priorities and unmet needs—Within these targets of technology development, Russians are especially strong in (Figure 9):

- software, hardware, sensors and communication products for the sensing, measuring, recording and reporting of information for reservoir identification, characterization and monitoring;
- stimulation techniques; and
- services for a variety of complementary needs in hydrocarbon separation.

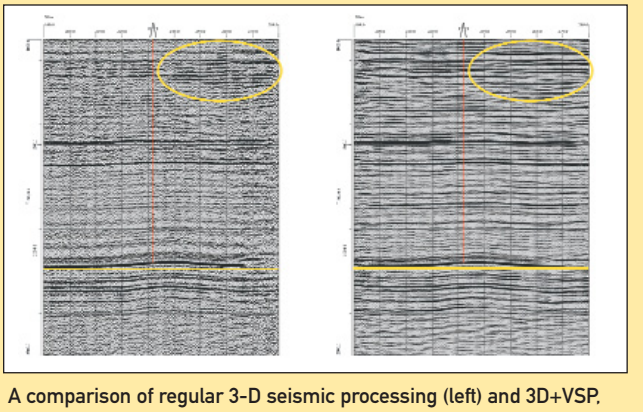
Upgrade CIS technology with Western solutions for Russian sales; then attack global markets—Moscow and CIS offices of international oil companies seek technology solutions for Russia- specific applications, including cold water ocean environments, Arctic conditions, gas reserves in deepwater basins and pack ice, or price-sensitive segments unique to the Russian market.

continued from page 20

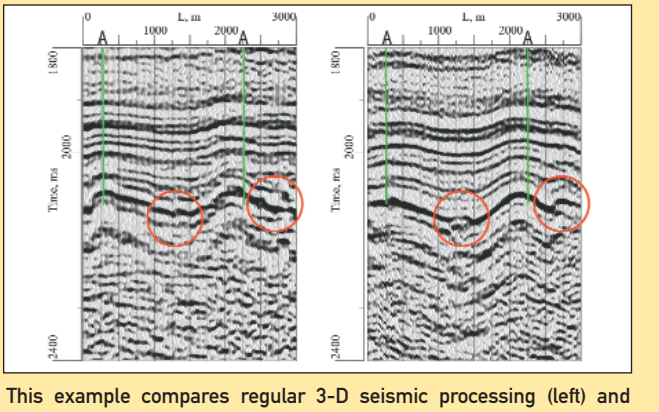
3-D acquisition geometry allows one to not only directly control impulse shape variation and shot statics for surface seismic, but also to estimate and account for lateral velocity inhomogenity. Having a massive multi-point device, it is possible to reconstruct a 3-D model of the near borehole area. Multiwave seismic data acquisition and processing enables vector inversion to recover PP and SS reflection coefficients corresponding to normal incidence as well as boundary dipping angles. This provides for the more detailed and accurate study of productive reservoirs because of higher quality and reliable data results.

The combined seismic acquisition 3D+VSP is partly developed with a single geophone or a several-point downhole device. The SME developer is working in hardware and software development to create a large number of geophones for the simultaneous acquisition of data in the entire borehole. The device has been prototyped and software development is working in several complimentary directions:

- solution of the inverse kinematic problem of having multiwave vector fields acquired in the entire borehole; and
- full vector 3-D migration of surface and downhole seismic data. ◆



A comparison of regular 3-D seismic processing (left) and 3D+VSP, true shot and impulse shape corrections applied on downhole data. Dynamic features of the section are improved (circled) and the structure is changed (underlined).



This example compares regular 3-D seismic processing (left) and 2D+VSP processing of the same profile. There are significant changes in structure and an increase in resolution.

A number of Russian technologies were developed for Russian buyers where the prices are significantly lower than Western solutions. These products are just below world class, such as gas separation technologies from Moscow and Krasnodar companies and a plastic sphere (cold weather) technology from an enterprise in Vladimir. Opportunities exist to upgrade Russian technologies to Western standards to expand their scope on the Russian market and later commercialize them to global customers, increasing value for international petroleum companies and the supply chain.

Such home-grown Russian technologies help multinational companies localize supply content, substitute imports with domestic purchasing to reduce cost and comply with Russian government requirements for doing business in Russia; increase the number of supply chain relationships with Russian technology and Russian suppliers.

Link global technology activities to the supply chain needs of your Russian operation—Schlumberger is applying this strategy effectively with two expatriates backed by a local team in Russia seeking acquisitions; purchase of assets deepens Schlumberger's presence in Russia and helps it satisfy local supply chain requirements for conducting business within the country and CIS. This team also seeks technology for global markets through minority investing and supplier contracting.

Invest locally and internationally to create value—The decision to do this is a function of the deal and the GoForward plan/budget, as well as events on the political front in Russia.

International corporations developing technology in Russia are implementing low- and high-dollar investment projects. Boeing announced a $2.5-billion Russian investment project for its new airliner with a good portion of the design and development being done with Russian institutes/subcontractors and the sourcing of mission critical components like high-precision titanium parts from Russian suppliers.

At the other end of the spectrum is lower cost – yet still in the millions of dollars – knowledge-based technology development programs with the R&D subsidiary residing in Russia to serve the international parent. These include Intel with a large R&D facility in Nizhniy Novgorod and their recent purchase of the group that was Sun's SPARC development team. IBM also is in Russia as are Cadence, Sun and Motorola. Schlumberger also has a presence, and Baker Hughes adopted a toe-in-the-water strategy.

One model that investors are implementing is the dual-location/value-added strategy; R&D in Russia with the corporate entity/headquarters in the United States (or Europe).

International or local funding is made on a case-by-case basis, contingent on a number of issues and objectives. For example, several Russian technologies fall slightly short of competing against the "best of the best" for global applications, but are value creative for niche applications as a substitute for high-cost imported technology. Strategic investors can finance an investment in Russia, prove its value domestically and upgrade the technology for international use, a short-term win/win for the local market and a long-term win/win for the corporate investor in its international operations.

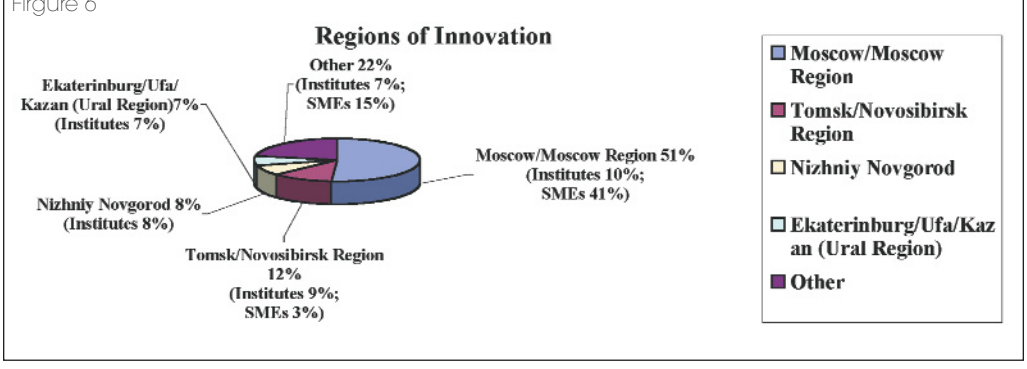
Capital is a partial solution; provide Western system skills to Russian counterparties—Steps toward this goal include providing institutes and enterprises with proper customer direction and financing in the blocking and tackling activities of technology development such as end-user guidance to focus design and development, cost and price requirements and comprehensive testing to international standards. IVI expects that many technologies that are rejected (42%) in part because of poor description and lack of test data have second lives as viable opportunities with proper direction from corporate partners.

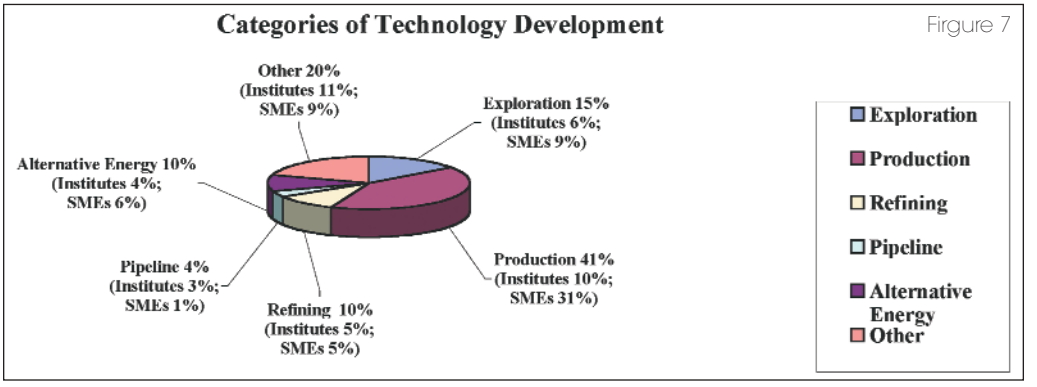
Deal flow exists and can be developed with financing as well as Western systems delivery and management execution in:

- project management and implementation skills;
- testing and technical service/support; and
- business development, marketing and sales.

Most technologies have specific applications where they perform best and create the most value. The Russian side needs to better know the range of oil reservoir characteristics, drilling conditions, weather and location impacts, expertise and technical skills of the customer, to realize the value the technology provides to pinpoint its best applications. With such business development help from the Western side, investors and partners can better understand the value added

Firgure 6





Firgure 7

by Russian technology, – where it is best used, its prospects for adoption by customers in Russia and abroad, additional development and capital investment required to make the technology market-ready.

Russians are particularly poor in getting technology in the hands of customers for testing when users are not receptive at first or when they encounter barriers and detours in the marketing and sales process; some give up and quit, while others fumble and waste time.

This situation goes back to the Russian culture and their lack of experience in Western marketing and sales practices. One solution is to persist, continue to make contact with the Russian side, provide opportunities to test the technology (perhaps in limited situations), tell the Russians your objections and work to overcome those obstacles to extract the added value of the technology.

The virtue of patience—Time and persistence are needed to develop business relationships. The Russian culture is people-driven with confidence created through 'face time' vs. the Western way of working with a free flow of information like patents distributed without confidentially agreements. Trust is established by doing what one says he or she will do and following up decisively. Big corporations are slow in making decisions and taking action; Russians respect corporate staffers that implement the small but necessary steps that lead to a final conclusion even when they work in the culture of a large multinational oil company.

VC and the industry's GoForward plan

While the business of venture capital is to invest money, resources and contacts into companies, (local) venture capitalists can help reduce Russian risk and improve results in other ways too.

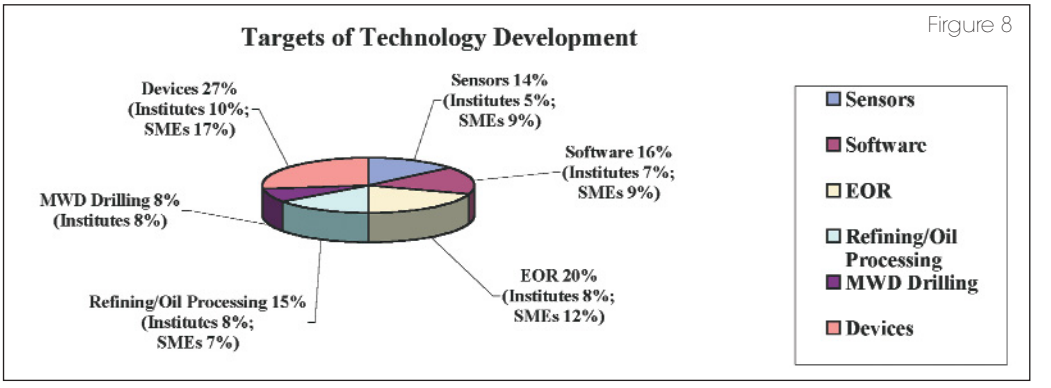
Access the market, both institutes and SMEs—Institutes under the FSU were the driving force in technology creation and development. Historically in this market, Russian oil companies were (and many still are) vertically integrated with captive suppliers and institutes. It was the Soviet (and Russian) oil companies that deployed the technology with full responsibility (and risk).

Western multinationals operate differently. Oil companies' needs are to get solutions from suppliers with them carrying the risk and earning the reward. Venture capitalists' objective is to build and finance the suppliers to do this; some delivering directly to the oil major as a first-tier supplier with others as second-tier suppliers to the first-tiers such as Halliburton and Schlumberger.

While accessing early stage SMEs in the Russian Federation is a bit daunting given its size and a general lack of information, it is manageable and possible. Sixty percent of the technologies and opportunities come from CIS companies vs. institutes, and 70% of short-listed solutions come from SMEs vs. institutes. SMEs are more transparent, commercial and visible as they promote their developments in the market vs. institutes.

Such SME self-promotion is positive. It is IVI's view that this trend is needed to properly align customer and supplier responsibility/risk; to get solutions developed and implemented quickly and efficiently into the field vs. performing institute R&D and having to work through deployment and service issues.

continued on page 30



Firgure 8

continued from page 26

An SME focus is not meant to diminish the role of institutes, but to properly place them in the role best suited for what they do in this market, in the current environment. SMEs accelerate technology deployment for the benefit of all.

Create the deal; technology does not equal a deal—Technology in and of itself is not an opportunity. Venture capitalists conduct the due diligence on the people, confirm their strengths and fill in the gaps with the proper strategy and the right people. Moreover they create the proper structures to develop and implement the technology with incentives properly aligned among all parties; entrepreneurs, managers and investors.

Maintain the vision; drive the investment to success, liquidity and exit—Big multinationals are poor at developing seed and early stage start-ups into thriving and profitable companies. That activity is best left to venture capitalists since their interests (and financial rewards) are aligned with the entrepreneurs and managers of investee companies. Big companies operate differently with a different culture, response time to needs and urgencies, and perspectives to and about ownership.

Venture capitalists make several contributions to the objectives of "Big Corporate:"

- building the SME with the technology of strategic interest to the corporate investor and putting the structures into place to accomplish this;
- raising co-investment money from other investors for development and working capital needs;
- creating the board of directors;
- seeing through technology development into actual products and services for sale to customers; and
- managing the growth process.

Ultimately, this work rewards all as the venture capitalist sells the equity stake in a cross-border merger and acquisition to liquefy the investment and return capital to the investors.

Conclusion

Only a consortium of companies working together for individual and industry benefits can exploit the opportunities in the Russian technology sector. The financial, investment, business development and resources requirements are too great for one company to develop the ecosystem as it exists in the West and technology development in competing regions like India, Israel and Ireland.

It's imperative that all work together to align industry strategies – increasing profits, longe-vity and position for an alternative future – with those of the ecosystem to accelerate the creation and commercialization of new technology and realize objectives faster. Creating supply chain linkages helps localize the ecosystem. Involving the ecosystem and getting it involved and committed provides all parties with a bigger footprint in the Russian innovation system and better insights into product development. This aligns the interests of the supply chain to technology development to diffuse innovation faster.

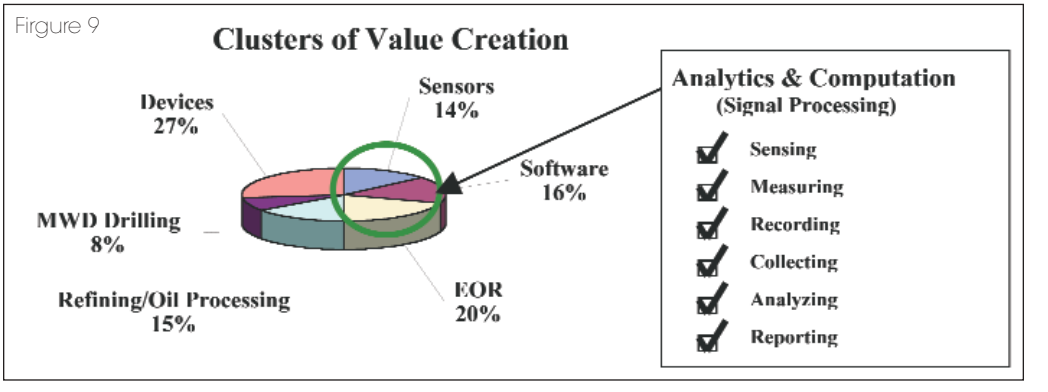
Shtokman: Where technology and need meet

Working together is critical for the development of the Shtokman field. No project is more in need of new technology, domestic and international collaboration. The Russians expect a majority of E&P content will be local; some officials target 70% and especially so in value-added products/services that go beyond Shtokman, to multiple fields and customers in Russia and abroad. Tangible plans by the short-listed contenders – Chevron, ConocoPhillips, Norsk Hydro, Statoil and Total – to invest in the development and commercialization of Russian technology and its supply chain are major evaluation criteria for winning the tender.

Multinationals selected in this first short list could wait until Gazprom makes its final selection of partners to see whether they are selected before initiating the actions to invest and grow Russian content (technology and suppliers). That may expose contenders to too much risk at this critical stage of the tender process.

An alternative is to start sourcing and investing, and capitalize on such development efforts to create marketing advantage for final tender documentation. This step is a small one, but little things like this can make a big and meaningful contribution to success. Lead time is needed

Firgure 9



so existing or new suppliers can finish product development, testing, certification and the integration into the implementation plan. While technical solutions and the supply base may be a small component of the proposal, inclusion of such information demonstrates to Gazprom and Russian government officials a willingness to be proactive for Russian content. Action speaks loudly to Russian politicians, and the final selection is a business and a political decision.

The industry's labor crisis

Years of low oil prices, resulting in underinvestment, frequent restructuring and downsizing, led not only to a lack of new capacity to meet demand, but also to a shortage of talent to satisfy the human capital needs of the industry. The average age of employees creeps upward without enough new talent coming into the industry to replace those who leave.

While each country and company is responsible for replenishing its intellectual capital, the internationalization of R&D continues with Russia emerging as the third most attractive market for R&D during the next 5 years[2] because of its strength in the basic and applied sciences. With the scarcity of engineering and scientific labor in the industry, international oil majors might consider Russian and CIS institutes as well as SMEs as talent pools to their manpower needs. China, India and Russia account for almost a third of all technical students in the world[3] for the latest reporting years 2000-2001.

While some transnational corporations use Russian talent to adapt imported technology to local conditions for marketing and sales purposes, there are other possibilities. R&D groups can be established to develop new products and processes for local, regional or global markets as well as technology monitoring units to learn from local innovators and keep abreast of development in Russia.

Get to know a venture capitalist

Russia and the CIS offer international E&P companies and service suppliers a number of options in strategy and execution. The ones selected are a function of an operator's experience and presence in the region. IVI works to develop the market for technology and venture capital, to invest in new solutions for the industry, to create more and better suppliers and the supply chains to improve the capabilities of local operating units and boost access into international markets. VC can reduce risk and bring efficiency to the courtship of local technology suppliers. While some multinationals may not be ready for entry or investment in the CIS region now, they may be in the near future. For more information about IVI's activities, visit *www.ivipe.com* ◆

About Innovative Ventures Inc.

Since 1986, the business of IVI is venture capital (VC); the company manages institutional capital for direct VC investment and provides financial institutions with advisory services to create, invest in, and manage international and emerging market VC funds in the Commonwealth of Independent States (CIS), East Europe and Africa. IVI develops markets and entrepreneurs since the emerging countries lack the quality and quantity of companies for VC investment.

Active in the CIS since 1994, IVI began looking at the Russian technology sector for VC opportunities in 2000, in 2002, Exploration and production technologies for the service supplier industry and in 2003, the company launched the CIS High Technology Partnership Initiative; its objective is to establish industry-VC consortia between multinationals, IVI, Small to medium-size enterprises (SMEs) and institutes to accomplish the following purposes:

- finance technology and technology SMEs with transactions structured as VC investments vs. purchase of assets/Greenfield ventures as typically done with foreign direct investment in the oil sector; and
- create targeted R&D programs to serve the industry specific needs of multinationals, with the outputs commercialized by CIS SMEs; and
- establish supply chain contracts between VC financed technology SMEs and the multinationals participating in the consortia to create more and better suppliers.

In 2004, Shell Technology Ventures (corporate venture arm of Shell Oil) and IVI partnered to make venture transactions in CIS technology and technology SMEs for the petroleum sector. In 2005 the company launched the CIS Oil & Gas Consortium to build on this beachhead:

- finance SMEs with gamechanging technologies for global markets/customer applications.
- finance technologies one step below world class but significantly lower cost vs. international competition, with capital invested to expand sales in the CIS. Selectively upgrade some for global customer applications while others remain CIS focused for the local market.
- mix and match foreign and domestic technology to create the total solution in cost/value, localize product content and expand sales for foreign suppliers and domestic players.

Transactions include a technology/sales and supply-chain contract with a consortia member, its VC investees and/or joint venture partners to speed commercialization and develop the local supplier network between CIS seed and early stage companies and Consortia partners. ◆

1 Source: Society of Petroleum Engineers Web site (*www.spe.org*), Oil & Gas Basics

2 Source: World Investment Report 2005, Transnational Corporations & the Internationalization of R&D, 29 September 2005, United Nations Conference on Trade & Development

3 Ibid