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## Capacity Building for National Exploration Risk and Resource Assessment Programs

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### SUMMARY

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Petroleum Resource Assessments, which quantify and demonstrate the overall potential of a prospective area or country, are essential to a Government's efforts to effectively evaluate and market their petroleum resources and to get them explored and ultimately produced. A rigorous Petroleum Resource Assessment is, therefore not only an academic or scientific effort, but an essential tool for a national agency to manage the country's hydrocarbon wealth.

The authors present capacity building programs which enable regulatory authorities to more completely understand the true potential of the areas offered, so that the agency can set terms that will get fair value for the country from any hydrocarbons that are discovered, to decide which areas to offer that are most likely to attract investment, and to present a technical prospectus that will convince investors that the areas being offered have significant hydrocarbon potential AND are superior to other areas inside or outside the country that may be in competition for investment funds.

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A clearly structured and auditable process is an essential step for a government agency to take the available G&G data from areas of interest (which are preferably stored in a National Data Center), and to enable valuations to be made so that assets can be marketed and licensed and their maximum value obtained. The processes need to be customized, for example to be fully integrated into data management systems such as National Data Centers which are either being developed or are already operating, and they need to be closely coupled to tasks such as planning and data packaging for lease rounds.

The **objectives** are to perform rigorous assessments of the exploration risk and petroleum resources of entire basins and all of their included plays, and can be extended to cover all of the basins in a country with a standardized approach following industry best practices. This enables basin and play scale ranking based on an assessment of the key exploration risks and their distributions in the different areas and plays in the basin. It also delivers an assessment of the Yet-to-Find (YTF) petroleum resources, including the resource type, i.e. whether oil or gas is more likely to be discovered. The programs utilize industry-standard, advanced technologies and workflows, and enable significantly improved management and ranking of exploration portfolios. Capacity building is at the core of the programs and enables the continued management of the assessment process by the Government authorities.

The **methodology** is based on rigorously structured workflows in which all of the available G&G data is used to assemble geological models of the basin and the petroleum systems in which its oil and gas originated. These models can also be conceptual and based on rigorous analogue studies in areas with sparse data. The model stage is critical in order to ensure that rigorous quality control procedures are applied to the data and interpretations, and they are a valuable deliverable in data packages that are offered by the country's agencies. The data models are then used to perform petroleum systems modeling to understand the processes through geological time that control its petroleum potential, and to determine the amount and type of petroleum (oil or gas) that was generated. This information is then used to map the exploration chance of success for each basin and play. Petroleum resources are assessed using methodologies which are applied by recognized authorities, and which provide an objective and fully auditable assessment of the Yet-to-Find (YTF) petroleum resources in each play. The program scope can also be directly extended to include prospect scale assessments which are based on the knowledge acquired during the basin and play studies.

The **key benefits** of the capacity building programs are that they enable Governments to make objective valuations of the basin's resource potential, as well as informed decisions on exploration strategies. The programs can be connected directly to National Data Centers, and enable the data that is stored to be pro-actively utilized to acquire more knowledge of the country's oil and gas resources. Capacity building programs support the development of a team of experts who will then be able to continue the assessment process on their own. This gives Governments the ability to manage the exploration assessment processes independently and with full control of the process. As the capacity building program is directly linked to the execution of the basin studies, it ensures that the participants will obtain a deeper understanding of the regional geology and petroleum systems of their basins. This will directly support efforts to ensure that staff can acquire and maintain a similar level of expertise to that of the E&P companies that are invited to explore in the country.

In summary, the capacity building programs enable regulatory authorities to:

- More completely understand the true potential of the areas offered, so the agency can set terms that will get fair value for the country from any hydrocarbons that are discovered
- Decide which areas to offer that are most likely to attract investment

- Present a technical prospectus that will convince investors that the areas being offered have significant hydrocarbon potential AND are superior to other areas inside or outside the country that may be in competition for investment funds.

The authors are closely involved in developing data management and resource assessment programs for clients in the industry and will present the objectives, methodology, key benefits and case studies of petroleum resource assessment programs for Ministries, Regulatory Authorities and National Oil Companies.