



Technical capabilities basin modelling

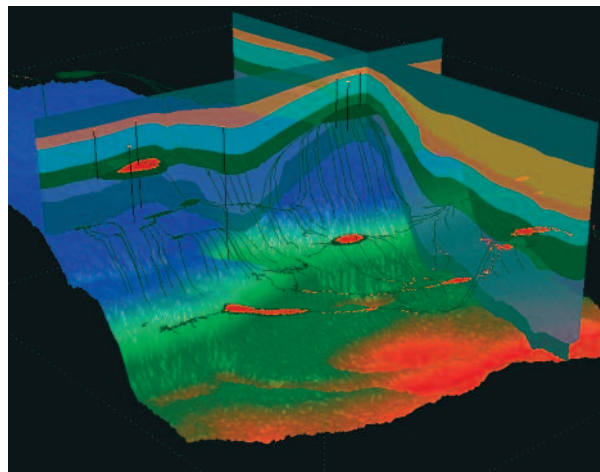
At Senergy, basin modelling is recognised as a powerful and effective tool which can be applied throughout all stages in the exploration process. Our basin modelling can be offered as a high quality, stand-alone service that can be used to address specific hydrocarbon charge issues. However, as integration underpins everything we do at Senergy, we believe that the full potential of basin modelling can be achieved through combination with all aspects of the exploration workflow. This approach allows us to add maximum value to all our exploration and basin modelling projects.

Regional and frontier exploration

Our integrated basin modelling approach can be used in data-poor areas to identify the key uncertainties associated with exploring a high risk and/or unproven petroleum system:

- assessment of source rock presence in an untested basin can be aided by the use of an integrated approach combining structural geophysics, regional geology and **burial history** modelling of key locations; therefore giving increased confidence to your depositional environment interpretation.
- **maturity history** within a frontier basin can be investigated through modelling the evolution of the **thermal regime** using geophysical, geological and geochemical data; thus allowing identification of kitchen areas based on more rigorous parameters than depth alone.
- timing of hydrocarbon **generation** and **expulsion** from a source rock is a key consideration in play evaluation; hence allowing you to focus time and analysis on areas and plays where charge is lower risk.
- integration of well and map-based basin modelling techniques allows a more robust interpretation of hydrocarbon **migration**, meaning that work can be focused on lead and prospect generation in areas with favourable hydrocarbon drainage.

A basin modelling approach to regional charge analysis has been incorporated as a key element in the **Ternan Regional Play Fairway Analysis** reports, which provide geological analysis of the regional petroleum systems within the North Sea and Northeast Atlantic Margin.



Prospect charge analysis

Basin modelling techniques are successfully applied to reduce the exploration risk associated with prospect generation and ranking:

- using map-based basin modelling techniques, **fetch histories** can be quickly calculated for individual prospects, giving information on charge timing, charge volume and hydrocarbon phase.
- prospect **migration studies** can be used to identify potential kitchen areas and secondary traps/targets which can be used to increase the value of the prospect.
- probabilistic modelling of the **key uncertainties** in prospect charge analysis such as source rock quality, source rock depth, fetch area, temperature gradient and migration loss gives a range of sensitivity analyses more closely reflecting the realities of petroleum exploration.

A geological approach

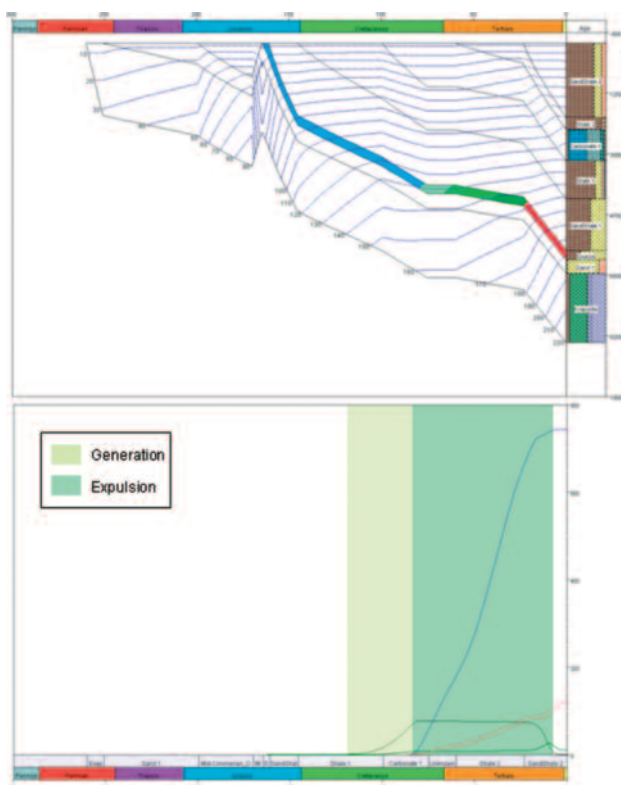
We use Genesis™ and Trinity™ basin modelling software which has been developed by Zetaware “for geologists by geologists” (Zetaware website, 2008).

Trinity is designed on the principle that the complete and perfect dataset required by a full scale basin simulator is not possible to obtain. It offers a practical tool to solve problems and answer questions about the petroleum system; it “is designed to give us the 90% answer in 10% of the time spent” (Zetaware website, 2008).

We use a probabilistic approach to charge volume analysis which recognises the uncertainties inherent in geological and geochemical data, and identifies the parameters which should be investigated to cost-effectively mitigate charge volume risk.

Our geologists have worked on basin modelling projects in diverse geological settings and geographical locations, from unexplored frontier basin studies to charge failure analysis in mature provinces where the petroleum system was thought to be well understood.

1D burial history with hydrocarbon generation curves



We have worked on quick-look studies with very short time-scales through to more academic problems presented at international petroleum conferences. We are always looking for new approaches to traditional problems and have proven success in integrating basin modelling studies within the wider exploration environment.

Perhaps the clearest indicator of the quality of our work is that our clients have returned to us for repeat business, time after time.

Technical capabilities

- timing of generation and expulsion
- primary and secondary migration modelling
- probabilistic charge risking
- identification of key charge volume uncertainties
- source rock identification and quality assessment
- hydrocarbon phase prediction
- burial history and uplift modelling
- well (1D) and map-based basin modelling experience in a diverse range of structural and geological settings
- integration of geochemical, geophysical and geological datasets into the wider exploration workscope
- QC and interpretation of geological and geochemical calibration data
- project management; data loading through to product delivery