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## Alternative energy resources in Lithuania - shale gas perspective

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In World's practice it is known that shale gas can be a viable source of energy. Lithuania is situated in the central and eastern parts of the pericratonic Baltic Sedimentary Basin. The Lower Silurian shales are considered as a most prospective formation for gas exploration due to high amount of organic matter (more than 2%) and large thickness (120-200 m). Mineralogical composition and related petrophysical and mechanical properties were assessed for west Lithuanian shales that occur at the depths of 1500-2000 m. Thermal maturity of organic matter  $T_{max}$  ranges from 432 to 455°C (oil window). Shales contain 37–57% of clay minerals. Illite predominates and chlorite is less abundant mineral. Quartz and feldspars compose about 35–45% of shale volume. The carbonate content ranges from 1% to 28%. TOC content is about 2%, while interpretation of well logs show higher average amount of TOC ranging from 2.5 to 8%. The Middle Llandovery “hot” shales of 4-11m thick show anomalous TOC content up to 20%. The mineral brittleness index was calculated to range mainly from 0.35 to 0.40 (below the lower exploitation limit), while logging brittleness index varies from 0.40 to 0.60 (good quality). This difference is explained by logging coverage of the whole Lower Silurian section by contrast to selective drill coring of wells. The bulk porosity decreases with depth from 16% to 3% (linear correlation  $Depth = -0.0107 \times Porosity + 25.7$ ). The low cation exchange capacity (0.2-8.8 meq/100g) is accounted to specific mineral composition. The low erodibility (Roller Oven technique) is related to high shale compaction. The capillary suction time method was used to estimate the swelling capacity of shales. Rather low values are explained in terms of predominance of illite in clay fraction and high amount of detrital grains. In summary, the exploitation parameters estimated for west Lithuanian shales are classified as good and excellent and can be used to minimize the impact on the environment.