For supporting the realization of the objective of the Ministry of Energy and Mineral Resources (KESDM) in achieving the national sustainable development goals in energy sector, accordingly the role of internal audit is literally required in order to assist the organization in achieving this objective. The internal audit is forced to meet the requirements upon the good organizational governance, which combining both the effective risk management need and reliable control. As one of the organizational function, the internal audit unit is faced to the resources limitation, which includes the time limit and budget limit, hence such risk-based planning with reliable ability to evaluate the risk is critically required, asides from its role in improving the effectiveness of audit and risk management system. Departing from these backgrounds, a research on the audit planning by using the risk management approach was done, in which the internal audit was able to facilitate the implementation process of risk management, such as by initially developing the risk management system by using 31000:2009 ISO framework.

The research was conducted at the Directorate General of New Energy, Renewable and Energy Conservation, Directorate General of Electricity and Secretary of the National Energy Board in the Ministry of Energy and Mineral Resources. This research used both the primary data and secondary data in form of qualitative and quantitative data. The primary data was generated through the questioner, focus group discussion, and brainstorming towards the respondents which were selected through the purposive sampling method. The secondary data itself was generated through the collection of the existing data in the organization internal, including the vision and mission, strategic planning, organizational structure, and work plan as well as budget plan.

Within the research, the risk management system and its implementation developed in order to generates the effective and efficient risk-based internal audit. The research methodology involved literature review, questioner, group discussion and benchmarking, for the purpose of observing the inherent risk on the examined object, while the Analytic Hierarchy Process (AHP) was used to obtain risk level and subject observed in the internal auditor’s perspective. From engaging the risk-based internal audit planning within this research, the result showed an efficient working day which may be used to carry out the additional duties which have not been scheduled before to create such added-value through consulting and evaluating.

Keywords: analytic hierarchy process (AHP), internal audit planning, risk-based audit planning, risk management