

SUBMISSION OF GHANA: THE COP, CMP AND CMA BY ITS DECISION 4/CP.25, 4CMP.15 AND CMA.2, MANDATED THE KATOWICE COMMITTEE OF EXPERTS ON THE IMPACT OF THE IMPLEMENTATION OF RESPONSE MEASURES (KCI) TO RECEIVE INPUT FROM EXPERTS, PRACTITIONERS AND RELEVANT ORGANISATIONS IN ORDER TO IMPLEMENT SOME ACTIVITIES IN ITS WORKPLAN.

Workplan Activity 5: Build awareness and understanding of Parties and other stakeholders to assess the economic impacts of potential new industries and businesses resulting from the implementation of response measures with a view to maximizing the positive and minimizing the negative impacts of the implementation of response measures” as per annex II by 31 March 2022.

Introduction

The workplan of the forum on the impact of the implementation of response measures (forum) and its Katowice Committee of Expert on the Impacts of the Implementation of Response Measures (KCI) was adopted at COP 25, in Madrid Spain in December 2019 (Decisions 4/CP.25, 4/CMP.15, 4.CMA.2).

The Government of Ghana welcomes the call for inputs by the KCI in order to implement the workplan activities.

As per annex II of the subject COP decision, the Government of Ghana will provide its input on:

Activity 5.a

Introduce the new/emerging industries and business resulting from mitigation policies and measures:

5.1 INTERNATIONALLY TRANSFERRED MITIGATION OUTCOMES (ITMOs).

In Ghana the most relevant new/emerging industries and business resulting from mitigation policies and measures is the country tapping into the carbon market, which will create demand for 24 million tonnes of carbon as apart of climate mitigation measures.

This move is under Ghana’s NDCs. Ghana has completed negotiations with Switzerland, signed bilateral agreement and ratified by Parliament. The agreement among other things, will implement emission reduction projects to generate the Internationally Transferred Mitigation Outcomes (ITMOs). Currently the Mitigation Activity Design Document (MADD) for the project on Improved Cooked Stoves (ICS) has been approved and letter of authorization is to be issued.

There are four projects in the offing including the Ghana Sustainable Rice Production, where some 2,500 rice farmers would be engaged to improve water management practices to reduce methane production through Alternate Wet and Dry (AWD) rice cultivation. The projects are aimed at cultivating 20,000 hectares of rice by 2030. Other projects enlisted on Ghana’s Article 6.2 white paper are the National Clean Energy Programme, and Waste handling and disposal

These other projects under the Switzerland partnership will include the provision of financial guarantee scheme to commercial banks to invest in green renewable energy, construction of compost plants to reduce methane and the promotion of efficiency through clean cook stoves.

Activity 5.b

Describe the social and economic impacts of the new/emerging industries and business including short description of the method or tool used for assessment.

Ghana envisages that this initiative will mobilise sustainable finance. It will also create green jobs, provide food security, improve the air quality, facilitate green technologies transfer among local business and achieve global targets.

As at this moment no tools or methodologies were used for assessment on the ITMOs.

5.2 Nuclear Power Generation in Ghana

5.2.1 Introduction

The second most relevant new/emerging industries and business resulting from mitigation policies and measures in the country is the quest for new, clean, sustainable and cost-effective energy sources to support Ghana's industrialization and developmental agenda. This has led Ghana to consider introducing Nuclear Energy in its energy mix. In view of this, the Ghana Nuclear Power Planning Organisation, has conducted technical work to assess the economic impact of introducing nuclear electricity in the Ghanaian economy. The economic impact assessment considers metrics such as Gross output, Value added, number of jobs (employment created) and associated incomes to labour.

5.2.2 The economy and the energy transition imperative

Energy transition is a pathway towards transformation of the global energy sector from fossil-based to zero-carbon sources. Central to this process is the need to reduce energy-related CO₂ emissions to reduce the effect of climate change especially on emerging economies. Its economic effect includes job creation and investments in low-carbon energy sources necessary to achieve a just transition to a net zero energy generation. Reducing carbon-intensive energy sources will destroy jobs in specific sectors such as coal mining and fossil fueled power plants as well. However, this loss is expected to be offset by job creation from the deployment of low-carbon energy sources that will potentially change the labour market by creating higher-skilled and better-paid jobs.

5.2.3 Methodology of Impact Assessment

An input-output framework was used to estimate the economic impacts of introducing nuclear power to support economic growth in Ghana. Input-output modelling allows for a quantitative analysis of inter-sectoral activities. Such models have been applied widely in various forms with varying number of sectors to the country context and therefore prove to be robust and consistent way to understand macroeconomic impacts of policies, industrial or business activities.

The input-output modeling depicts the flow of goods/services and money among the sectors in an economic system. The model shows the interdependence of the sectors of an economy, both as a producer of input and a consumer of output. In the model, each sectors' production activity is represented by structural coefficients that describe in quantitative terms the relationships between the inputs it absorbs and the output it produces.

The model developed for the study combines electricity data with Ghana's Social Accounting Matrix (SAM) and the allocation of the workforce over the various economic sectors. A Social Accounting Matrix (SAM) is a representation of the economy. It is an extension of the input-output matrix that adds other parts of the economy. The SAM is a square matrix which captures all the main circular flows within an economy in a given period. Simply put, the SAM is a statistical and static representation of the economic and social structure of Ghana.

The Input-Output (I-O) table which is embedded in the 2015 SAM for Ghana was produced by the Ghana Statistical Service (GSS) in collaboration with the Institute of Statistical, Social and Economic Research (ISSER) and the International Food Policy Research Institute (IFPRI), and a detailed disaggregated/micro-SAM and data from the Integrated Business Establishment Survey (IBES) phase 2, were sourced from the Ghana Statistical Service to assess economy-wide impacts.

This analysis uses the input-output table in the updated 2015 Social Accounting Matrix (SAM) of Ghana to build multiplier models to estimate the broad economic effect of nuclear power project in Ghana. The SAM multiplier modeling was used to assess the induced and second-order growth effect (removal or reduction of power related constraints to production sectors) on the Ghanaian economy. The updated 2015 micro-SAM of Ghana has 55 production sectors (disaggregated sectors). These were aggregated into 27 sectors in accordance with the International Standard Industrial Classification system (ISIC Revision 4 for the analysis).

5.2.4 Results

The analysis assumes that Ghana's nuclear power programme will build minimum of a 1200 MW plant. Once fully operational, the plant will generate 9,460 GWh per annum at a tariff of 0.14/kWh. Transmission and distribution losses in Ghana are about 4% and 23% respectively. After taking into account these losses, the amount of additional supply of electricity available for use in the Ghanaian economy is USD 1,606 million. This dollar value of electricity was run through the Social Accounting Matrix (Input-output) model.

5.3 Economy-wide Impact on Gross output

The results show that, if the power constraint facing the industrial sector in Ghana is reduced or eliminated, additional output worth about **USD 39 billion** will be produced.

5.4 Economy-wide Impact on Value Added (GDP)

The value added (from different sectors) sums up to **USD 18.7 billion** which will be approximately equal to 17% of GDP at the nuclear power plant's operational phase.

4.3 Economy-wide impact on employment

The analysis applied the Integrated Business Establishment Survey Phase 2 data on labour force allocation per sector, wages, salaries, social security and other income to measure the potential number of jobs that can be created across the entire economy with the onset of nuclear power generation in Ghana. The results indicate that by minimising the power constraints on sectoral production, approximately **1,131,240 jobs** throughout the economy can potentially be created.

4.4 Economy-Wide Impact on Labour Income

The increase in output in the economy resulting from deploying of nuclear energy further creates additional income for the labour force throughout the economy. This increase in incomes of the labour force was estimated to be approximately **USD 6.9 billion**

5.2.5 Conclusion

The study shows an *ex-ante* macroeconomic impact analysis of a nuclear power project in the Ghanaian economy. From the ‘Second-Order-Growth’ effect of achieving price competitive reliable energy supply, four aspects of macroeconomic impacts were estimated.

The model results show that a nuclear power potentially will induce a total sectoral Gross-Output of approximately **USD 39 billion**. Further, the economy-wide value added is approximately **USD 18.7 billion** which is about 17% of projected GDP at 2030. The economy-wide effect on employment was also estimated to be **1,321,240** jobs, whereas incomes associated with the employment created are estimated to be approximately **USD 6.9 billion**.

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