MEASURE ENERGY CONSUMPTION

Diverse energy resources have to be developed [1-2] which are environmentally safe, and energy consumption has to increase on a massive scale [3-4] in order to reduce energy/material scarcity [5], implement urban and rural projects, develop many industries such as consumerism, health care, tourism, automation, manufacturing, trade, transportation, other vital services and numerous other businesses, and to ultimately improve the economy.

As mentioned in the preliminary work on Energy Consumption theory [3], the cost of energy production and energy consumption can be compensated by considering the revenue that these energy operations would generate for many businesses, industries, financial institutions and consumers (due to the consequential financial transactions and the monetary multiplier effect [6]) and by allocating a small fraction of the resulting overall revenues (usually in the form of consequential extra tax revenue) to cover the cost [5].

In other words, if the cost associated with an energy-related project exceeds its revenue in the NPV (Net Present Value) discounted analysis, and if a fraction of the tax on the extra revenue that affected businesses and consumers would earn is greater than the energy-related project loss, the amount can be used to cover the project loss [7] in the form of subsidies [8]. The second condition is critical because we want to make sure that the project loss is covered by the revenue that the energy-related project would generate for others. Otherwise, the project loss has to be covered by raising taxes or borrowing which is detrimental to the economy.

Subsidies are currently used [8] to implement negative NPV energy-related business plans because with the current state of technology, it is difficult to electronically track the massive financial transactions and the extra

revenues that are earned by affected parties due to the implementation of these energy-related business plans (along with the taxes that the affected parties pay).

The extra or residual revenues that are earned or collected by the impacted businesses and consumers (after subsidizing the negative NPV business plan in increments or periodic payments) translate into more government revenue due to the tax process. Governments use this extra revenue to cover the cost of funding for the qualified subsidies.

The business performance metric REO (Revenue Earned by others) [11] in this case is the collective revenue that is earned by businesses, industries, financial institutions and consumers due to the implementation of energy production and consumption-related projects. Artificial Intelligence (AI), machine learning tools, Big Data diversified prescriptive analytics along with hyper-clustering can be used to estimate this critical REO metric [10-11]. However, in the future, international standards and guidelines have to be developed for this metric to make it uniform and applicable in the global sense.

The Negative NPV Feasibility (or Subsidy Justification) Report which is generated by the institution that is planning to implement an energy-related project will be carefully assessed by governments or funding institutions to ensure that the Big Data information and diversified business analytics that are used in the report are valid and justifiable before covering the project loss. Some guidelines for estimating the revenues that are earned by affected parties and qualifying negative NPV or negative feasibility business opportunities, urban and rural projects and subsidies are specified in references [6-9].

Developing Diversified Energy Resources

In order to dramatically enhance the global economy, improve the quality of life for everyone, eliminate poverty and develop urban and rural projects, energy consumption has to increase significantly [1, 4].

For this purpose, all types of energy resources and harvesting methods including hydrocarbons, nanogenerators, sustainable/renewable energy sources, (electrolyte and EV) batteries, hydropower, small modular reactors, solar energy, solar energy with nano-generator embedded solar panels, wind turbine energy, geothermal energy and hydrogen fuel cells have to be developed (as long as they meet the environmental requirements).

The energy sector including the oil and gas industry has a critical role in meeting this demand by achieving net-zero greenhouse gas emissions and by making a smooth transition to clean mixed-energy infrastructure [2].

There is an abundant supply of natural gas and other hydrocarbon fuel. Hydrocarbon energy can be extracted, processed, transported, consumed & converted to other energy sources (such as electricity for car batteries) or products (such as hydrogen fuel) as long as the environmental issues are tackled by capturing, redirecting & modifying the emissions into value-added products.

The environmental issues are basically handled by the CCUS (Carbon Capture, Utilization and storage) technology. For example, the CO2 emissions can be captured and converted into value-added products via CO2 conversion facilities. Also, many oil & gas companies are in the process of injecting the captured CO2 into used HC reservoirs and other geological formations (aside from using CO2 in enhanced oil recovery).

Moreover, instead of gas flaring during depressurization in hydrocarbon refineries, we can redirect the extra gas to electrical generators & other facilities with value-added benefits. This eliminates the emissions due to gas flaring.

Environmentally friendly and diversified mixed-energy resources drive each other and the emission converting units, and they also provide critical material exchanges. For example, the output of an emission conversion process could be a feed to a hydrogen generating module or to an electrolyte or EV battery operation.

Energy as an Agent for Economic Growth

In order to have economic growth, material and energy resources should be developed and processed [5], rural and urban projects should be defined and implemented, and many industrial sectors including tourism, automation, manufacturing, trade, transport, other vital services and numerous businesses should be expanded [1].

Urban and rural projects in their execution phase, drive various industries and businesses, increase business transactions many-fold, expand transport and tourism, improve recreation sites and vacation spots, enhance international trade and ultimately lead to an improved global economy.

An example is an arid land development project which involves seawater pumping along with desalination facilities. The resulting vegetation triggers many other projects, creates various new industries and dramatically improves global trade and tourism beyond imagination.

To meet these economic growth objectives, energy resources have to be developed on a massive scale. Energy is required to produce products and services on the customer or vendor side, and it is used in all stages of the supply chain. Energy is also required in all aspects of the client or customer side to purchase the products or services. In the wider picture, energy is required for the extraction, production, distribution, consumption and disposal of products and materials.

According to [12], energy consumption had a significant impact on the nominal GDP of major Asian countries. Furthermore, based on [13], increases in productions led to a remarkable increase in energy consumption in 34 European countries. Note that in many reports, energy consumption is stated in terms of monetary value but in this report, emphasis is on the energy unit aspect of energy. For a fixed amount of energy consumption, certain combinations of energy resources will have lower energy consumption monetary value or cost with respect to other combinations.

On the issue of material resources, there is an abundant supply of needed materials or minerals that need to be extracted from the reservoirs, mines and from other materials through chemical and physical reactions. For this purpose, an extensive amount of energy is required for the extraction and processing stages.

However, some technologies or processes require special minerals or materials that are scarce in nature. In this case, research can be conducted to alleviate the need for the rare material by either modifying the main technology or by coming up with substitute materials.

Covering the Cost of Energy Production & Consumption

Diversifying and mixing environmentally friendly energy resources and harvesting units have a tendency of lowering the cost of energy production in the long term.

However, if the cost of the project exceeds its revenue in the NPV discounted analysis due to the massive energy requirement or other issues, we can use the Negative Feasibility Theory [7] to qualify the negative NPV [6] energy production and consumption projects or business plans.

Instead of focusing solely on the projected revenue and cost, let's look at the big picture. If the business plan were implemented, it would generate revenues for many businesses, industries, financial institutions and consumers due to the consequential financial transactions and the monetary multiplier effect [11].

Therefore, in order to execute the business plan, we can set aside a small portion of these extra (residual) revenues (that are earned by others) to cover the business plan's potential loss. For example, a fraction of the tax on these residual revenues can be devoted to this purpose.

The new Enhanced Economic (Negative) Feasibility method uses the argument that an energy-related business plan with a projected loss can still pass the Economic Feasibility Analysis if the loss can be recovered by a

small portion of the residual or extra tax revenue which is obtained from consumers, other businesses and financial institutions that have financially benefited (collected more revenues) from the execution of the energy-related business [7].

This method requires the intensive use of diversified AI (Artificial Intelligence) or machine learning computing algorithms to perform business projections for the business plan, and to calculate the projected multiplier gain on financial transactions and the extra or residual revenues that other businesses and consumers would earn due to implementing the business plan [10-11].

Using Subsidies Without Increasing Taxes

A subsidy [8] is a cash payment or a grant which is paid directly to companies, individuals and institutions by the government in order to enhance production, improve exports, retain businesses, decrease unemployment, promote research & development and lower the price of products or services for consumers. The subsidy may show up also in the form of tax credits or concessions.

Therefore, a subsidy is an effective method for funding the financial loss for the energy-related business opportunities that do not pass the NPV (Net Present Value) projected revenue cost analysis (i.e., the projected and discounted cost is more than the projected and discounted revenue). In this case, the amount of subsidy would be the cost minus the revenue.

Carefully planned subsidies provide short-term and long-term improvements in affected businesses and consumers which in turn would lead to improvements in GDP and more government revenues in the form of sales taxes that are imposed on goods and services and other taxes. Note that the affected businesses and consumers include the subsidized businesses along with other businesses and consumers that benefit financially from the subsidized businesses.

The extra or residual revenues that are earned or collected by the impacted businesses and consumers (after subsidizing the negative NPV energy-related business plan) translate into more government revenue due to the tax process. Governments use this extra revenue to recover the funding for subsidies.

Traditionally, as subsidies are increased above a small percentage of GDP, governments can either increase their debt to cover the cost of subsidies or increase taxes in the hope of recovering the funds for the subsidies. However, increasing taxes on corporations or individuals could slow down the economy and lead to lower tax revenues in the long run which would defeat the purpose of increasing subsidies in the first place.

One method of increasing the subsidies for (negative NPV) business plans without increasing the taxes is to ensure that the businesses which receive subsidies would most likely generate sufficient revenues for many other (impacted) businesses and consumers and would lead to more financial transactions (ripple effect) such that a fraction of the extra government revenue (due to the consequential sales and other taxes) would recover the amount of the subsidies for the business plans. In other words, the business plan which qualifies for the subsidy should be a sufficient revenue generator for others after executing its plan [11].

Conclusion

Environmentally-safe energy resources and harvesting methods have to be developed, and energy consumption has to increase on a massive scale to meet vital objectives such as global peace, rural and urban development and improvements in many sectors of the economy including consumerism, healthcare, tourism, automation, manufacturing, trade, transportation and other vital productions.

It is interesting to note that the businesses and consumers which have benefited from these critical energy-related projects can devote an extremely small portion of the residual or extra revenue that they have earned (usually in the form of consequential extra tax revenue) for the

purpose of covering the financial loss of projects that are subject to negative NPV analysis.

Due to the difficulty in tracking the extensive financial transactions and the extra revenues that are earned by affected parties due to the implementation of these energy-related business plans (along with the taxes that the affected parties pay), diversified Big Data AI (Artificial Intelligence) or machine learning computing algorithms can be used on an enormous scale to provide the best estimate on these extra revenues and the consequential tax revenues.

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