Energy Replenishment Diversification Under Marine Spatial Planning Connects Big Data, Artificial Intelligence, Internet of Things for Coastal Community Sustainability

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Original article

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Abstract

Background Controversial coal power plant restart and non-nuke policy were rejected by referendum in Taiwan on 24 Nov 2018. Outcomes affecting energy replenishment and undermining economic stability are criticized politicization because coal energy is detrimental but no nuke beneficial for the environment. These policies could be contradictory.

Problem No autonomous energy puts the country into extreme risk and is controlled by foreigners. Developing energy faces a traditional tradeoff between economic development and environmental protection.

Purpose The assumption an innovative energy diversification linking Big Data, artificial intelligence (AI), and the Internet of Things (IoT) is encouraged. The paper investigates upgrading liquified petroleum gas (LPG) to liquified natural gas (LNG) under marine spatial planning (MSP) for energy replenishment and creating an energy diversification framework through integrated coastal zone management (ICZM) linking Big Data, IoT, AI whether are supported.

Results Online sampling investigation results, enhancing LPG to LNG at the ecologically biologically significant area (EBSA) under MSP was less encouraged but linking Big Data, IoT, AI innovation through ICZM was overwhelmingly supported and consistent with goalkeepers interview. Research finding gender, the environment, age revealed no significant difference from LNG through MSP and AI under ICZM. Males more support LNG energy replenishment and energy diversification. Energy deficiency, environmental protection, and economic development were interrelated.

Conclusion The results LPG to LNG revealed less encouraging and implicates many coastal communities in favor of tangible stable electricity without blackout is important than the intangible slogan EBSA protection, or perhaps renewable energy is an alternative approach. An autonomous energy diversification framework through ICZM links Big Data, IoT, AI for sustainable coastal community development (SCCD) indicating no significant difference from gender, environment, age, and is consistent with the goalkeepers' interview results supporting energy diversification. The finding males more support LNG and energy diversification. Finally, the study suggests that legislative enforcement establishment designate expertise teamwork to coordinate administration, integrate programs of energy replenishment, creating an autonomous energy diversification framework for monitoring energy demand, supplies, replenishment, and connect Big Data, IoT, AI innovation for SCCD.

1. Introduction

The increasing global population surges consumption in energy while land availability is decreasing. Solar, wind, tidal energy has no significant decrease in the demand for oil, gas, coal, and other traditional resources. Energy diversification identifies sources and the possibility of alternative energy to step up the framework. (Dyatlov, Didenko, Ivanova, Soshneva, & Kulik, 2020). The deployment of offshore facilities in marine renewable energy creates tension as competition for other uses as economic exploitation of

marine resources increases (Quero García, Chica Ruiz, & García Sanabria, 2020). Marine spatial planning (MSP) brings together various energy, coastal community, government to coordinate integration how to use marine resources sustainably and provides a mechanism to achieve identification of suitable locations to accommodate energy converters (Galparsoro et al., 2012). Big Data involves storage processing, real-time analysis, the transformation of coastal planning techniques to analyze multiple large volumes of data themes for interactions in environmental and societal elements (Rumson, Hallett, & Brewer, 2017). A complex relationship requires a multidisciplinary and integrated coastal zone management (ICZM) approach to perform an effective application of management policies directed towards conservation and sustainable exploitation of the coastal zone (Giordano & Ferraro, 2020). Artificial intelligence (AI) strength converts complex issues and develops remote sensing data into ICZM (Kratzer, Harvey, & Philipson, 2014) and comprehensive areas balancing environmental, socio-economics, cultural, recreational objectives attempt to achieve sustainability (Khakzad, Pieters, & Van Balen, 2015). The internet of things (IoT) technology along with AI maybe overcome the challenges of energy use, significantly increases the network complexity and shifts towards renewable energy to eliminate the use of toxic chemicals (Ramadoss, Alam, & Seeram, 2018). Sustainable Coastal community development (SCCD) preserves natural resources, paying attention to socio-economic and ecosystem protection from economic growth to conservation in the coastal zone. The SCCD discipline incorporated governmental processes, coastal community capacities for appropriate action to counter energy issues of adaptive capacity (Marfai et al., 2008) and suggested MSP implementation (Dunstan et al., 2016). The Convention on Biological Diversity (CBD) agreed in 2008 needs to identify ecologically or biologically significant areas (EBSA) in the world's oceans and focus future conservation management (Dunstan et al., 2016). EBSA covers unique, vulnerability, fragility, slow recovery, rare endemic species, populations, communities and serves important purposes to freely offer varied benefits from the natural environment ecosystem services.

Each energy system harms the environment. Sole energy leads to excessive burdens and causes environmental fatigue. The cost-competitiveness of renewable energy is improved and stored in energy storage technologies for consumption in future needs (Azhgaliyeva, 2019). The current system progressively increases the efficiency of renewable energy generation is considerably impacted by energy framework development (Ortner & Totschnig, 2019). Energy successful transformation is asserted technically possible, demands fundamental changes, and coordinates efforts to integrate and identify cost-effective solutions to deliver st multiple energy objectives (Gielen et al., 2019). A restart controversial discard plant of coal power and non-nuke energy homeland policy was rejected by referendum in Taiwan on 24 Nov 2018. Although results affecting energy replenishment consequently undermines economic growth, social stability but environmental organizations support these outcomes. A country without an autonomous energy framework leads to national security at risk due to energy is controlled by others. Taiwan has been implementing renewable energy offshore windfarm and paving the way toward autonomous no nuke policy. Simultaneously, the progress of related fields has been developing attributed to intense demands for infrastructure enhancement and broad application. The SCCD has been encountering problems related to environmental protection and economically influential elements (Abu-

Hijleh & Jaheen, 2019). Additionally, political struggles usually play a key role in energy policy and seem the most potential risk of no nuke homeland such as the opposite party would resume nuclear energy if won the presidential election on 11/Jan/2020 in Taiwan. The paper suggests activating discard, idle assets, linking current facilities for energy replenishment through MSP connection with AI, IoT, Big Data under ICZM to develop energy diversification, simultaneously protect the EBSA for SCCD. Finally, research suggestion creates an autonomous energy diversification framework to stabilize energy supply, mitigating blackout risk from natural disasters or anthropological behavior and promptly offers alternative energy replenishment if energy encounters deficiency in crisis.

2. Methodology

The interview coastal community goalkeepers identify whether upgrading current coastal liquefied petroleum gas (LPG) to liquefied natural gas (LNG) for energy replenishment in EBSA under MSP, and autonomous energy diversification through ICZM linking Big Data, IoT, AI innovation for SCCD is achievable. Research created the null hypothesis conducting an online sample of data collection and statistical analysis for the test. Finally, the study examined whether these results of the interview and online sampling are consistent or inconsistent.

2.1 Goalkeepers Interview

Problem-solving of energy deficiency selected elements of goalkeepers considering capabilities of coordination, negotiation, communication with various organizations in the local district. Additionally, candidate qualifications were required familiar with the community, coastal zone specialty characteristics, expertise, and interest in sustainable development. Code recording consent of goalkeepers was informed and approved by interviewees before performed interviews. The goalkeeper pseudonym John face to face interview energy diversification of economic developments and coastal environment protection was conducted at the regional administrative office about fifty minutes in the afternoon on 22/Dec/2018, and then pseudonym Brown phone interviews about forty minutes in the afternoon on 23/Dec/2018.

2.2 Data Collection and Analysis

The preliminary interview outcome was assumed that the coastal community accepted clean energy in EBSA and the results needed to be examined. Therefore, research creating Plan “A” the null hypothesis “ Upgrading Current LPG to LNG Develops Economics and Protect EBSA through MSP for Energy Replenishment Is Acceptable “ and Plan “B” the null hypothesis “ Creating Autonomous Energy Diversification Framework through ICZM Linking Big Data, IoT, AI Innovation for SCCD Is Achievable.” The alternative hypothesizes are unacceptable and unachievable respectively.

An online sampling data collection coastal community, students of National Taiwan Ocean University (NTOU) on 24/Dec, 2018, and a total of 35 respondents were collected for the statistical analysis as experimental justification. Increasing test creditability and reliability, the study used the same null hypothesis to conduct online snowball sampling family members on 17/Dec, 2019 and collected 66 responses to assemble the previous 35 participants 66+35 = 101 respondents for the statistical hypothesis test. Sample population widely covered community residents, local district administration, neighbor district citizens, executive graduate students from 3 departments of NTOU; first department, Environmental Biology, and Fisheries Science; second, Institute of Applied English; third Institute of Marine Affairs and Resources Management. These careers of respondents included the elementary, junior high school teacher, teaching assistant, students, professor of NTOU, Coast Guard, Ministry of Transportation, shipping industry, Taiwan Power Company, local Environmental Protection Agent, radio host, police officer, Taiwan Railway Administration, manufacture director, and Fisheries Agency, The Council of Agriculture, one-way ANOVA for the test.

2.2.1 Plan “A” Upgrading Current LPG to LNG of Economic Development and EBSA Protection through MSP for Energy Replenishment.

The arguments coal power plant restart and non-nuke energy homeland policy were rejected by referendum in Taiwan on 24 Nov 2018. Creating Plan “A” the null hypothesis “ Upgrading Current LPG to LNG Develops Economics and Protect EBSA through MSP for Energy Replenishment is acceptable “ for test and the alternative hypothesis is unacceptable. If the government upgrades current coastal LPG to clean energy LNG for energy replenishment of economic development in EBSA under MSP for SCCD. Agree or Disagree.

2.2.2 Plan “B” established the null hypothesis “ Creating Autonomous Energy

Diversification Framework through ICZM Linking Big Data, IoT, AI Innovation for SCCD Is Achievable.” for test and the alternative hypothesis is unachievable.

3. Results

Results of preliminary interview suggested activating discard, idle assets to upgrade current LPG to LNG in EBSA for energy replenishment through MSP. Then, connected Big Data, AI, IoT under ICZM to develop an energy diversification framework, simultaneously protected environment for SCCD. The null hypothesis test results were not rejected and consistent with the preliminary interview.

3.1 Interview Goalkeepers

Preliminary interview results upgrading current LPG to LNG in EBSA through MSP for energy replenishment was acceptable, and establishing an autonomous energy diversification framework through ICZM linking Big Data, IoT, AI innovation for SCCD was supported. Furthermore, finding energy deficiency, environmental protection, and economic development were interrelated.

3.2 Online Sampling

The result of 101 responses on 17/Dec/2019 showed no significant difference and was consistent with 35 participation on 24/Dec/2018. Table 1.1 increasing the sample size to upgrade the creditability and reliability of arguments result, research further conducted the same online sampling from members of families for snowball sampling, friends, classmates, colleagues, and 66 respondents were collected on 17/Dec/2019, characteristics including Male 25 (37.88%), Female 41 (62.12%); Age ~30 Young 45 (68.18%), 31-50 Middle 6 (9.09%), 51~ Elder 15 (22.73%); Environment 24 (36.36%), Non-Environment 42 (63.64%). These careers covered undergraduate, postgraduate, senior high school students, charity, municipality, retirement, local administration, construction employee, designee employee, labor, business owner, environmental protection agent, and professors.

3.2.1 Plan “A” Result Was Consistent with Interview

Results of Plan “A” upgrading current LPG to LNG in EBSA for energy replenishment is acceptable. "Disagree" 42.86% but "No Comment Total" 34.29% + "Agree Total" 22.86% = 57.14% was consistent with goalkeeper interview results.

3.2.2 Plan “B” Overwhelmingly Support Energy Diversification Framework

Table 2 the total 35 participants, Plan “B” energy diversification framework under ICZM linking Big Data, AI, IoT innovative for SCCD "Agee" 80.00%, "No Comment" 20.00%, and "Disagree" 0% illustrated overwhelmingly support Plan “B”.

4. Discussion

Due to environment and energy generation tradeoff, improved environmental benefits seem to outweigh the deterioration in economic activities such as energy exploitation (Wesseh & Lin, 2016). Many people claim outcomes of coal power plant restart and non-nuke policy were rejected by referendum in Taiwan, not only affects energy replenishment but also undermines economic development. However, the views were criticized for politicization due to the coal power plant was detrimental but no nuke beneficial for the environment. These distinctive energy policies probably a significant difference. Economic growth and environmental protection were thought traditional trade-off which could be replaced by innovative

comprehensive integration an alternative such as energy diversification, renewable energy exploitation, AI, and IoT application is supported by the previous study Wessh & Lin, 2016.

Table 1 a total of online 35 respondents characteristics 17 Female (48.57%), 18 Male (51.43%); 10 Young (28.57%), 13 Middle (37.14%), 12 Elder (34.29%); 15 Environment (42.86%), 20 Non-environment (57.14%) including community resident, neighbor cities citizen, graduate student, elemental, junior high school teacher, professor, Local Administration, Coast Guard, Taiwan Power Company, Environmental Protection Agent and the Council of Agriculture. Table 1.1 primary data of online snowball sampling a total of 66 Respondents on 17/Dec/2019. These participants contained members of families, relatives, classmates, colleagues, career covering undergraduate, postgraduate, senior high school students, charity, local administration, construction employee, designee employee, business owner, environmental protection agent, professors participated in Plan “A” LNG under MSP for energy replenishment and Plan “B” creating autonomous energy diversification framework through ICZM linking Big Data, IoT, AI Innovation for SCCD.

4.1 Interview Results Was Supported by Previous Studies

Pseudonym John and Brown recommended activating a discarded power plant where the place around 500 meters away from current LPG at coastal EBSA under MSP to develop economics and protect EBSA for energy replenishment and was supported by previous studies. Such as MSP attempted to integrate diverse systems, engaging indigenous peoples and local communities (Nai'a Lewis, John Parks, & Gustavo San Martin, 2017) and offered multi-functionality, integrity, easy use, freely available as an integrated management tool (Pınarbaşı et al., 2017) to focus on achieving specific objectives, related to nationally important strategic priorities, complex, fragmented, and ad hoc emergent processes (Peter J.S. Jones a, 2016). While finding energy deficiency, environmental protection, and economic development are interrelated and attributed to high technology industries' non-stop operation consumed substantial electricity because economic growth required sufficient stable energy supply.

4.2 LNG Energy Replenishment. The Null Hypothesis Was Not Rejected, Consistent with Interview Result, and Supported by the Previous Studies.

Supporting cleaner energy LNG for the production of electricity as an alternative approach to increase sustainable production with renewable energy resources (Markopoulos, 2019). LNG tanks deposit and pipeline transportation energy should be approved by the coastal community. A tangible fact of energy deficiency demonstrated great value than an intangible SCCD slogan. Table 2 Plan “A” LNG through MSP for energy replenishment and Plan “B” energy diversification linking Big Data, AI, IoT under ICZM for CCSD Total 35 respondents were collected on 24/Dec/2018. Plan “A” "Disagree" 42.86% but "No Comment Total" 34.29% + "Agree Total" 22.86% = 57.14%. Table 2.1 a total of 101 respondents contain 66 respondents on 17/Dec/2019 and 35 on 24/Dec/2018. The Plan “A” "Disagree Total" declining to

25.74% from 42.86% of Table 2 reflected Plan A LNG in EBSA could be possible for developments. Plan B "Agree Total" 82.18% is similar to previous research 35 respondents 80.00% and illustration Plan B is supported.

Table 3 illustration the gender, environment, and age was no significant difference from clean energy exploitation in EBSA for SCCD. Online sampling 35 respondents were collected on 24/Dec/2018. All P-Value of Gender group 0.912, Age 0.748, Environment 0.565 were greater than significant interval alpha 0.05; F 0.013, 0.304, 0.390 is less than critical value 7.708, 5.143, 7.708 respectively. Table 3.1 LNG 35 respondents on 24/Dec/2018 + snowball sampling 66 on 17/Dec/2019 were Total 101. The P-Value of Environment 0.170, Gender 0.361, Age 0.112 were greater than significant interval alpha 0.05, F 1.061, 2.784, 3.222 are less than critical value 7.708, 7.708, 5.143 respectively indicating no significant difference and LNG the null hypothesis " Upgrading LPG to LNG Develops Economics and Protect EBSA through MSP for Energy Replenishment is acceptable " was not rejected, consistent with the interview and is supported by previous studies. Such as LNG technology is seen as a factor in decreasing delivery costs, lower capital, operative expenditures and has become a competitive and sustainable option for energy production. It is possible to use re-gasified LNG from any receiving terminal, trading the same resource to prepare for energy production and immediate consumption (Markopoulos, 2019). LNG establishment will conflict with current sectors including fisheries, port, and terminals are been zoning, MSP management approach may reduce the conflicts (Mannan, 2019). MSP a way of easing tensions has not been exploited due to the limitations imposed by legal and administrative barriers (Quero García et al., 2020). Although EBSA was important. However, some citizens prefer tangible energy resources supply with no blackout is important than political slogan intangible sustainable development in EBSA.

4.2.1 Finding no sufficient evidence is determined as a policy to reject or support LNG in EBSA through MSP for energy replenishment.

Fig1 "Agree" Male 7/18=38.89% is greater than Female 1/17= 5.88% ."Disagree" Male 8/18=44.44% is greater than Female 7/17=41.18% "No Comment" Male 3/18=16.67% is less than Female 9/17= 52.94%. The view probably implicated Females less interest in LNG than males causing “Agree” and “No comment” significant difference. The total "Disagree" 42.86% is less than "Agree" 22.86% + "No Comment" 34.28% indicating LPG exploitation in EBSA is acceptable and consistent with interview results. The argument EBSA is important than LNG because of alternative renewable energy such as solar, offshore wind-farm substitutes LNG and protects EBSA which views are supported by previous studies as the following contents of the renewable energy section. Therefore, no sufficient evidence is determined as a policy to reject or support LNG in EBSA for energy replenishment. EBSA is significantly important, however, many citizens assert that stable tangible energy with no blackout demonstrates great value than an intangible political slogan.

4.2.2 Renewable Energy Is Supported

Renewable energy is collected from renewable resources, naturally replenished sunlight, wind, rain, tides, waves, and offers energy generation, air, water heating, transportation, rural energy services to play a key role in achieving environmental sustainability (Ike, Usman, Alola, & Sarkodie, 2020). Probably the coastal community preferred tangible electricity no blackout than intangible political slogan sustainable development or maybe LNG replaced by alternative renewable energy, solar power, offshore wind-farm for energy generation. Nevertheless, the irreversible loss will be incurred in EBSA once the harm happened. Setting criteria for the prioritization of stakeholders incorporate trade-off mechanisms and adapt to new marine renewable energy technologies (Salvador, Gimeno, & Sanz Larruga, 2019). Offshore energy has been a principal driver for MSP processes, predominantly offshore wind, further expansion of offshore and ocean energy is expected (Yates, 2018). MSP definitively drives marine renewable energy, offshore facilities, compatibility improvement, stakeholders integration, environmental conservation of sensitive areas, and cross-border co-operation (Quero García, García Sanabria, & Chica Ruiz, 2019). Environmental degradation and habit destruction caused EBSA irreversible loss for decades. Clean or renewable energy generated electricity and protected the environment for SCCD. Renewable biomass photosynthesis was versatile renewable sources and applied for biohydrogen production, aquatic plants, and household effluents. Biohydrogen demonstrates the fermentative conversion of biomass to regain the balance of depleting natural non-renewable resources (Mishra et al., 2019). Renewable energy stable growth mainly fostered by policies, increasing demand played a crucial role in driving global energy transformation and offered a comprehensive perspective development (Wang, Li, Sun, Xu, & Zhang, 2018).

4.3 Energy Diversification. The Null Hypothesis Was Not Rejected and Supported by Previous Studies

Energy discipline involvement politics, commercial, environment affected sustainability, alternative approaches, and production form (Harjanne & Korhonen, 2019). Energy diversification conveys heavily relying on the sole source that exposes a country vulnerable to disruptions or shocks. Energy-importing countries had few changes in diversification, the extent was taken of political risk (Cohen, Joutz, & Loungani, 2011). Nuclear waste was asserted detrimental to the environment, ecosystem service, and irreversible harm for the next generation. The deadline year 2025 of non-nuke energy policy in Taiwan is inappropriate due to without enough renewable energy for replenishment, simultaneously, electricity consumption hiking and nuclear energy no consensus. The global energy-environment dynamics are based on the implementation of energy diversification for a global drive towards a cleaner environment and sustainable economic development (Ike et al., 2020).

Table 4 all P-Value at Environment Group 0.774, Gender 0954, Age 0.964 were greater than significant interval alpha 0.05 and F 0.107, 0.004, 0.037 were less than critical value 18.512, 18,512, 9.552. Table 4.1 the 35 respondents on 24/Dec/2018 + 66 conducting online snowball sampling on 17/Dec/2019 = total 101 all P-Value of Environment 0.6903, Gender 0.7924, Age 0.8478 were greater than significant interval alpha 0.05 and F 0.183, 0.079, 0.172 were less than critical value 7.708, 7.708, 6.944 respectively. These indicating no significant difference, and the null hypothesis of energy diversification through ICZM linking

Big Data, IoT, AI innovation for SCCD was not rejected and supported by previous studies. Such as future marine plans must stress on cross-border cooperation. MSP diversity offered alternative approaches in the planning of marine energy uses (Quero García et al., 2019). The ICZM provides economic benefits, healthy coastal ecosystems for reducing vulnerability and innovative approaches for the protection of sustainable investment in coastal communities (Maldonado et al., 2020). The portfolio of energy diversification is asserted essentially for security and alleviate risk. The analysis showed the energy diversification framework through ICZM for SCCD was imperative. ICZM considers the development use and conservation from anthropic pressures on environmental and socio-economic in the coastal zone (Giordano & Ferraro, 2020). Alternative combinations of resources, technologies, and policies were found capable of attaining future energy pathways to improve energy access, air quality, and security (Gielen et al., 2019).

4.3.1 Finding Male More Support LNG in EBSA for Energy Replenishment and Energy Diversification for SCCD

Social-cultural factors advance gender-sensitive policymaking to facilitate the choice of investing in friendly environmental energy solutions (Foudi, Silvestri, Bartek-Lesi, Diallo, & Csutora, 2019). Fig.1.1 "Agree" Male 22/43=51.16% is greater than Female 18/58 =31.03% indicating Male more support LNG in the EBSA under MSP for energy replenishment as same as Figure 1. Figure 2 autonomous energy diversification framework through ICZM linking Big Data, IoT, AI innovation for SCCD. Total "Agree" 28 (80%), No Comment 7 (20%), "Disagree" 0 (0%), Male 16/18=88.89% is greater than Female 12/17= 70.59% indicating more support energy diversification. Figure 2.1 Plan “B” Total “Agree” 83 (82.18%), “No Comment” 18 (15.84%), “Disagree” 2 (1.98%) demonstration overwhelmingly supported. The 35 respondents were collected on 24/Dec/2018 + Online Snowball Sampling 66 on 17/Dec/2019 = Total 101. "Agree" Male 37/43 = 86.05% is greater than Female 46/58=79.31% indicating more support energy diversification is consistent with the previous study. Such as the energy choices may differ from gender ideologies, thus designing energy policies and direct investments suggest considering gender-sensitive as well as social, economical and environmental sustainability (Foudi et al., 2019).

4.3.2 ICZM Linking Big Data, IoT, AI Innovation for SCCD

Sectoral management coastal zones failed to offer a whole picture of interactions between various uses (Chen, Lee, & Liu, 2019). ICZM provides conservation, protection, management integrated the mechanistic understanding of marine ecosystem processes with economic tradeoff (Lowerre-Barbieri, Catalán, Frugård Opdal, & Jørgensen, 2019) and combines the economic, social, environmental aspects to reduce conflict, moreover regulation for all fields affecting the coastal zone, all stakeholders involved (Maldonado et al., 2020). Big data indicated strategy applications in every field and the demand for transcended across all sectors (Rabah, 2018). AI data discipline was revealed by IoT offered smart, affordable, reliable, and highly efficient services (Dupont, Cousin, & Dupont, 2018). IoT showed portable, low cost, versatile, and allowed sharing information through the cloud of ICZM for aquaculture farm

economic improvement and environmental control (Encinas, Ruiz, Cortez, & Espinoza, 2017). AI, IoT delivers socio-economic benefits such as reducing accidents and increasing productivity (Castro & McLaughlin, 2019). New data technology advances in analytical capacity through Big Data, AI, and social dimensions integration management such as explicit hydrological biological data collection were uploaded to satellite and transferred to data centers for real-time analysis (Lowerre-Barbieri et al., 2019). IoT monitoring quality information was useful to identify a possible environmental disaster and how to optimize resources. AI innovation was overwhelmingly supported by gender, environment, and age. Cutting edge IoT combined with AI encounters increasing demand, approach to integrated multi-trophic, and produces environment-friendly (Dupont et al., 2018). Unfortunately, the view an integrated marine framework aims at energy diversification by ICZM linking Big Data, AI, IoT for economic development and environmental protection but lacks administrative coordination, specific legal mechanisms at offering environmental protection against impacts from energy diversification is consistent with the previous study (Salvador et al., 2019).

5. Conclusion

The purpose of the paper examines upgrading coastal LPG to LNG for developing economics of energy replenishment in EBSA under MSP environmental protection and an autonomous energy diversification framework through ICZM linking Big Data, IoT, AI for SCCD whether are accepted. The results LPG in situ to LNG revealed less encouraging and implicates many coastal communities in favor of concrete tangible stable electricity without blackout is important than the intangible slogan EBSA protection, or perhaps renewable energy is an alternative approach. Creating an autonomous energy diversification framework through ICZM links Big Data, IoT, AI for SCCD shows no significant difference from gender, environment, age, and is consistent with the goalkeepers' interview results supporting energy diversification. The finding males more support LNG and energy diversification. Finally, the study suggests that legislative enforcement establishment designate expertise teamwork to coordinate administration, integrate programs of energy replenishment, creating an autonomous energy diversification framework for monitoring energy demand, supplies, replenishment and connects Big Data, IoT, AI innovation for SCCD.

Author Declaration

Conflict of Interest

No conflict of interest exists.

The author confirms that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

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Intellectual Property

The author confirms that has given due consideration to the protection of intellectual property associated with this work and that there is no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have followed the regulations of our institutions concerning intellectual property.

Ethical Approval and Consent to participate

“Not applicable”

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Availability of supporting data

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Authors' contributions

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Tables

Table 1 Primary data of descriptive statistics a total of online 35 respondents conducting on 24/Dec/2018 included community resident, neighbor cities citizen, graduate student, elemental, junior high school teacher, professor, Local Administration, Coast Guard, Taiwan Power Company, Environmental Protection Agent and the Council of Agriculture in Plan “A” the null hypothesis “ Upgrading Current liquefied petroleum gas (LPG) to liquefied natural gas (LNG) Develops Economics and Protect ecologically biologically significant area (EBSA) through marine spatial planning (MSP) for Energy Replenishment is acceptable “ and Plan “B” “ Creating Autonomous Energy Diversification Framework through integrated coastal zone management (ICZM) Linking Big Data, internet of things (IoT), artificial intelligence (AI) Innovation for sustainable coastal community development (SCCD) Is Achievable.”

Respondent on 24Dec2018	Plan"A" the null hypothesis"Upgrading LPGto LNG Develops Economics and Protect EBSAthrough MSP for Energy Replenishment is acceptable"	Plan"B" the null hypothesis"Creating Autonomous Energy Diversification Framework through ICZM Linking Big Data, IoT, AI Innovation for SCCD is Achievable."	Gender	Marriage	Age Group	Career	Career ,Expertise or Interest
1	No Comment	Agree	M	No	~30 Young	Elemental School Teacher	Non-Environment
2	No Comment	Agree	F	No	~30 Young	Elemental School Teacher	Non-Environment
3	No Comment	Agree	F	Yes	31-50 Middle	Junior Hight School Teacher	Non-Environment
4	Agree	Agree	F	No	51~Elder	Local Administration	Non-Environment
5	No Comment	Agree	F	Yes	31-50 Middle	Local Administration	Non-Environment
6	Disagree	Agree	F	Yes	31-50 Middle	Local Administration	Non-Environment
7	Agree	Agree	M	No	~30 Young	Local Administration	Non-Environment
8	Disagree	Agree	F	No	31-50 Middle	Local Administration	Non-Environment
9	No Comment	No Comment	F	No	31-50 Middle	Local Administration	Non-Environment
10	No Comment	No Comment	F	Yes	51~Elder	Local Administration	Non-Environment
11	Disagree	Agree	F	Yes	31-50 Middle	Local Administration	Non-Environment
12	No Comment	No Comment	F	No	~30 Young	Graduated Student	Non-Environment
13	No Comment	No Comment	F	No	~30 Young	Graduated Student	Non-Environment
14	No Comment	No Comment	M	Yes	51~Elder	Local Administration	Non-Environment
15	Disagree	No Comment	F	No	~30 Young	Teaching Assistant	Environment
16	Agree	Agree	M	Yes	31-50 Middle	Coast Guard	Environment
17	Disagree	Agree	M	Yes	51~Elder	Professor	Environment
18	Disagree	Agree	F	No	~30 Young	Teaching Assistant	Environment
19	Disagree	Agree	M	Yes	31-50 Middle	Coast Guard	Environment
20	Agree	Agree	M	No	31-50 Middle	Coast Guard	Non-Environment
21	No Comment	Agree	F	No	31-50 Middle	Ministry of Transportation	Environment
22	Disagree	Agree	M	No	31-50 Middle	Shipping Industry	Non-Environment
23	Disagree	Agree	F	Yes	51~Elder	Environmental Protection Agent	Environment
24	Agree	Agree	M	No	~30 Young	Graduated Student	Environment
25	Disagree	Agree	M	Yes	51~Elder	Taiwan Power Company	Non-Environment
26	Agree	Agree	M	Yes	51~Elder	Coast Guard	Environment
27	No Comment	Agree	M	Yes	51~Elder	Radio Host	Non-Environment
28	Disagree	Agree	M	Yes	31-50 Middle	Police Officer	Environment
29	Disagree	Agree	F	No	31-50 Middle	Elemental School Teacher	Non-Environment
30	Agree	Agree	M	Yes	51~Elder	Professor	Environment
31	Disagree	Agree	M	Yes	51~Elder	Professor	Environment
32	No Comment	Agree	F	No	51~Elder	Taiwan Railway Administration	Environment
33	Disagree	No Comment	M	No	~30 Young	Community Resident	Non-Environment
34	Disagree	Agree	M	Yes	51~Elder	Manufacturer Director	Environment
35	Agree	Agree	M	Yes	~30 Young	Council of Agriculture	Environment

Remark : 1.The online investigation was conducted by author on 22-24 Dec, 2018. Total 35 respondents characteristics contain 17 Female (48.57%), 18 Male (51.43%); 10 Young (28.57%), 13 Middle (37.14 %); 12 Elder (34.29%); 15 Environment (42.86%), 20 Non-environment (57.14%)

Table 1.1 Primary Data of Online Snowball Sampling a Total of 66 Respondents on 17/Dec/2019. These participants contained members of families, relatives, classmates, colleagues, career covering undergraduate, postgraduate, senior high school students, charity, local administration, construction employee, designee employee, business owner, environmental protection agent, professors participated in Plan “A” LNG under MSP and Plan “B” creating autonomous energy diversification framework through ICZM linking Big Data, IoT, AI Innovation for SCCD.

Respondent on 17/Dec/2019	Plan"A" the null hypothesis"Upgrading LPG to LNG Develops Economics and Profit of EBSA through MSP for Energy Replenishment is acceptable"	Plan"B" the null hypothesis"Creating Autonomous Energy Diversification Framework through ICZM Linking Big Data, IoT, AI Innovation for SCCD is Achievable."	Gender	Marriage	Age	Expertise or Interest	Carrier
1	Disagree	Agree	Female	Yes	31~50 Middle	Non-Environment	Local Administration
2	No Comment	No Comment	Female	No	51 ~ Elder	Non-Environment	Charity
3	Agree	Agree	Male	Yes	51 ~ Elder	Environment	Municipality
4	No Comment	Agree	Female	Yes	51 ~ Elder	Environment	Environmental Agent
5	Agree	Agree	Female	Yes	51 ~ Elder	Non-Environment	Construction Employee
6	Agree	Agree	Male	Yes	51 ~ Elder	Environment	Construction Employee
7	Agree	Agree	Male	Yes	51 ~ Elder	Non-Environment	Local Administration
8	Disagree	Agree	Female	No	31~50 Middle	Non-Environment	Local Administration
9	Agree	Agree	Male	Yes	51 ~ Elder	Non-Environment	Retirement
10	Agree	Agree	Male	No	~30 Young	Environment	University Student
11	Agree	Agree	Male	Yes	51 ~ Elder	Non-Environment	Retirement
12	Disagree	Agree	Male	Yes	51 ~ Elder	Environment	Professor
13	Agree	Agree	Female	No	51 ~ Elder	Non-Environment	Designee Employee
14	Agree	Agree	Female	Yes	31~50 Middle	Environment	Environmental Agent
15	No Comment	Agree	Female	No	~30 Young	Non-Environment	University Student
16	Agree	Agree	Male	Yes	51 ~ Elder	Environment	Business Owner
17	Agree	Agree	Male	No	~30 Young	Environment	University Student
18	Agree	No Comment	Male	No	~30 Young	Non-Environment	University Student
19	No Comment	Agree	Female	No	~30 Young	Environment	University Student
20	Disagree	Agree	Female	No	~30 Young	Non-Environment	University Student
21	No Comment	No Comment	Female	No	~30 Young	Non-Environment	University Student
22	Disagree	Agree	Female	No	~30 Young	Environment	University Student
23	No Comment	Agree	Female	No	~30 Young	Non-Environment	University Student
24	No Comment	Agree	Female	Yes	31~50 Middle	Non-Environment	Local Administration
25	Disagree	Agree	Female	No	~30 Young	Environment	Undergraduated Student
26	Disagree	Agree	Male	No	~30 Young	Non-Environment	University Student
27	Agree	Agree	Female	No	31~50 Middle	Non-Environment	Business Owner
28	No Comment	Agree	Male	No	~30 Young	Environment	University Student
29	No Comment	Agree	Female	No	~30 Young	Environment	University Student
30	No Comment	Agree	Male	No	~30 Young	Environment	Undergraduated Student
31	Agree	Agree	Female	Yes	51 ~ Elder	Non-Environment	Labour
32	Disagree	Agree	Male	No	~30 Young	Environment	University Student
33	Agree	Agree	Female	No	51 ~ Elder	Non-Environment	Retirement
34	No Comment	Agree	Male	No	~30 Young	Environment	University Student
35	No Comment	Agree	Female	No	~30 Young	Environment	Highschool Student
36	No Comment	Agree	Male	No	~30 Young	Non-Environment	University Student
37	No Comment	Agree	Male	No	~30 Young	Environment	Undergraduated Student
38	Disagree	No Comment	Female	Yes	51 ~ Elder	Environment	Retirement
39	No Comment	Agree	Male	No	~30 Young	Non-Environment	University Student
40	Agree	Agree	Female	No	~30 Young	Non-Environment	University Student
41	No Comment	Agree	Female	No	~30 Young	Non-Environment	University Student
42	Agree	Agree	Female	No	~30 Young	Non-Environment	University Student
43	No Comment	Agree	Male	No	~30 Young	Non-Environment	University Student
44	No Comment	No Comment	Female	No	~30 Young	Non-Environment	University Student
45	No Comment	Agree	Female	No	~30 Young	Non-Environment	University Student
46	Agree	Disagree	Male	No	~30 Young	Environment	University Student
47	No Comment	Disagree	Female	No	~30 Young	Non-Environment	University Student
48	No Comment	Agree	Female	No	~30 Young	Non-Environment	University Student
49	Agree	No Comment	Male	No	~30 Young	Non-Environment	University Student
50	Agree	Agree	Female	No	~30 Young	Non-Environment	University Student
51	No Comment	Agree	Female	No	~30 Young	Non-Environment	University Student
52	Agree	Agree	Male	No	~30 Young	Non-Environment	University Student
53	Agree	Agree	Female	No	~30 Young	Non-Environment	University Student
54	No Comment	Agree	Female	No	~30 Young	Non-Environment	University Student
55	No Comment	No Comment	Female	No	~30 Young	Non-Environment	University Student
56	Disagree	Agree	Female	No	~30 Young	Non-Environment	University Student
57	Agree	Agree	Female	No	~30 Young	Environment	Highschool Student
58	Agree	No Comment	Female	No	31~50 Middle	Non-Environment	Enterprise Employee
59	No Comment	Agree	Female	No	~30 Young	Non-Environment	University Student
60	Agree	Agree	Female	No	~30 Young	Non-Environment	University Student
61	No Comment	Agree	Female	No	~30 Young	Environment	University Student
62	Agree	No Comment	Male	No	~30 Young	Non-Environment	University Student
63	Agree	No Comment	Male	No	~30 Young	Environment	University Student
64	Agree	Agree	Male	Yes	51 ~ Elder	Non-Environment	Retirement
65	No Comment	No Comment	Female	No	~30 Young	Non-Environment	University Student
66	Disagree	Agree	Female	No	~30 Young	Environment	University Student

Remarks : The total 66 online respondents characteristics contain Male 25 (37.88%), Female 41 (62.12%); Age ~30 Young 45 (68.18%), 31~50 Middle 6 (9.09%), 51~Elder 15 (22.73%); Environment 24 (36.36%), Non-Environment 42 (63.64%)

Table 2: Plan “A” LNG through MSP in EBSA for energy replenishment and Plan “B” energy diversification linking AI, IoT under ICZM for SCCD total of 35 respondents were collected on 24/Dec/2018. Plan A "Disagree" 42.86% but "No Comment Total" 34.29% + "Agree Total" 22.86% = 57.14% was consistent with interview results upgrading current LPG to LNG in EBSA for energy replenishment. Plan B "Agee" 80.00%, "No Comment" 20.00%, and "Disagree" 0% illustrated overwhelmingly support.

Table 2 :Contingent Table of Total 35 Respondents Was Collected on 24/Dec/2018 Claimed The Plan "A" Upgrading Current LPG to LNG in EBSA Through MSP and The Plan "B" Energy Diversification Framework Linking Big Data, IoT, AI Innovation for CCSD.

			Plan "A" Upgrading Current LPG to LNG Develops Economics and Protect EBSA through MSP for Energy Replenishment Is Acceptable. Expertise or Interest									
			⊟No Comment		No Comment Total	⊟Disagree		Disagree Total	⊟Agree		Agree Total	Grand Total
Plan "B" Establishing Autonomous Energy Diversification through ICZM Linking Big Data, IoT, AI Innovation for SCCD Is Supported.	Gender	資料	Environment	Non-Environment		Environment	Non-Environment		Environment	Non-Environment		
⊟No Comment	Female	People		4	4	1		1				5
		%	0.00%	11.43%	11.43%	2.86%	0.00%	2.86%	0.00%	0.00%	0.00%	14.29%
	Male	People		1	1		1	1				2
		%	0.00%	2.86%	2.86%	0.00%	2.86%	2.86%	0.00%	0.00%	0.00%	5.71%
No Comment People				5	5	1	1	2				7
No Comment %			0.00%	14.29%	14.29%	2.86%	2.86%	5.71%	0.00%	0.00%	0.00%	20.00%
⊟Agree	Female	People	2	3	5	2	4	6		1	1	12
		%	5.71%	8.57%	14.29%	5.71%	11.43%	17.14%	0.00%	2.86%	2.86%	34.29%
	Male	People		2	2	5	2	7	5	2	7	16
		%	0.00%	5.71%	5.71%	14.29%	5.71%	20.00%	14.29%	5.71%	20.00%	45.71%
Agree People			2	5	7	7	6	13	5	3	8	28
Agree %			5.71%	14.29%	20.00%	20.00%	17.14%	37.14%	14.29%	8.57%	22.86%	80.00%
People 的加總			2	10	12	8	7	15	5	3	8	35
% 的加總			5.71%	28.57%	34.29%	22.86%	20.00%	42.86%	14.29%	8.57%	22.86%	100.00%
Remarks												

1.Total 35 Respondents on 24/Dec/2018. Plan A "Disagee Total" 42.86% no exceeding 50%, however, "No Comment Total" 34.29% + "Agree Total" 22.86% = 57.14% is consistant with preliminary gatekeeper interview results.

2.Plan B "Agee Total" 80.00%, "No Comment Total" 20.00% and "Disagree Total" 0% showed overwhelmingly agreed with Plan B.

Table 2.1 Total of 101 Respondents contains 66 respondents on 17/Dec/2019 and 35 on 24/Dec/2018. The Plan “A” LNG energy replenishment through MSP and the Plan “B” energy diversification framework linking Big Data, AI, IoT under ICZM for SCCD. "Disagree Total" declining to 25.74% from 42.86% of Table 2 reflected Plan A LNG in EBSA could be possible for developments.

Table 2.1: Total 101 Respondents Contingent Table Contain 35 Respondents on 24/Dec/2018 and 66 on 17/Dec/2019. The Plan "A" Upgrading Current LPG to LNG in EBSA Through MSP for Energy Replenishment and The Plan "B" Autonomous Energy Diversification through ICZM Linking Big Data, AI, IoT Innovation for SCCD Is Achievable.

%	Plan "A" Upgrading LPG to LNG in EBSA through MSP for Energy Replenishment									
	⊟Agree		Agree TTL	⊟Disagree		Disagree TTL	No ⊟ Comment		No Comment TTL	Total
Plan "B" Establishing Autonomous Energy Diversification Framework through ICZM Linking Big Data, IoT, AI Innovation for SCCD Is Achievable	Environment	Non-Environment		Environment	Non-Environment		Environment	Non-Environment		
⊟Agree	12.87%	20.79%	33.66%	11.88%	10.89%	22.77%	9.90%	15.84%	25.74%	82.18%
⊟Female	2.97%	13.86%	16.83%	4.95%	6.93%	11.88%	5.94%	10.89%	16.83%	45.54%
~ 30 Young	0.99%	5.94%	6.93%	3.96%	1.98%	5.94%	3.96%	7.92%	11.88%	24.75%
31-50 Middle	0.99%	1.98%	2.97%	0.00%	4.95%	4.95%	0.99%	2.97%	3.96%	11.88%
51 ~ Elder	0.99%	5.94%	6.93%	0.99%	0.00%	0.99%	0.99%	0.00%	0.99%	8.91%
⊟Male	9.90%	6.93%	16.83%	6.93%	3.96%	10.89%	3.96%	4.95%	8.91%	36.63%
~ 30 Young	3.96%	1.98%	5.94%	0.99%	1.98%	2.97%	3.96%	3.96%	7.92%	16.83%
31-50 Middle	0.99%	0.99%	1.98%	0.99%	0.99%	1.98%	0.00%	0.00%	0.00%	3.96%
51 ~ Elder	4.95%	3.96%	8.91%	4.95%	0.99%	5.94%	0.00%	0.99%	0.99%	15.84%
⊟Disagree	0.99%	0.00%	0.99%	0.00%	0.00%	0.00%	0.00%	0.99%	0.99%	1.98%
⊟Female	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.99%	0.99%	0.99%
~ 30 Young	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.99%	0.99%	0.99%
⊟Male	0.99%	0.00%	0.99%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.99%
~ 30 Young	0.99%	0.00%	0.99%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.99%
⊟No Comment	0.99%	3.96%	4.95%	1.98%	0.99%	2.97%	0.00%	7.92%	7.92%	15.84%
⊟Female	0.00%	0.99%	0.99%	1.98%	0.99%	2.97%	0.00%	6.93%	6.93%	10.89%
~ 30 Young	0.00%	0.00%	0.00%	0.99%	0.00%	0.99%	0.00%	5.94%	5.94%	6.93%
31-50 Middle	0.00%	0.99%	0.99%	0.00%	0.99%	0.99%	0.00%	0.00%	0.00%	1.98%
51 ~ Elder	0.00%	0.00%	0.00%	0.99%	0.00%	0.99%	0.00%	0.99%	0.99%	1.98%
⊟Male	0.99%	2.97%	3.96%	0.00%	0.00%	0.00%	0.00%	0.99%	0.99%	4.95%
~ 30 Young	0.99%	2.97%	3.96%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.96%
51 ~ Elder	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.99%	0.99%	0.99%
Total	14.85%	24.75%	39.60%	13.86%	11.88%	25.74%	9.90%	24.75%	34.65%	100.00%

Remarks

1. Total 35 + 66 = 101 Respondents. Plan A "Agree Total" 39.60%, "Disagree Total" 25.74%, "No Comment Total" 34.65%. The "Disagree Total" 25.74% seemed arugment Plan A LNG in EBSA is possible for developments. Which result is differennt from previous 35 resspondents "Disagree Total" at 42.86%

2. Plan B "Agree Total" 82.18%, "Disagree Total" 1.98%, "No Comment Total" 15.84%. The "Agree Total" 82.18% is similar to previous research 35 respondent 80.00%. This illustration is asserted that Plan B is imperative and need to be done as soon as possible.

Table 3 Plan "A" all P-Value of Gender group 0.912, Age 0.748, Environment 0.565 were greater than significant interval alpha 0.05 indicating no significant difference. The null hypothesis " Upgrading LPG to LNG Develops Economics and Protect EBSA through MSP for Energy Replenishment is acceptable " was not rejected and consistent with goalkeeper interview results. Although EBSA was important. However, some citizens preferred tangible energy resources supply with no blackout important than political slogan intangible sustainable development in EBSA.

Table 3. The Online Total 35 Respondents Was Collected on 24/Dec/2018. The Summary of Study Plan "A" LNG in EBSA under MSP for Energy Replenishment.						
Group	Number	Sum	Mean	Variance		
Female	3	17	**5.66666667**	**17.33333333**		
Male	3	18	**6**	**7**		
~30 (Young)	3	10	3.33333333	**0.333333333**		
31-50 (Middle)	3	13	4.33333333	6.333333333		
51~ (Elder)	3	12	4	1		
Environment	3	15	**5**	9		
Non-Environment	3	20	**6.66666667**	12.33333333		
One-Way ANOVA						
Source	SS	Degree of Freedom	MS	F	P-Value	Critical Value
Between (Gender)	0.166666667	1	0.16666667	0.01369863	**0.912468758**	7.708647422
Within (Gender)	48.66666667	4	12.1666667			
Total (Gender)	48.83333333	5				
Between (Age Group)	**1.555555556**	**2**	**0.77777778**	**0.304347826**	**0.748352985**	**5.14325285**
Within (Age Group)	**15.33333333**	**6**	**2.55555556**			
Total (Age Group)	**16.88888889**	**8**				
Between (Environment Group)	4.166666667	1	4.16666667	0.390625	**0.565855971**	7.708647422
Within (Environment Group)	42.66666667	4	10.6666667			
Total (Environment Group)	46.83333333	5				
Remarks						
1. Female "Mean" 5.666 smaller than Male 6, however, "Variance" 17.333 larger than 7 shows mcuh diversion from Plan A						
2. Young and Elder are similar to no diversion because "Variance" at 0.3333 and 1						

Table 3.1 Online Sampling of Plan “A” LNG 35 respondents, in addition to Snowball Sampling 66 was conducted a total of 101. The results P-Value of Environment 0.170, Gender 0.361, Age 0.112 were larger than significant interval alpha 0.05 indicating no significant difference. The null hypothesis was not rejected and consistent with goalkeeper interview results.

Table 3.1. Previous Respondents 35 on 24/Dec/2017 + Online Snowball Sampling 66 = total 101 Respondents Were Conducted on 17/Dec/2019. The Summary of Study Plan "A" Upgrading LPG to LNG in EBSA under MSP for Energy Replenishment.						
Group	Number	Sum	Mean	Variance		
Female	3	58	19.33333333	26.3333		
Male	3	43	14.33333333	44.3333		
Environment	3	39	13	7		
Non-Environment	3	62	20.66666667	56.3333		
~ 30 Young	3	55	18.33333333	72.3333		
31-50 Middle	3	18	6	4		
51 ~ Elder	3	28	9.333333333	37.3333		
One-Way ANOVA						
Source	SS	Degree of Freedom	MS	F	P-Value	Critical Value
Between (Female, Male)	37.5	1	37.5	1.06132	0.361129	7.708647422
Within (Female, Male)	141.3333333	4	35.33333333			
Total	178.8333333	5				
Between (Environment, Non-Environment)	88.16666667	1	88.16666667	2.78421	0.170522	7.708647422
Within (Environment, Non-Environment)	126.6666667	4	31.66666667			
Total	214.8333333	5				
Between (Young, Middle, Elder)	244.2222222	2	122.1111111	3.22287	0.112045	5.14325285
Within (Young, Middle, Elder)	227.3333333	6	37.88888889			
Total	471.5555556	8				
Remarks						
1.Male "Mean" 14.333 smaller than Female 19.333, however, "Variance" 44.333 larger than 26.333 indicates much diversive from Plan A.						
2.Young "Variance" 72.333 the maximum value shows the most diverse oppinions from Plan A.						

Table 4 The Summary and ANOVA of Plan “B” the null hypothesis “Creating Autonomous Energy Diversification Framework through ICZM Linking Big Data, IoT, AI Innovation for SCCD Is Achievable”. All P-Value at Environment Group 0.774, Gender 0954, Age 0.964 were larger than significant interval alpha 0.05; F 0.107, 0.004, 0.037 were less than critical value 18.512, 18,512, 9.552 indicating no significant difference, and the null hypothesis was not rejected.

Table 4. The Online Total 35 Respondents Was Collected on 24/Dec/2018. The Summary of Study Plan "B" Establishing Autonomous Energy Diversification through ICZM Linking Big Data, IoT, AI Innovation for SCCD Is Supported.

Group	Number	Sum	Mean	Variance		
Environment	2	15	7.5	84.5		
Non-Environment	2	20	10	32		
Female	2	17	8.5	24.5		
Male	2	18	9	98		
~30 (Young)	2	10	5	2		
31-50 (Middle)	2	13	6.5	60.5		
51~ (Elder)	2	12	6	32		
One-Way ANOVA						
Source	SS	Degree of Freedom	MS	F	P-Value	Critical Value
Between (Environment Group)	6.25	1	6.25	0.10729614	0.774353159	18.51282051
Within (Environment Group)	116.5	2	58.25			
Total (Environment Group)	122.75	3				
Between (Gender Group)	0.25	1	0.25	0.00408163	0.954870632	18.51282051
Within (Gender Group)	122.5	2	61.25			
Total (Gender Group)	122.75	3				
Between (Age Group)	2.333333333	2	1.166666667	0.03703704	0.964074043	9.552094496
Within (Age Group)	94.5	3	31.5			
Total (Age Group)	96.83333333	5				
Remarks						
1.Environment "Mean" 7.5 smaller than Non-Environment 10, however, "Variance" 84.5 larger than 32 shows much diversion from Plan B						
2.Male "Mean" 9 similar to Female 8.5, however, "Variance" 98 larger than 24.5 indicates the most diverse from Plan B						
3.Middle 31-45 age "Mean" 6.5 similar to Elder 6, Young 5, however, "Variance" 60.5 larger than Elder 32 and Young the minimum 2 illustrate much diversion from Plan B						

Table 4.1 The Summary and ANOVA of Plan “B” the null hypothesis all P-Value of Environment 0.6903, Gender 0.7924, Age 0.8478 were larger than significant interval alpha 0.05; F 0.183, 0.079, 0.172 were less than critical value 7.708, 7.708, 6.944 indicating no significant difference and the null hypothesis was not rejected.

Table 4.1. Previous Respondents 35 Was Collected on 24/Dec/2018 + Online Snowball Sampling 66 Collected on 17/Dec/2019 = Total 101 Respondents. The Summary of Study Plan "B" Establishing Autonomous Energy Diversification through ICZM Linking Big Data, IoT, AI Innovation for SCCD Is Supported.

Group	Number	Sum	Mean	Variance		
Environment	3	39	13	364		
Non-Environment	3	62	20.66666667	**596.33333**		
Female	3	58	19.33333333	**558.33333**		
Male	3	43	14.33333333	**389.33333**		
~ 30 Young	3	55	18.33333333	**440.33333**		
31-50 Middle	2	18	9	**98**		
51 ~ Elder	2	28	14	242		
One-Way ANOVA						
Source	SS	Degree of Freedom	MS	F	P-Value	Critical Value
Between (Environment Group)	88.16666667	1	88.16666667	0.1836168	0.69035	7.708647422
Within (Environment Group)	1920.666667	4	480.1666667			
Total (Environment Group)	2008.833333	5				
Between (Gender Group)	37.5	1	37.5	0.0791418	0.792417	7.708647422
Within (Gender Group)	1895.333333	4	473.8333333			
Total (Gender Group)	1932.833333	5				
Between (Age Group)	105.047619	2	52.52380952	0.1721152	0.847802	6.94427191
Within (Age Group)	1220.666667	4	305.1666667			
Total (Age Group)	1325.714286	6				
Remarks						
1.Non-Environment "Vaiance" 596.33 indicates the most diverse oppinion from Plan B						
2.Female "Vaiance" 558.33 larger than Male 389.33 shows diversion from Plan B						
3.Youg ~30 "Vaiance" 440.33 larger than Elder 242 and 31-50 Middle 98 is the relative small illustrate no diversion from Plan B						

Figures

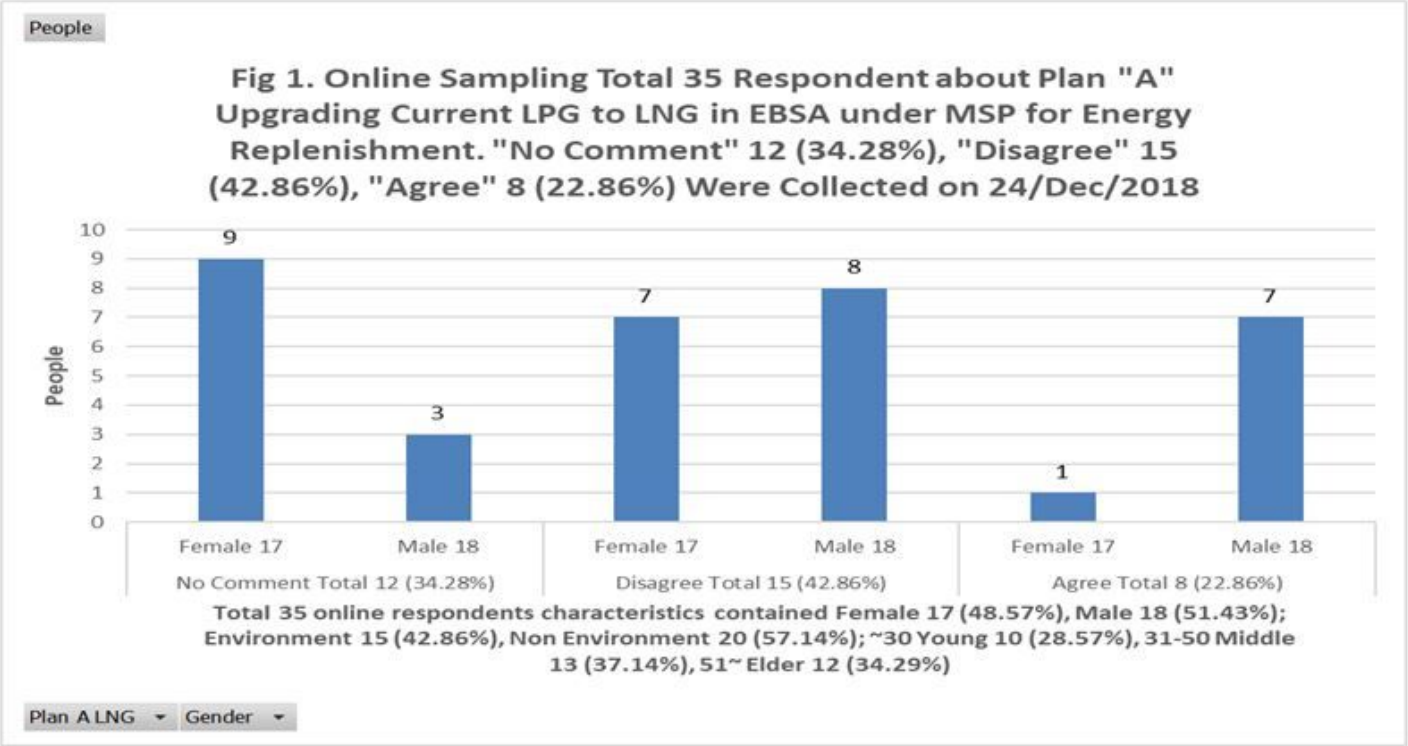

Figure 1

Plan “A” upgraded current coastal liquified petroleum gas (LPG) to clean energy liquefied natural gas (LNG) in the ecological or biological significant area (EBSA) under marine spatial planning (MSP) for energy replenishment. "Agree" Male 7/18=38.89% is greater than Female 1/17= 5.88% ."Disagree" Male 8/18=44.44% is greater than Female 7/17=41.18% "No Comment" Male 3/18=16.67% is less than Female 9/17= 52.94%. The total "Disagree" 42.86% is less than "Agree" 22.86% + "No Comment" 34.28% indicating LPG exploitation in EBSA is acceptable and consistent with interview results. No sufficient evidence to determine a policy of reject or support Plan “A” LNG in EBSA for energy replenishment. Although EBSA is significantly important. However, many citizens asserted that stable tangible electricity with no blackout demonstrated great value than an intangible political slogan in EBSA.

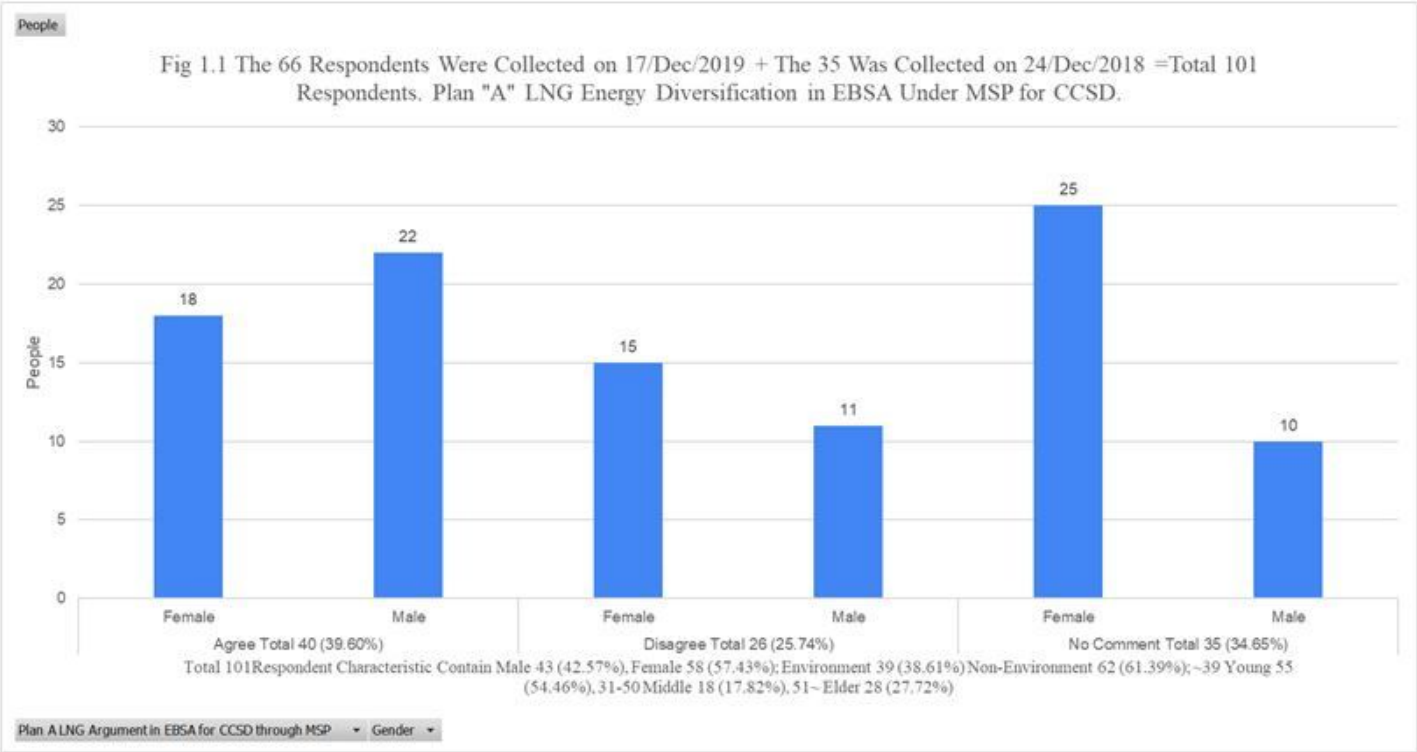

Figure 2

1.1 Plan “A” investigation LNG in the EBSA under MSP for Energy Replenishment. Indicating Male more support than Female as same as Figure 1."Agree" Male 22/43=51.16% is greater than Femal 18/58 =31.03% "Disagree" Male 11/43= 25.58% is less than female 15/58= 25.86% "No Comment" Male 10/43 = 23.26% is less than Female 25/58= 43.10%

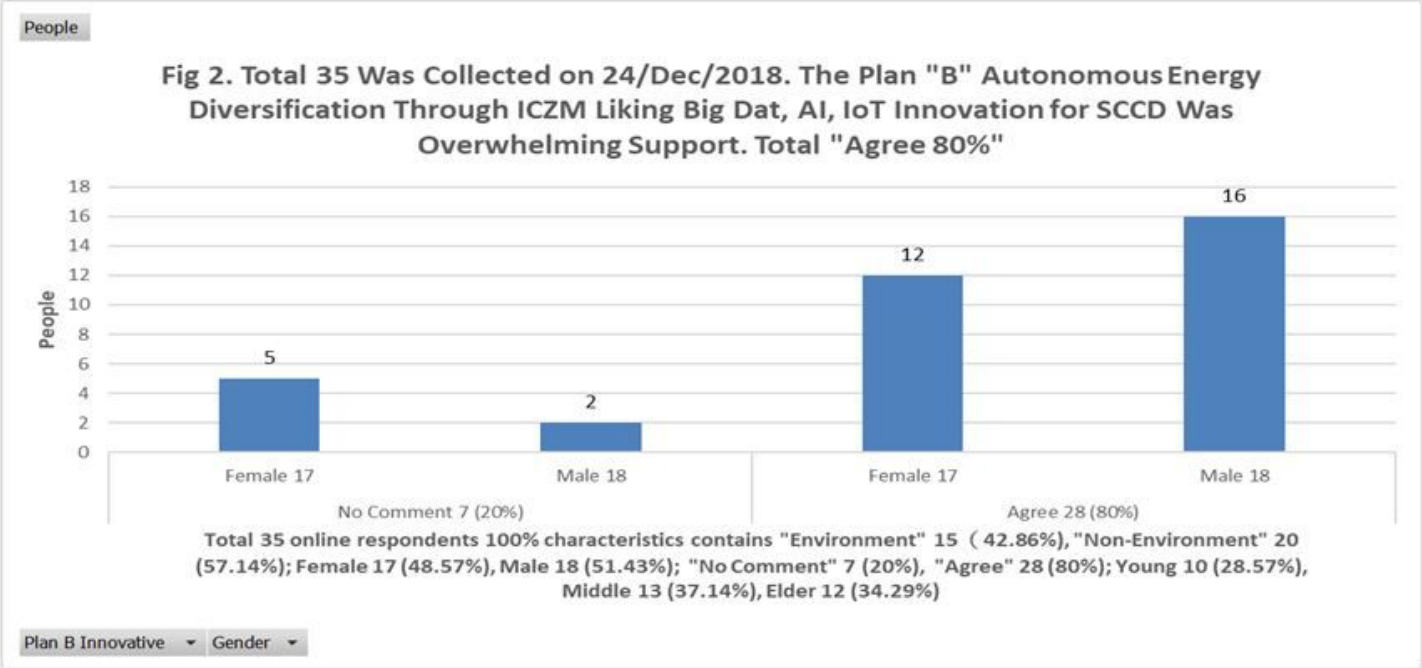

Figure 3

Plan “B” creating autonomous energy diversification framework through integrated coastal zone management (ICZM) linking Big Data, internet of things (IoT), artificial intelligence (AI) Innovation for sustainable coastal community development (SCCD) is achievable. Total "Agree" 28 (80%), No Comment 7 (20%), "Disagree" 0 (0%), Male 16/18=88.89% is greater than Female 12/17= 70.59% "No Comment" Male 2/18 = 11.11% is less than Female 5/17= 29.41%. Indicating Male more support energy diversification than Female.

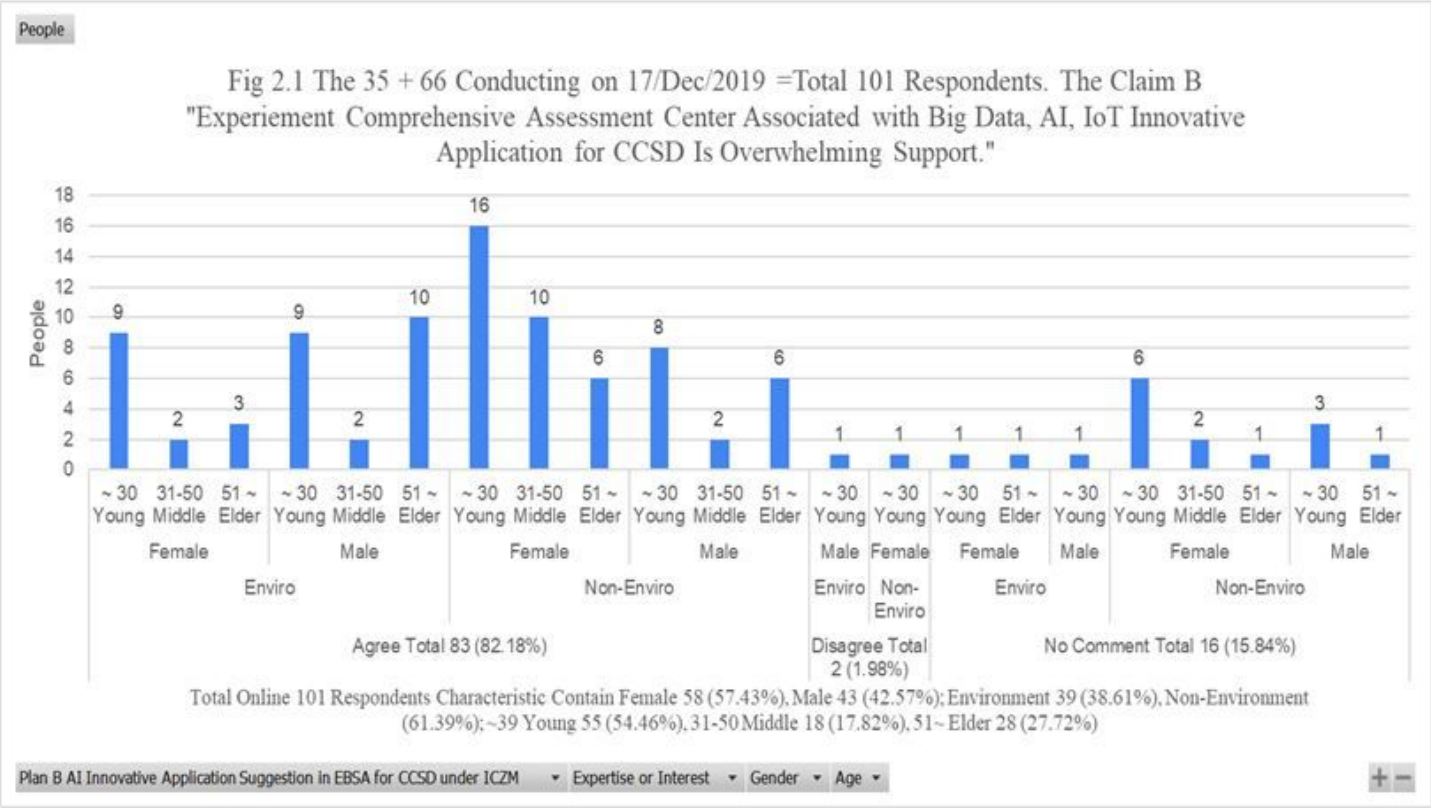

Figure 4

2.1 “ Plan “B” creating autonomous energy diversification framework through ICZM linking Big Data, IoT, AI innovation for SCCD illustrated “Agree Total” 83 (82.18%), “No Comment Total 18 (15.84%), “Disagree Total 2 (1.98%) demonstration Overwhelmingly Supported. The 35 Respondents Was Conducted on 24/Dec/2018 + Online Snowball Sampling 66 on 17/Dec/2019 = Total 101. The Noticeable 16 figure Showed the majority of “~ 30 Young”, “Female”, “Non-Environment”. According to Fig 2, Plan B, The 35 respondents, agreed total 28/35 = 80%, female total 12/35= 34.29%, male total 16/35=45.71%. But, Fig 2.1, The 101 respondents, agreed a total 83 (82.18%), Female total 14+32 = 46/101 = 45.54% was larger than Male 21+16=37/101 = 36.63%.