



Maintaining Sustainable Tourism Through the Management of Carbon Gas Emissions Concerning Green Growth 2050 Bali Roadmap

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Article Info

Submitted: 31 July 2022

Revised: 10 August 2022

Accepted: 1 October 2022

Keywords:

Carbon gas emission;
Sustainable Tourism;
Bali green growth

Kata Kunci:

Emisi gas karbon;
Pengelolaan Emisi;
Pariwisata Berkelanjutan

Abstract

This study will provide insight in managing the carbon gas emission that Bali tourism development could raise. It will be related to the Green Growth Roadmap, released by the Provincial Government of Bali. Through an in-depth interview and desk research study, followed by a qualitative descriptive analysis, some strategies could be found that could be a way for the government to execute the carbon gas emission policy. We suggest an intensive collaboration between government and industry by setting a progressive target to reduce greenhouse gas emissions and determining a specific number. This article also suggests a mechanism by establishing a periodic report and assistance to anticipate gas emissions. Our research also found that promoting education and explaining the benefits of measuring and reducing greenhouse gas emissions. Conducting a research center dedicated to research and communication to help the business sector reduce emissions, including information in technology, facilitated by the academician. Last, creating an integrated certified system called "Authentic Green Bali." We also recommend to value carbon expenditure schemes for air, land, and accommodation transportation.

Abstrak

Studi ini akan membantu dalam mengelola emisi gas karbon yang dapat ditimbulkan oleh pengembangan pariwisata Bali. Hal itu terkait dengan *Green Growth Roadmap* yang dikeluarkan oleh Pemerintah Provinsi Bali. Melalui wawancara mendalam dan studi pustaka, dilanjutkan analisis deskriptif kualitatif, dapat ditemukan beberapa strategi yang dapat menjadi jalan bagi pemerintah untuk mengeksekusi kebijakan emisi gas karbon. Kami menyarankan kolaborasi intensif antara pemerintah dan industri dengan menetapkan target progresif untuk mengurangi emisi gas rumah kaca dan menentukan jumlah tertentu. Artikel ini juga menyarankan mekanisme dengan membuat laporan berkala dan bantuan untuk mengantisipasi emisi gas. Penelitian kami juga menemukan bahwa mempromosikan pendidikan dan menjelaskan manfaat mengukur dan mengurangi emisi gas rumah kaca. Menyelenggarakan pusat penelitian yang didedikasikan untuk penelitian dan komunikasi untuk membantu sektor bisnis mengurangi emisi, termasuk informasi di bidang teknologi, yang difasilitasi oleh akademisi. Terakhir, membuat sistem bersertifikat terintegrasi yang disebut "*Authentic Green Bali*". Kami juga merekomendasikan menilai skema pengeluaran karbon untuk transportasi udara, darat, dan akomodasi.

D.O.I :

<https://doi.org/10.17509/jithor.v5i2.51418>

INTRODUCTION

Towards 2050, the governments of Indonesia and Bali, in this case, the Ministry of Tourism, compiled several strategies for Bali tourism in the long term. This strategy is expected to bring Bali tourism to play a role in the international tourism industry and achieve a new eco-friendly tourism economy and market. For this reason, the government then developed a roadmap to compile a list of action and investment strategies to be implemented.

Tourism is probably not among the leading industries contributing to air pollution and energy consumption. According to [Shindell et al. \(2018\)](#), indirect carbon emissions by other tourism sectors except the transport sector were 3–4 times their direct carbon emissions. Compared with the manufacturing industry, tourism is an industry of low pollution and energy consumption. However, no detailed research calculates how domestic tourism, inbound tourism consumption, and other tourism consumption could insure domestically. In Indonesia, the relationship between outbound travel and airfares paid to the national carriers has never been thought of strategically. Therefore, a top-down approach could effectively measure the national tourism dioxide emissions ([Anser et al., 2020](#)).

The strategy formulation that appears in this roadmap is specifically based on several things, including (1) the scope of Bali tourism and comparing it with several competitors as well as global trends; (2) examining the concept of Bali tourism and its ability to anticipate climate change (climate change); (3) include reviews of sustainability of resources and greenhouse gas emissions within the scope of Bali tourism; (4) completing the data with an analysis of the demand sector for Bali tourism, a comparison of the market situation including brand positioning; and (5) covering quadruple (economic, social, environmental, climate) visions for Bali tourism based on the Balinese community, culture and industry. It is supposed to be in line with changes in the economy, employment, markets, international market demands; and others ([Mulia et al., 2019](#)).

The existence of the Covid-19 pandemic, which impacts the decline in tourism activities in Bali, makes it easy for stakeholders to discuss and rethink Carbon Gas Emission Management in 2050 ([Anele, 2021](#)). However, no literature answers how the tourism sector can contribute nationally to the management of carbon gas emissions. As a globally recognized destination, the tourism authorities in Bali can rethink the steps that can be taken to manage this carbon gas emission. The decline in tourism activity due to Covid-19 also provides space and time to reorganize Bali's tourism sector's sustainability ([Sudira & Mudana, 2021](#)). The impression of mass tourism attached to the tourism industry players in Bali can be removed in few steps if studies on the management of carbon gas emissions can be carried out.

This study aims to explore forms of carbon gas emission management for Bali as an international destination through discussion and interviews with tourism stakeholders in Bali. This study contains several novelties, namely a study that looks at maintaining sustainable tourism from a relatively specific point of view, namely carbon gas emission. This study also follows the trend of the Indonesian government to suppress carbon gas emissions. The steps taken by the government include converting oil-fueled vehicles to electric cars, energy conversion, intensive control of air pollution, and shifting from public transportation to private vehicles. Apart from the study function, which emphasizes the efforts made by the current government, this study also tries to address the gap regarding the lack of literature discussing carbon gas emissions in the tourism industry context. This study will also complement previous research focusing on sustainable tourism management's ultimate goal.

LITERATURE REVIEW

Sustainable Tourism Management

Sustainable Tourism is the management of the far-sighted tourism sector and has recently been adopted by managers of the tourism sector in various countries ([Della Corte et al., 2021](#)). Sustainable tourism management is also a continuation of the activities carried out by the

United Nations in supporting sustainable development, often referred to as the Sustainable Development Goals (SDGs). Sustainable tourism management is defined as a tourism development program in various countries (Rasoolimanesh et al., 2020). In another sense, sustainable tourism can be defined as visiting a place as a tourist and positively impacting the environment, society, and economy. Sustainable tourism is also established with various principles, including Economic Sustainability, Nature Conservation, and Socio-Cultural Conservation (Scheyvens & Biddulph, 2018).

Through these principles, sustainable tourism management is then implemented through many tactical steps. The step that often appears is to ensure economic viability. This step is carried out by ensuring the continuity and strength of the tourism sector's competitiveness in an area to obtain long-term economic benefits (Scheyvens & Biddulph, 2018). Continuity is related to another step, namely local prosperity, maximizing the tourism industry's contribution to the welfare and economy of the local community. Economic viability is also often juxtaposed with the employment quality program, which ensures that all communities in tourism destinations get decent types of employment and the certainty of equality in terms of gender, ethnicity, and race (Cahyadi, 2018).

The next activity that can be carried out is to ensure social equity. This principle can be implemented by providing the most comprehensive and fairest distribution of economic and social benefits for the entire community involved (Cahyadi, 2018). Social equity involves providing the best experience for tourists during their visit to the destination and involving the community during the planning, monitoring, and evaluation process for the sustainability of the tourism industry (Scheyvens & Biddulph, 2018).

Communities involved or affected by the tourism sector must ensure its sustainability in terms of quality of life and health (Shindell et al., 2018). The negative impacts of the tourism sector, such as air and noise pollution, can be

prevented by implementing this principle. This principle also regulates how culture, traditions, and customs are constantly maintained, valued, and respected so they are always authentic and part of the destination's uniqueness.

The following sustainable tourism management activities cannot be separated from the components of maintaining and preserving the environment. This principle is implemented through several programs, such as maintaining the conservation and preservation of nature, fauna, habitats, and sanctuary (S.-Y. Pan et al., 2018). Environmental preservation is also very closely related to managing carbon gas emissions, where a large amount of pollution will increasingly threaten an area's biological diversity (S.-Y. Pan et al., 2018). Biodiversity is an essential part of the components, including the attraction of a destination. Ensuring the principle of environmental purity is integral to sustainable tourism management by minimizing air, water, and soil pollution and waste accumulation by tourist destinations and tourists (Darma et al., 2020). The principle of sustainable tourism in terms of the environment is also closely related to the efficient use of resources, especially non-renewable resources, for operationalizing the tourism sector.

Carbon Gas Emission

Carbon gas emissions have a very significant impact on environmental sustainability in an area. The existence of the tourism sector provides an opportunity for the movement of a large group of people, which of course, adds to the negative impact of carbon gas emissions (Y. Pan et al., 2021). Unmanaged carbon gas emissions will have harmful consequences for the tourism destination and cause global warming, and climate change is the worst (Y. Pan et al., 2021). The analogy for carbon (CO₂) emissions is like a blanket in the air, trapping heat in the atmosphere and warming up our planet. This layer prevents the planet from cooling and could be able to raise global temperatures. Global warming affects environmental conditions, food and water supplies, weather patterns, and sea levels.

Several inventories were carried out to determine the primary sources of carbon emissions. Various data emerge, but experts agree that transportation and energy to generate electricity are the primary sources of carbon emissions (Usman et al., 2021). Suppose it is associated with the tourism sector. In that case, the movement of people from their original area to tourist destinations will lead to an increase in terms of transportation modes. The movement will lead to an increase in fuel purchases and air pollution as well as noise pollution (Huang et al., 2021). Almost all types of transportation are involved in the tourism sector, ranging from airlines, sea and river transportation, to land transportation. Although breakthroughs for land transportation have already started, the same thing has not happened in improving air and sea transportation modes. Not to mention the existence of destinations on islands, where land transportation cannot reach them, so they can only be reached by sea or air transportation.

The next source of carbon emissions is electric power. If this is not taken seriously, then converting transportation from fuel to electricity will only move the problem and not solve the problem (Usman et al., 2021). In Indonesia, most electricity is produced from water or diesel sources using many non-renewable raw materials such as coal, gas, or fuel. The tourism sector is one of the industries that will contain high expenditure in using electrical energy. Even though industry players have had campaigns, such as turning off the lights at night in some tourist facilities, carbon emissions from electricity consumption cannot be significantly reduced (Huang et al., 2021).

Other literature also mentions some sources of carbon gas emissions that have not received serious attention from the relevant authorities. A number of these emissions are generated by household activities (such as cooking or food waste), livestock and fishery activities, supporting industrial activities, to the lack of waste management that produces methane gas which is quite dangerous (Darma et al., 2020). Deforestation also threatens high carbon gas emissions because the reduced

number of trees and plants due to infrastructure investment will increase emissions even higher.

RESEARCH METHOD

This study uses an interpretive approach. This research is carried out where the researcher uses a paradigm that views truth and reality from various sides (Duffy et al., 2021). We use an interpretivism approach to look at social phenomena, in this case, the context of understanding the importance of carbon gas emission management in sustainable tourism. To carry out this interpretivism approach, we carried out two forms of data collection methods. These data collections included the interview method with the tourism sector actors on the Bali island, followed by the second method. The second method is desk research, by looking at the literature related to carbon gas emissions and sustainable tourism in Bali and nationally.

The research process lasted three months, from October to December 2021. This research involved twenty informants with various backgrounds. All informant details mention in table 1 with deidentified information. We used purposive sampling and snowball sampling methods to obtain data saturation. At the beginning of the study, we prioritized the representation of the components of tourism actors, including management of five-star hotels, management of homestays/guesthouses, local restaurant managers, managers of other tourist facilities (such as spas, event venues, recreation centers, water sports, transportation, and tour agents), travel agent management, tourist destination managers, members of tourism organizations in Bali, academics, and the media who often make coverage related to the tourism industry.

We stopped the interview process as soon as the data was considered saturated, where a saturation point appeared when no more new information or data was obtained from the next informant.

Table 1. Informant Details

Informant Code	Location	Position	Time of Interview	Length of Experience
P1	Denpasar	Private Sector	October	3 years
P2	Denpasar	Private Sector	November	2 years
P3	Kuta	Private Sector	December	5 years
P4	Kuta	Private Sector	October	4 years
P5	Denpasar	Public Sector	December	3 years
P6	Singaraja	Academician	November	3.5 years
P7	Singaraja	Academician	December	5 years
P8	Ubud	Academician	October	8 years
P9	Ubud	Media	November	7 years
P10	Nusa Dua	Local community	December	1.5 years
P11	Jimbaran	Local community	November	1 years
P12	Canggu	Local community	November	3 years

During the data collection process through interviews, we also carried out desk research by looking at many documents to answer research problems. These documents include reports from the government regarding carbon gas emissions and sustainable tourism management, research reports from research institutes or other reputable institutions, research articles from reputable journals, and other documents related to the topic of study. The desk research results were then validated by re-checking during the interview process with the informants (Okamoto, 2021).

All data collected were then analyzed using descriptive analysis techniques. This analysis technique is carried out by summarizing the findings obtained through two data collection techniques (interviews and desk research). After the data collection process, we carry out the next step: data reduction. Data reduction means that not all data obtained in the two data collection methods are used to answer research problems. All data collected is then described narratively and packaged into a model framework. Finally, this narrative description draws a conclusion to answer the research question.

RESULT AND DISCUSSION

Carbon Emission Management

Emission management has received attention since the recent process of climate change that occurred on earth, caused by uncontrolled emissions management. Emissions are defined as a beam (solid, gas, and liquid) in the form of a reaction's light, heat, or electrons (Swardika et al., 2020). According to Macklin et al. (2018), it turns out that air transportation holds the most portion of contributors to air emissions in Bali. The data is quite reasonable, considering Bali does not have an industrial factory like Jakarta, and carbon emissions from vehicles are more prevalent in southern Bali.

Based on data from the Ministry of Environment in 2010, Indonesia is a significant producer of greenhouse gas emissions, primarily due to deforestation that has occurred so far. Therefore, the ministry is committed to a 26% reduction in the effect of carbon emissions by 2020. Concerning tourism, especially in Bali, our informant mentioned that the income from the tourism sector can later be used in connection with a campaign to overcome the effects of greenhouse gasses (due to the Balinese economy, 46% of it came from the tourism sector, according to the 2009 BPS data). However, it turns out that Bali tourism is also potentially affected by the risks of climate change, one of which is caused by these emissions. Moreover, data collection and management of emissions are still running in Bali, so this has become very serious about welcoming Bali tourism in 2050. Our informant states that the reduction can be started by measuring, monitoring, and reporting current production of carbon dioxide produced by the tourism sector. Most of our informants mentioned that lack of public transport becomes a major source of carbon emissions.

‘I think the government should build a public transport system in the island, to minimize the air and noise pollution’ (P12) and

‘We have heard about the plan to install railway system in Bali, but it was just about the plan’ (P1)

Regarding strategies for managing emissions from the tourism industry, in the Bali document, the GreenGrowth Roadmap, especially the one in strategy 6, will be more inclined to reduce existing greenhouse gas emissions. Reducing (reducing) greenhouse gas emissions from the tourism sector in Bali is intended to align with commitments and capabilities through economic strength and mitigation, which are also carried out nationally. As Y. Pan et al. (2021) said, growth in the scale of tourists and the scale of tourism output both result in the rapid growth of carbon emissions; the constant decrease in energy intensity helped inhibit carbon emissions from the stage of exploration to the stage of consolidation. However, the scale effects of tourists and the energy intensity have become important positive factors to the growth of carbon emissions (Mishra et al., 2020).

‘dynamic movement from domestic and international tourists certainly contributes to the number of carbon emissions (P5)’ and ‘international event might provide some benefits however we need to recalculate how much of emissions that it produced that might harmful for the environment’ (P4)

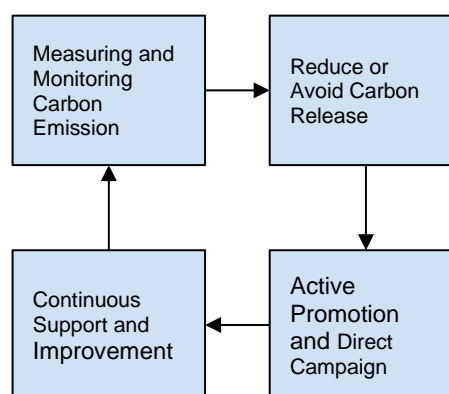
In contrast, the effects of energy structure and output scale on the growth of carbon emission had become negative factors. As a result, the inhibition of the growth of carbon emissions from optimizing the industrial structure rapidly weakened at the stage of transformation and upgrading. We propose four steps of addressing and managing the carbon emission in Figure 1. First, it starts with measuring, reporting, and monitoring every carbon emission released by major sources of tourism activities. As what literature and interviewees mentioned, most of the carbon emissions in Bali are released by transportation. However, we also can not avoid the existence of unsustainable electrical sources such as extracted from fossil fuels. Second step is to reduce the

activities that cause carbon emission release. As a small island, traveling through an airline is the only option for travelers coming to Bali. However, multiple activities can be promoted to minimize the carbon emissions, including using non-fuel vehicles, consuming local products, avoiding waste, and limiting plastic bags.

‘New policy from government has improved the awareness of locals to bring reusable bags and it can definitely help the authorities to limit carbon footprint’ (P7)

The next step is to ask for more movement and campaign through active promotion. Our interviewees suggested digital influencers and digital nomad tourists to actively promote living without waste and being wise with electricity. However, without active engagement between government and local communities, the locals and tourists will not be able to comprehend the benefits of doing climate action. Our last suggestion in carbon emission management is to be consistent and always improve every small step being undertaken.

Figure 1. The Flow of Carbon Emission Management in Bali through Tourism Sector



Reducing Gas Emission Strategy

Our interview findings confirm that reducing gas emission is a critical component inside the emission management. Hence, the foremost step that can be taken to reduce greenhouse gas emissions is to optimize tourism in reducing greenhouse gas emissions. In its strategy, the formulator

provides several strategies. Our interviewee from the government mentioned that the government must collaborate with industry to set progressive targets for the business sector to ensure and reduce greenhouse gas emissions with specific numbers. Meanwhile, we've got suggestions that industries must collaborate with the government and provide periodic reports and assistance to prevent and anticipate gas emissions by optimizing education. It is in line with Sun et al. (2019) who suggest that the government and industry publish, educate and encourage other businesses by explaining the benefits of measuring and reducing greenhouse gas emissions. According to Jin et al., (2018); the government and industry established a research center dedicated to research and communication to help the business sector reduce emissions including the inclusion of information in technology.

One of our informants suggests that the stakeholders must invite other businesses to take action to use an integrated certified system with the name "Authentic Green Bali". It is part of engaging the local community and creating awareness about the importance of labeling and slogan during promotion of specific movements (Khan & Ahmad, 2021). Another strategy that was proposed by our interviewee is by evaluating carbon expenditure schemes for air, land and accommodation transportation, while allocating profits from the sector to be invested as rehabilitation forest areas. *'A specific scheme for mode of transportation must be released by asking carbon tax to allocate their profit as part of carbon reducing strategy'* (P9)

The next step proposed is to reduce carbon intensity for tourism-supporting sectors such as electricity and, simultaneously, develop carbon efficiency in the land transportation system (Zhang & Zhang, 2018). The strategy can be carried out by inviting foreign partners to fund climate change mitigation and development investments to support the development of a

generation of low-carbon electricity (Paramati et al., 2018). The government is also expected to issue new policies such as subsidies and tax cuts for the medium-scale process of low-emission electricity generation. In addition, the government is also expected to be able to issue policies to reduce gas emissions in private transportation (Zhang & Zhang, 2018). At the next level, public transportation, which is also included in Bali's future tourism plan, must be optimized with the construction of mass transportation construction and increasing users of this mode.

'Funding in reducing carbon emissions is essential as most of the impacts will be felt by local communities and SME's' (P10)

Although it covers the whole of the causes of climate change because of gas emissions, the strategy presented is still incomplete, considering that most of the emissions come from air transportation. Measures to minimize emissions from air transportation are considered increasingly heavy considering the construction of airports that will be increasingly rapid in Bali, which is estimated to have two airports in Bali by 2050. The strategy does not include calculations if Bali increases tourist visits. The arrival of tourists using air transportation must be anticipated so that the effects of emissions in the sky of the island of Bali can be minimized. Therefore, adding carbon tax could be one of the important strategies to eliminate the emission.

'Funding is essential, and it can be obtained if we can apply carbon tax for several luxury vehicles or other massive contributors' (P6)

The strategy of cutting taxes and levying optimized carbon gas investments from all airlines running their aircraft in Bali's sky can be recognized as one of the innovative strategies (Paramati et al., 2018). However, further problems will arise if the allocation of the amount of money obtained is not necessarily able to overcome carbon gas emissions. Carbon emissions are overcome through the number of trees because trees can naturally convert carbon

gas emissions into oxygen air (Zhang & Zhang, 2018). Logically, suppose Bali wants a small amount of carbon gas emissions. In that case, the thing that can be allocated is funds from the airlines for the massive forest reforestation process in Bali.

The national government could inaugurate several assessments to decompose tourism greenhouse gas emissions. As Sun (2019) documented that technology and specific assessment could be a way to add a greenhouse emission strategy. First, assess whether total tourism emissions directly increase tourism consumption over time. Second, trace the underlying determinants and their effects on tourism emissions expansion and eco-efficiency performance. Third, by comparing the carbon performance of the tourism industry against the national average. Finally, assessing, tracing, and comparing this carbon emission would be one way for provincial and national governments to understand and set up a goal of whether a technology could be an efficient way to offset tourism-based carbon emission.

Community Awareness

The process of understanding the community about the importance of reducing the number of carbon emissions in the air must receive further attention (Zha et al., 2021). The attention is where one of the strategies contained in the Bali GreenGrowth Roadmap can be optimized. The strategy is in the third point relating to capacity-building development (labor capital). Therefore, in addition to establishing and developing education and training systems to provide tourism workers according to industry needs, human capital development must also be carried out to examine their concern for the importance of reducing carbon gas emissions in the air. Furthermore, in this process of education and training, human resources that are sensitive to the environment will be obtained, which will be able to obtain investment funds from air and land transportation companies (Jamin & Rahmafritria, 2022).

‘We always have an issue by introducing community awareness when we start the carbon emission program. It has to be taught in every formal education.’ (P8)

and

‘It’s not easy to convince the importance of reducing carbon emission. But Balinese community have tried this when the government release about plastic reduction policy’ (P7)

Even more critical, these human resources will be able to allocate investment funds to aim for reforestation to reduce carbon gas emissions in the air. Zhang (2018) mentioned that a carbon tax policy could remarkably impact tourism-related carbon emissions and economic welfare (Cahyadi, 2018). In addition, we find those impacts would be significantly different at different times. Also, the impacts of different carbon taxes on the different tourism industry sectors are quite different. The government of Bali could implement a carbon tax policy for related main emission contributors in Bali, such as airplanes, hotel developers, and fossil-fuel transportation. The Carbon Tax Policy will bring a decent level of awareness from local communities that they are part of the movement.

As Paramati et al. (2018) said that tourism investment could improve environmental quality by reducing the Co2 emission. Tourism investment also plays a very significant role for economic development, both in developing and developed countries (Paramati et al., 2018). With a clear consideration, developed countries are able to minimize the negative impacts of tourism emission on the environment (Jamin & Rahmafritria, 2022). Public awareness could be raised through a massive number of people who are involved in this industry.

Capacity Building

In addition to the capacity building process, conservation programs for biodiversity, such as those contained in the fifth strategy in this draft, can also be added

to emission management efforts. As stated earlier that reforestation is one of the main solutions for carbon emission management, studies to increase flora diversity must always be done to ensure the existence of forests and trees reducing carbon gas emissions (Vourdoubas, 2019). Related to the world of education, studies on conservation and plant preservation can be established so that later the data will provide actual things on how to overcome carbon gas emissions. Our informant suggests that strategies in terms of preservation and conservation can be carried out by involving government, industry and local communities to review their respective environments which can be used as biodiversity conservation land.

‘Capacity building programs can be carried out by involving tourists and non-government organizations. This campaign has been executed for many years with positive results’ (P3)

Through the development process, the government can implement regulations or policies to protect preservation and conservation areas. The government can provide funding support that might come from the highest carbon gas producer, to the highest extent it is used for plant research that can reduce gas emissions. The process of conservation and preservation can also be done by maintaining typical Balinese environmental concepts such as the concept of mixing *pengatag*¹ ceremony or the philosophy of *tri hita karana*². Thus, indigenous communities can work together to help the government in providing a conservation environment. Thus, indigenous people and villages must be supported by the financial sector by the community (Perdana et al., 2021).

‘Bali has several unique tradition and beliefs that actually aligned with carbon emission

reduction and sustainable tourism development’ (P2)

The growth of the economy will lead to expansion in tourist arrivals. By the time of its increasing number, economic growth will generate positive impacts on gross capital formation. Energy consumption negatively affects tourist arrivals, calling for increased attention towards improving energy efficiency and energy diversity. Furthermore, the article adds that national policies to increase tourist arrivals should be integrated with national energy and environmental policies to facilitate the transition towards a sustainable tourism sector. This type of policy should be driven either by the national government of Indonesia and the local government of Bali. Considering the tourists arrival growth by almost 5% every year, the government could not anticipate it with environmental policies. One of newest policies released by the provincial government, through banning plastic use in the entire island. However, most of the plastic waste found in the island is not only from internal activities, but also comes from outside the island (Darma et al., 2020). This policy is quite effective for plastic reduction, but it would be ruined more effectively if it could be executed at the national level.

Green Growth Roadmap

The informants agreed that the Green Growth Roadmap 2050 should be achieved by all tourism components in Bali. This will also play a role in restoring the reputation and trust of the international community that Bali does not only care about tourist visits, but also sees the need for support for environmental sustainability as this sector progresses. The Green Growth 2050 Global Standard is actually an internationally recognized environmental and hotel industry sustainability standards. Green Growth 2050

¹ Known as pengatag ceremony, held by Balinese to support the balance between technology and environment

² A Balinese concept about living harmony, by balancing between spirituality, humanity, and environmentally friendly

was also formed in order to answer immediate solutions to problems related to climate change, environmental issues, social and cultural issues impacted by the tourism sector. Green Growth 2050 also moves beyond the current one-dimensional, legacy, certification-based solutions of yesterday.

There are seven principles that are implemented in conjunction with the Green Growth 2050 campaign. The campaign includes the UN Global Compact; The UNEP Green Economy Principles; UN Declaration of Human Rights; The Code against the sexual exploitation of children; UNWTO Ethics in Tourism; International Labor Organization Standards; and The Global Sustainable Tourism Criteria for Hotels and Tour Operators. Later, all tourism operators who run the Green Growth 2050 campaign will obtain certification after receiving a comprehensive assessment from each assessor.

Our informants are of the opinion that the management of carbon gas emissions does not only support Bali's efforts towards Green Growth 2050. What is more important than this certification is awareness and education on the importance of protecting the environment, in addition to relying on numbers that must be achieved economically (Chen, 2019). Carbon emission management will also play a role in ensuring wellbeing and wellness for all Balinese people and tourists who come to Bali. Our result shows that the existence of an inventory process and comprehensive efforts to suppress carbon gas emissions will make Bali remain a *prima donna* not only in the short term but also in the long term.

CONCLUSION

Measuring how much emissions produced by Bali tourism and emissions produced by citizens in general, is a major obligation in carrying out an emissions management strategy. One suggestion that can be done is to create a system that is related to a network, which is simple, capable of being measured, and supported by

scientific equipment. This is done so that all citizens and industries can play an active role in managing carbon gas emissions, which can have implications for the effects of greenhouse gasses and climate change. The government can involve the active role of the community by giving slogans, 'you can manage what you measure. Our study extends previous literature by showing concrete action that can be performed by tourism stakeholders in Bali. We also present carbon emission reduction and strategic management to bring a pathway of reaching Green Growth by 2050.

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